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Table of contents

Executive Summary

The national research programme 'Process and System Innovation in Building and Construction' (PSIB) was established in 2003 as a joint initiative of industry, government and research institutes following a Parliamentary Inquiry into large-scale fraud which revealed an urgent need for improvement and reform of the Dutch building and construction sector. PSIB has secured substantial funding from both government and industry.

The government's broad policy aims towards the sector, to be supported through the PSIB programme, were set out in a policy note issued in response to the findings of the Inquiry. This was published on 25th November 2003 at a national congress for the building and construction sector by three Ministers (Trade and Industry, Transport and Civil Works, and Housing, Spatial Planning and the Environment), each of whom stated their aims and objectives for the sector. These centred around a few principal themes: restoring trust in the sector; creating effective market mechanisms and transparent competition; promoting professionalism in procurement processes; instilling high standards throughout the supply chain and 'less but more effective' regulation.

This report presents the findings of the first phase of PSIB project PP1 'Inventory of International Reforms in Building and Construction'. This 'pathfinder' project was instituted to provide guidance for other PSIB projects by investigating other countries' experience of construction reform and bringing to the Netherlands the lessons learned in the implementation of reform initiatives.

This phase of the PP1 project involved two Study Missions: Mission 1 to Finland, Norway, and Denmark and Mission 2 to Singapore, Hong Kong, and Australia. In preparation for the missions, much information was collected through desk-research, using published literature and Websites. Other important sources for reform themes were publications from the UK's reform programme 'Rethinking Construction', and the papers presented at the international CIB symposium 'Revaluing Construction – the International Agenda', held in February 2003 in Manchester, UK. which stemmed from a global review of construction reform programmes. Three Dutch experts on international building and construction research and innovation issues, two senior directors from large construction enterprises, and desk researchers and three professors from two Universities of Technology participated in the project team. In addition, because of their knowledge of construction reform in the UK and in other countries, three academic experts from the UK were consulted and two took part in the study missions.

The countries visited in this phase were selected on criteria which included: having a current or recently concluded reform programme, the prominent participation of government bodies in this programme, and the existence of a substantial public sector market for building and construction. In total, around 75 meetings were held with key individuals and representative bodies. These included bodies responsible for reform programmes, government policy units, private and public clients, construction firms, professional bodies, universities and research organisations. It is envisaged that the contacts made through these meetings will form the basis for a global network of experts relevant to other PSIB projects; giving substance to this network will be one of the tasks in the second phase of the PP1 project.

The issues identified and lessons learned through the missions have been related first to the actual objectives of reform, as set out in the government's policy note, and secondly to the structures and strategies and processes of a reform programme.

Objectives of reform

1. The reform process must create market structures and competitive pressures that will drive reform and improvement after the initial impetus has faded. Political commitment to reform, now evident following the Parliamentary Inquiry, is essential for the initiation of reform, but is not the permanent driver that is required. There are important lessons from Australia and Denmark, where initiatives faded away within four years as a consequence of government changes. The process of reform will take longer than the lifetime of one Parliament, and to be self-sustaining must in the end be based on commercial incentives. This theme runs through all the findings of the study.

2. There is good experience in the use of Codes of Practice or of Ethics as means of restoring trust between the government and the industry and among parties in the supply chain. The development of such Codes is normally undertaken through collaboration between industry and government and this, as well as the ultimate commitment of all parties to the Code, contributes substantially to strengthening trust between them. However, Codes can be developed unilaterally, and imposed through concerted government action as a first step in the reform process. This was the initial act in the strategy for reform adopted in New South Wales.

3. Procurement practices are of crucial significance in reform. Traditionally, procurement has been based on price. The introduction of 'non-price' factors in the award of contracts and of 'value for money' criteria and innovative approaches to tendering can have major impact. Registration of potential suppliers, with past performance being one of the factors taken into account, can be the basis of a

transparent and accountable system of pre-qualification which also stimulates performance improvement.

4. The public sector is a very significant client for construction and it is therefore essential that public sector procurement practices reflect the objectives of reform. Some reform programmes, for example in New South Wales, have been based on the power of public sector procurement. Audit bodies have supported reform (eg in Hong Kong) and should be involved in the development and implementation of new procedures. It is less easy to secure a co-ordinated approach from the private sector but leading private sector clients in Hong Kong and Singapore have adopted the same procurement principles as the public sector and so reinforced the reform process. This should be encouraged in the Netherlands.

5. More integrated forms of procurement have been found to provide better value for clients. Having greater integration of design teams, and extending integration to include construction, has resulted in higher quality construction and more effective processes. The Dutch building and construction sector is fragmented, and while in part this reflects the wide diversity of activities and the variation in the scale of projects; it also leads to poor communications and inefficient processes. The reform programme in the Netherlands should, as a key issue, promote appropriate integration in order to address fragmentation of the process.

6. While procurement systems are very influential, it was widely accepted that successful projects resulted from teamwork and having the right relationships. Such relationships may be promoted by more integrated procurement systems, but there were also examples (eg in Norway and Australia) where teams were specifically assessed for the quality of the co-operation as part of the selection process. A focus on the factors that lead to good human and organisational relationships in construction should be part of the reform programme.

7. The central place of procurement in reform leads naturally to much greater focus on client requirements and on the need to raise the capabilities of clients. Clubs of clients can identify and promote good practice and help to give staff confidence in new procedures. They can also participate in research. It was noted that even where reform has been in progress for some years, there were allegations that government clients were not consistently following the principles that they espoused and this reinforced the need for support for staff in the move from price-based selection. In Denmark, an association of clients has been formed to help clients become more professional.

8. Industry competences and responses can similarly be enhanced through action by industry associations, particularly in promoting more integrated working through

collaboration with other associations. Professional bodies have experienced some difficulties in this, partly owing to statutory restrictions, but also because of the established position of their members in the current processes. They should be encouraged to be fully engaged in reform.

9. Reform and industry improvement can also be promoted through research. Some programmes, as in Finland, have been led through research and others have resulted in new research structures. Close links between research and industry, and possible new organisational arrangements, are required.

10. Examples of 'less but more effective' regulation were found, for example in Norway and Singapore. Regulations in Singapore promoted efficiency of construction, through requiring an analysis of the site labour required. Norway requires, as part of the approval process for a new building or other construction, the calculation of life-cycle costs. This stimulates the adoption of a whole-life perspective in the design process.

Reform structures and management

1. For reform to be successful, the aims must be accepted by all the key stakeholders. No significant interest should be excluded from the development of the strategy or the subsequent reform process. The experience of Australia, where a national programme was developed without due input from the architectural profession and product suppliers, and had difficulty in securing acceptance as a result, is illuminating. Established specialisms may appear threatened by new ways of working, and will need to be reassured. Even then, it will take time for new roles to develop.

2. This inclusiveness should be reflected in the steering arrangements for the programme. While this is normally composed of members appointed for the individual qualities, they should come from a range of backgrounds. In addition, representative bodies should have means of inputting to the programme, and need to be fully committed to it, since they can communicate the aims and measures of reform to their members.

3. A clear and well-founded vision has formed the basis of reforms in other countries. The process of creating this vision and the subsequent commitment is a contribution to restoring trust

4. Regular reports to stakeholders help to maintain commitment and momentum. The development of monitoring and reporting procedures, and the formulation of performance measures for the reform process, should be an integral part of the

programme. In Hong Kong and Singapore, these reports are made publicly available through the Web. In addition, major public clients kept performance records to record improvement in project performance (eg through the Performance Assessment Scoring System in Hong Kong).

5. Most reporting procedures concerned the implementation of reform measures, rather than assessments of impact, but in some countries, there was evidence of improvement from other sources, such as accident statistics. Indicators of industry performance and impact are important for securing continued support for programme and as the basis of national benchmarks.

6. Investment in communications is essential. The vision and the programme should be communicated effectively throughout the demand side as well as down the entire supply chain. Leaders in each part of the industry, and from government, respected for their achievements, can be 'champions' communicating the messages effectively.

7. In the long term, reform principles are embedded in the industry through training and through the education of future entrants and reform processes should therefore involve the educational system. IN Singapore, multi-disciplinary courses for professionals have been developed to stimulate mutual understanding and integrated working.

The countries visited provide a rich store of experience and detailed approaches to reform and the PP1 Project team wish to record their thanks to those who assisted the Missions. While the circumstances that have stimulated the desire for reform in the Netherlands are unfortunate, they are not unique. It is encouraging that other countries, although they would admit that much remains to be done, have achieved considerable change in their building and construction sectors through reform processes. But their experience is also that reform does not happen overnight – it is a long-term process and ultimate success requires constancy of purpose, the commitment of all key stakeholders, and the development of business processes that stimulate and reward high levels of performance.

1. Background

1.1 The need for reform

As in all countries, the building and construction sector is a significant component of the Dutch economy. With an annual turnover of approximately € 60 billion, the sector represents 7% of GNP. It is comprised of 85,000 firms and has around 526,000 employees in the total supply chain. Some Dutch construction firms, notably those concerned with dredging and civil works, are world leaders.

However, investigations into the building and construction sector, including a Parliamentary Inquiry in 2002-2003, have revealed a number of systemic problems, including irregular pricing practices, artificial constraints on markets, and even a degree of fraud following the introduction of new European regulatory arrangements in 1992.

In addition, the industry has been criticised for not achieving the level of improvement in performance and productivity shown by other industrial sectors. While leading projects utilise advanced technologies and design systems, the application of technology in the industry overall has not kept pace with developments in other sectors and it remains a labour-intensive sector with work practices that put workers at high risk of injury or health problems. In a further illustration of in industry's poor performance, the National Foundation for Quality Certification for Building Products (KOMO[1]) showed in 1996 that rectifying defects and operational failures accounted for some 12-15% of national turnover in building and construction.

As a consequence of these criticisms, the construction sector has been the subject of negative comment in the media and Parliament and generally has a poor image.

In the past ten years many recommendations for improvement have been published: by commissions, advisory bodies, representative bodies within the industry, and research institutes. For example, the report "Building on Knowledge"[2] by the Advisory Council for Science and Technology Policy (AWT) made comprehensive recommendations for change; these echoed the earlier recommendations of the Advisory Council for Technology Policy in Building and Construction (ARTB)[3]. However, although the AWT and ARTB reports were discussed with members of

[1] Article in Building Newspaper "Cobouw" (1996)
[2] Adviesraad voor het Wetenschaps- en Technologiebeleid (AWT) (2000), *Bouwen op kennis*, Rapportage Verkenningscommissie Bouw, The Hague, The Netherlands
[3] AdviesRaad Technologiebeleid Bouwnijverheid (1998), *ARTB Bouwvisie 2015*, The Hague, The Netherlands

government and were publicly debated in symposia and national conferences, little happened to implement their recommendations. The Parliamentary Inquiry, though, provided a political impetus for change.

1.2 The findings of Parliamentary Inquiry and other investigations

In 2002, a Parliamentary Inquiry and Audit Commission was established to investigate fraud in building and construction practices, which had been revealed though earlier legal cases. The findings and recommendations of this Commission, issued in 2003[4], were very challenging for the building and construction industry, and damaging for its reputation. They have created an atmosphere of distrust amongst its clients and the public and provided a focus for reform.

The Parliamentary Inquiry identified shortcomings in the industry which contribute to its relatively poor performance:

- Traditional market structures, with their emphasis on short-term relationships, provide little opportunity for optimising the relationship between price and quality or for continuous learning by both clients and the supply side.
- There is inadequate understanding of clients' real requirements and of the needs of society. To meet with these requirements and needs, the whole life-cycle of built assets should be taken into consideration, but the traditional construction process is focused on the internal optimisation of sub-projects, and separates responsibilities for design, construction, operation etc.
- The industry is highly fragmented, with many parties involved in the different phases of a construction project and, as a consequence, potentially subject to conflicting objectives and poor communications.
- Its research base and the bodies that advise on future opportunities and trends are not well linked to practitioners in the industry.

These findings complement those of the earlier enquiries, which identified other factors that affect the performance of the industry:

- Clients have specific requirements and each building or structure occupies a unique site. Moreover, most production processes are site-based. This leads to one-off designs and ever-changing assembly processes. It is therefore difficult to compare the quality and price of different construction outputs, and this inhibits competition based on performance.

[4] Parlementaire Enquete Commissie Bouwfraude (2002), *De bouw uit de schaduw*, SDU, The Hague

- In some markets, competition is reduced. Factors that have led to this situation include mergers, the cost of preparing bids, and the criteria used for pre-qualification of suppliers, which raise the threshold for entry.
- Firms have collaborated in tenders in order to apportion work, and this has again reduced competition.
- The strong "horizontal" structures on the supply side, with separate, well-established bodies representing the interests of architects, design consultants, contractors and product suppliers. These inhibit "vertical" integration and are a barrier to improvement in the performance of the total supply chain.

These factors, it was claimed, led to abuses in the form of collusion on pricing and the allocation of work. They also inhibited competition and innovation, and so reduced progress in quality standards and productivity. There were inadequate incentives for higher performance or better value and firms were not sufficiently orientated towards their clients. The overall effect was to give the industry an increasingly poor image, which put off talented young talented people form seeking employment in the industry.

These previous reports and the Parliamentary Inquiry therefore set the background for reform.

1.3 The Government's response

In response to the findings and recommendations of the Inquiry, on 25th November 2003 three Ministers (Trade and Industry, Traffic and Civil Works, and Housing, Spatial Planning and the Environment) jointly presented a note setting out their aims for the industry to a national congress for the entire building and construction sector.[5] This 'future perspective' note, now the basis of the government's policy for change in the sector, stated the government's aims to be:

- complete and unhampered competition within the building and construction sector;
- restoring normal relationships between the government and the sector and within the sector itself;
- regaining trust among the stakeholders on both the demand and the supply side;
- improving the quality and the price/quality ratio of built assets.

[5] The Ministries of Trade and Industry, of Transport and Civil works and of Housing, Spatial planning and the Environment (2003), Perspectief voor de Bouw, The Hague

Through this note, the government note set out its objectives in promoting change, improvement, and a joint approach to reform in the sector. The note consists of three parts: a review of the sector's recent performance', a future perspective and an Action Plan. The Action Plan is to be implemented under the leadership of a top level Steering Council composed of individuals recognised for their achievements. The plan aims to stimulate:

- Restoring trust between the government and the sector
- Developing effective markets and a properly functioning sector;
- Enhancing professionalism in procurement
- Instilling high standards in the supply chain;
- Less, but more effective, regulation.

1.4 The PSIB programme

The PSIB programme stemmed from a Commission into construction established in September 2001 and chaired by a senior executive from a leading client for construction, the Dutch Rail Infrastructure Authority. The members of this Commission represented a cross-section of both the demand and supply sides of the Dutch building and construction sector, together with research institutes and universities. In 2003, the Commission launched its programme for change under the title of 'Process Innovation in Building and Construction' (PSIB). The main objective of this programme, inspired by the UK programme 'Rethinking Construction', was 'to start a comprehensive and strategic reform of knowledge development and knowledge application in the building and construction process'[6]. The initiative was supported by senior representatives of government, large building companies, prominent consultancy firms, technical universities and research institutes.

Following the statement on 25th November 2003, the Dutch government committed €15 million of basic funding to the programme over a period of four years from 2003. This will be matched by industry contributions. PSIB will thus be the supporting programme for realising the objectives set out by the government in that statement.

The PSIB programme focuses on reform and renewal of the demand-transaction-supply process in the building and construction sector. Appendix 1 summarises its aims, objectives and structure. It is structured into eight clusters of R&D projects. The cluster 'Professional Procurement' is seen as a key element in the programme leading because it explicitly addresses market dynamics. Within this cluster, the PP1 project – of which this is the first report - is the first to be initiated.

[6] Proces en Systeem Innovaties in de Bouw (PSIB) (2003), *Process and system innovation in the Dutch construction industry*, project plan for a research and development programme, Business Plan PSIB, The Netherlands

Picture 1: PSIB-PP1, Dutch projectteam, from left to right: Wim Bakens, Rob Geraedts, Theo Mulder, Dik Spekkink, George Ang and Jan van Oorschot

2. Overview of the PP1 project

2.1 Objectives of PP1

Project PP1 'Inventory of International Reforms in Building and Construction' is a pathfinder project within the Professional Procurement cluster of PSIB. The aim of the project was to seek out other countries' experience and identify the lessons for the Netherlands before developing the final PSIB programme. In addition, the project would set up an international network of experts within the relevant fields of reform. The project sought to investigate to which extent the initiatives taken in other countries had led to improvements in their building and construction industries and generally to learn from their experiences. The results were intended to guide and to support decision-making in the implementation of reform in the Dutch context.

The objectives of PP1 were therefore[7]:

- to identify in reform programmes the main issues, and success factors relevant to the Dutch construction industry, in particular in relation to the policy background and market mechanisms;
- to identify and analyse the international position on construction reform, acquiring and making available information on reform initiatives;
- to identify and classify the drivers for reform and assess their relevance to the Netherlands;
- to identify innovative methods for improving the interface between demand and supply, i.e. the core theme of the PSIB business plan;
- to identify experience and information that could be used in other PSIB projects;
- to make formulating recommendations concerning the objectives and processes of reform in the Dutch building and construction sector.

2.2 Approach

This report is the result of the first of the five phases that are foreseen for PP1. This first phase started with the creation of an inventory covering the 'landscape' of international reforms. This was carried out by studying reports and publications about international reform programmes comparable to PSIB and was guided by input from three experts from the UK: Professors Roger Courtney (Construction Innovations and UMIST, Manchester), Peter Barrett (Salford University) and Graham Winch (UMIST, Manchester). They were involved in the PP1 project from the start

[7] Ang G. (2003), *Projectplan Psib PP1*, 5th November 2003, The Hague, The Netherlands

because of their knowledge of the UK reform programme 'Rethinking Construction' and their direct involvement in the current international CIB[8] programme 'Revaluing Construction'. The strategy report of the latter programme[9] contains detained information on reform initiatives in construction in 9 countries, with reference to others.

The results of this desk research formed the input for an international workshop in December 2003, attended by national and international experts. The aim of the workshop was to create a suitable framework for further analysis and then to select reform programmes in different countries that could be of specific interest to the Dutch situation. Reform programmes in six countries – Finland, Norway, Denmark, Singapore, Hong Kong and Australia - were selected for further investigation and analysis abroad through Working Missions. The rationale for the selection of these countries can be found in Appendix 3. Visits were seen as a key part of in the PP1 programme because of the richness of information that can be obtained from face-to face contacts and direct experience of the local context. This is particularly important when the aim is to explore such 'soft' issues as the drivers for change, the relationships between parties engaged in a reform programme and the cultural context in which the local building and construction industry operates.

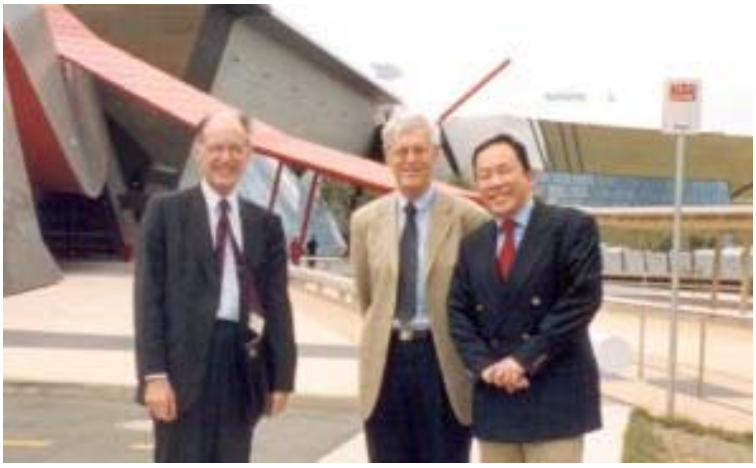
Two Working Missions took place:

- Mission 1 to Finland, Norway and Denmark: Prof. Peter Barrett (UK), ir. Dik Spekkink (NL) and ir. Theo Mulder;

Picture 2: Prof. Peter Barrett (UK), ir. Dik Spekkink (NL) and ir. Theo Mulder;

[8] International Council for Research and Innovation in Building and Construction (CIB); www.cibworld.nl

- Mission 2 to Singapore, Hong Kong and Australia: Prof. Roger Courtney (UK), ir. George Ang (NL), and ir. Jan van Oorschot (NL).



Picture 3: Prof. Roger Courtney (UK), ir. George Ang (NL), and ir. Jan van Oorschot (NL).

Prior to the visits, researchers from the Technical Universities of Twente and Delft prepared working documents for each country[10] which contained information about the reform programmes assembled from literature and websites. The documents served as intensive briefing for the Mission members, which enabled them to explore the reform initiatives 'in depth' during their short visits to the different countries.

Both Working Missions made their visits abroad in February 2004. They had intensive meetings with representatives of reform steering groups, governmental bodies, construction firms and associations, associations of architects and other construction professionals, research institutes, etc. The organisations visited are listed in Appendix 3.

The Missions particularly focussed on the political and economic drivers for reform, the mechanisms employed and the lessons learned from the process and system innovations introduced into in the local building and construction sectors. Mission members also sought an understanding of:

- local interpretations of the background factors that led to the creation of the programme;
- the relative influence of parties involved in shaping the reform programmes;
- perceptions of progress and barriers from different perspectives;
- the culture of the local building and construction sector;
- the principal themes in the programme, and reactions to them.

[9] CIB (February 2003) *Revaluing Construction, The international Agenda*, Symposium Manchester, UK
[10] The desk research results per country are published in separate reports of the PP1 project

The results of the Missions were presented and discussed in a second international workshop in March 2004, in order to produce the basis for recommendations on the possible application of significant findings in the Dutch situation. This second workshop, attended mainly by the same experts as the first workshop, provided the main outlines for this report on the first phase of PP1.

3. Findings – Objectives and aims of reform programmes

3.1 Introduction

This chapter discusses findings related to the aims and content of reform programmes in the different countries visited, i.e. the drivers for change, the objectives for reform and the themes addressed in reform initiatives. It is structured around the principal reform objectives identified by the Dutch government (Section 1.3):

- Restoring trust between government and industry
- Developing effective markets and a properly functioning sector
- Enhancing professionalism in procurement
- Instilling high standards in the supply chain
- Less, but more effective, regulation

The findings are illustrated by examples from the countries studied; in many instances, several countries have followed a similar route and examples could be drawn from any one of a number of programmes. But some countries have distinctive lessons for the Netherlands.

The overall reform objectives set out for the Netherlands have parallels in other countries. Two examples are Singapore and Denmark.

Singapore: objectives of 'Construction 21'

In the Singapore 'Construction 21' (C21) reform programme six 'strategic thrusts' were defined:

- *enhancing the professionalism of the industry;*
- *raising the skills level;*
- *improving industry practices and techniques;*
- *adopting an integrated approach to construction;*
- *developing an external wing (ie an export capability*
- *striving for a collective championing effort for the construction industry.*

Denmark: drivers for change

Denmark has for more than 50 years developed an industrialised approach to building. Against that background, the objectives of recent reform programmes have been:

- *further promotion of industrialisation, with development of new types of housing end improvement of existing housing;*
- *increased productivity;*
- *enhanced international competitiveness;*
- *reduction in disputes in the construction process, with the introduction of new methods of co-operation such as partnering;*
- *reduction of defects at the hand-over and in operation;*
- *increased openness in costs and pricing*

3.2 Restoring trust between government and industry

The problems in the Dutch building industry (Section 1.1) have left a legacy of distrust. The government statement has made the restoration of trust between (particularly governmental) clients and the industry, as well as between partners in the supply chain, a matter of priority. Other countries have had the same need and have undertaken reform initiatives that might serve as examples for the Netherlands.

Common rules of conduct

In several countries, rules of conduct have been developed and incorporated in Codes of Conduct to which all parties are committed. Breaches of the Code may result in sanctions, such as the loss of future opportunities to tender. Such Codes may be agreed jointly by government and industry, or they may be imposed through market power (ie through the action of significant clients, such as government bodies). They may also be incorporated in regulations and procurement protocols.

Australia: Code of Practices in procurement and tendering

Following an enquiry into illicit practices in the industry, the government of New South Wales in Australia established in 1992 a Steering Committee of government client bodies and drew up a Code of Practice on procurement, without consultation with the industry. This was enforced through government procurement processes. The Code set out the requirements that government clients had of the industry, but also clarified the conduct that the industry should expect from its clients when dealing with the government. In the view of those responsible for the Code, it was an essential first step in the process of restoring trust but, being a unilateral initiative, it could not be a permanent basis for relationships between the government and the industry. It was therefore followed by the collaborative development of a successor Code agreed with the industry.

The effect of the Code, and the de-registration of a contractors' body, in the aftermath of collusive tendering, was to replace a fragmented client side and co-ordinated supply side with a co-ordinated client side and fragmented supply side. It changed the balance of power and enabled the government to impose reform. However, the Code was not incorporated into contractual conditions, since a breach would then potentially disrupt the execution of the contract. Instead, compliance with the Code was built into pre-qualification criteria and so breaches would result in lost opportunities for future business.

Other bodies in Australia have developed Codes, each with the aim offsetting a constructive framework for contractual relationships between the government and the industry. The Australian Procurement and Construction Council, which co-ordinates procurement policy among Australian government bodies at the Commonwealth and State level, has produced various 'model' codes while the Australian Masters Builders Association (comparable with the Dutch NVOB/AVBB) has also developed a code for its members and reviews compliance quarterly, with a major review including government representation annually. These are all significant contributions to improving and maintaining trust between the sector and government.

Some countries have preferred to develop, through a collaborative approach involving all major stakeholders, a common 'Code of Ethics', with principles set out at a more abstract level. The Norwegian model appears to be comprehensive and balanced.

Norway: common Code of Ethics

In 2003, a common Code of Ethics was agreed in Norway among the main associations in the building and construction industry and then adopted by each association, therefore covering contractors, architects, consulting engineers and product suppliers. This joint code is seen to have stimulated trust and co-operation among the parties. The code consists of a one-page summary with ten headings, which are elaborated in subsequent pages. The headings relate to:

- *compliance with the law*
- *concern for the environment*
- *reasonable profits for all involved*
- *satisfying the client's requirements*

- *justice and respect for employees and staff*
- *fair dealings with competitors*
- *co-operation and mutual respect*
- *use of contracts that balance mutual interests of the parties*
- *disclosure of conflicting interests*
- *avoidance of discrimination.*

3.3 Effective markets and a properly functioning sector

The Dutch building and construction sector is suffering from faulty market mechanisms, with insufficient emphasis on performance as a basis of competitive success. The Parliamentary Inquiry set out the issues (Section 1.3). Similar problems have occurred in other countries, and international experience in addressing them and improving market mechanisms is therefore relevant to the Netherlands.

Norway: 'Samspill'

In Norway, different co-operative ("Samspill") approaches to procurement have been introduced on an experimental basis, and monitored, to overcome the emphasis on lowest price and to create more integrated" supply-side structures. These have included 'full design team tendering', where the price is only one of a number of criteria (usually accounting for about 20%) used in the selection among competing design consortia. Other criteria may include the past performance of the consortium or of its members and the ability to work as an integrated design team. The 'full design team' might include a contractor, but this is not a requirement. In most Samspill projects, traditional contracts have been used, so that responsibilities are defined in case of conflicts. The Samspill approach has been found to produce better designs in a shorter time, with closer integration of the design parties and less potential for inconsistent requirements.

The Norwegian Government Building Agency, Statsbygg, has been involved in some of the experiments and expects to develop the use of Samspill for 'traditional buildings' in the future, but not to use it for complex high-risk projects until more experience has been gained. This view led to some discussion, since the *approach could be ideal for solving complex problems.*

Picture 4: PSIB Peter Barrett meets Statsbygg Arne Petter Breirem & Torgeir Thorsnes

The view was expressed that the approach was widely used in the private sector, where it is seen as 'common sense'. Moreover, private clients retained the same teams for future contracts when they were pleased with their work, thus providing the opportunity for mutual learning and for greater understanding of the client's business needs.

New procurement systems in Australia and Hong Kong

The National Museum of Australia was constructed using 'alliancing' principles in which risks were shared between the client and the supply side and 'trust and no-blame' culture was promoted. Major infrastructure projects in Hong Kong (eg the recent West Rail extension to the Kowloon and Canton Rail system) have similarly been constructed under partnering arrangements, with very close liaison throughout the project between the Rail Corporation and the contractors. Other innovations aimed at improving relationships have included the successful use of 'Dispute Mediation Advisors' by the Housing Department in Hong Kong.

Picture 5: MTR Russell Black meeting George Ang, Jan van Oorschot and Roger Courtney

For the client, the effect of these procurement systems is to introduce a wider range of performance factors in the selection of contractors or clients and to offer the potential for long-term relationships in which the supply side can develop greater understanding of the client's requirements. But in order to continue with the relationship, the supply side must satisfy a range of cost and performance criteria. For the supply side, therefore, the effect is to remove the focus on the lowest-cost delivery of a single project, and to cause attention to be paid to overall performance and to creating effective and sustainable relationships within the supply team and with the client. Overall, these developments change the nature of the construction market in the ways desired by the Netherlands government.

Procurement - the key to reform

It is no accident that the examples cited above concern the introduction of new procurement systems, nor (see below) that government clients were prominent in these initiatives. In all countries visited, it was clear that procurement practices are of crucial significance in reform of the building and construction sector and that well thought-out, rigorously applied procurement practices hold the key to raising standards and 'professionalising' both clients and the industry. This is only to be expected, since procurement processes define the requirements on the industry; they are the meeting point of demand and supply, through which the supply side responds dynamically to the demands of the client side. Therefore procurement processes need to encourage behaviour that is in line with aims for the industry, placing emphasis on quality, performance, value and the development of learning opportunities. To do so, however, implies a move away from traditional selection methods based on 'lowest price'. The experience of other countries can provide a guide to the ways in which new procurement mechanisms may be introduced while maintaining proper safeguards against malpractice. Registration systems, together with transparent and accountable pre-qualification procedures, play a major role in these new procurement processes.

> ***Hong Kong: Performance assessment system***
>
> *In Hong Kong, procurement reform has been a key theme in the reform programme, with government bodies in particular (notably the Public Works Bureau and the Housing Department) undertaking a thorough revision of their procedures. They have placed emphasis on monitoring performance across a range of indicators, with the results regularly fed back to contractors and used in future selection processes. The 'Performance Assessment Scoring System' (PASS) of the Housing Department is a formal monitoring and reporting system.*

Registration of contractors

In addition to monitoring performance on pubic sector contracts, reform programmes in Hong Kong and Singapore have introduced compulsory registration of contractors as a means of setting minimum standards of competence and behaviour. Such registration acts as a general pre-qualification process, and may be supplemented by additional processes tailored to the client and project. Registration offers a tool for raising, over time, the entry requirements to the industry.

The influence of public clients

In all the countries visited, public sector clients (including publicly owned infrastructure companies) played a central role in reform through their procurement practices. Examples of leading practice are also to be found in the private sector (for example Swire Properties in Hong Kong) but government clients were the main influences on construction markets. Several States in Australia, notably New South Wales and Queensland, have used procurement as the principal means of achieving reform, with clear principles governing government procurement, selection based on a range of performance criteria, and close monitoring of performance in order that the performance record may be one of those criteria. The Code of Practice developed in New South Wales was referred to above.

Procurement reform in Queensland

The Queensland government initiated reform through procurement in 1994, and estimated that this increased the value obtained from government expenditures on construction by 17.5% over 5 years. The view was expressed that this figure could potentially be much higher, but there was still a gap between policy set at the top level and practice at the working level. A similar comment was made about the reform programme in New South Wale – that practice did not always follow the principles set out in the government's procurement codes. Changing long-established practices at the mid-levels of governmental bodies has everywhere required consistent effort over a considerable time

Promotion of Life-Cycle Costing in Norway

Public procurement has been employed to promote a better balance between initial and operating costs in buildings in Norway. A Life-Cycle Costing (LCC) assessment, carried out to a Norwegian LCC standard, is mandatory for all public buildings. This policy has been is initiated by Statsbygg, the Norwegian organisation for Public Construction and Property (comparable to the Dutch Government

Building Agency). The rentals paid by public organisations using Statsbygg buildings and facilities are based on LCC. The assessments carried out in the procurement process provide benchmarks for the design against set of Key Performance Indicators. It was stated that this policy had enhanced the industry's awareness of total cost of ownership and its relationship to client needs.

It is clearly essential for public bodies, acting as clients, to adopt principles consistent with government policy towards the industry, and public clients have the market power necessary to bring about change across the many supply-side interests, each of which has to change in order that the whole procurement system can change. But a change from traditional practices may also suit governmental needs better than those of many private clients, because of the government's longer-term commitment to the buildings and facilities once constructed. In Hong Kong, it was observed that while public bodies and leading private sector clients had embraced reform, many private clients had much shorter-term business horizons, and saw little need to take factors other than initiative price into account in their procurement processes. The consequence was a developing 'two-tier' industry, with a 'premier league' of firms carrying out the governmental and major private projects, and a lower tier of firms whose performance had not yet improved. The difference was evident in, for example, accident statistics.

3.4 Enhancing professionalism in clients

In the studies carried out in the Netherlands, a consistent theme has been that the industry should have a greater orientation towards the needs of clients, and at that at present there is inadequate understanding of clients' real requirements and how these relate to the needs of society, as expressed in regulations, political perspectives, interest groups etc. To change from the present situation, actions are needed on both demand and supply sides.

On the demand side, clients need to develop a greater ability to express the requirements and aspirations of end users and society in a consistent and comprehensive way. Furthermore, they need to bring these requirements to the market in a way that challenges the supply side to produce solutions that maximise value for the clients. Finally, clients need to be able to assess the added value of different solutions. These changes may be summed up as the development of professionalism in clients.

These perceptions are shared in the countries visited. All countries saw client attitudes and behaviours as key factors in the way that the industry operated. Some

reform initiatives had been implemented principally through public procurement, ie through changing the policies and practices of government clients. Collectively, such bodies were responsible for 50% and sometimes more of the market for new buildings and infrastructure; their influence was very great. However, the private sector client community was fragmented, with many organisations being only occasional customers for construction, and as noted above in relation to Hong Kong, having a wide range of business drivers and needs. It is therefore difficult to develop a coherent approach to procurement amongst private sector clients that will reinforce the pressure for reform.

Client forums

If clients in both public and private sectors can jointly develop procurement policies and practices, these can become a powerful driving force for improvements in the sector. This has been recognised in Denmark.

Client forum in Denmark

Recent reform initiatives in Denmark are mainly based on the report "The Danish Construction Sector in the Future – from Tradition to Innovation" prepared by a Task Force appointed by Government and published in 2000. It is generally accepted in Denmark, as a consequence of this report, that the impetus for change in the building industry should come from clients. One of the 28 recommendations of the report was to establish a client's association and this led to the creation on in 2001 of the Danish Association of Construction Clients (DACC). The association started as a collaboration of government clients, but membership has grown to 45, with private sector clients represented. There is a strict rule that members must be user organisations and not have interests in contracting or property development.

Picture 6: DACC Henrik Bang and DBUR Kim Haugbølle

DACC organises activities to enhance the capabilities of its members, and to increase their influence, such as seminars and working groups on procurement topics, educational sessions to

update employees and the preparation of responses to legislative proposals. It is now a recognised voice for clients in discussions with government and the construction industry.

3.5 Enhancing professionalism in the industry

The creation of a client-orientated industry requires clients to find new ways of expressing their needs and aspirations. Equally, though, it requires the supply-side industry to find new ways of meeting them. In particular, the present fragmentation of the typical construction process, with many parties each taking responsibilities for a separate aspect of the project, is seen as a major barrier to higher performance.

Supply chain integration

The integration of design and construction, and extending this to maintenance, is widely recognised as a route to higher quality construction and more effective processes. The current fragmented process, with many parties involved in the different phases of a construction project, leads to poor communications and inefficient processes. The focus on the ultimate performance of the building or facility may be lost, and responsibilities may cease well before it comes into operation. This separation of interests is reflected in the strong 'horizontal' bodies that represent the industry; as noted in Section 1.1, architects, consulting engineers, contractors and product suppliers all have well established representative organisations.

Many of the procurement initiatives referred to above have sought to promote a more integrated approach to design and construction, with the aim of enhancing the value obtained for the client. But some countries have taken steps also to secure a more integrated approach to reform from the representative bodies, and through this to promote 'vertical' integration in the supply chain.

Norway: The Co-operative Board for Building and Civil Works (BAE)

In 1990 the Minister of Industry came to the view that discussions with the separate industry associations (architects, consulting engineers, contractors and so on) were counter-productive and that therefore a single point of contact with the building and construction industry was required. The Co-operative Board for Building and Civil Works (BAE), which had been in existence for many years, formed this contact point. The Directors of seven industry associations comprise the BAE, which has annual meetings with government preceded by much preparatory work. The BAE now acts as a focus

not only for the Ministry of Industry but also for other government interests in their dealings with the industry.

Integration in the supply chain and a more holistic view of the client's needs, have been promoted through national research programmes.

Finland: towards 'total service delivery'

The general thrust of the programme 'SARA – Value Networks in Construction', promoted by TEKES, the National Technology Agency for Finland, is to support a move in the building and construction sector from 'product delivery' to 'system delivery' and on to 'total service delivery'. The aim of the Sara programme is value-networked construction, a new operating paradigm for the construction industry. It aims to maximize the added value offered to the user and harnesses the skills of all parties involved to provide the end user and other network members with added value. The members within the network are assessed on the basis of the added value produced. In the construction industry, there will be a shift from supply chain management towards value-network management. The operating paradigm is based on extensive use of information technology and the process is transparent and characterized by long-term cooperation, mutual confidence and substantial research and development input. The partnership should bring benefits to all sides(win-win-win), while the parties take a flexible approach so that they can assume new roles in accordance with changing requirements. (www.tekes.fi). Some leading Finnish construction companies already offer 'total service' in some projects. This includes design, construction and maintenance and can extend to operational services such as catering, ICT infrastructure and security services for a period of, for example, fifteen years. (Projects funded through the Private Finance Initiative in the UK have been models for these kinds of integrated services.) Because of this expansion in the scope of its services, one of the major construction firms is no longer listed as a construction firm on the Stock Market, but as a service provider.

Developing teams

It is generally recognised that successful projects result from teams that work effectively together. However, this has not been reflected in procurement processes, nor in the way that the industry has operated. Firms have been selected on the basis of their individual capabilities, without reference to their ability to enter into

successful relationships with the other parties to the project. But in some countries such considerations have been introduced into pre-qualification criteria

Norway: the human factor

The design of the new Trondheim Hospital was prepared in a 'Samspill' experiment. 'Full design team' tendering was used, in order to select the complete design consortium. As part of the assessment process, a psychologist was employed to perform tests which would provide guidance on the potential performance of each consortium.

Australia: team selection for the National Museum

The best overall team may not be composed of the firms who individually are outstanding. Selection of the best overall team for that particular project was the aim of the selection method used in the National Museum of Australia. Through in-depth interviews and workshops with the different possible partners for the alliance, the different teams were tested for their attitude towards the alliance concept and their teamwork abilities. The National Museum was constructed under 'alliancing' or partnering arrangements. After the selection of the 'best team for the project', the design and target price were developed by the team and the client in collaboration. Once the client and the team reached consensus on the target price, the final alliance agreements could be concluded and the project commenced.

Information standards

Construction projects generate huge volumes of information, which need to be communicated efficiently and accurately to many parties. Traditional processes have the potential for introducing errors and misunderstandings. The promotion of integrated responsibilities and processes needs to be supported by the development of similarly integrated information. Even if all parties are using IT-based systems, and the information is digital, there can be incompatibilities in hardware and software which prevent communication. If the same information has to be generated or translated several times during a project, the result will be inefficiency, high risk of errors and the potential for defects or failures in the eventual building.

A key step towards of greater professionalism in the industry will therefore be the development of open, uniform and hardware-independent information standards that can be used by all participants in a project, and the introduction of systems that employ them. Such standards are under development through both national and international programmes, with Dutch participation. Nevertheless, the use of IT to

promote efficiency and integration in the whole construction process appeared in some countries to be further advanced than in the Netherlands.

Norway: information standards as the DNA for building process reform

In Norway, international information standards, such as the Industrial Foundation Classes (IFCs) developed and promoted by the 'International Alliance for Interoperability' (IAI,) are considered to be the DNA for building process innovations. The use of open information standards in the Norwegian building and construction sector is strongly promoted by the Norwegian off-shore industry, which is a key client for the construction sector. In recent years a lot of R&D effort has been put into the development and implementation of IFC based open information standards in the Norwegian Building industry, especially by the Byggforsk institute and private firms like EPM Technology. As a result the Norwegian government is now considering to make the use of these open information standards mandatory for the submission of digital building applications.On December 23, 2003 Public Building Services' Commissioner F. Joseph Moravec signed a policy document entitled" Cost Effective Delivery of Capital Construction Program". It has a section "Prepare Design Deliverables and As-Builds using Standardized IFC-based Building Information Models" that describes a requirement to use IFC by 2006. It is expected that the Norwegian Government (Bygningsteknisk Etat and Statsbygg) will mandate IFC in 2005.(Dutch initiatives to develop of 'object libraries' like the STABU Lexicon and the CROW object library for infrastructure, are based on IFCs.)

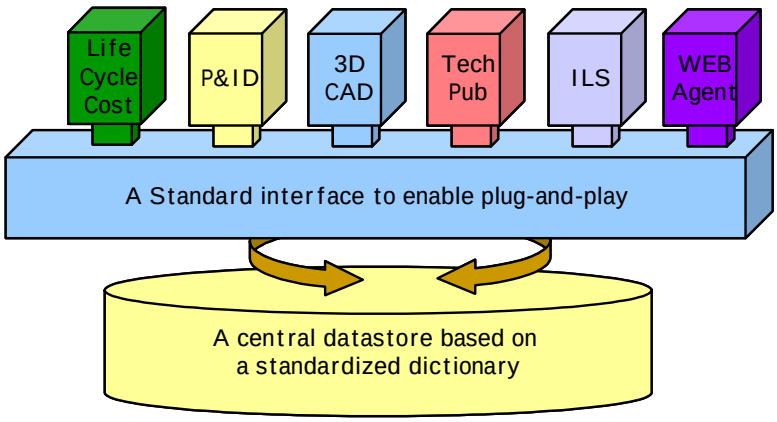


Diagram: open information standards enable system independent exchange of data between different software applications, without loss of information (source: EPM Technology, Norway)

Finland: Building Information Management

From 1997 to 2002, TEKES promoted the VERA programme on 'Information Networking in the Construction Process' . The goals of VERA were 'Management of the information flow during the entire life cycle of the building' and 'Improvement of the information management among the project parties'. Information should be part of the product, and the as-built information should be handed over at the end of the construction project to form the basis for the use and maintenance of the building. To manage the information flow between project partners and to be able to develop integrated information systems it is necessary to agree on the content, structure, format and presentation of the data. The various parties in the AEC/FM industry have applied and developed information technology focusing only on their own needs. Internal systems are therefore for the most part in place, but information sharing between the parties and joint utilisation of this information are a bottleneck. Networking is contingent upon broad utilisation of information technology in the whole value chain. An evaluation of the programme has been carried out by Dr. Thomas Froese (Tekes, 2003). Amongst other things he concluded that the programme set out to do no less than cause a major technological and procedural shift in one of the nation's largest industries. This is a vast and exceedingly difficult undertaking. The shift has not yet taken place, but the momentum has definitely been created and there is a strong feeling that the critical mass has been reached to make this shift inevitable. This is one of the reasons why 'Building Information Management' is also a major theme in the current SARA programme, whose aims are similar to parts of the PSIB

programme. SARA picks up where VERA stopped. 60% of the budget of SARA is spent on subjects related to IT.

Singapore: building applications

In Singapore, the CORENET programme has developed an electronic system for submitting applications for building permits. Use of his system is now mandatory, thus stimulating take-up of IT in the industry. Moreover, the applications are checked electronically for compliance with codes and regulations. As a result, building permits can be issued within one week. The system is based on IFC data standards.

3.6 The role of research

Several of the reform initiatives have identified the lack of suitable research structures as a barrier to change. In Singapore, C21 recommended that a new research fund be established, but after an initial allocation of funds this has not been continued. In Hong Kong, a new Construction Industry Institute has been founded through a collaboration between industry and academic interests. Generally, the aim in such initiatives has been to create stronger links between industry and centres of research expertise and this is illustrated by the creation of the Co-operative Research Centre for Construction Innovation in Australia.

Australia: CRC for Construction Innovation

Co-operative Research Centres are a particular kind of joint industry-research venture developed in Australia. The Centre has around 12 leading firms and public bodies as partners, representing all stages of the construction process. Other partners include universities and the Commonwealth Scientific and Industrial Research Organisation (CSIRO). Each partner commits funding an manpower to the Centre for a period of seven years and the Commonwealth Government contributes further funding. The Centre's programmes are developed and steered by industry and research interests jointly and the aim is that the Centre will be fully self-supporting through income from its outputs by the end of its first seven years.

Picture 7: After meeting CRC for Construction Innovation, from left to right: CRC Carol Green, George Ang, CRC Tony Sidwell, Jan van Oorschot, Roger Courtney, CEO CRC Keith Hampson

Research provides essential support from reform programmes through deepening understanding of barriers to change and the development of tools to assist new ways of working. The concept of industry-research collaboration is well established in other countries, as demonstrated in Finland by the programmes of TEKES and any new research initiative needs to be developed in the context of existing practices and institution in the Netherlands. However, the countries visited provide alternative models for research collaboration, which can be drawn upon.

3.7 Less and more effective regulation

Regulations or legislation can initiate or stimulate different behaviour. The example of CORENET demonstrates the use of regulations to promote take-up of IT systems in the construction sector. The compulsory registration of contractors is another example of the use of legislation to raise standards and change behaviour in the industry. Regulations can raise minimum technical performance standards, but can also inhibit innovation if written in prescriptive terms. Performance-based regulations can challenge the building industry to come up with innovative solutions. The Australian Building Code was put on a performance basis in initiatives taken through the 1990s.

Singapore has used regulation to promote greater prefabrication in the industry

Singapore: Buildable Design Appraisal System (BDAS)

The Singapore Building and Construction Authority (BCA) have over the last decade developed a system for assessing the 'buildability' of a proposed design. 'Buildability' refers to the labour requirement on site and will reflect the complexity of the assembly process. Since 2001, this assessment has been incorporated in the approval system for building permits, so that designs must now pass a minimum BDAS 'buildability' score. This has encouraged designers and contractors to look for ways of reducing site labour requirements, in particular by moving to the use of prefabricated components.

Picture 8: BCA-CDL-PSIB Singapore, from left to right: BCA Ang Lian Aik & Tan Tian Chong, CDL Kelly Tang & Christina Lim, BCA Neo Choon Keong & Ang Kian Seng, PSIB Roger Courtney & George Ang

4. Findings – The organisation and management of reform programmes

4.1 Preface

This chapter discusses the findings related to the structure and management of reform programmes and the communication of reform objectives and measures to the industry. It considers these under the following headings:

- Leadership and management structures
- Measures for stimulating reform
- Monitoring and evaluation
- Research structures
- Communications

4.2 Leadership and management structures

The experience of the countries visited is that reform requires:

- top level industry and political commitment, sustained over a period of years;
- participation of all significant interests in the formulation and implementation of the reform programme
- active promotion by 'champions', particularly from industry, but also within government when political decisions and government practices are involved;
- the development of commercial drivers for reform, that will maintain momentum after the original impetus has diminished and when political priorities may have changed.

Top-level Steering Group

A high-level Steering Group, with representatives from both government and industry, has in many instances (eg Hong Kong, and CIDA in Australia) provided a national focus for reform. The Steering Group is responsible for developing and articulating the vision that will guide the reform process, for setting priorities and directions within the programme and for monitoring progress. It will identify barriers and take steps to overcome these. Most importantly, it will communicate the reform programme and its objectives to all the key interests in the client community and down the supply chain.

In some cases (eg Hong Kong), implementation of the reform programme has been steered by the same group as identified the objectives and measures of reform. But not all reform programmes have had such a group; in New South Wales, the

programme was led by the Construction Policy Co-ordinating Committee drawn entirely from government bodies; in Singapore, the Building and Construction Authority have been responsible for most of the implementation, meeting with industry representative bodies in the Construction Joint Consultative Committee. In the collaborative culture of the Netherlands, however, such a steering group appears an important means of securing the support and commitment of industry, and of giving the reform programme influence in government and industry,

Members of steering groups have in general been appointed for their individual qualities and reputations rather than as representatives of particular interests. At the same time, care has been taken to ensure that the committee contains people form a wide range of backgrounds, both on the demand and supply sides of construction. The pattern of appointing individuals is not universal; some enquiries into construction (eg the C21 study in Singapore) have been conducted by committees which had direct representation of architects', contractors' etc interests, and in Australia, the National Building and Construction Committee (NatBACC) was composed only of leaders of representative bodies. However, it was noted in discussions that representative bodies sometimes have difficulty in promoting reform, owing to the established position of their members in the current arrangements.

Singapore: Institute of Architects

The Singapore Institute of Architects were represented on the Construction 21 committee. However, it was clear in discussion that some aspects of the reform process, such as the greater use of design-build contracts, were not favoured by the Institute.

Whatever the composition of the Steering Group, it appears essential that all significant interests be actively involved in setting priorities for the reform process and developing reform measures. This may involve setting up a 'Reference Group' composed of the principal associations, who have an important role to play in the communication of reform to the smaller firms in the industry. Otherwise, key interests may be alienated, and will not be committed to the objectives of reform. Representative bodies have a role to play in shaping and communicating the reform programme, even if they are not directly represented on the Steering Group, and programmes that have not brought them into the reform process have been less effective as a result.

Australia: CIDA and NatBACC

The Construction Industry Development Agency in Australia was established without any representation from architects or product suppliers. As a consequence, these groups considered that CIDA's

initiatives had been developed without reference to their interests and so were not committed to putting the reforms into practice. The omission was later rectified, but the delay in recognising the position of these significant groups within the construction process reduced the effectiveness of CIDA.

By contrast, the Building for Growth programme was developed by senior representatives of all the main industry associations, meeting as NatBACC. However, the subsequent implementation of the programme was devolved to the government bodies and industry groups directly responsible for putting into practice its recommendations, without a clear central focus. The absence of this focus was thought be some to have reduced the effectiveness of Building for Growth

Finland: TEKES Technology Programmes and Visio 2010

The technology programmes promoted by TEKES, the Finnish technology agency, have had the effect of stimulating and supporting new ways and working in construction although they are not 'reform' programmes as implemented in Singapore, Hong Kong etc. TEKES consults widely before establishing a programme and then establishes a high-level Steering Board which creates and communicates the programme vision and oversees the development and implementation of the research projects within the programme.

Picture 9: PSIB Peter Barrett, VTT Pekka Huovila, SKOL Martti Kiiskinen and PSIB Theo Mulder

A Vision for the Finnish Real Estate and Construction 'cluster' of industries, Visio 2010, was produced by a high-level group with representation from both government and industry and subsequently developed by the Confederation of Finnish

Construction Industries to produce the Technology Strategy for the Finnish Construction Industries, published in 2002.

Hong Kong: Provisional Construction Industry Coordination Board

The reform process in Hong Kong was instituted by creating a commission to study the industry, with members drawn from a range of backgrounds but appointed as individuals. This Construction industry Review Committee then became responsible, as the Provisional Construction Industry Co-ordinating Board (PCICB), for overseeing implementation of its recommendations. There have been subsequent changes in membership.

Picture 10: Hong Kong PCICB Chair Martin Hadaway (Gammon Skanska) and Ada Fung (Hong Kong Housing Authority)

Role of audit bodies

Amongst the interests that need to be closely involved the reform process will be the bodies that set out the principles for public procurement and audit public expenditure. New approaches to procurement, involving a move away from selection on the basis of price, and possibly the use of longer-term 'partnering' contracts, raise issues of propriety which have to be satisfactorily addressed. In some countries, these issues are particularly acute because of past malpractice, but the reform process has been conducted with the support and assistance of the bodies set up to address this.

Hong Kong: Independent Commission Against Corruption

The Commission was established in the 1970s following high-profile corruption cases and has wide powers. It has no objection in

principle to the use of non-price factors in procurement and has supported the programme of the PCICB by providing training in procurement processes to ensure that new approaches to procurement are consistent with its policies.

Picture 11: After meeting the Independent Commission against Corruption, ICAC Mok Wah-hoi & Samuel Hui

Clear vision and focus

Successful reform programmes have been founded on a clear vision, which is then turned into reality through a long-term strategy. Expressing the vision in a memorable phrase - a 'one-liner' assists communication and commitment.

Hong Kong

The vision put forward the Construction Industry Review Committee in Hong Kong was of 'an integrated construction industry that is capable of continuous improvement towards excellence in the knowledge age'. This contains a number of valuable themes, but is not as succinct as the vision in Singapore (below).

Singapore

The C21 Committee produced as its vision: 'To be a World-class builder in the knowledge age'. This is perhaps more inspirational, but less specific. However, the Committee also typified the reforms required as the transformation of construction from a 3D (dirty, demanding, and dangerous) industry to a 3P (professional, productive, and progressive) industry. The slogan 'from 3D to 3P' is memorable.

Finland

The aims of TEKES' programmes are summarised in brief 'vision' statements. That for the SARA programme, as noted earlier, is 'From product delivery to system delivery to total service delivery'.

'Champions' for reform

A reform process can be started through the development of a vision and recommendations for change. But the experience of other countries is that it will not succeed unless there is clear and visible commitment to change by key interests. In some cultures, Singapore being an example, change may be introduced mainly through regulation and government requirements. In most countries, however, there is a crucial need to persuade established interests of the need and benefits of reform and to secure their 'buy-in' through dialogue. In these actions, 'champions' – senior individuals respected in their communities – may play a crucial role in promoting change and in being representatives of the reform process. These may be members of an original enquiry, or people recruited later to the cause of reform.

Hong Kong

The Construction Industry Review Committee was composed of leading figures from the industry and its clients. Members of the successor PCICB have been of similar standing (eg the Managing Director of one of Hong Kong's largest contractors and senior executives from the railway corporations). They have acted as champions of reform in their organisations and more widely.

Australia: Political and industry leadership

CIDA resulted from the commitment of Ministers in the Commonwealth government to reform. Its Board members were champions for the Agency's work.

Reform takes time

Reform takes time. The construction sector is large and diffuse. The client community is diverse, and many clients have little experience of dealing with construction. The industry has developed its practices over many years and has developed many institutions and specialist groupings that reflect current ways of working. The experience of the countries visited is that changing attitudes and practices is a process that takes up to 10 years, and even then there will be more to be achieved. Countries whose reform processes started four or five years ago may have implemented a good number of the immediate reform measures, but also recognise that these have yet to have impact throughout the sector.

In Singapore, 'Construction 21' started in 1999, and is still in progress.

New South Wales pursued a reform strategy based on public procurement from 1992 to 2003.

The government of Queensland commenced reform in 1994, and are still active in improving industry performance.

In Denmark, 'Projekt Hus' was planned to last from 2001 to 2009.

In Finland, TEKES has promoted industry change through its technology programmes for more than ten years.

The creation of permanent drivers for reform

Because of the long timescale for reform, it must be expected that the sense of urgency amongst stakeholders and the intensity of political support for reform will reduce before the reform process is complete. The stimuli to reform – failures, legal cases, labour problems, concerns over safety, etc – lose their immediacy. Most importantly, Governments change and political priorities move on. The experience in other countries is that reform initiatives can quickly lose momentum when governments of different political persuasions come into power, or even when Ministers change.

Denmark: the termination of Projekt Hus

The most recent reform programme in Denmark, 'Projekt Hus' was aimed at improving construction processes and had many similarities with PSIB. After the elections in Denmark in 2001, the new government took the view that clients and the market should be the principal forces for change and terminated Projekt Hus after two years.

Australia: the demise of CIDA

CIDA was established with a 'sunset clause' which had the effect of bringing the Agency to an end after three years. During its period of operation, there was a change in government and even while CIDA was functioning, there was a review of its activities. There was no political support for extending its period of operation.

Singapore; reform becomes routine

While the C21 reform process is still active in Singapore, some participants expressed the view that it was losing momentum and that the reform activities were becoming routine. Some new stimuli were thought to be needed.

These experiences suggest that a central aim in a reform process should be to create pressures for change and improvement that become part of the industry's normal practices, so that ordinary commercial competitive processes have the effect of stimulating industry improvement. Through such means, reform can be embedded in the industry and will survive political changes. The new procurement processes developed in Hong Kong and Australia, which use past performance as a factor in the selection of contractors, the registration of contractors as practised in Singapore, and the benchmarking being introduced in Denmark, are examples of changes that will apply continuing pressure for improvement to firms in the industry.

Singapore: CONQUAS

The quality of publicly-funded projects in Singapore is assessed through the CONQUAS system, which rates projects at hand-over according to the number and type of defects recorded. The distribution of CONQUAS scores is made available through the Website of the Building and Construction Authority while individual scores form part of the performance assessment of the contractor and are taken into account in future tenders. The average CONQUAS score has risen steadily since the system was introduced in the early 1990s and private sector developers have adopted the system.

Underlying this strategy, however, is a view that markets must in the end provide the main drivers for improvement and this reinforces the importance of securing commitment from major clients (in both public and private sectors) to the reform process. If these are prepared to change their requirements of the industry at an early stage in the process, while there is intense attention on the need for reform, long-term change will be more assured.

4.3 Communicating reform and stimulating action

Different approaches to the communication of reform were observed. These reflected fundamental factors in the country concerned, and also cultural differences. In Hong Kong and Singapore, which are compact communities with populations of a 4-6 million, there are well-developed informal communications networks, and the number of firms and individuals who need to be influenced is relatively small. In Singapore also, the BCA acts as a focus for all matters concerning construction and many changes can be introduced through its policies and programmes. The need for an extensive programme of communications is therefore reduced.

In other countries, where geographical distances are greater and populations larger, reform may require a more focussed communications initiative. However, it did not seem to receive it in the countries visited. Instead, communications and

implementation took place largely through the contractual processes of government bodies or through general publicity and the types of 'research' communications promoted in the TEKES programmes. In the culture of the Netherlands, with a population larger than that of all the countries visited with the exception of Australia (where the individual States with their small populations carry much responsibility for construction) communications programmes are likely to feature more prominently in the strategy for reform. This may require the early involvement of marketing and communications professionals.

However, there are other means of stimulating reform and creating competitive pressures for reform.

Demonstration projects

Demonstration projects have been used in the Netherlands as a means of communicating new concepts in construction and stimulating others to emulate these. It appears, though that this approach may not be as suited to process change as it is, for example, to the promotion of technological developments. Denmark has a long history of using demonstration projects to promote change and its experience was summarised in the paper by Bang and others.[11]

Denmark: experience with demonstration projects

Problems experienced with demonstration projects include:

- *diffusion of the changes demonstrated does not seem to be achieved, owing to lack of business incentives for innovation, together with insufficient evaluation and documentation of results.*
- *The results of demonstration projects are often specific to the project, that are hard to translate into generic rules for lasting change;*
- *Other issues, related to the 'normal' aspects of the project, may overtake the demonstration aspects.*
- *Leading firms may be reluctant to engage in demonstration projects for because of concerns over the protection of intellectual property and giving competitors an advantage.*
- *firms are afraid of what they perceive as a large administrative burden in conducting experimental building projects*

[11] Bang, H.L., Bonke, S. and Clausen, L. (2001), Innovation in the Danish construction sector; the role op public policy instruments, Innovation in Construction; An internation review of public policies, edited by Manseau and Seaden (2001), Spon Press, London, UK.

As a consequence of this experience, there has been trend towards larger programmes of co-ordinated initiatives rather than sets of small, unco-ordinated demonstration projects. The projects became a means of promoting the outcome of research projects rather than being stand-alone.

The Danish experience has its parallels in Finland and demonstration projects are no longer included in Finnish technology programmes.

The conclusion is that demonstration projects can be a powerful way forward (the procurement approaches used in the National Museum of Australia have been widely publicised), but many issues need to be addressed if they are to have real impact. In particular, systematic evaluation, to provide convincing data, is essential. Moreover, demonstration projects are only suitable if there is something real to demonstrate; they do not provide a suitable environment for the development of new processes, products or systems.

Stimulating reform by awards

In several countries, award systems have been established to stimulate reform and to encourage long-term improvement. Cultural factors influence the effectiveness of awards in motivating reform and improvement; some cultures are very orientated towards public recognition of this nature; others have less public ways of recognising achievement. Singapore has a culture that recognises success through awards.

Construction awards in Singapore

In Singapore, many aspects of Construction 21 have awards associated with them. For example:

- *The BCA 'Best Buildable Design' Award was introduced to promote greater awareness and use of buildable designs. ie those that reduced manpower requirements on site.*
- *The BCA Awards for Construction Excellence recognise construction projects that demonstrate high quality standards.*
- *The Construction 21 Best Practice Award recognises companies and organisations that demonstrate leadership, innovation and sustained efforts in adopting the strategic changes recommended by the C21 report.*

Australia: Best Practice Schemes

In New South Wales, contractors and consultants that implement advanced procedures or who otherwise demonstrate excellence receive publicity and promotion through Best Practice Schemes.

Their achievements are published on a Website in order to stimulate others to adopt such practices and to engender a long-term commitment to improvement.

Identifying exemplary projects as representing best practice can be a powerful way forward, but in the Dutch context (which is definitely not characterised by an 'award culture') the way in which such awards might be introduced would require careful consideration.

Financial awards can of course also be powerful motivators for change – arguably, the most powerful. Many of the measures introduced to improve procurement process (eg pre-qualification or registration schemes) provide an incentive for change through the prospect of future business. But excellence in carrying out a project that results in financial savings can be directly rewarded under an appropriate contractual framework.

Finland: target pricing

Senaatti (the Finnish Government Building Agency) has experimented with systems of 'target pricing' under which a firm's profits are projected according to the estimated overall cost of the project. Variations in cost are then apportioned between the client and the project team according to an agreed formula. Hence savings can be shared and profits enhanced. Such arrangements are a form of 'partnering'.

Benchmarking

Benchmarking programmes can be influential in promoting change, particularly if they are linked with procurement. The example of the CONQUAS system in Singapore has already been mentioned. In Hong Kong, the performance of contractors and consultants on government projects is monitored and regular feed-back provided, with comparisons so that those involved may understand where they stand in relation to other firms engaged in similar projects.

Benchmarking may also be established outside the direct context of procurement. In Denmark, as noted above, a Building Evaluation Centre has been created. This will collect data from firms. If clients take note of the performance of firms against benchmarking indicators, the link with procurement is made and such systems can have significant impact

4.4 Monitoring and evaluation

To maintain commitment and momentum in reform programmes, it is necessary to have regular feed-back on progress. This may be of two forms:

a) Monitoring reports covering implementation of the measures in the programme
b) Indicators of change and improvement in the industry as a result of the programme

The Steering Committee formed to oversee implementation of the strategy normally take responsibility for issuing regular progress reports; this has been the case in Hong Kong, Singapore and New South Wales. These reports may take the form of published and circulated documents, or of items on the Committee's agenda which subsequently appear on its Website. Keeping up momentum through such monitoring activities is a crucial role for the Committee.

Monitoring of actual impact is more complex, and it was notable that this was not well developed for the industry as a whole in the countries visited. It requires the development and regular reporting of Key Performance Indicators relating to the objectives of the reform programme.

Where the main thrust of the programme was orientated towards public procurement, the data collected on the performance of firms on public projects were measures of the impact of the programme's impact.

Hong Kong: Performance Assessment Scoring System

The Hong Kong Housing Authority (HKHA) pre-qualifies contractors on criteria which include being certified to of ISO 9000, financial robustness, capability of taking on work of the relevant type value etc and track record. Contractors are then assessed through the Performance Assessment Scoring System (PASS), already been mentioned in Paragraph 3.4. This monitors a range of performance indicators including compliance with the specification in respect of materials and workmanship, and management capability. The system takes covers the contractor's performance not just during construction but also during the defects liability period. The system provides HKHA with a measure of performance improvement shown by firms engaged in pubic projects in Hong Kong, although the data are not made publicly available. Authorities in Hong Kong pointed also to accident statistics as a guide to the general effectiveness of project management; these had shown a marked decline on public projects subject to the reform initiative, but were not improving on other projects.

Achieving an agreed set of industry-wide Key Performance Indicators, and establishing systems for reporting these, may be am important task in the first stage of a reform programme, both to demonstrate real impact and justify continuing support for the reform initiative, and to provide the means of stimulating continuous improvement through client pressure.

4.5 Knowledge transfer and implementation

Communication of the need for reform, as a factor in motivating change, has been discussed above. However, there is also a need to transfer the new knowledge and experience gained in reform programmes, to assist those firms who wish to make changes in their practices. This aspect of reform was not well developed in most countries visited, although some had taken steps linked with aspects of their reform process. Where reform is achieved through legislation, there may not be the same need to motivate change, but there is still a need to help firms understand what is required, and to provide tools that will enable them to comply with the new requirements.

Denmark: a wide range of implementation methods

The Danish National Agency for Enterprise and Housing, a successor to the Ministry of Housing that developed and managed most of the recent Danish technology programmes for the building and construction industry, approaches implementation by using a combination of 'hard' and 'soft' mechanisms, ranging from workshops, reports and education to legislation and purchasing power.

Singapore: information and regulation

In Singapore, many changes were incorporated in regulations and government requirements. But at the same time, the BCA organises many seminars and workshop to help firms to understand new technical and process developments and to aid implementation of systems such as CORENET.

One of the main challenges is to educate and assist employees in the organisations engaged in reform. It is a common experience that top management may commit to reform, but middle-ranking and junior employees are uncertain about the risks and benefits in the new procedures. Hence each firm requires a strategy for communicating with and supporting its staff in the reform process. Groupings of firms and organisations facing similar challenges may find it helpful to exchange experience and to learn together.

New South Wales: learning networks

The Government of New South Wales established a Construction Improvement Roundtable. Learning Networks were created under the Roundtable; these brought together firms to study topics of interest and to exchange experiences. They developed benchmarks and identified best practice processes.

The example of the educational activities being developed by the Danish Association of Construction Clients has already been noted. It is particularly important that clients' staff should be comfortable with new approaches, since their attitudes and requirements are so influential within the industry.

Education of the next generation

Finally, new learning can be embedded in the practices of the next generation of construction professionals and managers through education. 'Vertical' barriers may be diminished through joint education of different professions and new management approaches incorporated in both pre- and post-qualification courses.

Hong Kong: Education against corruption

The Independent Committee Against Corruption in Hong Kong has arranged education and training to promote the correct attitudes and practices within future owners and managers in building firms.

Singapore: multi-disciplinary education

Common modules have been introduced for engineering and architectural students, to develop multi-disciplinary skills and mutual understanding and there is a view that construction courses that should include 'soft' skills (eg work ethics and management skills) to enhance the flexibility of construction practitioners. The Construction 21 initiative has enhanced collaboration between educational institutions, professional bodies and the BCA.

5. Conclusions – lessons and issues

In this Chapter, we summarise the issues and lessons that have emerged from the study. These are a guide, based on the experience of other countries, to the priorities and directions for reform. In addition, they will inform the development of future studies under the PSIB programme. We first consider the measures that might be included in a reform programme against the background of the principal objectives set out in the Government's statement of 25th November 2003. We then summarise issues in the organisation and management of reform.

However, one theme runs through all the conclusions, and that is that reform has ultimately to be driven by market forces. Change can be stimulated by specific actions, such as the Parliamentary Inquiry, taking place against a background of concern over the performance of construction. But the timescale for reform is measured in years and possibly decades and over that time political priorities change and the attention now being given to construction following the Parliamentary Inquiry will fade. Long term change will take place only if markets provide rewards and incentives for superior performance and have within them mechanisms that stimulate continuous improvement. In this period of high political attention on construction, and a will on all sides to change attitudes and practices, there is an opportunity to introduce new procurement systems and other measures that will provide the necessary pressures and rewards. This is the opportunity now addressed by the Regieraad and the PSIB programme.

5.1 Restoration of trust

Codes of Practice

Codes of Practice and Codes of Ethics appear to be valuable tools for restoring trust and establishing proper relationships between clients and supply side interests, and can also be adopted within the supply side in order to provide a framework for commercial relationships down the supply chain. Acceptance of such Codes by supply interests signifies a commitment to working to high principles, with integrity in all transactions and respect for staff, clients and partners in the supply chain. However, to be effective they need to be incorporated in commercial processes (eg registration or pre-qualification schemes). Compliance with the Code should be monitored and sanctions applied if the Code is breached. In this way, the Codes become part of the market pressures for reform and improvement.

Such Codes have normally resulted from a joint initiative of government and industry, but the example of New South Wales shows that initially they can be

imposed unilaterally through collective action by powerful clients (ie government departments). After a period, however, an amended Code was developed by collaboration between government and industry. In the Netherlands, therefore, issues to be considered include not only the place of Codes of Practice in restoring trust, but also the strategy to be adopted in their development and application.

Some construction interests, notably in the design professions, have existing codes that cover their responsibilities as professionals. These may need to be re-examined as part of the reform process, since the experience of other countries is that professionals may be inhibited from participating fully in reform either by traditional codes or by statutory restrictions.

In summary, the issues are:

- Whether Codes of Practice or of Ethics would be useful as instruments for restoring trust
- If so, who should be responsible for developing them
- What should be covered in the Codes
- How they would be applied
- What would be the associated monitoring procedures and sanctions
- Do existing codes require modification

A shared vision

Every reform programme has been based on a 'vision', preferably one which can be summed up in a memorable phrase. As with Codes of Practice, the development and promotion of a shared vision can be a means of restoring trust and creating confidence. It provides a foundation of the development of programmes and measures that will give effect to the vision. It can inspire commitment to change.

5.2 Developing effective markets and a properly functioning industry

Changing relationships

It is generally accepted that many of the problems experienced in the Dutch building and construction sector stem from the fragmentation of responsibilities and the short-term relationships between clients and suppliers, and within the supply chain, in conventional procurement structures. This underlines the clear message from all the countries, that procurement reform must be a central element within the wider reform process.

One approach to these issues is to promote more integrated approaches to design, as in Norway, and this may be taken further through the use of design-build contracts or 'concession' contracts although the latter were not widely used in the

countries visited. Such procurement systems aim to promote more integrated working within the supply chain, encouraging the creation of consortia that will develop their ability to work together in a team. Indeed, one criterion for the selection of a consortium can be a judgement on their ability to work together, and with the client, effectively. This raises the issue of how such a judgement should be made, in a manner which is defensible in public accountability terms – a subject for further study. Further, the factors that lead to high performance are not well understood, and need to the subject of research.

Registration and pre-qualification systems

A further aspect of construction markets which is widely considered to be a barrier to improved performance is the dominance of the lowest price in procurement decisions. Some approaches to procurement introduce non-price factors; these are considered later. But one means of introducing other factors into the market while retaining price as a important criterion is through the use of registration and pre-qualification schemes, as developed in Hong Kong.

Such schemes are tools for developing a properly functioning sector. They operate by setting standards of capability, performance and behaviour. These standards can be multi-level, and this allows firms to be recognised for achieving higher standards, or they can have just one level, which acts as a barrier to entry for poorly performing firms. Registration schemes can inform the selection decisions of all customers for construction, including small firms and individual households. Pre-qualification schemes are normally associated with individual projects or clients. However, there is a burden on industry if too may clients develop their individual pre-qualification schemes and co-operation, eg among public clients, is desirable.

To be effective, compliance with scheme's requirements must be monitored. This may take place as part of the normal processes of project monitoring by clients. To exert pressure for improvement, the schemes must also be reviewed at intervals, with standards being raised.

Benchmarks

As a variant on registration and pre-qualification schemes, firms may be required by clients to provide data on performance which can be compared with 'industry norms'. The CONQUAS system in Singapore provides a publicly-available view of the quality obtained in practice on public sector projects, and a benchmark for examining any individual firm's performance.

Underlying all these schemes is the aim of introducing a range of performance factors into the market, so that clients have available to them more rounded information about potential suppliers and can take this into account when selecting firms to

tender. Through them, standards can be set and raised, and competition on quality, delivery and other non-price factors encouraged.

Issues are:

- How can teamworking ability be recognised and enhanced
- Does registration have a role in the development of effective markets.
- If so, over which parts of the industry and what are the registration criteria
- Who operates and monitors such schemes
- Are existing pre-qualification schemes adequate and could they be co-ordinated
- What is the role of benchmarking in stimulating improved performance by firms and how might it be developed

Public sector procurement

The public sector is highly significant in the overall market for construction and it was evident in all countries that the policies and practices of public sector clients were key influences on the industry.. While individual public bodies will have some special requirements specific to their functions, experience elsewhere is that they are able to adopt common principles in their procurement practices.

The reform of public procurement is therefore a key means of developing an effective market. Such reform may have different aspects:

- adoption of more integrated approaches to procurement
- inclusion of non-price factors in tender evaluations
- adoption of life-cycle costing or moving in the direction of ‘concession’ ie design-build-operate contracts
- selection of consortia for ‘programmes’ of projects, rather than a single project
- development or revision of pre-qualification schemes
- collection (and possibly publication) of formal project monitoring data
- development of shared benchmarking databases

None of these is likely to be appropriate universally; further study will be required to establish the optimal combination of tools for different types of projects. But the creation of a forum in which these issues can be considered by public sector clients, and changes agreed with the bodies responsible for auditing public expenditures, appears to be an early requirement.

Issues are therefore:

- to what extent can public sector procurement policies be aligned?
- in what forum will changes be considered
- how will public bodies not directly controlled by the government (eg town and city councils) be involved
- what changes are required in legislation or standard contracts
- what experience is there in the Netherlands in different approaches to procurement, which can form the basis for early changes

Private sector clients

It is the experience in other countries that, while public sector procurement policies can be co-ordinated, this is much more difficult in the private sector. However, there are private sector clients with large property estates, and these should be included in the reform process if at all possible. The development of Codes of Practice, national registration systems for construction firms and benchmark indicators, may be one way of encouraging different procurement routes in the private sector.

Issue:

- to what extent can private sector procurement be aligned with those adopted by the public sector, in order to strengthen the market pressures for reform

5.3 Stimulating professionalism in procurement

Client clubs

The measures discussed above are important routes to changing procurement policies, but there will be many challenges in their application. Experience from Australia and elsewhere suggests that it takes consistent effort over a period of years to achieve change in all levels of an organisation. This is not only a matter of communications, staff need to have tools that will enable them to implement new approaches and to be confident that these are leading overall to better results, even if at times it appears that extra expenditure is being incurred.

Establishing ‘clubs’ where information can be exchanged and new ideas tested is one valuable means of creating that confidence and generally stimulating a more professional approach to procurement. These may be associations of clients, as in Denmark, or groups of individuals, as in New South Wales. They create a community amongst those engaged in procurement reform. Providing the opportunity for identification of leading practices, joint examination of issues, and learning how others have resolved problems, can be a means of strengthening that community.

More ambitiously, such clubs can become engaged in research, particularly into new ways of identifying and expressing client needs. The development of a client-focussed industry, widely advocated as a reform aim, will be promoted if clients can more precisely relate their construction requirements to their business and organisational needs and if they have means of monitoring subsequent performance. At present, the knowledge base required is inadequate; the collective experience brought together in client clubs could inform the research required.

In the longer term, training and educational courses can be used to disseminate the experience and best practices developed through the clubs.

Issues:

- would the creation of 'client clubs' promote more professional procurement?
- if so, would existing organisations form such clubs or do they require a special initiative

5.4 Developing high standards in the industry

The role of associations

The development of Codes of Practice, and their implementation through registration and procurement processes, will have strong influence of the industry. They will be tools for changing the culture and promoting the right relationships throughout the supply chain. New approaches to procurement processes and the introduction of benchmarking indicators will reinforce these changes. However, firms will need to examine their internal policies and processes and this can assisted by their associations. In particular, team building and integrated working within the supply chain will become a key factor in business success. The joint commitment of industry associations to reform can be manifest in their joint participation in educational and research programmes aimed at promoting an integrated approach to project delivery and a client-focussed, service orientated, perspective.

Associations – and particularly professional institutions - can, though, be inhibited by the established interests of their members. Reform is a test of their ability to balance immediate and long-term issues, to find a way forward that can be accommodated by their membership while not diluting the overall benefits of the programme.

Issue:

- In what ways can representative associations within the industry jointly and separately promote reform and assist their members to be more 'professional' in their business processes.

New information systems

Integrated supply chains need to be supported by integrated information systems, using common standards. Registration, benchmarking systems and project monitoring systems will need to be widely accessible. Productivity improvements will come from new information handling processes, such as electronic submission of building plans for approval. These are demands on the information technology capabilities of the sector, and on the research and technical community that supports IT developments.

Issue:

- What IT systems will be required to support a reformed construction sector and will these be provided by current programmes

Research

Some reform programmes have been driven through research; others have resulted in new research structures. The industry has traditionally not looked to research as a means of developing its capabilities. But a professional industry will wish constantly to improve its capabilities, and research has an important role to play in that process. Further, reform must be well founded, with the development and application of new practices being supported through research studies, with carefully monitored experimental or demonstration applications forming part of the knowledge base for the extension of reform. This may require the creation of new research structures, and certainly will require a very close relationship between research and industry interests.

Issue:

- Do existing research structures and priorities provide the support required for reform

5.5 Regulations

Regulations can promote or inhibit reform. They have typically been used to ensure acceptable technical standards but company legislation and accounting regulations govern a much wider range of business practices. Behaviour and attitudes cannot be controlled by legislation, but they have impacts on performance and this can be monitored and, if appropriate, included in mandatory benchmarking or registration indicators. Regulations are required when markets are not capable of applying the required pressures for change, and some countries have used them to promote change; they may usefully reinforce some of the measures suggested by the

experience of other countries, but perhaps only after voluntary adoption and market measures (ie pressure through procurement reforms) have been tried.

Issue:

- should any reform measures be introduced initially through legislation, and conversely are any reforms inhibited by current legislation

5.6 The structure and operation of the reform programme

The relevant he issues were discussed in Chapter 4 and some have been reflected in the previous sections in this chapter. This section, therefore, focuses on the principal points.

Inclusiveness

Experience in other countries indicates that the processes of formulating and implementing the reform programme should be inclusive, otherwise key groups may feel alienated and will lack commitment. This does not imply that the principal Steering Group should be composed of representatives rather than individuals – indeed, in most cases the members have been appointed because of their individual qualities. But they should come from a range of backgrounds, and representative bodies need to be involved in the process through some means. They offer, for example, important communication routes to the smaller firms in the industry.

The focus for reform, and 'Champions'

A clear focus for the reform initiative is highly desirable. Whatever body provides this focus – perhaps the Steering Group – is responsible for setting directions and monitoring progress and generally for maintaining momentum. Individuals associated with it then act as 'champions' for reform in communities in which they have influence. They are the 'public face' of reform.

Monitoring and reporting

The reform programme should be monitored, with regular progress reports to the industry. This is part of the communications process, but also keeps up the pressure on bodies who are responsible for implementing parts of the programme. In addition, it enables the Steering Group to adjust priorities and resources as required.

Measures of progress will include not only the actions taken in the reform process, but also indicators of the impact achieved. Indeed, the creation of such indicators is likely to be one of the most significant parts of the programme, since they can provide permanent drivers for improvement.

Communications

Communicating the objectives and measures of reform to the industry is essential if firms are to understand the need for change and to be committed to change. A formal communications programme is likely to be required, to knit together information from the various initiatives and to provide the means of demonstrating leading practice and celebrating success. But priorities will need to be established; the industry is large and contains many small firms. Different communications strategies will need to be developed to address its various sub-sectors.

Communications to the public cannot be ignored. This industry has gained a poor image as a result of recent events, and this has to be addressed. Evidence of commitment to reform, flowed by the promotion of real achievements brought about through new ways of working, will help to remedy this. But action is likely to be required at all levels, and particularly in schools if the industry is to attract the talented entrants that it needs.

Education and training

Training programmes, within firms and across the industry, can be vehicles for communicating and instilling reform. In the long term, however, the principles of reform must be incorporated in educational programmes, so that the next generation enters the industry able to take forward the process of improvement. The reform movement should include the education community, so that the outcomes can quickly be reflected in courses.

5.7 Concluding comments

The words of Machiavelli have been quoted many times in recent years in relation to construction reform, but remain apt:

> "There is nothing more difficult to take in hand, more perilous to conduct, more uncertain of its success or more dangerous to carry through, than to take the lead in the introduction of the new order of things. " (The Prince)

The experience of the countries visited shows that indeed there are difficulties, and success cannot be guaranteed. But in an industry which accounts for 9% of the Netherlands GDP, the challenge cannot be ignored. Reform does not happen overnight, and programmes may need themselves to be reformed and reinvigorated before the task is accomplished. But reform can succeed, attitudes and practices can change and real improvements made for the benefit of clients, industry and society. Some regard reform as a journey without a destination; fortunately, other countries have been down the path and their experience can guide the journey upon which the Netherlands has now embarked.

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- Mr. Peter Barda and Mr. Tom Crow from CROBAR
- Mr. Marton Marosszeki from the University of New South Wales
- Mr. Tony Waters, Mr. Bob Giles, Mr. Keith Farr, Mr. Don Allen, and Mr. Ken Moschner from the Queensland Government, Department of Public Works
- Mr. Steve Hogan, from Queensland Department of Main Roads
- Ms. Rosemarie Risgalla and Mr. Ted Smithies from Value Network
- Ms. Susan Kadar and Mr. Chris Maekin from the Lloyd-Jones Meakin Group

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On behalf of the delegates of the Dutch Study Missions for Project PSIB PP1 'Inventory of International Reform in Building and Construction':

Prof. Peter Barrett (UK)
Prof. Roger Courtney (UK)
Ir. Theo Mulder (NL)
Ir. Jan van Oorschot (NL)
Ir. Dik Spekkink (NL)
Ir. George Ang (NL), project leader PSIB PP1

Finally, as the PSIB PP1 project leader, George Ang wishes to express special thanks to our UK colleagues Prof. Peter Barrett, Prof. Roger Courtney, Prof. Graham Winch and CIB Secretary-General Dr. Wim Bakens for assisting us with their expertise, and particularly I would like to thank Roger Courtney for his guidance during this project and for drafting the final report.

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Queensland Department of Main Roads; www.mainroads.qld.gov.au

Queensland Department of publicworks, www.publicworks.qld.gov.au/home/home.cfm

Tekes, www.tekes.fi

Appendix 1: PSIB programme: vision, mission and objectives

In September 2001, the PSIB Commission (see Section 1.1) issued an expression of interest concerning the PSIB programme in the national funding of research programme 'ICES/KIS-3'. It was explicitly supported by high ranked stakeholders from government, large consultancy firms, the main technical universities, research institutes and large building corporations. The main reason why the government committed € 15 million to this initiative, was based on the idea that PSIB could act as a supporting vehicle for realizing the political objectives expressed by three Ministers in their joint 'Future perspective note' (see par. 1.1)

PSIB vision

The PSIB vision reveals the need for a structural reform of the building and construction sector, in order to break the impasse of an imperfect market, characterised by:

- mechanisms that bring suppliers into a reactive position;
- traditional forms of tendering that lead to sub-optimisation, and neglect the benefit from social advantages;
- a dominating preference on the lowest price criterion, instead of judging on a criterion of (added) value;
- little space and/or stimulation for innovation;
- construction companies remaining 'capacity-driven' instead of targeting towards 'service-driven';
- the absence of implementing learning effects.

PSIB derives from the vision that continuous developments of the society places higher demands on the construction industry. The construction industry itself is now recognizing the need for change. There is a certain sense of urgency for a clear vision and guidance to guide this process of change. Without this new vision and guidance, the current market leaders will face the risk of being put out of the market by newcomers.

PSIB mission

The mission of PSIB is to come to initiate a process of change and reform in co-operation and interaction with the entire supply chain in building and construction, that will convert the building and construction industry into an industry which is more sustainable, delivers a higher quality, performs better and has an improved image. PSIB has the ambition to support and co-ordinate all the initiatives that will lead to innovation in the construction industry.

***Objectives of the PSIB programme*[12]**

The five PSIB objectives aim for the achievement of a long-lasting and sustainable improvement in quality, image and trust. The five PSIB objectives are:

- Taking advantage of the social-economic benefits from construction
- Increasing the added value for client and stakeholders
- Increasing the profitability of the building and construction industry
- Introducing a competitive environment that stimulates innovation, as such enhancing the reliability and image of industry in order to restore trust
- Accumulating and rapid application of knowledge in the industry

...to combine in a coherent Research and Development Programme to reform the Dutch building and construction sector.

The vision, the mission and the aims of the PSIB programme are accounted for in the Business Plan of PSIB[13]. The programme was managed by the PSIB-Commission, chaired by a principal-stakeholder from the Netherlands Rail Infrastructure Management Authority. The Dutch government has committed basic funding for € 15 million to the PSIB programme over four years from 2003, and this will be matched by industry contributions.

Eight project clusters

The PSIB programme focuses at the renewal of the demand-transaction-supply process in the construction industry, and eight project clusters divided over three processes form the programme. The three processes are: solutions, conditions and instruments. The eight clusters (for explanation, see below) within the programme aim at three processes and contain different research project-issues. In each project the mechanism of demand-transaction-supply is approached from the perspective of its own project-issue. The aims for improvement are formulated on the basis of international experiences. Within this context it is assumed that the client satisfaction, productivity, efficiency, reliability can all be substantially improved, while risks and transaction costs can be minimized. It is internationally estimated that the construction industry can perform around 10% more effective. By an improvement of the building process, it is presumed that the building industry can save 4.5 billion of its 45 billion turnover. [14] This was an annual target of 'Rethinking Construction', and most people in the UK think that much greater improvement can be achieved over time.

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[12] Proces en Systeem Innovaties in de Bouw (PSIB) (2003), *Process and system innovation in the Dutch construction industry*, project plan for a research and development programme, Business Plan PSIB, The Netherlands

[13] Proces en Systeem Innovaties in de Bouw (PSIB) (2003), *Process and system innovation in the Dutch construction industry*, project plan for a research and development programme, Business Plan PSIB, The Netherlands

[14] Proces en Systeem Innovaties in de Bouw (PSIB) (2003), brochure *PSIB Proces- en systeeminnovatie in de bouw, Impulsprogramma voor vernieuwing van de Nederlandse bouw*, versie 3, www.psib.nl

Place of the PP1 project in the PSIB programme

The PSIB programme is a research programme comprehensively formed by eight clusters. The research clusters can be sorted into three main cluster groups[15]:

1. Solutions

Professional Procurement (Psib-pp1)

Supply chain integration (Psib-pp2)

Process management (Psib-pp3)

2. Conditions

Institutional framework (Psib-pp4)

Culture and behaviour (Psib-pp5)

3. Instruments

Experimental environment (demonstration projects)

Knowledge dissemination

The PP1 Project 'Inventory of International Reforms in Building and Construction' is part of the PSIB Cluster PP (Professional Procurement), and as such it belongs to the Cluster group of 'Solutions'. As a matter of fact the Professional Procurement Cluster is seen as leading because it explicitly addresses market dynamics. Project PP1 is therefore considered to be a pioneer project within this cluster, with the primary objective to learn from other countries, to carry out an international survey for this purpose, to set up an international network of expertise and experts within the fields of reform in building and construction, and to provide guidance for other PSIB projects, based on the knowledge and experiences from this inventory.

[15] Proces en Systeem Innovaties in de Bouw (PSIB) (2003), *Process and system innovation in the Dutch construction industry*, project plan for a research and development programme, Business Plan PSIB, The Netherlands

Appendix 2: Main elements of the 'Future perspective note' of three Dutch ministers (25th November 2003)

Substantial 'drivers for change' in the Dutch situation are based on this future perspective note, and essential elements in support of this can be derived from the joint vision expressed by the three Ministers Mr. Laurens Jan Brinkhorst (Trade and Industry), Ms. Karla Peys (Traffic and Civil Works), and Ms. Sybilla Dekker (Housing, Spatial Planning and the Environment) on 25th November 2003.

Developing effective markets and a properly functioning industry:

- New future-focused business approach, clean relationships; an urgent need for an effective market mechanism and quality guarantees is recognised. The new business approach shall guide the sector towards being a common sector as all other sectors.
- Government: "get best value for taxpayers money"
- Transparency and integrity; Code of conduct, no agreements prior to tendering, no illegal agreements among suppliers about pricing, and no corruption, i.e. a transparent way of negotiating between all parties in a fair and open market, taking into account 'the rules of the game'.
- International competition; development of quality, productivity, efficiency, innovation, and price/quality ratio. Corporations shall actively and explicitly monitor quality themselves during the process of building and construction, as a core competence.

Enhancing professionalism in procurement:

- Enhancing the development of the sector is urgent.
- Enhancing innovation by the way of procuring and contracting
- There are five requirements recognised for professional procurement, i.e. a sound and modern procurement policy, a severe but justified attitude when it comes to following the law and the regulations, not being predictable as principal, know what you talk about and knowing the market as a principal, and last but not least integrity
- Implementation by continuous professionalisation of Government agencies, by clarifying the demand towards the sector, by procuring carefully and taking advantage of the variety of tendering methods rather than tender on lowest price only, by more effectively preventing violation of the rules, and last but not least by raising a Knowledge Centre for Tendering in behalf of government agencies in procuring building and construction.

Instilling high standards in the supply chain:

- Improving (inter-) national competition, and the integrity of attitude, acting in conformity with the law for competition within the sector belong to the basics in competition of sound corporations
- Client orientation is a major driving force in doing things better
- State policy is knowledge economy; benefit from smart products and processes in international competition (especially Civil Works).There should be a prior attention for the own responsibility of governmental agencies.
- Advanced energy technology
- ICT in supply chain, from design to operation of built facilities
- Financial support for R&D-joint projects and knowledge transfer
- Fiscal reduction of costs for research-staff and techno-starters

Less, but more effective, regulations:

- One uniform and transparent framework for all governmental tenders in 2004
- There shall be room for initiatives and entrepreneurships through allocation of responsibilities where these belong, and through deleting inadequate rules and cluster other rules in order to reduce the amount of rules and regulations

Appendix 3: Rationale for the selection of countries to visit

The motives for the selection of countries to visit by two Working Missions of the PP1 project can be summarised as follows:

1. General motives (based on “rethinking construction and “revaluing construction”)
   - There has to be a clear “driver for change” behind the reform
   - Implementation of national programme – the aims of the reform and the context, background and initiatives of “change” have to be comparable/transferable to the Dutch situation.

2. Other selection criteria
   - The presence of a national (policy) initiative for change
   - The presence of a centralised government
   - The implementation of a national reform programme (by government)
   - Specific aspects of the NL context, and
   - Practical selection criteria as accessibility of persons, documents and relevant information for the other PSIB-projects.

The countries of choice

Summarizing are the following countries subject for the first phase of the PSIB PP1 working missions: Norway, Denmark, Finland, Singapore, Hong Kong and Australia

Norway	Recognition of reform initiatives in national research programs
	NL-comparable problems in the building and construction sector
	NL-comparable culture
	Focussed on quality
	Relatively easy to travel around in the country
Denmark	National (government) initiatives to reform the building and construction sector
	Many interesting demonstration projects
	NL-comparable culture
	Relatively easy to travel around in the country
Finland	Recognition of reform initiatives in national research programs
	NL-comparable problems in the building and construction sector
	Development of the ‘lean construction’ theory
	Well-known country as example for knowledge infrastructure and innovation (interaction between companies and science)
	NL-comparable culture
	Relatively easy to travel around in the country
Singapore	Explicit example of national (government) initiatives to reform the building and construction sector; the drivers to changes and central government characteristics are comparable with the Dutch situation
	Base of Dutch companies: 1. In the future: easy for contacts 2. Relevant for building and construction projects by Dutch companies in Singapore
	Number of advanced monitoring tools and IT-initiatives to support the performance of reform initiatives
	Emphasise the skills and education; with a better staff also a higher and more effective production and profit can be reached

	Based on UK ‘rethinking construction’ and 'revaluing construction' initiatives
Hong Kong	Explicit example of national (government) initiatives to reform the building and construction sector; the drivers to changes and central government characteristics are comparable with the Dutch situation
	Base of Dutch companies: 1. In the future: easy for contacts 2. Relevant for building and construction projects by Dutch companies in Singapore
	Preventing fraud and anti corruption as drivers for reform
	Interesting 'driver for reform' for legislation and purchase strategy
	Emphasise the skills and education; with a better staff also a higher and more effective production and profit can be reached
	Based on UK ‘rethinking construction’ and 'revaluing construction' initiatives
	Relatively successful initiatives
Australia	NL-comparable drivers to change
	National (government) initiative to change
	Promising start of the reform initiatives, but seeming to stagnate 1. How to visualise? 2. Why? 3. What are the lessons to learn for the Dutch situation?
	Based on UK ‘rethinking construction’ and 'revaluing construction' initiatives

Countries that are not chosen, but were considered

France, Belgium and Japan	No presence of a national reform initiative
	Completely different organisation of the building and construction industry
Sweden	Many reports about the building and construction sector are written recently, but on national level not much action is shown
UK	Three UK experts are present in PP1
	PP1 is already based on the UK 'rethinking construction' and on the CIB ’revaluing construction’ report
USA	No presence of a national reform initiative
	Need of a selective approach during a visit of the USA due to the enormous distances between the different states
	Decentralised government
	Partnering etc. is difficult to realize in the political structure of the USA
South Africa	Completely different context of the drivers to reform
Mediterranean countries	Users are not an aspect in the reform initiatives

Outline of missions

The six selected countries where divided into two workable packages to be carried out by two mission groups. The two working missions were:

Working Mission 1 (Scandinavia):
21 – 28 February 2004 Norway – Denmark - Finland
Team Mission 1: Prof. Peter Barrett (UK), ir. Dik Spekkink (NL) and ir. Theo Mulder (NL)

Working Mission 2 (Singapore, Hong Kong and Australia)
10 – 21 February 2004 Singapore - Hong Kong – Australia
Team Mission 2: Prof. Roger Courtney (UK), ir. George Ang (NL), and ir. Jan van Oorschot (NL).

During the missions the teams met multiple stakeholders of the different reform initiatives, i.e. key-players from government organisations, client organisations, private principal organisations, from several disciplines from the building and construction supply, and research institutes.

The organisations visited in Mission 1:

Finland:

- Tekes, the National Technology Agency
- VTT, the Finnish Building Research Institute
- RT Confederation of Finnish Construction Industries
- Senaatti, Senate Properties, the Finnish Government Building Agency
- SKOL, the Finnish Association of Consulting Firms

Norway:

- Byggforsk, the Norwegian Building Research Institute
- Snöhetta Modular Architects, specialised in standard residential systems
- EPM TEchnology, software company specialised in information standards
- Statsbygg, Public Construction and Property, the Norwegian Government Building Agency
- RIF Association of Consulting Engineers

Denmark:

- BY og BYG, the Danish Building and Urban Research Institute
- Ehrvervs- og Boligstyrelsen, the National Agency for Enterprise and Housing
- Byggherreföreningen, the Danish Association of Construction Clients
- The Danish Construction Benchmark Institute

The organisations visited in Mission 2:

Singapore:

- BCA Building and Construction Agency, the Singapore Government Building Agency
- NUS National University of Singapore, Dept of Building
- City Developments Ltd (a large real estate developer)
- Housing Development Board
- Informally the Singapore Institute of Architects chair
- Informally the Singapore Contractors Association chair

Hong Kong:

- Provisional Construction Industry Co-ordination Board (PCICB)
- Hong Kong Housing Authority, governmental regulations and procurement
- Hong Kong Housing Society, large residential housing principal
- Swire Properties, a large project developer/principal
- Hong Kong Institute of Engineers
- Hong Kong Institute of Architects
- Kowloon-Canton Railway Corporation (KCRC, a large principal)
- Metro Corporation (MTR, a large principal)

- Independent Commission Against Corruption (ICAC)
- Hong Kong Construction Association (large corporations)
- HK General Building Contractors Association (medium and small enterprises)
- Fugro, DHV and Ballast Nedam Dredging (overseas offices/plants of Dutch companies)

Australia:

- Australian Procurement and Construction Council (APCC), Canberra
- Australian Government, Dept of Industry, Tourism and Resources, Canberra
- Brisbane City Council
- Queensland Government, Dept of Public Works, Sydney
- Queensland Government, Dept of Main Roads, Sydney
- CRC Construction Innovation Centre, Brisbane
- Auatralian Institute of Quantity Surveyors, Canberra
- Master Builders Australia, Canberra (medium and small enterprises)
- Australian Constructors Association, Sydney (large corporations)
- John Holland Contractors, Sydney (large contractor company)
- Value Network Group, Sydney
- Ex CIDA (Construction Industry Development Agency) managers Peter Barda and Tom Crow, Sydney
- University of New South Wales, professor M. Marosszeki, Sydney

Appendix 4: Summary Singapore

Summary

Singapore

March 2004

Mission members:
ir. George Ang (VROM-Rgd)
ir. Jan van Oorschot (KVWS)
Prof. Roger Courtney (UMIST, Manchester)

Singapore

1. Background

Singapore is an example of 'state capitalism', a regulated, centralised state with a highly developed and successful free market economy, a remarkably open and corruption-free environment, stable prices, and a *per capita* GDP of around $US 25000, equal to that of the leading nations in Western Europe. Its population is some 4.2 million, inhabiting a land area of 685 sq km.

Singapore experienced rapid economic growth for several decades following independence and this translated into large investment in commercial and housing developments and major infrastructure works. Construction activity accounted for around 7% of GDP in the early 1990s, rising to a peak of 9.3% in 1998. However, there has since been considerable decline; the industry accounted for only 5.4 % of GDP in 2002.

Since at least the 1980s, there was concern that that construction in Singapore was heavily dependent on low-cost unskilled labour, predominately drawn from countries in the surrounding region. The industry accounted for 17.5% of all employment in 1997, a much higher figure than in comparable developed countries and out of line with its contribution to GDP. The use of imported labour was accompanied by low productivity and accompanying social problems; Concern over the industry was exacerbated by the performance of the sector during the 1990s, as its accident record deteriorated and productivity dropped by an estimated 13% in the four years following 1994.

Construction reform became an aspect of the Singaporean Government's more general drive to enhance the competitiveness of the economy. Following a review of national competitiveness in 1996, the government published a strategy for the development of a knowledge-based economy. In May 1998, the Minister of Manpower initiated the Construction Manpower 21 Study, focussed on the social problems and low productivity associated with the extensive use of unskilled foreign labour. In parallel, the Committee on Practices in the Construction Industry was convened by the Ministry of National Development. The two initiatives were combined to form the Construction 21 Steering Committee chaired by the Permanent Secretary (Manpower) and with the Deputy Secretary (National Development) as Deputy Chairman.

The C21 Steering Committee was supported by a Working Committee and four Working Groups: on industry professionalism, skills development, industry practices and techniques, and 'integrated systems approach'. In total some 80 people from all segments of the construction industry and the academic sector served on the Committees and groups. It held an Industry Forum attended by 450 members of the industry, and made study visits to the USA, Japan, Hong Kong and the UK. The Committee's 'Construction 21' report[16] was published in August 1999 and provided the impetus for a national reform initiative for the Singaporean building and construction industry.

2. Construction 21

The original focus of the C21 Committee report was on issues of labour supply and productivity in construction, but the committee broadened its enquiry in line with the government's aim for enhanced economic competitiveness. Its vision for the Singaporean industry became: "To become a World Class Builder in the Knowledge Age". This retained the focus on the development of the workforce, training, and professionalism in both procurement and industry but extended the scope to the organisation of construction and its promotion at home and overseas.

The C21 report made 39 recommendations, under six 'strategic trusts':

- *Enhancing the professionalism of the industry*

  Multi-disciplinary education, introduction of 'soft skills' Continuing Professional Development, Codes of Conduct, Awards for excellence, use if IT, licensing of contractors
- *Raising the skills level*

  Targets for use of unskilled workers, and for skills levels, enhanced training provision, levy on unskilled workers, incentives for training, encourage multi-skilling, loans of skilled workers
- *Improving industry practices and techniques*

  Minimum 'buildability' requirements, incentives for prefabrication, standard components, safety legislation, information on maintenance and lifetime costs, quality schemes and assessments, co-ordination of research and increased expenditure, construction management system, trained supervisors, housing for foreign workers, cut modifications to standard contracts
- *Adopting an integrated approach to construction*

  Promote and review tendering for design and build. Review legislation governing professionals, multi-disciplinary firms
- *Developing an external wing*

[16] Ministry of Manpower and Ministry of National Development (1999), *Construction 21,* ISBN 9971-88-709-6,Singapore

Assist overseas ventures, encourage exports

- *A collective championing effort for the construction industry*

  Implementation of recommendations

The Building and Construction Authority (BCA), the agency of the government responsible for regulation and promotion of construction in Singapore, was charged with overseeing implementation, working in collaboration with the Construction Industry Joint Committee, which brings together the leading associations from the construction and property sectors. The two bodies met approximately quarterly to monitor progress.

Many of the reform initiatives, concerning training, qualifications and regulatory procedures could be implemented through government action and there was less emphasis on cultural or organisational change within the industry than in some national programmes. The view was expressed that the report should have done more to challenge traditional procurement routes but its approach may reflect the culture of vigorous competition in Singapore. The legislation controlling architects and engineers, which previously prohibited their participation in design-build schemes, has been amended and the BCA has issued new guidance on the use of design-build. However there seemed little enthusiasm amongst professional bodies for new procurement structures, although design-built has been used in some civil works.

No specific promotional programme was instituted but new award schemes were instituted to promote Best Practice. In a small city-state, with a clear focus for construction regulation and guidance in the form of BCA, special communications initiatives were arguably not required. However, it is notable that the BCA, for a population of 4.2 million, has a budget of around 15 million Euros for industry development, of which some 9 million Euros is recovered in the form of seminar fees etc. This compares favourably with the level of investment in most European countries.

Most of the C21 recommendations were implemented by 2003, but because of decline in the industry introduction of some reforms were deferred. This decline has made the industry very price-competitive, but also enhanced its focus on client requirements. A view was expressed that after four years the programme was losing some momentum, with progress meeting becoming routine. This underlines the need to review and re-invigorate reform programmes at intervals.

3. Features of the reform programme

As is clear from the discussion above, some features of the reform process in Singapore addressed issues specific to local circumstances. However, improving

productivity and quality in construction is an issue of worldwide concern, whatever the causes. Singapore is notable for its use of quantitative performance measures, some incorporated in regulations, to improve performance in these areas, and for its promotion of IT in the construction sector, and the C21 programme hastened the development and application of tools that potentially have application in the Netherlands.

Buildable Design Appraisal System (BDAS)

Since the early 1990s, the BCA has been developing means of assessing the 'buildability' of building designs in order to judge the site labour requirement. The assessment system (BDAS) has from January 2001 been incorporated into building control legislation, and designs falling within the scope of the legislation (initially, most buildings of over 5000 m^2, but the limit has since been reduced) are required to meet a minimum BDAS score, which will be progressively raised. The effect is to promote prefabrication. BCA had concluded from site studies that the adoption of buildable designs could lead to manpower savings between 20% and 60% for structural works and since these accounted for around the total labour input, up to 30% of overall site labour content might be saved.

Leading developers are using BDAS as a means of improving designs and the Housing Development Board (HDB) (a very significant client for construction in Singapore, sometimes accounting for more than half of the annual market) has used BDAS to raise the proportion of prefabrication in their developments. HDB accepted that prefabrication raised initial costs by 5-10%, but these were recouped through reduced maintenance costs as a result of higher quality of construction.

The average BDAS scores of projects submitted for building control approval was one measure of progress in the implementation of reform.

Construction Quality Assessment Scheme (CONQUAS)

BCA had developed a structured system for assessing the quality of buildings at hand-over, which was applied to all publicly-funded projects. Defects were noted and weighting applied to each; for housing, these reflected experience of occupants' reactions to faults – some types of fault were tolerated while others (eg badly fitting doors) were not acceptable. The final score is a factor in the contractors' record and influences future pre-qualification assessments.

BCA has operated this system, in different versions, for some 10 years and has observed steady rise in average CONQUAS scores. The private sector has increasingly adopted the scheme. CONQUAS is a registered trademark in Singapore, United Kingdom, Australia and Hong Kong. There is evidence that assessment according to CONQUAS contributed to registrations of tenderers and allow accountable pre-qualification.

CORENET

CORENET is a system for electronic submission of plans for building control approval. It also contains all the regulations etc required in Singapore and is a network through which the BCA communications with the industry. Following extensive consultation, promotion and the provision training courses etc, use of CORENET will become mandatory in 2004. This illustrates the ability of BCA, in the Singaporean context, to advance industry practice through regulation in areas, which may be less amenable to that approach in other cultures.

National performance-based building specification

BCA has a national performance-based building specification under development, that will be available in mid 2004, and will permit both changes to the "base" specifications and the addition of requirements for the individual project on site.

Education

Singapore seems to have created a typical education and learning culture: common modules are structurally introduced for engineering and architectural students to develop multi-disciplinary skills (against current fragmentation and lack of cooperation and understanding among professionals), and construction professionals should be able to work with the techniques, systems, tools and information bases which become available in the knowledge economy.

Research has not featured strongly in the reform process. The C21 report recommended the creation of a National Construction Research Institute but no decision as yet been made and, in view of the interval since publication of the report, it seems unlikely that the Institute will be created. The report also recommended that there should be an annual budget of Sing$ 20 million for research; an initial tranche of Sing$ 10 million was granted to BCA, but no further provision has been made. Research within Singapore is predominantly carried out in the university sector, but good international links mean that Singapore has access to research results from around the world.

4. Lessons and implications for the Netherlands

The C21 report characterised the aims of construction reform in Singapore as a shift from three Ds (dirty, demanding, and dangerous) to three Ps (professional, productive, and progressive), i.e. from dirty and demanding, labour-intensive, low-skilled work to a professional knowledge-based industry, from dangerous, *in-situ* construction to well controlled, processes based on maximum off-site assembly, from segregated activities to integrated activities, and from low costs through low wages to low costs through high productivity.

While the principal drivers for reform in Singapore differ from those in the Netherlands, and the emphases will therefore differ, the transition from the 3Ds to the 3Ps remains an apt summary of the aims of reform.

The Singaporean context is that of a small city-state with strong central regulation and quasi-regulatory influences. Some of the approaches used will not be effective in a different culture and more diffuse communications routes. However, the C21 initiative:

- Stemmed from shared perceptions of the need for reform, and was developed with the participation of all significant groups
- Covered a wide range of interacting issues, although with less emphasis on procurement and structural reform than in other programmes
- Had a clear focus for implementation, with regular monitoring and reporting – but some momentum is now being lost and there is a need to reinvigorate the programme
- Instituted recognition and reward systems appropriate to the local culture
- Developed measures of success, based on some distinctive tools, and found mechanisms for embedding these in business and regulatory processes in order to stimulate continuous improvement
- Has, using these measures, demonstrated significant progress – but downturn in the industry has been an inhibiting factor
- Successfully promoted the uptake of IT in the construction sector
- Progressively engaged private sector developers, and is able to monitor their take-up of reform principles
– These themes and achievements contain principles and tools worthy of further study.

Appendix 5: Summary Hong Kong

Summary

Hong Kong

March 2004

Mission members:
ir. George Ang (VROM-Rgd)
ir. Jan van Oorschot (KVWS)
Prof. Roger Courtney (UMIST, Manchester).

Hong Kong

1 Introduction

Hong Kong became a Special Administrative Region (SAR) of China in 1997. This status provides a high degree of autonomy, except for matters of foreign policy and defence, under a 'one country, two systems' formula. In particular, Hong Kong continues to have a free market economy, highly dependent on international trade. Hong Kong's *per capita* GDP, at 27200 $US (2002), matches that of leading members of the EU. In the period prior to hand-over in 1997, annual GDP growth averaged a strong 5%, but Hong Kong has suffered two recessions in the past six years, the first because of the Asian financial crisis in 1998 and the second through the global downturn of 2001-2. In addition, the SARS epidemic in 2003 had adverse economic impact. The population of Hong Kong, 6.8 million in 2002, is expected to grow to approximately 8-9 million and this is creating continued demand for new residential developments and transport infrastructure, as areas away from the harbour are developed.

The building and construction industry which accounts for about 8.0% of GDP (2003) (the GDP in 2003 was HK$1235 billion, while the gross value of construction work was HK$98.9 billion), is a large employer (8.6% of workforce in 2003)[17] with public housing and public sector works accounting for slightly over 50% of the gross value of construction works in 1999. This industry is characterised by a small number of large local contractors, a high level of sub-contracting, the presence of many foreign-owned contractors and consultants, and a very large number of small locally owned firms. In addition, a substantial number of companies is both developer and contractor. Commercial developments in Hong Kong have a high reputation and give the city its characteristic skyline, some buildings being the international architectural icons. Public sector development is dominated by housing, with around half of the population living in subsidised public housing. The provision of public housing has been a long-standing political priority; the Hong Kong Housing Authority (HKHA) was formed in 1973 as a statutory authority and given the task of providing a home for all in need.

The need for reform in the industry was highlighted by corruption scandals in the 1980s and 1990s. In the most prominent of these, the foundations of some high-rise residential blocks (approximately 26 blocks) were judged to be inadequate owing to insufficient piling, and the blocks were demolished. Many other blocks were badly constructed, with concrete, which did not meet specifications and poor quality materials. The drive to provide housing for migrants to Hong Kong placed emphasis

on quantity rather than quality. Successful contractors secured work at a low price and promptly sub-let it to others with lower standards. Often, this process was repeated so that construction was actually performed by firms with no connection with the original tender process. Problems were compounded by poor site supervision, and the industry had a very bad safety record as a consequence.

In private sector developments, commercial pressures led to the same results. Economic growth in the 1980s meant that the principal concern of clients was that the building should be available for occupation as quickly as possible, with the prospect that changing requirements would lead to demolition and redevelopment within 20-30 years. Quality considerations were of secondary importance.

There was, though a contrast between the building and civil engineering sectors. Major public infrastructure projects (the Mass Transit system, road tunnels and the airport) were completed to international standards.

Political concerns over the industry's performance came to a head as a result of the corruption in housing projects. In response, the Chief Executive of the Hong Kong SAR established in 2000 a high-level commission, the Construction Industry Review Committee (CIRC), chaired by Hon Henry Tang and with membership drawn from the construction and property sectors, trades unions, academia and government. The CIRC's report *Construct for Excellence*, was published in January 2001. But even before the CIRC reported, major public clients such as the Housing Authority had initiated started radical reviews of their procedures and they have since been prominent in implementing change initiatives.

2 Issues, aims and management of reform

The industry's shortcomings, as set out by the CRIC, may be grouped under three headings and have their parallels in parts of the Dutch building and construction industry.

Performance:

- An unacceptable safety record (200.000 injuries with 607 fatalities from 1990-2000) with the construction industry representing 39% of all industrial accidents.
- Unsatisfactory environmental performance, with construction producing 44% of the waste disposed of at landfills in 1999.
- Costs among the highest in advanced economies, associated with declining productivity

[17] Census and Statistics Department (2004), Hong Kong, www.info.gov.hk/censtatd/eng/hkstat

Process:

- Heavy reliance on traditional and labour-intensive *in situ* methods of construction
- Fragmentation and an adversarial culture within the industry.
- Prevalence of 'lowest cost' tenders, with successful bidders promptly re-letting the work to sub-contractors.
- Multi-layered sub-contracting. Which added no value to the final output
- An inadequately trained workforce, with barriers to investment in training owing due to the degree of sub-contracting and the preponderance of temporary employment.

Business:

- A short-term attitude to business development, as evidenced by the low investment in research and development, and lack of initiatives to enhance the industry's long-term competitiveness.
- The lack of a client-focused approach, with sub-standard work, cost over-runs and project delays being commonplace and accepted. Leading to the industry having a poor image in the minds of the public, other industries and politicians

The CRIC stated its vision to be 'an integrated construction industry that is capable of continuous improvement towards excellence in a market-driven environment'. Further, the government, the industry and the community had a shared interest in a successful transformation of the construction industry. To steer the change programme would require a common purpose among all stakeholders, with committed leadership and an institutional framework that enabled all stakeholders to act in concert.

The CRIC report made 109 recommendations, grouped according to key aims:

– Fostering a Quality Culture
  - Clients to be knowledgeable and involved
  - Greater integration of planning and design and wider use of value management
  - Realistic project programming to ensure that all relevant factors are considered
  - Clear accountability, through revision of legislation and professional codes
  - Sound subcontracting, with greater control over levels of sub-contracting, a registration scheme and better training for sub-contractors
  - Improved site supervision and quality assurance, through tighter supervision and introduction of supervision as a criterion in tender evaluation
– Achieving Value in Construction Procurement

- Development and refinement of systems foe selection of consultants and contractors for public housing and works which give weight to past performance and non-price criteria
- Develop and make available benchmark scores from public works contracts
- Many other proposals relating to selection of contractors and consultants
- Promotion of systematic risk management
- Review of public sector conditions of contract, with inclusion of alternative dispute resolution
- Encouragement for alternative procurement approaches, including partnering
- Improved security of payment

– Nurturing a Professional Workforce
  - Review training at all levels
  - Foster an ethical culture through guidelines and training
  - Introduce a registration scheme for construction workers
– An Efficient, Innovative and Productive Industry
  - Greater integration of project delivery
  - Wider use of standardisation, prefabrication and modular components
  - Wider application of IT through training, automated checking of plans etc
  - Investment in R&D
  - Comprehensive review of regulations to facilitate innovation
– A Safer Workplace and an Environmentally Responsible Industry
  - Introduction of regulations to ensure safety is taken into account in design
  - Strengthen safety training
  - Develop incentive schemes
  - Strengthen enforcement
  - Develop policy on sustainable construction and environmental assessment scheme
  - Promote life-cycle costing
  - Encourage 'green' designs, energy efficiency and recycling
  - Include environmental criteria in tender evaluation

Finally, the CRIC recommended the designation of a lead department for construction reform, the creation of an industry co-ordination body and that progress with the recommendations be monitored after three years. It identified the following roles for the co-ordination body:

– To carry out self-regulatory functions for the industry through the formulation of codes of conduct and the administration of registration schemes for construction workers, subcontractors, renovation contractors and decorators, and other types of construction personnel;

- To provide guidance to the Construction Industry Training Authority and set direction for its work;
- To identify priority areas in construction research and to promote better co-ordination between the local research community and industry in order to encourage innovation in local construction;
- To assume responsibility over construction standardization matters;
- To promote sharing of knowledge on industry good practices, innovative construction technologies and sound management techniques through learning networks and demonstration projects;
- To devise performance indicators for the industry to measure its improvement; and
- To organize, in co-operation with the Government, award schemes to give recognition to outstanding performance in site safety, environmental protection, buildability, construction innovation and other built quality attributes.

3 Progress with the reform programme

(a) Mechanisms

The Provisional Construction Industry Co-ordination Board, chaired by Henry Tang, was established in 2001, with 25 members appointed as individuals but drawn from a wide range of backgrounds. The Board was charged with overseeing the implementation of the CRIC report. The Works Bureau provided the Board with a Secretariat, but otherwise it relied on voluntary inputs. After some debate, it was agreed that the Board should oversee the progress made against all recommendations, including those for which government departments and agencies were responsible. In 2002, the PCICB has established five Working Groups, focussing respectively on: construction cost and performance indicators; construction site safety and employees' compensation insurance; management of sub-contracting; manpower training and development; and formation of a statutory industry co-ordination board.

The PCICB has met approximately five times a year since its formation, and has published regular review of progress. In addition, the papers and minutes of its meetings are available through its website (www.pcicb.gov.hk/eng/emain.htm). A new Chairman, drawn from one of the largest property developers in Hong Kong, was appointed in 2003.

It is envisaged that statutory the Construction Industry Council, funded through an industry levy, will be established in 2004. Following the debate about its composition and appointment processes, its relationship with the government and other 'constitutional' issues, the necessary Bill has been drafted. This will provide extra resource for the reform programme.

(b) Substantive changes

Progress has been made on a broad front, both assisted and hindered by the downturn in construction since 1998. This has caused firms to look to non-price factors (safety, environment etc) in order to distinguish themselves from their competitors when bidding for public sector projects. On the other hand, it has intensified price-based competition in most of the private sector market. The result is that a two-tier industry is now evident in Hong Kong. This is illustrated by the significant improvement in safety performance in public sector projects but little change in the private sector. Similarly, the leading clients in both public and private sectors have introduced procurement processes that incorporate many of the recommendations of the CRIC, but lowest first cost is still prevalent in many other contracts. Progress can be monitored through government projects. There is clear evidence of improvement in safety but now imbalance between public and private safety standards is noticed.

Full details of the current position are included in the latest PCICB progress report, but notable developments are the introduction of many procurement reforms by the Housing Authority and the Works Bureau and the development and launch of a voluntary registration scheme for sub-contractors, shortly to be followed by registration for the individual worker. These have been established initially on a voluntary basis but it is envisaged that they will become mandatory.

(c) Promotion of reform

The CRIC report looked to a combination of changes in procurement practices, site supervision, regulations and training to achieve its aims for the industry. Arguably, it sought to control poor practice, rather than to eradicate it – closer supervision to detect defects, rather than a 'right first time' philosophy. There was no recommendation for a promotional campaign to change industry attitudes and encourage different forms of relationships, nor resources in the PCICB for that. Some have commented that CRIC review was too broad, with no clear theme, and it appears that there has been no vigorous 'championing' of reform by individuals. Hence there is a view that many in the industry see the changes as being mainly about safety and environmental concerns, rather than challenges to traditional attitudes and ways of working. Some of these were evident in the views on construction issues expressed by smaller contractors.

However, the report did not promote radically different structures within the industry ass a key instrument of reform; while it recommended greater integration in the construction process, and new procurement mechanisms such as design-build, most of its recommendations sought to improve the industry as presently structured.

The role of benchmarking in promoting reform is being explored by the PCICB, with comparisons of construction cost being made with other cities. In addition, the Works Bureau advises contractors of their performance under its monitoring regime, with suitable benchmark indicators. These data could be indicators of industry performance although they have not been used in that way.

(d) Research

A collaborative research body, the Construction Industry Institute Hong Kong (CII-HK) has been established in response to the CRIC recommendation that there should be greater investment in research. This has a membership drawn from industry and housing interests, with the Hong Kong Housing Association being a key founder member. The Institute, located in Hong Kong Polytechnic University, is establishing projects with industry steering groups.

4 Procurement reform

As noted earlier, procurement reform has been at the heart of the reform strategy and many of the CRIC recommendations were directed to public bodies in their role as clients. They have introduced new procedures as a consequence but the impact on industry performance, other than on safety, is not yet demonstrable through statistics. Major infrastructure projects, which have involved many international consultancies and contractors, have been procured and delivered through processes that would stand comparison with anywhere in the world and leading private sector clients are similarly embracing new modes of procurement, with one commenting that in their next development they will source internationally for standard components 'like Dell'.

Measures introduced in public sector procurement include:

- Greater emphasis on past performance in tender evaluations, and the introduction of non-price factors generally in tender evaluations
- Revised 'two-envelope' system for selection of consultants
- The development of a ethics code of practice
- Establishment of a' Premier League' of contractors for strategic partnerships
- Greater sharing of performance information amongst pubic clients
- The successful use of Dispute Resolution Advisors

It is significant that the Independent Commission Against Corruption (ICAC), a highly influential body in Hong Kong, is relaxed about new procurement methods. They do not regard them as more prone to corruption provided the rules are transparent and the procedures followed. The ICAC puts much effort into education and training in order to inculcate the right attitudes.

While partnering and other forms of non-traditional procurement are increasingly employed, and are regarded by leading clients and construction firms as the route to improvement, there still is a long 'tail' of traditional attitudes amongst private developers and supply interests. There appeared to be no immediate answer to this problem, but a hope that demonstrating improved performance through new approaches will in the end cause change throughout the sector.

5 Points of particular interest for the Netherlands

The background factors, which led to the establishment of the CRIC, have local parallels. The Netherlands has needed to meet high demand for housing, with implications for quality standards, and in the private sector there are strong commercial pressures for rapid construction and early occupation, with initial rather than lifetime costs being a principal consideration. While these factors have not led to multi-level sub-contracting and explicit corruption as experienced in Hong Kong, in other respects the diagnosis of the issues is very similar in the two countries and Hong Kong's experience of reform is therefore relevant, even though taking place in a very different economic and social context. Points for particular consideration include the following:

- The political drive for reform was reflected in the industry, which welcomed the focus on its contribution and issues provided by the CRIC. It also brought to light many examples of good practice, as a counter to criticism of the industry. There was therefore a willingness to support the government initiative and to accept the Committee's recommendations.
- CRIC had representation from all significant interests (although its members were not nominees of particular bodies) also assisted acceptance of its recommendations.
- Procurement reform had a central role, with key public bodies not only reviewing their own procedures, but acting as a focus for broader government-side initiatives. Specific tools, such as the Performance Assessment Scoring System of the Housing Authority, deserve further study as do systems employed in Hong Kong for dispute mediation, for registration of contractors and sub-contractors and for pre-qualification of contractors and consultants.
- The CRIC review was very broad. There is a risk of loss of focus, particularly if the broad strategy is not articulated and constantly promoted. Consideration of the scope of reform should be combined with assessment of the resources available for promoting industry debate and change, though supply-side initiatives, not just procurement reform.
- Highly effective procurement practice exists alongside poor practice, but in Hong Kong the gap between the different classes has not been bridged. Performance data from the best public and private projects, collected through normal monitoring procedures, could be used to stimulate change elsewhere. This would require leading firms and clients to be exemplars, and the development of

performance indicators that are widely applicable. However, the business drivers in parts of the construction market may continue, as in Hong Kong, to favour short-term perspectives.

– The strategic objectives of reform may vary. In Hong Kong, the programme aims essentially to improve the industry whilst retaining its present structures of responsibility – professionals, contractors, etc. But more radical change could have been contemplated. Debate over strategic objectives and the shape of the future industry could be an important element of the Dutch reform process.

Appendix 6: Summary Australia

Summary

Australia

March 2004

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Australia

1 Background

Australia is a Commonwealth, or federation, of six States (capital cities in brackets) – New South Wales (Sydney), Victoria (Melbourne), Queensland (Brisbane), South Australia (Adelaide), Western Australia (Perth) and Tasmania (Hobart) - and two Territories – Northern Territory (Alice Springs) and Australian Capital Territory where Canberra, the Commonwealth capital, is situated. Its total land area is 7,617,930 sq km (www.cia.gov). The population is 19,731,984 (July 2003 est.) (www.cia.gov) but most people live in the South East coastal belt extending from Adelaide to Brisbane. GDP *per capita* is amongst the highest in the world, at 26,900 $US (2002 est.) (www.cia.gov)

In 2000/1, the construction industry contributed 4.6% to the Commonwealth GDP, of which 39% was residential construction, 36% engineering construction and 25% non-residential construction, as measured by production-based gross domestic product (GDP) (chain volume measures). This was significantly lower than its contribution in previous years (5.6% in 1998-99, 5.7% in 1999-2000), and reflects the downturn that occurred in the industry after the introduction of the new Tax System in July 2000. In response to the downturn, the Commonwealth government implemented the First Home Owners Grant in February 2001, to boost investment in the residential market (www.abs.gov.au, year book Australia 2003). In May 2001 the industry employed 668,000 people, either as employees or as self-employed contractors. This represented 7.0% of the employment in all industries. (www.abs.gov.au, year book Australia 2003)

Under the federal structure of government, States take responsibility for many areas of policy, including industry development and the regulation of construction. In addition, State governments are the principal public clients for construction. Construction reform programmes in Australia have therefore been instituted at both Commonwealth and State levels. The principal reform initiatives have come through:

- the Construction Industry Development Agency (CIDA) 1992-95 (Commonwealth)
- the Construction Policy Steering Committee (CPSC) of the New South Wales government (1992-2003) (State)
- the Action Agenda 'Building for Growth' 1997-2002 (Commonwealth)
- the Australian Procurement and Construction Council (APCC) (1967- present) (Commonwealth and State)
- the Queensland Government (1994-present) (State)

This summary focuses on these principal initiatives, but the Mission team held valuable discussions with many other bodies who provided insights into the reform processes in Australia, some of which are reflected in comments below. We note also that the government of South Australia has been active in promoting reform through procurement, that the Building Commission of Victoria has been prominent in regulatory reform, particularly in the introduction of performance-based building regulations, and that CSIRO has been source of many technological and organisational developments. This short review cannot be comprehensive.

Developments up to 1997 are summarised in a paper by Gerard de Valence of the University of Sydney [18] and certain sections below are based on his text.

2 Issues driving the reform process

The reform programmes undertaken in Australia since the early 1990s reflect issues within the industry in preceding decades and the image these created in the minds of politicians and major clients. They are reviewed both by de Valence and by Peter Barda in his history of the Construction Industry Development Agency[19]. Major construction projects were disrupted by labour disputes and these led to one construction trade union being de-registered. Contractual disputes were prevalent. The property boom of the late 1980s put great pressure on the industry and the consequent skills shortages resulted in a lowering of quality standards. Some fraud cases added to the generally poor image of the industry.

A series of reports, commissioned by the industry itself and by governments at State and Commonwealth level, identified issues in procurement, contract management and the role of organised labour in the industry. Prominent amongst these were the 'No Dispute' report prepared jointly by the National Building and Construction Council (representing the private sector industry) and the National Public Works Committee (representing the major pubic sector construction clients), published in 1990, and the report of the Royal Commission into Productivity in the Building Industry in New South Wales (the 'Gyles' report) commissioned by the New South Wales Government and published in 1992.

The Commonwealth Government initiated a Construction Industry Reform Strategy in 1990; this initially focussed on labour issues but was progressively widened. It led ultimately to the creation of CIDA, which commenced its work in 1992, after a delay while the Commonwealth Government considered the report of the Royal Commission.

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[18] Valence, G. de (1997), *Industry Reform Strategies in Australia, CIDA and the CPSC,* Department of Construction Economics, University of Sydney, Proceedings of CIB W65 (Construction Organisation and Management) conference, Singapore

[19] Barda, P. (1995), *In Principle: a celebration of the work of the Constriction Industry Development Agency,* Government Publishing Service, Australian

The Royal Commission's report led to the New South Wales government establishing the CSPC. Because of political differences between the different levels of government, no formal relationship was established between the two bodies and New South Wales took no part in the work of CIDA.

3. Construction Industry Development Agency

The creation of the Agency was preceded by the drafting of an 'in principle agreement' under which key representative groups and major public bodies acknowledged that they bore some responsibility for the issues identified in industry reports and committed themselves to reform. This process revealed that various significant sectors felt that they had not been sufficiently consulted and their concerns were intensified by the initial selection of Board members which, for example, did not include any representative of the design professions. While this omission was in due course remedied, it meant that certain sectors of the industry felt little obligation to accept the outputs of the Agency and weakened its impact. As noted earlier, political differences also affected its ability to have national influence.

The CIDA vision was:

We will have a world class Australian building and construction industry that delivers our customer requirements by:

- Working with customers through the life of projects to ensure an outcome which is fit for the intended purpose
- Continually improving performance standards building on our existing strong base
- Promoting partnerships of interest to achieve the common aims of the industry parties
- Harnessing and extending the skills and creativity of people working in the industry
- Removing barriers to continual improvement in the quality of the working environment, the design, building and construction process, work methods and the completed product
- Fostering an innovative and dynamic wok culture where people are proud to work together
- Exceeding international best practice so that the world beats a path to our door.

It mission was set out thus:

- The Construction Industry Development Agency will be a catalyst to bring about real and measured change in the Australian building and construction industry.
- We will provide leadership, motivation, and foster the development of increased capabilities in the stakeholders to ensure a culture of leaning and continual improvement.

- Our approach will focus upon and reward the setting up of challenging performance standards and the establishment of international Best Practices. This will be achieved initially though the implementation of the In-Principle Agreement and the Code of Practice.
- We will consult with stakeholders to identify factors for success and remove barriers to change.
- We will also educate and promote to our stakeholders and the community the important benefits and achievements of this reform and development process.
- We will direct our development efforts through pioneering projects, enterprises and their workforces and other change agendas in the industry.
- This dynamic change process in the industry will become self-sustaining in the industry and extend beyond the life of the Construction Industry Development Agency for the betterment of the whole Australian community.

CIDA established five clusters of Action Plans to give effect to its objectives. Each was addressed through an Action Team whose members were drawn from a range of backgrounds. The Plans were:

Cluster A Project Delivery

A1 Project initiation

A2 Project Management

A3 Contractual relationships

A4 Security of payment

Cluster B Best Practice

B1 Code of Practice

B2 performance measurement and databases

B3 Strategic management

B4 Model projects and enterprises

Cluster C Industry Development

C1 Research and development

C2 Export

C3 Regulation reform

C4 Industry representation

C5 Future structure of the industry

Cluster D Skill Formation

D1 Skill formation

D2 Equal Employment Opportunity

Cluster E Workplace Reform

E1 Workplace enterprise bargaining

E2 Award restructuring

E3 Health and safety

E4 Review of employment benefits

E5 Restrictive practices

Each Action Team typically produced one or more guidance documents for the industry. In total, CIDA produced over 30 'Products' and related documents, including Codes of Practice and Best Practice guides. These form a valuable corpus of knowledge and embodied experience, although now some10 years old.

However, the impact of these outputs was limited. Changes in the structure of public sector clients at the State level, which had the effect of fragmenting previously monolithic client bodies, meant that promotion of CIDA's findings required much more resource than originally envisaged and inhibited wide application. In addition, political changes removed support from CIDA and it was wound up when it came to the end of its original term. There was therefore no resource for continuing promotion after 1995.

4. Construction reform in New South Wales[20]

The report of the 'Gyles' Royal Commission into Productivity in the Building Industry in New South Wales (1990-92) provided a detailed indictment of poor practices in the construction industry in that State. It stimulated a sustained programme of reform, led by the NSW government, which was active for more than 10 years and which still continues, although now incorporated in wider policy aims. The programme is notable for passing through several phases, reflecting the changing relationship between the government and the industry.

In the first phase, the NSW government had two principal aims:

- To re-establish the rule of law in the industry, particularly in relation to labour issues and tendering procedures
- To force cultural change and process reform through deploying the government's purchasing power

NSW Government agencies with construction interests were brought together in the Construction Policy Steering Committee[21] (CSPC) which developed a Code of Practice and a Code of Tendering. The Codes established minimum standards of behaviour expected of construction service providers who wished to do business with the government. This was supported by vigorous compliance procedures, and a co-ordinated approach to compliance across all government clients. The Codes were not incorporated into conditions of contract, since to do so would risk disruption if its

[20] This section draws heavily on a summary of the work of the Construction Policy Steering Committee (CPSC) (2001), *NSW Construction Industry development; from Reform to Sustainability*, The prinicpal documents are available from www.cspc.nsw.gov.au.

[21] The Construction Policy Steering Committee, www.cpsc.nsw.gov.au

provisions were not adhered to; they were applied in pre-qualification procedures. Importantly, the Codes were presented to the industry as a government requirement, not as the subject of consultation. However, they also set out the expectations that industry should have of government. Development of the Codes and the compliance procedures was an essential part of restoring trust between government and industry.

While the early focus of reform was on industrial relations, a wider agenda soon developed, with client focus, workplace practices and new procurement processes being introduced. This broader approach was set out in the NSW Government Capital Works Investment Capital Project Procurement Manual, which supported the Codes of Practice by providing requirements and guidance for both government clients and prospective tenderers.

By 1995, relations between government and industry had improved. As a consequence, reform moved into a more collaborative phase. Extensive consultations took place with all sectors of the industry and with employers' organisations and trades unions. The outcome was a reaffirmation of the principles in the Codes, but this time with industry endorsement and undertakings to establish compliance mechanisms within their organisations. This co-operative phase therefore was marked by a change from imposed reform to shared 'core values' and, in the period to 1998, the joint development of a vision for the industry. Several 'Green Papers' were issued by the government, one dealing with mechanisms for security of payment and another setting out 'opportunities and challenges' for the industry. The latter covered a range of issues including industry structure and relationships, training and skill formation, workplace issues and industry process improvement. In addition, the government issued a discussion paper: 'A perspective of the construction industry in NSW in 2005.

This 'development phase' in reform culminated in the publication of the White Paper 'Construct New South Wales'[22] in July 1998. This was founded on a vision of an industry marked by the following four characteristics:

- seamless,
- efficient and profitable,
- innovative
- environmentally responsible

Then new mood of co-operation was evident in the introduction to the White Paper:

[22] Construction Policy Steering Committee, www.cpsc.nsw.gov.au/ConstructNSW

"The release of Construct NSW affirms the NSW Government's commitment to support of key industries in the State to achieve their potential and maximise their contribution to the growth of an internationally competitive industry. At the same time, Construct NSW calls for commitment by the industry to building a better industry, one which has strongly connected partnerships - clients and their advisors, contractors, subcontractors, consultants, suppliers and employees - all working together to deliver a better built environment".

Construct NSW set out an integrated framework of 20 strategies and 85 supporting actions to enable the government to achieve best value for money from its construction procurement, to support its economic and social goals through construction procurement and also to assist the industry to achieve its potential.. A parallel discussion paper aimed to increase the use of IT within the construction sector.

The strategies were grouped under eight headings. Subsequent developments are summarised below:

1. *Strategic information for decision making*
   The government now provides market forecasts, and Key Performance Indicators for the industry and for firms have been developed

2. *Business ethics and practices*
   Revised Codes and Practice, and Implementation Guidelines, have been introduced, and procedures for reporting breaches of the Codes have been streamlined.

3. *Security of payment*
   Legislation governing payments to sub-contractors and others has been amended and the government has set standards for its own payment procedures.

4. *Management and workforce development*
   Training manuals and guidelines, and information services have been developed. Contractors on major government projects are required to establish a training facility. Future skills requirements have been assessed.

5. *Continuous improvement*
   Rigorous reporting procedures on consultants and contractors working on government projects have been instituted. These reports are available to all government agencies. Guidelines on industrial relations have been developed and safe working practices promoted, particularly by selecting only contractors who have demonstrated good health and safety management practices. Guidance literature and performance indicators for health and safety management have been prepared.

6. *Towards an ecologically sustainable industry*
Environmental Management Guidelines and model Plans have been issued.

7. *Encouraging and recognition*
The government's contract award processes reward high performance and encourage long-term improvement. Consultant and Contractor Best Practice Schemes have been introduced.

8. *Information technology*
Electronic procurement has been introduced.

By 2000, some 59 actions had been implemented and a further 18 were in progress. The next step in the evolution of reform was to encourage and facilitate greater industry leadership, in order to make reform self-sustaining. The government established the Construction Improvement Roundtable to provide a forum for exchange of ideas on key issues affecting construction and to provide leadership in the creation of Learning Networks. The members of the Roundtable were appointed in their personal capacities. Members of the Learning Networks each make a formal commitment through a Memorandum and then develop a Business Plan for the Network. The Networks enable members to benchmark performance, devise and use best practice processes, and to participate in research.

In the most recent development, the NSW government restructured its procurement responsibilities in 2003 and established an NSW Government Procurement Council within a new Department of Commerce. Construction procurement comes within the remit of this Council. While the lower profile of construction may be seen to be measure of success in the reform programme, the establishment also in 2003 of another Royal Commission into labour practices in the industry indicates that the reform process has yet some way to go. Nevertheless, the history of reform in NSW, from its genesis in fraud and corrupt labour practices, through the successive phases of government-industry relations, to the final aim of continuous, self-sustaining improvement, has clear lessons for the Netherlands.

5. Action Agenda – Building for Growth[23]

The demise of CIDA left a vacuum, in that it was recognised both within the industry and within the Commonwealth Government that construction was still in need of improvement reform, but there was no forum in which government and industry could consider the issues. Several advisory groups were set up but in September 1997 the Government established the National Building and Construction Committee (NatBACC), with representatives of 13 industry associations concerned with construction and property, and invited the Committee to prepare an Action Agenda for the building and construction sector. The preparation of Action Agendas was one

[23] Department of Industry, Tourism and Resources, www.industry.gov.au

of the initiatives to strengthen Australian industry that the government had announced earlier in 1997 in its policy statement 'Investing for Growth'. The agendas were prepared by industry, but then put into effect through joint industry-government action.

NatBACC commissioned extensive analyses and background studies, mostly from the university sector, and produced the Action Agenda, with 35 recommendations, in April 1999.The government provided its response the following month.

The recommendations covered a broad range of issues:

- the creation of a permanent forum for government-industry liaison (now established as the Australian Construction Industry Forum)
- the provision of better market data and forecasts
- better co-ordination of public procurement
- support for innovation , including the creation of a Co-operative Research Centre for construction
- promotion of IT in construction and the introduction of electronic tendering
- greater consistency in Building Codes, planning systems and contractor registration
- studies of project delivery and productivity, including international benchmarking and a specific study of 'alliancing' in the construction of the National Museum of Australia
- incentives for energy efficiency and improved environmental performance
- measures to improve industrial relations and training
- support for construction exports

The Action Agenda was taken forward in the following three years through a range of bodies, both in industry and government. Most of the recommendations led to action, but the implementation process was criticised for having no clear focus and in some quarters the initiative was seen as the product of government action, rather than stemming from and 'owned' by the industry. The focus for information about the Action Agenda, for example, was the government (Department of Industry, Science and Resources, now the Department of Industry, Tourism and Resources) and there was no obvious 'champion'.

A Departmental review of the Agenda published in 2004 concluded that it had achieved had been a valuable programme but had been too ambitious in setting out 35 recommendations, without clear priorities. The list had perhaps reflected the difficulty of achieving consensus across the diversity of interests in construction. Moreover, the emphasis on government action in the recommendations was inconsistent with the partnership between government and industry on which Action Agendas were founded. The review considered that the creation of the Co-operative Research Centre for Construction Innovation, with $Aus14m of Commonwealth Government funding and contributions in cash and time from industry estimated to

be worth $Aus50m, was the most significant achievement. It has also created awareness of international competitiveness; the Web-based market forecasting service was a useful development; and sustainability had been promoted through Code revisions.

5.1 Co-operative Research Centre for Construction Innovation

The Co-operative Research Centre for Construction Innovation[24] was established in 2001 as a partnership of 19 leading industry interests, public bodies and universities, and the Commonwealth Government, each of which have pledged financial and (with the exception of the Government) manpower inputs for a period of seven years. The intention is that, by the end of that period, the Centre should be self-supporting through income from 'products' and other sources. Its stated objectives are:

- to enhance the contribution of long-term scientific and technological research and innovation to Australia's sustainable income and social development
- to enhance collaboration between researchers, industry and government, and to improve efficiency in the use of intellectual and research outcomes
- to create and commercially exploit tools, technologies and management systems to deliver innovative and sustainable constructed assets to further the financial, environmental and social benefit to the construction industry and the community

Based at the Queensland University of Technology in Brisbane, the Centre has developed three principal research programmes: business and industry development, sustainable built environment, and delivery and management of built assets, with an underpinning advanced Information and Communication Technology Platform. Each programme has a Director and Deputy Director, one for research/academia and the other from industry/public bodies. Projects within those programmes are generally led from the research/university members but are steered by a Project Team drawn from the partners.

Collaborative research is a familiar concept, and collaborative construction research bodies exist in various countries; however, the nature of the academic/industry/public body partnership in the CRC differs from that found in other bodies, being in principle much closer, confined to a relatively few bodies (at least initially), and with a long-term commitment. This brings tensions, particularly in relationships with bodies outside the partnership and in the constraints that may be placed on the academic and research partners, but the approach may also result in more effective steering and application of research. The Centre has not been established long enough for any conclusions to be drawn, but it may provide an alternative model for collaboration in the Netherlands, complementing existing research bodies.

[24] Cooperative Research Centres for construction innovation; www.construction-innovation.info

6. Australian Procurement and Construction Council

Founded in 1967 as the National Public Works Council and renamed in 1998 when its remit broadened to all procurement maters, the APCC[25] is the 'peak council' of departments responsible for procurement and construction policy in the Commonwealth, State and Territory governments. The New Zealand government is also an associate member. The Council aims to promote excellence in the way that governments delivery value to their communities and is 'the national reference point' on policy advice, principles and best practice initiatives. It has a small permanent secretariat in Canberra.

Because of the different levels of government in Australia, the Council plays an important role in the exchange of experience among governments and promoting harmonisation of requirements and processes across administrations. However, its direct influence has diminished as governments have dispersed procurement responsibilities to operating agencies. In addition, new forms of procurement, such as Private-Public Partnerships, have introduced new parties between the government client and the construction sector, and these have further diluted the influence of public procurement policies on the industry.

Over the years, APCC has developed a portfolio of guidance and 'best practice' documents, drawing on the work carried out under the auspices of CIDA, the NSW government and other Australian initiatives, and global experience. Currently, it is placing emphasis on electronic commerce in government procurement, public sector infrastructure needs, competitive tendering practices and improving access to government markets for small and medium enterprises.

While the government structure in Australia is not replicated in the Netherlands, there would seem a case for a similar central forum and centre of expertise on construction procurement for the public sector, capable of influencing practice across all levels of government, national and local, and of providing benchmarks for procurement functions. This would promote professionalism in procurement.

7. Government of Queensland

The Government of Queensland, through its Department of Public Works[26] and Department of Main Roads[27], is the principal client for construction in the State and in addition has its own in-house design, contract management and maintenance staff. It has since the early 1990s sought to improve the value for money obtained from its expenditures, and the performance of the construction sector, though its procurement policies and through regular dialogue with the industry.

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[25] Australian procurment and construction council; www.apcc.gov.au
[26] Queensland Department of publicworks; www.publicworks.qld.gov.au/home/home.cfm

In 1994, it commenced a change programme with the aim of increasing efficiency in the industry by 20%. It has estimated that after five years the improvement was some 17.5%, but measurement problems mean that this figure has some uncertainty. The measures taken by the government, then and more recently, include the adoption of Best Value as the criterion for selection of consultants and contractors (this has led in some cases to the selection of consultants purely on non-price criteria), the introduction of rigorous pre-qualification standards, new forms of contract (non-adversarial, alliancing, private finance etc), the development of systematic recording of performance by contractors and consultants, feed-back to unsuccessful tenderers etc. In addition, both Departments meet regularly with representatives of the supply sector to consider issues affecting construction interests in the State.

The Departments have systems for determining the most appropriate procurement route, based on the characteristics of the project, and through the Co-operative Research Centre are supporting the development of a more advanced decision-support system in which the factors used in the selection process will be derived from the outcome of completed projects.

However, even after this long history of promoting change through procurement, the Departments still consider that there are cultural issues to overcome in the relationship between public clients and the industry; the 'lowest price' culture is difficult to eradicate at the operating level.

8. Conclusions for the Netherlands

The history of construction reform in Australia contains important lessons for the Netherlands. Further, the specific tools, procedures and documentation developed over the past 10-15 years, which have not been itemized in this summary, constitute a valuable resource for those developing similar products for application in the Dutch construction sector.

Some of the principal lessons are:

- the length of time required for real change to take effect. Reform programmes have been in existence for more than 10 years, but there are still challenges. Political commitment to reform is essential for the process to start, but may not last; other drivers have to be developed to provide incentives for change and improvement
- the importance of involving all significant interests in the development of the reform agenda so that this is 'owned' and taken forward across the industry spectrum

[27] Queensland Department of Main Roads; www.mainroads.qld.gov.au

- the role of public procurement in driving change, with the associated need for consistency across public bodies and for policies developed at the top level to be communicated to and put into effect by staff at the operational level
- the need for clear directions and priorities, and for resources with which to communicate these to clients and industry

The Australian experience also shows that, with time, clear purpose and commitment, it is possible to change a situation characterised by suspicion, corruption and lack of trust into one of collaboration and mutual respect, with the reform strategy changing as relationships evolve. And that real improvement in industry performance can be secured through government action. These are encouraging conclusions for the Netherlands.

Appendix 7: Summary Finland

Summary

Finland

March 2004

Mission members:
ir. Dik Spekkink (Spekkink Consultancy)
ir. Theo Mulder (Ballast)
Prof. Peter Barrett (Salford University)

Finland

1. Background and Progress

After a period that can be characterized by an overheated economy, Finland suffered for a severe economic downfall from 1989, after the collapse of the Soviet Union. The government responded by downsizing its spending dramatically, except for the spending for Research & Development, which was increased dramatically. The idea behind this was to be ready for the times when the crisis was over and there would be possibilities to grow. We may conclude that this strategy worked very well, since Finland probably has one of the most advanced and prosperous building industries in Europe. The low point of the economy was in 1995-1996. The next years show an increase in the national building production; since 2000 the production is stabilizing on a 'normal' level.

Six contractors are dominating both the market and the development initiatives.

Since the early 1990's a series of technology and reform programmes have been set up for all important economic sectors. Some 30 programmes were (and are) especially aimed at the building and construction industry (including the building materials industry). Currently there are 23 programmes running, of which 3 are dedicated programmes for building and infra:

- CUBE – Building Services Technology Programme, 2002 – 2006 (total budget M€ 27);
- INFRA – Construction and Services Technology Programme, 2001 – 2005 (total budget M€ 24);
- SARA – Value Networks in Construction, 2003 – 2007 (total budget M€ 33).

Partly these programmes build on former programmes like ProBuild (Progressing Building Process), Rembrand (Real Estate Management and Services) and VERA (Information Networking in the Construction Process). Considering the scope and objectives, SARA very much resembles the Dutch PSIB programme.

Since a couple of years there is an effort to get technology programmes for the building industry more strategically planned. For this the 'Visio 2010' process was started. It brought together representatives of both the private and public sectors to discuss and outline the strategic goals and priorities for the coming years in the Building & Construction cluster. The process that is still going on is generally seen as an important and necessary step in shaping the strategic intent within the cluster. The Visio 2010 process aims among other things to integrate the cluster by establishing stronger links between the actors.

2. Set-up and Management of Reform Programmes

Tekes, an agency of the Ministry of Trade and Industry and the Finnish counterpart of the Dutch Senter, plays and important role in the set-up and the management of technology or reform programmes. Tekes is involved in the preparation, coordination and the decision taking. There is a close cooperation between Tekes and the industry. Continuous discussion with leading representatives of the Building & Construction cluster, including research institutes, leads to suggestions for a reform programme. Associations of contractors, architects, consulting engineers a.s.o. are mainly involved in the initiation phase of a reform programme, but do not play a significant role in the follow up.

Tekes will look for a pattern and if relevant start up e technology/reform programme. The role of Tekes in the cluster is somewhat stronger than in other industries. This is seen by many as a necessity, due to the special characteristics of the industry, especially the fragmentation. For every programme Tekes installs a Steering Board, consisting mainly of high-level visionary people from all sections of the building industry. The aim is to get clients and client organizations more and more involved in this; Tekes feels that important incentives for change should come from clients (in the Rembrand programme the client was defined as the real estate owner. It is felt though that the end user should be more in focus: “Everybody in the supply chain should think of what the end user needs”).
The Steering Board creates and guards the programme vision.

The programme management is 100% outsourced to top-level managers from private companies, government bodies, the R&D community or Tekes itself (depending on the subject or focus of the programme). Important responsibilities of the programme manager are:

- To get good projects that contribute to realizing the programme objectives;
- To get the right people involved;
- To promote and organize synergy between the projects within the programme;
- The communication within and about the programme.

Projects within a programme are always tendered. The nature of the projects is R&D; demonstration projects and experiments are not funded. The reasons for this are:

- Tekes wants to keep away from financing actual construction activities;
- Tekes wants to avoid that contractors (and other parties) can enter a building project without competition because it’s an R&D project;
- The aim is to achieve a permanent and sustainable impact, where demonstration projects almost always lead to one off, compromised prototypes that are difficult to generalize (“only the companies who are directly involved benefit”);

- The normal project objectives, like getting the work done in time and within the budget, in practice always seem to be more important than the R&D objectives;
- There were some demonstration projects in the past; afterwards nobody seemed to be happy with them.

The Finnish Agency for Government Properties – Senaatti - supports the Tekes approach, but also places some critical remarks:

- Tekes is very much involved in other economic sectors, e.g. biochemics, which leads to the danger that the approach is too sophisticated for the building industry;
- Tekes wants long-term programmes promoting durable change, while the building industry is mostly short term oriented. This short-term orientation is not so much 'stupidity' of the industry as it is a rational, smart survival strategy. Moreover, a building project is a 'single period game' almost by nature. This is a major set back for e.g. project independent partnering.

40 – 60% of the budget in reform programmes is being spent on research. Most of the research (applied research) is done by VTT, which is also an agency of the Ministry of Trade and Industry. 50-60% of the research is funded by Tekes, 40-50% is funded by the industry. People form the industry are always involved in the project (supervision) team. Basic research is funded by the Academy of Finland. It is mostly carried out by the universities. Most R&D efforts in the industry itself stem from product manufacturers; contractors are said to be "more lazy" in this respect.

3. Content of the reform programmes

For PSIB the most interesting current reform programme is SARA. Like PSIB SARA is process oriented and the objectives are similar. Important thematic areas are:

- From chain to network;
- Requirement management, considering a life cycle view (in other words: improved client orientation), added value for building users;
- From product delivery to system delivery to total service delivery. The transition of product delivery to system delivery has been accomplished to a great extend during the last few years. Now the transition from system delivery to total service delivery is being promoted. The extend to which projects contribute to that goal is an important selection criterion in the tendering;
- Building information management (product modelling, product libraries, open access to digital information. In this, SARA builds on the VERA programme that has ended in 2002. Building information management takes approximately 60% of the total SARA budget. One of the projects in SARA is ProIT, initiated by the Confederation of Finnish Construction Industries and aimed at digital data transfer between participants in the building process, using 3D building models.

A barrier is that the industry is not used to transparency and sharing the risks and the profit, which is the main idea behind the programme.

4. Procurement

- The traditional procurement method (design – bid – build) is still very dominant in Finland.
- Also 'Construction Management' on a fee basis is quite widely used (a Construction Manager more or less takes over the client's role and manages all contracts in both the design and the construction phase).
- Project development is the most used method for realizing private housing and business parks.
- There is a trend towards Design – Build – Maintenance. Some contractors bid for the maintenance of built facilities for e.g. 15 to 20 years. Because of this a contractor like YIT is listed as a 'service company' on the Finnish stock market. It is expected that the market share of Design & Build (& Maintenance) will grow, not to be dominant.
    - There is little experience with PPP/PFI; this procurement method is currently applied for the first time in a few infrastructure projects. The general feeling is that PPP/PFI is only an option when the government wants to realize major projects but does not have the funds to do so. E.g. Senaatti does not seem to be a fan of PPP/PFI because of the inflexibility it introduces (long term contracts, difficult to anticipate on changing user needs without contractual consequences, the fact that only the very large companies are able to tender). PPP/PFI is supported by the Confederation of Finnish Construction Industries (RT) by means of manuals, which fit in the SARA programme.
    - Probably the most interesting development in procurement stems from Senaatti. This government properties agency developed a shortlist of firms who can bid for services in the field of project development, contract management and facilities management, thus scaling down the amount of partners that Senaatti works with. Partners on the shortlist are selected on the basis of quality and unit prices ('beauty contest'). The final selection in projects is on price. Senaatti states that this way of working complies with the EU procurement regulations. There is no shortlist for contractors.
    - The Association of Consulting Engineers developed a manual for selecting consulting engineers on the basis of quality (80%) and price (20%). Experience with the manual in practice teaches, that the price stays very important. Many firms qualify on the basis of general quality criteria and thus the price becomes decisive.

5. Promotion

New knowledge deriving from technology/reform programmes is in principle owned by VTT. Legislation is underway for owner rights in cases where the research is partly funded by the industry. Interesting results of projects are made known by issuing brief summaries. However, the knowledge is not confidential and in principle accessible for the industry. When other companies want to make use of the new knowledge, they can contract VTT for the implementation.

6. Possible implications/themes for the Netherlands

- Increasing R&D efforts in times of economic decline.
- Industry reform is a long-term effort that calls for a consistent, strategic planning, with involvement of all stakeholders, including clients and end users.
- The necessity of a leading role of government bodies in industry reform, because of the characteristics of the building industry (fragmentation).
- Steering board consisting of high level, visionary people, representing all stakeholders, developing and guarding a consistent programme vision.
- Systems for the selection of project partners on the basis of quality and price.
- Demonstration projects and experiments may not be the right tools to achieve radical and durable change.
- Promoting a shift from product delivery to system delivery and from system delivery to total service delivery.
- Building Information Management as a major thematic area.
- How to get synergy between separate projects within the programme.

Appendix 8: Summary Denmark

Summary

Denmark

March 2004

Mission members:
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Denmark

1. Background and Progress

The Construction Sector is an important industry in Denmark. The products are an important element in everyone's life, the quality and the houses are among the best in the world, the sector has a good reputation abroad and constitutes about 10% of total Danish exports. Yet the Construction Sector has some problems: productivity has increased under an international average, building materials are said to be 20% too expensive, there are many defects at hand over and later, the collaboration in building projects is often marked by too many conflicts, there is a lack of transparency in the price-quality ration and there is lack of new ideas. Therefore several development programmes have been carried out in Denmark since the mid nineties, all of them in housing. The most important programmes were:

- Process and Product Development (PPD, 1994 – 2001);
- Urban Renewal (1995 – 1999);
- Project House (2001 – 2009);

The general framework for these programmes is an industrial building tradition. Industrialization of the building process (products and processes) has been practice in Danish building industry since the late 1940's, when there was an urgent need for new dwellings. The objectives of the reform programmes were:

- Further industrialisation; development of new types of housing and improvement of existing housing;
- Increased productivity;
- Enhance the international competitiveness of the Danish building industry;
- Decrease of conflicts in the cooperation between building partners, new methods of cooperation like partnering;
- Decrease of defects at the hand over and later;
- Enhance transparency in price-quality relations.

Some earlier programmes that we can learn from are Recycling and Cleaner Technology (1986 – 1997) and the Energy Research Programme (see chapter 3)

New types of housing were developed with the help of the development programmes, especially low and dense and more sustainable housing. Guidelines for partnering and new rules for public procurement were issued.

Major effort to bring down defects (in public housing) resulted in a building defects fund being set up in 1986, which covers individuals for twenty years and companies for 5 years. The funding for the fund comes from a 1% levy on projects (1.5% on refurbishment projects), so that effectively clients pay. This fund was twinned with a

major initiative to install QA systems in companies and with technical advice to avoid the defects. After 5 years an inspection was carried out to assess the level of defects. Initially the incidence of defects went up and then levelled out. In recent years a one-year inspection was added and the level of defects is now down from an incidence of 25% to 6-7%.

The most recent reform programme Project Hus (Project House) was mainly process related and thus had many similarities with PSIB. After the last elections in 2001 the social democrat government was replaced by a conservative/liberal government that had different priorities and reallocated the funds for Project Hus. The general vision of the new government is: “It is up to the market to initiate developments and not by government.” So Project Hus was terminated after two years. It is not to be expected that the Government will recover the funds. The Agency for Enterprise and Housing and others will try to install a fund by clients, with which some programmes for innovation could be supported. It is not sure whether or not clients will be willing to set up such a fund (public clients have to be very cost effective and private clients will want to spend the money on their own topics).

Facilities management is growing greatly in strength and means that the users perspective has a much greater chance of being expressed / heard.

2. Set-up and Management of Reform Programmes

After the last elections the Ministry of Housing, that was responsible for the (social) housing supply, was abolished. The two agencies of the Ministry of Housing that played major roles in the reform programmes were taken over by the Ministry of Economic and Business Affairs. These organizations are the National Institute for Enterprise and Housing and the Danish Building and Urban Research Institute (DBUR). Programmes are managed and projects secretariats are operated by either the one or the other. Programme related research is as rule done by DBUR and the universities.

Formerly the Ministry of Housing set up national R&D programmes, defining the scopes and objectives and setting requirements for the evaluation, documentation and dissemination. The basis for the programmes are action plans that are made up by the Ministry every 5 to 6 years. These action plans pass Parliament.
Firms from the industry generate proposals, which have to fit into the programmes. These are assessed by the programme secretariat. All programmes used *demonstration projects* as the mechanism and several points emerged from this extensive experience. The projects were typically in housing. Funding was provided to supplement the contract value for the project to build, say, 150 houses, and so enable new approaches to be deliberately developed and trialled.

Recent reform initiatives are mainly based on a document called 'Danish Construction Sector in the Future – from Tradition to Innovation' (2000), issued by a task force appointed by the Government. The task force presented four drivers for change:

- More professional clients;
- More competition in the building industry;
- Improved cooperation between partners in construction projects;
- More efficient use of knowledge.

To promote these drivers, the report recommends 28 changes in the framework for the construction industry as well as in the implementation of specific construction projects. Some of the resulting initiatives are: Benchmarking & Evaluation, Partnering and the set up of a Clients Association. Under the influence of the task force report, it is felt that incentives for change should come from clients. An important player in this focus is Danish Association of Construction Clients (DACC - Bygherreforeningen).

The DACC was set up around five years ago with some Ministry support for the first two years. The membership grew smoothly to the current 45. Membership is a bit biased towards the public sector. There is a strict rule that members must be professional clients and only involved in the demand side, that is companies with contracting or development interests are not allowed membership. The DACC is now operated on a membership fee basis. The DACC organises various activities with the members as the main resource:

- Seminars on topical subjects such as PPP, partnering. These are free.
- Educational provision to update employees on subjects such as legal requirements. These are for an at-cost fee.
- Working groups on issues such as partnering, education and development and very importantly responding to legislative proposals.

With only one full time member of the secretariat and with three junior part-time helpers, the organisation is very lean and has grown organically. A 9 member Board runs the organisation. Views are made in written submissions and through informal discussions with people in key positions, such as the Government. Strangely Government groups are also members and so can put more contentious views through this forum. DACC is aiming ultimately for 100 clients, representing one-third of the sector volume.

Lessons learned from the Danish reform programmes are:

- Yes, it is possible to make a difference and to achieve industry reforms, but is essential to secure demand during the process.
- Disadvantages of demonstration projects are that de development/demonstration aspects are easily pushed away by every day

concern in a building project that it is difficult to synergy between individual projects and that project dependent results are difficult to generalize.

- Therefore (not only) it is important to separate the development phase from the actual building/demonstration phase.
- Take care of a close monitoring and sparring of project participants by an independent, challenging expert board to track progress ("Nasty monitors asking nasty questions can be very valuable").
- There is a great need for systematic evaluations.
- Carry out research in balance with applications.
- Need to design the diffusion / implementation strategy, including the appropriate use of other policy levers, such as taxes, education, regulations, etc.
- Take a long-term perspective, e.g. 8 – 10 years.

In the earlier programmes the evaluation of results has not been very good, unsystematic. The set-up of an independent, external evaluation body was promoted in the report 'Danish Construction Sector in the Future – from Tradition to Innovation'. Following this, a Building Evaluation Centre was set up 1st February 2001 as a joint venture of clients and contractors. The approach is centred on benchmarking the performance of participants to projects by getting data from various participants to the projects and only finalising them when all parties agree to the ratings given. 'No agreement then no rating', which reflects badly on both parties. The numbers can be causally combined mathematically around the project or used as an assessment for the individual firms. The idea of the balanced scorecard is being used. Contractors and clients are using the system, but not yet consultants. It was stated that this benchmarking initiative is addressing mainly contractor issues (the construction process); the system does not facilitate measuring the impact of projects within reform programmes.

3. Content of the reform programmes

- The project Process and Product Development (PPD) in Social Housing ran for eight years from 1994 and involved the building of 1600 dwellings by four consortia, each of which trialled a different approach. The consortium that probably made most progress worked to improve the process to deliver the traditional product. The generic approach included dividing the development work, and resulting ideas, from an initial project, so that the ideas could be fully built into the project, rather than being displaced by the main project requirements. The lessons from the initial project were then used to enhance the ideas and tested in another project, and so on. All the time an independent, "devil's advocate" team of four evaluators tracked and monitored the work. The project produced some new building systems and gained some industry advocates for new thinking, but hard to measure cost

and quality benefits. The phased approach was on balance good, but suffered from practical delays in continuity from one trial project to the next.

- The Urban Renewal project concerned 150 renovation projects of properties between 80-120 years old. Diffusion was weak beyond those involved and problems with unsystematic “local” evaluations made it clear that independent evaluation is essential. An interesting learning point was the power of maintaining multi-skilled teams of workers.
- In the Project Hus the phased approach as described in the PPD project was planned to extend over eight years after an initial two-year development phase. This initial phase went well with ten groups producing around 70 proposals and 1600 pages of reports. The task of each of these working groups was to investigate the state of the art concerning the specific themes and come up with a set of proposals, putting the clients in the driver’s seat. Then the project was stopped before the second phase could begin amid changes in Government departments, however, several of the ideas have been taken up.
- The Recycling and Cleaner Technology project covered all industries, but construction was represented with 120 projects. Recycling in Denmark is up 80%, but this is also linked to the use of taxation. The lesson is that using several levers in unison can be very powerful. The demonstration projects making it feasible and the taxation making it desirable.
- The fifth project, the Energy Research Programme, is different in character from the others as it has run for over twenty years (1979-2001) and had very significant impacts. The Energy Research Programme was stimulated originally by the oil crisis and a fear of over-dependence on foreign sources. The response to this initial stimulus has been tremendous such that Denmark is now a net exporter of energy owing to a 50% reduction in energy used per square metre of buildings. This success has blossomed into a real economic strength of Denmark, which is now a leading exporter of energy saving technologies. The success of the programme could be thought to be due to its long-term consistency of purpose, the expertise that built up, the tangible initial benefits and the wider benefits to a wide circle of stakeholders.

4. Procurement

– It is stated the public sector is a major client, who is able to influence the changes in the construction sector. Areas of attention that are mentioned are:
  - Increased use of new tendering and cooperation structures (PPP, new standard form of contract, partnering and agreements of incentives);
  - New architectural qualities (new industrialization, quality in partnering);
  - Common requirements/guidelines in the use of IT, digital tendering and bids, 3D projection, common project webs, delivery of operation data, digital handling of construction projects;

- Common requirements of key numbers and benchmarks.

– The tendering law from 1960s in Denmark has until the last couple of years demanded competitive tendering for both public and private sector projects. This now only applies to public projects, but even here for “experimental projects” can be done without tendering (if below EU limit) and it is expected that new regulations will soon allow “competitive dialogue” after the individual tenders have been received.
– The various Government departments (health, defense, education, etc) procure independently, but have a joint committee that establishes some general rules and this opens the possibility of the public sector being an exemplar in some cases.
– The Danish approach of partnering is stressing cooperation with dialogue, confidence and openness on the basis of common activities, targets and economical interests.
– The clients’ group’s view on partnering directly influenced legislation. Their approach is to use partnering carefully underpinned by traditional contracts that maintain the “traditional borders of responsibility”.
– There are no PPP/PFI projects as yet in Denmark, but from 1 January 2004 a directive demands that for all public sector projects a documented evaluation is made of the potential for PFI and partnering. It will also demand that data is made available for four main variables (quality, accidents, time and clients’ evaluations) to support benchmarking.

5. Promotion

In general, diffusion has been quite weak. This is partly due to the nature of demonstration projects (one off, project specific solutions that are mostly not translated into rules for durable change). There is a need to design diffusion and implementation strategies right from the start, including the appropriate use of other policy levers, such as taxes, education, regulations, etc.

The National Agency for Enterprise and Housing thinks in terms of implementation by using a combination of hard and soft mechanisms, ranging from workshops, reports, education to legislation and purchasing power.

6. Possible implications/themes for the Netherlands

- Make sure that it is clear from the start who is in the lead in PSIB, the ‘Regieraad’ or the Steering Group.
- Lengthy timescales should be envisaged if significant industry reforms are the objectives, say 8 –10 years.
- Demonstration projects can be a powerful way forward, but there are many practical issues to be addressed if they are to add up to more than the sum

of their parts. In particular systematic evaluation is essential. It also seems very important to separate the idea development phase from the building/demonstration phase.

- In order to realize the objectives of PSIB, also think of other tools than an R&D programme alone. A range of levers can be more effective than a single instrument. This can mean policy measures, but also extends to IT and the data infrastructure.
- A strong clients association like DACC, clustering major public and private clients, would be very useful for articulating the demand side. Demonstrating that their views are listened to and have impact must be important for the credibility of the initiative. Having a strong national FM association can positively support a shift to a stronger client orientation.
- The public sector as a major client can influence the necessary changes in the construction sector and this influence is probably needed to break e.g. the 'lock in' situation in which the building partners hold each other (all have to be willing to move to achieve significant change). In slight contradiction DK Government is standing back to let market do things, where it has traditionally use multiple mechanisms.
- The approach that demands that partnering / PFI are explicitly considered for public projects could be a useful model for a low level of action on chosen issues.
- Managing the market does not seem to be feasible (industrialisation). But linking together Government (public sector) demand around important themes could be a way forward provided it steers the market rather than trying to redirect it.

Appendix 9: Summary Norway

Summary

Norway

March 2004

Mission members:
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Norway

1. Background and Progress

Norway does not have a comprehensive reform programme for the building industry similar to PSIB. Nevertheless, the history of e.g. the introduction of quality management in the Norwegian building industry shows that a prolonged, joint effort of research institutes and (groups of) construction companies can have a large and positive impact, even on an international level. The driving force was – as still is in many developments in the building industry – the offshore industry 'coming to land'. Close relationships with the offshore gives the building industry a head start in some aspects, like quality management, cost engineering, planning, standardization and 3D modelling.

A series of smaller initiatives can be recognized from the early 1990's to date and all orientated towards the general theme of *conflict as a cultural trait in the construction industry*. This was evidenced in the traditional friction between engineers / architects and contractors regarding say turn-key projects. It is more systemically evident in the standard contracts that are set up to manage the *expected* conflict and so arguably institutionalise it (also see chapter 3).

Recently 'innovation' has become a very important theme, causing a significant shift in Norway of funding away from traditional technical research to support innovation research, in all for around 1000M Euros. The Norwegian Building Institute Byggforks and other research institutes are moving rapidly to meet this challenge.

IT is regarded as a key technology for the development of the building industry, especially in the Byggforsk environment. Again the offshore industry leads the way. It is stated that a "knowledge platform" is urgently needed using the new IFC / IFD standards. This latter is seen as the "DNA", or a new "backbone" for the industry. Seeing it another way, if people can be persuaded to be "willing" to change, such a platform may mean they are "able" to as well (problem of no-one being willing to change, but all failing as a result).

Also Life Cycle Costing (LCC) is an item of topical interest in Norwegian building industry. LCC assessment is mandatory for all public buildings, following a Norwegian LCC standard. This is initiated by Statsbygg, the Norwegian organization for Public Construction and Property (sister organization of the Dutch Government Building Agency). Public organizations rent facilities from Statsbygg; the rent is LCC based. It is stated that LCC enhances the industry's awareness of total cost of ownership and

client needs. LCC also provides Key Performance Indicators for benchmarking and the pre-calculation of new projects.

In 2003 a *common code of ethics* was agreed between the main associations in the building industry and then adopted by each association. This comprises a one-page summary with ten headings, which are expanded upon a bit in subsequent pages. The headings are concerned with: Compliance with the law, a concern for the environment, the necessity of reasonable profits for all involved, satisfying client's requirements, justice and respect for employees, fair dealings with competitors, cooperation and mutual respect, the use of contracts that balance the interests of the parties, disclosure of conflicts of interest, and no discrimination.

2. Set-up and Management of Reform Programmes

There are three organizations that are concerned with the programming and/or financing of research in Norway.

1. Norwegian Research Council. Defines research themes for all economic sectors, in cooperation with stakeholders in research and the industry (key persons, not associations). The annual budget is M€ 500, divided over basic/scientific research, comprehensive efforts and R&D for innovation (the latter since 2004). The main focus is on research. It is said to be relatively hard to get funding for initiatives in the building industry; apparently the Council does not consider Building & Construction very important.
2. Innovation Norway. Established in 2004, with an annual budget of M€ 500, sponsored by the Ministry of Industry & Trade and the Ministry of Municipalities and Regional Matters. Small and medium sized enterprises are the main target groups; therefore it is regionally organized. Innovation Norway is not so much involved in developing new knowledge, as in commercialising existing knowledge.
3. Nordic Innovation Centre, a small but strategically important funding organization. Supports and co-funds innovation projects that involve at least three Nordic countries (Norway, Sweden, Denmark, Finland, Iceland)

An interesting organization is the BAE, a "Cooperative Board of those involved in building, civil works and as owners". It has been around for many years, but now comprises the Directors of seven industry associations. Around about 1990 the *Minister of Industry in Norway made it clear that discussions with each association were not desirable and a single point of contact with construction was required* and this gave the BAE impetus as a mouthpiece for the industry. In the last three years there have been major annual meetings with Government for which much preparation takes place to identify major issues. Interestingly the various parts of Government with construction interests are now collecting around this forum, eg schools.

3. Content of the reform programmes

- In the early 1990's there was a NORSEK oil and gas initiative for partnering on construction. This led to some standardisation that facilitated partnering with some positive impacts in the offshore. Spill over to mainland construction much less than might have been expected. In part this limited overall impact was because of the effort needed to adapt / scale down the measures and, in part, owing to a lack of overlap between the companies in both sectors. However, *individuals* from contractors seconded to offshore projects *did carry some of the lessons* to a stream of quite major projects.
- In 1993 "Porter Study" of the Norwegian construction industry carried out for the BAE. This introduced the ideas of *"clusters", which reinforced the need to go beyond homogenous professional groupings*, and of "demanding customers". The ideas in this document are still considered relevant and useful, but in terms of the general industry they made very little impact ("the industry needs to learn to read").
- In 1995 a major programme of research from 1996-99 was established focused on "cooperation in construction" ("Samspill"). This introduced marketing notions of internal and external efficiency, typified as "doing things right" and "doing the right things". Different forms of partnering were tested in demonstration projects, e.g. the tendering of full design teams. The study built on the Porter study, but challenged value chain thinking as too linear and stressed the need to work *with* clients. It was enjoyable for those (often important players) involved and it resulted in a number of papers, but little impact in practice. Web-based material (some in English) is available on the web at http://samspill.interconsult.com and www.metamorfose.ntnu.no/english/index/php. The study could be said to have been a "basis for thinking".
- In 2001 a construction industry project on "cooperation and conflicts" was carried out for BAE. This was rooted in some disappointment at the only limited impact of the 96-99 programme. A project manager / facilitator from Byggforsk was commissioned and a *series of workshops was run with different combinations of stakeholders*. These met twice, first to identify the major areas of conflict between the parties and then, second, to explore possible solutions. This process came to similar conclusions to the previous major programme, but created much more industry *ownership* and led into the *identification of possible practical solutions*. A major learning point for all concerned was what they termed *"lock in". This is the fact that they all hold each other in a tight grip* so that no one can move without taking on considerable risk, but as a result they all lose. There is not a simple solution, but it is important mentally that the problem was better understood and *attention was now focused on "unlocking" the situation together*.
- The Eco-Build Programme ran from 1998-2002. This was based on 50 : 50, Government: industry funding, latter in cash and / or kind. The project didn't

really build from the Brundtland lead. It focused on sub-projects on waste, energy, etc and integrated design / management. A major finding was that, even in this particular area, it was clear that *more effective collaboration* was needed to address the issues. Working backwards this could be an indication of the broad range of area where benefits could be expected if more effective joint working was achieved.

4. Procurement

- Traditional procurement is dominant.
- Statsbygg was involved in Eco-Build and is since trying a "partnering" (Samspill) initiative where full teams (architect, consulting engineers and sometimes also a contractor in the role of consultant) were invited to enter a competition. Selection criteria were categorized as 'Collaboration' (30-40%), 'Benchmarking' (30-40%) and price (10-20%). The overall phasing was: briefing, pre-design, detailed design and building. Statsbygg can terminate the pilot after each phase. After the pre-design the project is turned into a Design & Build contract, using 'target pricing'. Increases above or savings below the target price are shared between client and team. Statsbygg feels that this was a very good competition, but found it very hard to judge 'cooperation'. It is expected that this type of Samspill will save costs, because integrated, discussed solutions are applied. This fits EU regulations on tendering as open and transparent. They expect to use samspill more for "traditional buildings" in the future, but not for complex high-risk projects. In discussion some doubt arose about this, as a partnering approach could be ideal for solving complex problems. It was stated that the private sector already used the partnering approach widely. In most partnering projects traditional contracts are underlying, just in case of conflicts.
- PPP (OPS in Norwegian) is used on a small scale in road building. Skanska pulled in engineering consultants in a bid on 50% "risk sharing" fee, which when the bid would be successful, could increase to a 150% fee. Consultants were very positive as the process design was driven towards maximising value. This trend towards recognising value over price has been progressing over last 5-7 years. The Norwegian Association of Consulting Engineers (RIF) developed a consultant selection template that suggests weighting various criteria of which price is only one, and one that is sometimes now as low as a 30% weighting, down from a more typical 80%. The net result is that the new arrangements in which consultants are not in traditional, key positions, such as turnkey or Design & Build projects, "don't seem so bad now!" in the eyes of RIF.
- Since a year ago all hospitals (with very few exceptions) come under central Government control and this has led to an interesting experiment in construction team selection for the new hospital in Trondeim. The main criterion used was how well the team worked together as assessed by a

system set up and administered by a psychologist. The implied argument is that get the right team and they will be able to deliver the project. Some doubts have been raised about the satisfaction of EU tendering regulations.

- The Ministry of Finance, of which Statsbygg is an agency, is not in favour of PPP/PFI; they feel that it is too costly during too long a time. Statsbygg is only in it because major construction companies keep asking it.

5. Promotion

Though the reform initiatives were quite good, only few people in the industry heard of them. Only firms that were directly involved benefited.

6. Possible implications/themes for the Netherlands

- Use of LCC can open up value discussions to be much broader. A broad legislative requirement can be a stimulant to this.
- The selection of teams based on weighted criteria had been successfully piloted, with significant attention to team working capacity. There does not seem to be any problem wit EU tendering regulations.
- The discussion seems to highlight that the private sector already does many of the things the public sector is considering.
- There is a lot of potential for organisations such as Statsbygg to make a big impact by leading through example.
- Reforms take time. The *movement of individuals* can be an effective vector of change.
- The private sector already automatically uses many aspects of “partnering” as simple common sense. Where they had a good relationship, they used people again.
- Arguably the public sector is limited by EU tendering regulations, but it does seem odd that things have to be “bureaucratic to be efficient!” Maybe the EU regulations are not as restrictive as they are perceived?
- Samspill (partnering) in practice very much resembles the Dutch ‘bouwteam’ concept.
- Clear selection criteria weighted towards soft factors such assessing complete teams for “team working” are possible and can lead to the value brought by all team members being valued.
- Links to an emphasis on samspill or “playing together” to overcome the “lock in” effect in which no-one can move unless all do, but all suffer.
- A common code of ethics, created and shared by all major stakeholder groups could be a good symbolic action – the Norwegian model appears comprehensive and well balanced.
- Creating a single forum of all major stakeholder groups connected to the industry (including clients) to communicate with Government can help

stimulate vertical integration. To achieve this the Government can indicate that it does not wish to speak to individual “horizontal associations.

- Facilitated workshops of combinations of stakeholder groups can rapidly identify conflict issues and practical actions to reduce / remove these conflicts.
- Open standards for accessing digital project data and general data are considered very important tools in the context of industry reform. ‘IFC/IFD as the DNA for the industry’.
- Start thinking now how the whole of the building industry can benefit from PSIB.

Appendix 10: Participants

Participants 1st international workshop

Ir. George Ang	Ministry VROM – Rijksgebouwendienst/PSIB PP1 Project Leader
Dr. Ir. Wim Bakens	International Council for Research and Innovations in Research and Construction CIB
Prof. Peter Barrett	University of Salford, UK
Ir. Rob Geraedts	Delft University of Technology
Prof. Roger Courtney	UMIST, Manchester, UK
Prof. Dr. Geert Dewulf	University of Twente
Prof. Dr. Ir. Andre Doree	University of Twente
Ir. Johan de Jongh	PSIB CUR
Ms. Martine Keizer	University of Twente
Ir. Jelle Koolwijk	Delft University of Technology
Ing. Peter Kole	Ministry of Traffic & Civil Works – Rijkswaterstaat
Ms. Ir. Inge de Kort	University of Twente
Ir. Jan van Oorschot	PSIB Cluster Leader Professional Procurement
Prof. Dr. Ir. Hennes de Ridder	Delft University of Technology
Ir. Dik Spekkink	Spekkink Consultancy & Research
Prof. Graham Winch	UMIST Manchester, UK

Participants 2nd international workshop

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Prof. Peter Barrett	UK Salford University / PSIB Mission 1
Dr. Wim Bremer	Ministry VROM – Rijksgebouwendienst/Research Co-ordinator
Prof. Roger Courtney	UK UMIST Manchester / PSIB Mission 2
Ms. Dr. Robine van Doorn*	Ministry of Trade & Industry/ DG Ondernemingsklimaat
Prof. Dr. Ir. Andre Doree	University of Twente
Ir. Rob Geraedts	Delft University of Technology
Dr. Joris Houben *	Ministry of Traffic and Civil Works/Secr Toplevel Steering Council
Ir. Johan de Jongh*	PSIB / CUR financial manager
Ms. Martine Keizer	University of Twente
Ir. Peter Kole *	Ministry of Traffic and Civil Works / PSIB mentor PSIB PP
Ir. Jelle Koolwijk	Delft University of Technology
Ms. Ir. Inge de Kort	University of Twente
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Ir. Theo Mulder	PSIB PP1 Mission 1 /Director Bureau PSIB a.i.
Ir. Jan van Oorschot	PSIB PP1 Mission 2 / Cluster Leader PP
Ir. Jaap van der Poll *	PSIB Cluster Leader Experimental Environments
Prof. Dr. Ir. Hennes de Ridder	Delft University of Technology
Ir. Dik Spekkink	PSIB PP1 Mission 1
Ir. Rick Stuylingh de Lange*	VROM-advisor Parliamentary Inquiry Committee

* = invited guest