MEASURING CONSTRUCTION COMPETITIVENESS IN SELECTED COUNTRIES

FINAL REPORT

The Research Team at the University of Reading

Roger Flanagan
Carol Jewell
Stefan Ericsson
Patrik Henricsson
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CHAPTER ONE

Introduction
INTRODUCTION

This research project began with an interest in construction industry competitiveness being expressed by construction federations in Sweden and Finland who were faced with negative reports by their governments about the construction industry. The UK government also expressed an interest in developing their work on competitiveness. Work on the project began in December 2003 at the University of Reading with the aim of developing a way to measure construction competitiveness.

A framework was developed into which the factors of competitiveness fit. This framework provides an explanation of the different facets of competitiveness and was based on Porter’s Diamond. The research team quickly recognised the need to adapt the diamond to reflect the characteristics of the construction industry and a Construction Competitiveness Cube (3D version) and Construction Competitiveness Hexagon (2D version) was developed.

The framework forms part of a toolbox that will allow companies, industries or nations to look at their competitiveness. The importance of the framework is not in achieving the ‘right’ answer as that depends on the question, but in taking people, organisations or industries through a process of understanding the factors of competitiveness, their relative importance and performance.

Background

Competitiveness is a concept that economists, industrialists, politicians, journalists and academics frequently refer to, debate and worry about. Countries see their competitiveness position and its trend as a reliable measure of success or failure of their policies, and take corrective actions to improve their position. The World Economic Forum (WEF) and the International Institute of Management Development (IMD) provide an evaluation of competitiveness at the national level, whilst rankings of corporations in business magazines can be considered an example of evaluation at the corporate level. Through studies like these, the knowledge of the role of competitiveness at the national and firm level has improved significantly, but its role at the industry level is often overlooked. This is particularly true for the construction industry. The success of a nation partly depends on the synergistic efforts of its constituent industries. Given that the construction industry usually counts for 5-10% of a nation’s GDP, it is vital for nations to increase their knowledge and understanding of competitiveness in the construction industry.

Despite widespread acceptance of its importance, competitiveness remains a concept that is not well understood, particularly in the construction sector. There have been very few reports on construction competitiveness, but many on productivity and benchmarking. The metrics and definitions used for both competitiveness and productivity are unclear (Tucker et al., 1999, p5). For example, UK national statistics show construction as having declining productivity; this is not reflected in project performance figures provided by companies, which show improvements in productivity on site and in the design office. The Center for Construction Industry Studies (US) looked at US Construction Labor Productivity Trends between 1970 and 1998 and concluded: “the reluctance of the Bureau of Labor Statistics to publish information on productivity due to a lack of reliability demonstrates this difficulty” (Tucker et al., 1997, p25).

The study

The research aims to benchmark the competitiveness of the UK construction sector with selected countries, and to identify the strengths and weaknesses of domestic construction sectors that influence sustainable competitiveness. This will be achieved through the answers to four important questions:

1. What factors influence competitiveness of the construction sector?
2. How can national competitiveness be measured for the construction sector?
3. How does the competitiveness of the UK construction sector rank when
compared with other selected countries?

4. How can the UK, Swedish and Finnish construction sectors sustain competitiveness?

The research has revealed that competitiveness means different things to different people and that there is no consensus on what is meant by competitiveness or how it is best measured. This is mainly due to the fact that studies have been carried out at different levels of analysis and ideological differences. According to Scott and Lodge (1985, p3) national competitiveness is "a country’s ability to create, produce, distribute and/or service products in international trade while earning rising returns on its resource".

However, for nations as well as for firms, competitiveness refers to an objective - a high and rising standard of living for its citizens and high, with rising returns on investment to its owners. Ideally, the measure of competitiveness should fully capture the definition. However, given the multi-perspective approach for this project, there is no single measure that covers all aspects of the concept. Instead, a set of measures of competitiveness are used, covering financial and production performance as well as client and employee satisfaction.

It is important to stress that the construction industry is not homogeneous; it has many sectors and several key stakeholders. So, while one measure of competitiveness may appear quite satisfactory from the perspective of one stakeholder, it may fail to recognize the viewpoints of others. Consequently, the definition for an industry needs to balance the needs and expectations of all relevant stakeholders. The key stakeholders of the construction industry are identified as investors, employees, clients and society.

The research team collected a large number of factors of competitiveness from their focus groups, interviews and an extensive literature review. The potential differences in importance between factors was acknowledged. The study covers the whole value chain (material suppliers, designers, engineering consultants and contractors) and both SMEs and larger firms. Furthermore, the role of government and clients are devoted special attention. The data to feed the Construction Competitiveness Cube (CCC) will be collected both quantitatively – from questionnaires and published sources – and qualitatively – from structured interviews.

Why improve competitiveness?

Globalisation has created an interconnected and interdependent world. It converts the world into a complex and multi-faceted dynamic place with free competition, free trade, financial deregulation, growth of exports and so on. Mobility of capital and a communications revolution has brought about time-space compression overcoming national boundaries. In the construction sector in the UK, the effects can be seen with the growth in imported construction components and materials, the increase in UK companies working overseas, and the rising number of components imported from low-wage economies.

The international debate about the construction sector has highlighted a number of areas where sector performance could be improved, such as better training and education, greater use of new technologies, better project management and innovative design. All countries can improve, but it must be a measured improvement and there are no baseline metrics for the performance of the UK or any other country.
CHAPTER TWO

Research Methodology
**QUESTIONNAIRE BASED SURVEY**

Based on the codes and size intervals of the companies presented in 'Defining the construction industry', page 25, a statistical sample size was calculated for Sweden in order to see if a questionnaire-based approach would be feasible. According to this calculation, the study would need to include a total of 1,642 companies to reach a representative sample for the Swedish construction industry. Furthermore, there needs to be a good sample of respondents in each company, and that the same approach must be used in all three countries in order for comparisons to be made. Questionnaire-based surveys within construction usually have a low response rate, sometimes as low as 35%, and so the research team decided that this approach was not feasible within the time and cost constraints of the project.

**INTERVIEWS**

As the questionnaire-based approach for collecting data was abandoned, interviews became the main source of collecting primary data. The need for a representative sample is not as great for interviews, as there is no statistical analysis of the results. Instead interviewees in strategic positions can be targeted using completely different criteria.

Using an interview-based approach for collecting the bulk of the data gives a chance to probe for more information during the interviews. This allows for a more complex story to be told, and issues and topics that the research team were unaware of at the design of the study could be incorporated. The results from the interviews could be challenged or supported using statistics from official bodies such as National Statistics UK, National Statistics Sweden, Statistics Finland and Eurostat.

An overview of the research methodology used in this study is illustrated in figure 1. More detailed information on how the primary data were collected can be found in the next section.

**DATA COLLECTION**

**Preparatory phase**

**Brainstorming workshops**

In an attempt to generate as many potential factors of competitiveness as possible, two brainstorm-oriented workshops were held, one each in Helsinki and Stockholm.
Stockholm

The workshop in Stockholm was attended by seven senior industrialists representing several sectors of the industry. It began with a short presentation by the research team. This covered a very brief introduction of the academic discourse on competitiveness, followed by the agenda for the day. The very varied understanding that different academic scholars have of competitiveness was highlighted in the presentation to make the attendants aware of the breadth of potential factors that could be covered. The general presentation was made in English, but the agenda for the day was presented in Swedish to minimise the risk of misunderstandings due to any language barriers. All facilitation during the workshop and the concluding discussion was carried out in Swedish.

The attendees were grouped together according to their profession, so that three relatively homogenous groups were created. One consisted of designers and engineering consultants, one of clients and the third of contractors.

The workshop was divided into four main tasks:

1. The first aimed at generating as many ideas as possible of what was considered important for the domestic construction industry’s sustained competitiveness. For this purpose each group was equipped with post-it notes, pens and a large sheet of paper. They were invited to write down as many factors they could think about, one on each post-it note, in about 20 minutes. This task could be done either individually or as a group.

2. Having named as many factors of competitiveness as possible, they were invited to group these factors under headings of their choice, and ascribe each group a weighting. The weighting was to be given as a percentage, according to how influential a group was on the overall competitiveness of the industry.

3. The third task involved looking at each grouping in depth to estimate the importance of each factor of competitiveness.

4. Finally, the attendants listed the five main strengths and weaknesses of the domestic construction industry.

The workshop concluded with a free-ranging discussion for over 30 minutes, where the groups were given a chance to explain their factors and the way in which they had chosen to group and weight them.

Due to time constraints, task number three was cancelled, so that more time could be put into the fourth and final task.

At the conclusion of the workshop, each group’s results were digitalised, and the discussion summarised and evaluated. Based on this evaluation, some minor changes were made for the workshop in Helsinki.

Helsinki

The workshop in Helsinki was modified slightly, based on the experience in Stockholm—Task 3 was not included.

This second workshop saw a larger number of attendants, 12 in total, but from equally varied sectors of the industry.

This time, as none of the research team spoke Finnish, the workshop was held in English. However, during the internal discussion in the groups Finnish was frequently used. As a result, the research team missed out on some of their discussion, but there were greater benefits in having the attendees speaking freely. An increased effort was made to understand the reasoning behind factors, grouping and weighting during the concluding discussion.

Preparatory interviews

Following the workshops, exploratory non-directive interviews were held with senior industrialists. As the purpose of the interviews were to discuss and validate the results of the previous workshop and not primarily to collect further data, there was no need for a representative sample of the industry. Instead the interviewees were all chosen as they had previously expressed a
sincere interest in the study, and held a broad knowledge of the Finnish/Swedish construction industry and how they operate.

There were two interviews in Helsinki, one with a representative from a nationwide research body, and one with a representative from the engineers and architects association. Interviewees in Sweden were with one professor, one client, one contractor, one consultant and one representative from the contractors’ confederation. Each interview was attended by two researchers.

The interviews were either held at the interviewees’ office, or at the office of the contractors’ confederation, and took between one and a half and two hours each. None of these interviews were recorded as there would be no strict analysis, instead notes were taken during the interviews. These notes were transcribed, and general impressions of each interview were added.

**Main phase**

The bulk of the data was collected through interviews and official statistics from a wide variety of sources. A Delphi survey was conducted to structure and explore the explanatory factors of competitiveness.

**Delphi study**

The Delphi method can be described as “a method of combining the knowledge and abilities of a diverse group of experts to the task of quantifying variables which are either intangible or shrouded in uncertainty” (Pill, 1971). It was originally developed in the 1950s by the Rand Corporation in a study for the US Airforce. The aim of the Delphi was to obtain a reliable consensus of opinion of a group of experts by using a series of intensive questionnaires interspersed with controlled opinion feedback (Linstone and Turoff, 1975).

The views of a group on the identified issues are collected through a series of iterations. At each iteration the ‘expert’ has the opportunity to see the responses of the entire group to the previous iteration. By utilising an iterative series of questionnaires sent out to a panel of experts, the Delphi method attempts to draw on a wide reservoir of knowledge, experience and expertise in a systematic manner, rather than relying on ad hoc communications with selected individuals (Ziglio, 1996). It enables the experts to change their previous assessments in the light of new information provided by their peers and project them beyond their own subjective opinions (Chan et al., 2001).

The method is especially suitable when time and cost constraints make frequent face-to-face meetings difficult to arrange. This is particularly true for studies geographically dispersed or, when participants are unlikely to set aside the time needed for e.g. a seminar. The Delphi method allows the experts to partake at their own pace, completing the questionnaires at a time suitable for them. The Delphi method may also be used when the heterogeneity of the participants must be preserved and anonymity assured to avoid the domination of the communication process by one profession, vested interest or strong personality (Ziglio, 1996). The experts in the competitiveness study never met face to face, nor were their identities revealed. This was done purposefully as power relationships have the ability to weaken the consensus process (Wright, 2004).

When conducting a Delphi study, it is important to bear in mind that although the group opinion has a higher probability of being correct than has the view of an individual, its success is dependent mainly on the selection of the experts participating in the study, and the formulation of the questions (Goldstein, 1975). Another major challenge of a Delphi study is to maintain a high response rate among the experts and in being able to judge if and when a consensus has been reached.

In a study aiming to test whether Delphi studies provide sufficient reliability and validity for supporting claims of it being a scientific methodology, Duffield (1993) arranged two different panels to look at the same issues and then compared the
results. The two panels both needed two rounds to reach consensus and the analysis indicated high degree of similarity between the panels, as they agreed on 93% of the issues. However, there are only a few studies undertaken that confirm Duffield’s results, which of course raises questions over validity, reliability and therefore the value of conducting Delphi studies (Bowles, 1999).

The Delphi method has been used in many fields of research where a consensus is required for complex problems. Although the method has been used for strategic planning for several decades, it has been applied to the construction industry only relatively recently (Chan et al., 2001). However, since it was first introduced, the Delphi method has been applied to many areas of construction, including procurement methods (Chan et al., 2001), bridge condition rating and effects of improvements (Saito and Sinha, 1991), and contractor selection (Mahdi et al., 2002).

The Delphi method was chosen as research method for this study as, according to Lindeman (1975), it is especially effective in difficult areas which can benefit from subjective judgements on a collective basis but for which there may be no definitive answer. Furthermore, Chan et al. (2001, p699) concluded that “the Delphi method is a powerful and appropriate technique for deriving objective opinions in a rather subjective area”.

Compiling the list of factors

For the purpose of this study, a comprehensive list of factors of competitiveness was collated. The strategy was to make the list as detailed as possible, by including factors without taking into account if something very similar had appeared earlier, and instead reviewing the entire list at the end of the compilation process. After having compiled a bid list of factors, those factors which conveyed similar meaning were combined and rephrased. Furthermore, some of the factors were similar, but at different levels of abstraction. These factors were combined together on what was agreed to be a suitable level for a study on an industry level, ignoring the most detailed factors. Having eliminated the superfluous factors, a list of 158 factors remained. The list was aggregated from six main sources:

2. The World Competitiveness Yearbook, an annual study by International Institute of Management Development.
3. The set of Key Performance Indicators developed by Constructing Excellence, UK.
4. Two workshops held in Finland and Sweden at an earlier stage of this project. The workshops were brainstorm-oriented with the purpose of generating factors related to the competitiveness of construction industries.
5. The study on construction industry competitiveness carried out by Momaya and Selby (1998).
6. EU communication on the competitiveness of the construction industry (COM (97) 539)

Selection and size of expert panel

As previously stated, forming the expert panel is a crucial part of a successful Delphi study. Despite its importance, there is no agreement regarding the size of the panel, nor any recommendations concerning sampling techniques (Williams and Webb, 1994). For this study, the panel of experts needed to cover as much of the construction industry as possible, but not exceed what was thought to be a manageable size.

Previous studies using the Delphi method have incorporated anything and everything between less than ten and more than 1658 experts (Dalkey and Helmer, 1963, Reid 1988). However, for a heterogeneous panel, a total of 5-10 experts have proved to be a good guideline (Delbecq et al., 1975; Uhl, 1983).

Using what Frankfort-Nachmias and
Nachmias (1996) refer to as a purposive sample, it was decided that the panel should consist of experts representing the four key stakeholders of the industry - owners, employees, government and clients (Henricsson and Ericsson, 2004). Furthermore, representatives from research institutions were added to provide more of an observer’s perspective of the industry. As this sample would constitute a highly diverse group of people, likely to have different perspectives of what requirements should be met by a competitive construction industry, a total of ten experts from each country was deemed sufficient for this study. This would also make it possible to keep personal contact with the respondents to ensure a commitment to the study; something that is crucial for a successful Delphi study (Corotis, 1981, Chan et al., 2001).

A study with such a small sample is highly sensitive to respondent’s biases. In an effort to reduce the risk of introducing biases depending on organisational priorities, the decision was made to use representatives from industry federations rather than individual companies. For example the Swedish Contractor’s Federation was approached to represent the Swedish contractors instead of a representative from a Swedish company e.g. Skanska or NCC. The end result was a panel consisting of ten people, one representative from each of the following perspectives:

- Contractors’ federation
- Architects and Engineering Consultants
- Material suppliers’ federation
- Trade union – managers
- Trade union – operatives
- Client association – occasional
- Client association – professional
- Academia
- Research institution
- Policy maker

Ziglio (1996) listed three criteria that should be considered when designing the expert panel: sufficient experience, special skills or knowledge of the subject; capacity and willingness of to contribute to the exploration of the matter under investigation; and finally, not to be underestimated, is the assurance that sufficient time will be dedicated to the tasks.

To meet the first criteria, people approached were of senior management level. Using respondents involved with decision making at a strategic level would ensure a capability to prioritise between the many issues suggested as factors of competitiveness. To ensure a high commitment by the experts, they were first sent an email inviting them to participate in the study. In the email, characteristics of the Delphi study were explained, as well as a brief summary of the research project. About a week after the initial email, the experts were approached by phone so that they could get answers to any questions they had about the study, and also to confirm that they had the time and the commitment required.

**Design of the questionnaire**

The Delphi questionnaire was distributed to the respondents via email. The first round was designed in two separate parts that together formed the basis for further investigation. Out of the thirty questionnaires sent out for the first round, 23 were returned, see Table 1. Firstly, the respondents were presented

<table>
<thead>
<tr>
<th>Country</th>
<th>Sent</th>
<th>Returned</th>
<th>Discarded</th>
<th>No of suggested factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finland</td>
<td>10</td>
<td>9</td>
<td>-</td>
<td>105</td>
</tr>
<tr>
<td>Sweden</td>
<td>10</td>
<td>8</td>
<td>1</td>
<td>109</td>
</tr>
<tr>
<td>UK</td>
<td>10</td>
<td>5</td>
<td>-</td>
<td>82</td>
</tr>
</tbody>
</table>

Table 1 Summary of the response rate for the first round
with the list of 158 factors, from which they were asked to choose the 30 most influential factors of competitiveness. It was stressed that their choice of factors should reflect the ones having the greatest impact on the construction industry, regardless of whether that impact is positive or negative in terms of competitiveness. The respondents were also invited to add factors of their own choice, should they feel that something was missing.

Having chosen their 30 most influential factors, the respondents were directed to rate each of their chosen factors’ importance on a scale from 1 to 5. As they had already prioritised the factors that were important, the scale went from important (1) to absolutely essential (5).

**Pilot**

Phrasing of the questions in a Delphi study is a delicate and important task (Goldstein, 1975). Misinterpretations of the meaning of one or several factors could lead to a skewed result, especially when using a small group of experts. To reduce the risk of such distortion, a small pilot study was conducted. The questionnaire was sent to a group of PhD students at the University of Reading, who were asked to comment on the phrasing of the questions and the overall design of the questionnaire. As a result of this, some factors were later rephrased and the order of them slightly revised.

**Interviews**

Having looked deeper into how to address validity and reliability issues when using a broad questionnaire-based survey, the research team decided to abandon this approach in favour of an interview-based approach.

**Selection of interviewees**

A total of 43 semi-structured interviews have been conducted, providing the bulk of the primary data used for this study. One of the benefits of using a qualitative approach such as interviews is that there are no strict requirements for a statistical sample in the same way as for a questionnaire-based interview. There were several requirements of the interviewees: firstly, they must cover all the main actors of the construction industry. The construction industry is by its nature very complex, with a huge number of specialised contractors, consultants and suppliers. Therefore, conducting interviews with every specialised sector was deemed impossible. Instead the industry was encapsulated by dividing it into a manageable number of sub-categories, which in broad terms, could be considered constituting if not all at least the vast majority off the actors involved in the sector. The following categories were used:

- Architects
- Consultants
- Contractors
- Clients
- Research organisation
- Policy makers
- Trade union

A further distinction was made between contractors operating mainly within housing, and those mainly focusing on non-housing projects. A similar distinction was also made for clients.

Secondly, consideration had to be given to the high degree of fragmentation within the industry. In all three countries, there is a huge number of registered companies. The majority of these companies are small or medium sized, whereas only a handful are large. For example in the UK, there are approximately 172,000 registered contractors, and of these, 88% employ eight people or less. The vast majority of the output is produced by the largest contractors, which therefore could be considered more important for the competitiveness of the industry. As a response to the challenge of market fragmentation it was decided to differ between the size of firms. Therefore, interviewees representing architects, consultants and contractors were to be chosen from both large and medium sized companies. The smaller companies were neglected, not because they were considered unimportant, but because it was believed that their input to the study would be less significant.

The third criterion was about the
expertise of the interviewee. It was clear that, by covering the whole construction industry whilst keeping the number of interviews at a manageable and affordable level, concerns of the validity of the data were inevitable. The need for increased validity was addressed by ensuring that the interviewees all had significant expertise in their field. Therefore only people at a senior management level, preferably CEO or similar, were approached. One could indeed question this choice by claiming that interviewees of middle managerial level such as site managers or project managers would have been able to provide a better view of how things work in the field. However, there were many topics to be covered by the interviews, and many of them were of strategic character, and so an interview with someone in a senior position within the organisation was considered more appropriate.

The fourth and final criterion for selecting interviewees was the number of interviews to be conducted. Given the reasoning above, it was decided that initially 15 interviews would be conducted for each country, equivalent to each of the perspectives mentioned above. Ideally, a larger number would have been chosen in order to reduce the risk of bias, but 15 interviews per country immediately took it to a total of 45 interviews. Instead of designing the study around a too large and potentially too resource-consuming sample, a review after 15 interviews was done. In case the preliminary analysis showed that there was still a need for further interviews, potential interviews would be approached at that time.

Table 2 below summarises the distribution of interviewees for each country, and the position they hold within their organisation.

### Design of the interviews

The interview guide was developed based on the literature review and the newly developed Construction Industry Hexagon. As explained in chapter five, the framework consists of one explanatory side and a set of competitiveness indicators. The interview guide was designed to provide some of the answers for the indicators, whereas the rest of the indicators would be covered by official statistics.

The following topics were covered in the interviews:
- Financial performance
- Production performance
- Client satisfaction
- Employee satisfaction
- Innovativeness
- Business ethics
- Sustainability

Each topic was covered by one to three

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**Table 2** The perspectives covered by the employees and the position held within their organisation

<table>
<thead>
<tr>
<th>Perspective</th>
<th>Position</th>
<th>Perspective</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contractor - large, housing</td>
<td>CEO</td>
<td>Engineering consultant – SME</td>
<td>CEO</td>
</tr>
<tr>
<td>Contractor - SME, housing</td>
<td>CEO</td>
<td>Material supplier, large</td>
<td>CEO</td>
</tr>
<tr>
<td>Contractor - large, infrastructure</td>
<td>CEO</td>
<td>Material supplier, SME</td>
<td>CEO</td>
</tr>
<tr>
<td>Contractor - SME, infrastructure</td>
<td>CEO</td>
<td>Policy maker/ government</td>
<td>Senior adviser or construction industry co-ordinator</td>
</tr>
<tr>
<td>Architect – large</td>
<td>CEO</td>
<td>Academia</td>
<td>Professor of building economics</td>
</tr>
<tr>
<td>Architect – SME</td>
<td>CEO</td>
<td>Client association – housing</td>
<td>Senior representative</td>
</tr>
<tr>
<td>Engineering consultant – large</td>
<td>CEO</td>
<td>Client association – infrastructure</td>
<td>Senior representative</td>
</tr>
<tr>
<td>Employees – Trade union</td>
<td>Director</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
broad questionnaire-styled questions similar to the ones used by the World Economic Forum in their studies, e.g. "Companies in the UK construction industry are (1= reluctant to absorb new technology, 4= willing to absorb new technology, 7= aggressive in absorbing new technology)?". Based on these broad questions the interviews were continued in a semi-structured manner, enabling plenty of room for follow-up questions and probes. This allowed for alternative scores and interpretations for different parts of industry. It was carefully emphasized during each interview that the story and the reasoning behind this score was more important than the score itself.

In general, the same interview guide was used for all interviews, although the time allocated for each topic depended on the interviewee's background and experience. In allowing the time allocated for each topic to be flexible, the interviewees' expertise in certain areas could be maximised. After some of the interviews, it became apparent that the interviewees were particularly hesitant to answer one particular question regarding the amount of rework in the industry. This could be because they possessed no knowledge of the topic or that it was poorly phrased and therefore they did not understand it. The question was considered the least important of the ones covered by the interviews and was therefore eventually omitted from the interview guide so that more time could be spent on the other questions.

Where and when
The majority of interviews were conducted over a period of six weeks in spring 2005. They all took place at the interviewee's office, or at another place chosen by the interviewee, and lasted between one and two hours. For most of the interviews, and always during the first five, the two main investigators attended each interview. This served two purposes: on the one hand, it allowed for the interviewer's performance to be monitored so it could be improved for the next interview. On the other hand it ensured that both investigators adapted the same style of interviewing so that the risk of a researcher inflicting bias to the study was minimised.

During the most intense periods, it was not feasible to have more than one researcher attending each interview. By that time however, a considerable number of interviews had already been performed and discussed between the researchers, so that the style of interviews could be kept unaltered.

Documentation
All interviews were recorded and later transcribed. The decision to use a recording device is delicate, as the respondent may feel threatened by it, or it could subconsciously affect the interviewee, and thus deteriorate the quality of the outcome (Remenyi et al., 1998). However, this risk is likely to be particularly important when the interview topic is of a sensitive nature. As these interviews were aimed at an industry level and not discussing the company's or any individual's performance or attitudes, the benefits of a more accurate rendition of the interview by using a recording device were seen as an advantage not a disadvantage. The interviewees were informed of the use of a recording device, why it was used and how the data would be treated, and were thereafter given the choice to do the interview with or without recording. There were no objections to recording in any of the interviews.

Not all interviews were transcribed word by word. Instead a technique was adapted where short sequences of the interview were transcribed at a time, allowing for a much swifter transcription. It is the research teams' sincere belief that this did not deteriorate the results in any way.

Collection of statistics
There are a lot of statistics on the construction industry and national economy in general available from official sources such as Statistics Finland, the Swedish Bureau of National Statistics and the UK office of National Statistics. Those institutions, together with a report from EUROCONSTRUCT, are the sources for most of the
Defining the scope of the industry

Most statistical data for the construction industry are organised according to a system called NACE, an international format for categorising and analysing statistical data. The hierarchy of codes presented in the section “Defining the construction industry” on page 25 has been used to specify requested items of data in some instances, mostly for number of firms, turnover and number of employees for different parts of the industry and employment size bands.

Reliability of statistical data

Statistical data must always be interpreted with caution, especially if comparing data between one country and another. Data can sometimes be collected in identical ways so that they are directly comparable, whereas in many cases there are some major differences. This report will not go into detail on the implications of reliability, or otherwise for the statistical data presented. However, as data is frequently used and referred to it is worth pointing out some major reasons for differences between the countries. These are some important differences between the countries in terms of health and safety statistics:

- **Different incentives to report the statistics.** Finland has an insurance based system, where reporting procedures are mainly based on the notification of the accidents to the insurer which could be either public or private. Sweden and the UK on the other hand utilise a non-insurance based system, where reporting procedures are mainly based on the legal obligation of the employer to notify the accidents to the relevant national authorities.
- **Different definitions.** An accident is reported as fatal in Finland and the UK if the victim dies within 1 year from the date of the accident. For Sweden there is no such limit in time.
- **Different industry structure.** Many statistics do not take into account self-employed people. There is a huge number of self-employed people in the UK compared to Sweden and Finland, where direct employment is much more common, and this will therefore inflict uncertainties.

Validity

Yin (1994) mentions three basic kinds of validity: construct, internal and external.

Construct validity is about establishing correct operational measures for the concepts being studied. This has been done mainly through using several sources of data. Furthermore, the interviews were carefully documented and transcribed prior to the analysis to avoid bias. The interviews were all recorded, and the name and position of the interviewee were noted. None of the transcriptions or interpretations of the interviews were sent back to the interviewees for control of accuracy. This is unlikely to have had any impact on the interviews for Sweden or the UK as they were all done in the interviewees’ native language. For Finland however, where a second language was used, checking that what the interviewees said was what they actually meant by asking them to proofread the interview could have increased the construct validity.

The internal validity is for explanatory or causal studies only, and refers to establishing a causal relationship whereby certain conditions are shown to lead to other conditions. In this case the report heavily relies upon the respondents' expertise for causality. It was not possible to do a study on each topic to verify that what the interviewees claimed to be a causal relation also had support in previous studies and academic literature.

The Hexagon Framework, around which much of the theoretical discussion circulates, is developed from several previous scholars’ opinions on competitiveness, as well as the result of workshops and the Delphi study. It should be seen foremost as a way of relating to the discourse of competitiveness, and is a way structuring factors of competitiveness. It does not claim any causal relationship...
between the factors and the competitiveness indicators

The discussion chapter in this report tries to do this by discussing answers given in interviews, and relating them to results from the questionnaire and observations as well as literature written by contemporary scholars. However, the same behaviour and attitudes could be traced back to more than one theoretical dimension, making the construction of a causal relationship a difficult process. Efforts were made to increase the validity through multiple sources of evidence, so called triangulation.

The results regarding the need for pre-expatriation training are likely to be valid for the three organizations when working on international projects, but are likely to vary depending on where the project is taking place.

Reliability

Reliability is about whether the evidence and the measures used are consistent and stable (Remenyi et al 1998). In other words, would another team of researchers have reached the same results at another time, using the same methods and techniques?

There are obvious risks of bias in that the bulk of the data was collected through interviews with only 15 industry experts. However, already after a few interviews, the aggregated story showed significant conformity. The remainder of the interviews confirmed the picture given by the first interviews, rather than adding a lot of new information.

The reliability of statistical data is, as described above, highly debatable. However, these concerns are mainly when comparing data from one country to data from another. Within the same nation, the statistical data is generally reliable.
CHAPTER THREE

Theoretical background
The research team has undertaken, and constantly continues to do so, an extensive literature review on the concept of competitiveness in general and, more specifically, how it relates to construction. This section presents the major findings from this review and is structured in the following way:

- Definitions of competitiveness
- Further characteristics of competitiveness
- Frameworks for analysing competitiveness
- Definitions of a construction industry

**COMPETITIVENESS**

**Definitions of competitiveness**
Given the wide-ranging nature of the concept, and the problems of application, it is not surprising to find that there is no unique definition of competitiveness. Different writers from different disciplines have contributed to the range of definitions, diverse in their nature for a number of reasons, for example:

**Different levels of abstraction**
The most common levels of abstraction are nation, industry and firm, but also studies of the competitiveness of products, tourist destinations and cities have been found. For more details on the different levels of competitiveness see Moon et al., 1995.

**Different foci**
As concluded by Buckley et al., 1988, some studies focus on the competitiveness of the process (e.g. the manufacturing or construction process), endowments (the traditional view of comparative advantage) or actual performance (e.g. financial performance).

**Different perspectives**
Waheeduzzan et al., (1996, p7) argues that “competitiveness is one of the most misunderstood concepts of the 1990s.”. The authors then go on to present a thorough picture of different perspectives of competitiveness — see Table 3

### Table 3 Different perspectives of competitiveness (from Waheeduzzan et al, 1996)

<table>
<thead>
<tr>
<th>Perspective</th>
<th>Indicators/measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comparative advantage and price competitiveness</td>
<td>Price</td>
</tr>
<tr>
<td>Broad schema and empirical studies</td>
<td>One or more of parameters such as, for instance, levels of technology, factor conditions, government policy and characteristics of the labour force</td>
</tr>
<tr>
<td>Strategy and management</td>
<td>Resources of the firm, structure of the organisation and other firm specific parameters</td>
</tr>
<tr>
<td>History, politics and culture</td>
<td>One or more of parameters such as, for instance, race, climate, power of the state and cultural values</td>
</tr>
</tbody>
</table>
Cited definitions

“Competitiveness is the degree to which a nation can, under free and fair market conditions produce goods and services that meet the test of international markets while simultaneously maintaining or expanding the real incomes of its citizens” (Report of the President’s Commission on Industrial Competitiveness, 1985).

“Competitiveness refers to a country’s ability to create, produce, distribute and/or service products in international trade while earning rising returns on its resources” (Scott and Lodge, 1985, p 3).

Competitiveness is “the degree to which a country can, under free and fair market conditions, produce goods and services which meet the tests of international markets while simultaneously maintaining and expanding the real incomes of its people over the longer term” (OECD, 1997).

Competitiveness “is about creating high skills, high productivity and therefore a high usage economy” (UK White paper on Competitiveness; HM Government, 1994).

Competitiveness is “the capacity of businesses, industries, regions, nations or supranational associations exposed, and remaining exposed, to international competition to secure a relatively high return on the factors of production and relatively high employment levels on a sustainable basis” (European Commission, 1994:17).

Competitiveness is “the ability of a country to achieve sustained high rates of growth in GDP per capita” (World Economic Forum, Global Competitiveness Report 1996, p19).

Competitiveness is “the ability of a country to create added-value and thus increase national wealth by managing assets and processes, attractiveness and aggressiveness, globality and proximity, and by integrating these relationships into an economic and social model” (International Institute for Management Development (The Economist, 01/06/96, p 84).

“A firm is competitive if it can produce products and services of superior quality and lower costs than its domestic and international competitors.” (UK White paper on Competitiveness; HM Government, 1994).

Competitiveness is synonymous with a firm’s long-run profit performance and its ability to compensate its employees and provide superior returns to its owners” (Report of the Select Committee of the House of Lords on Overseas Trade, 1985).

In the short term, competitiveness may be “equated simply with the real exchange rate” (Boltho, 1996).

“Competitiveness reflects the capability of an economy to attract and maintain firms with stable or rising shares in activity, while maintaining stable or increasing standards of living for those who participate in it“ (Storper, 1995).

In summary, national competitiveness often includes elements of successful trade performance in the international markets that will in turn lead to sustained and rising standards of living in terms of rising real incomes. In other words, the objective of the competitiveness of nations centres on human development, growth and improved quality of life. Firm competitiveness is related to market performance, with high productivity being the key to success. The objective of firm competitiveness, after having secured survival, is the creation of new growth options that create value for shareholders. Hence, competitiveness is associated with achieving an objective. In other words, competitiveness is not an end but a means to an end (Buckley et al., 1988).
**Competitiveness for the construction industry**

The only definition related to construction is the one developed by Momaya and Selby (1998). They argue, based on their definition of competitiveness in terms of financial performance, that “the first component of sector competitiveness may appear quite satisfactory from the perspective of an investor; however, it can fail to recognize viewpoints of some of the important stakeholders within the industry.” Instead “sector competitiveness is given as the extent to which a business sector (1) satisfies the needs of customers from the appropriate combination of the product-service characteristics such as price, quality, and innovation; (2) satisfies the needs of its constituents, for example, workers in terms of wages, safe workplace, training, and steady employment; and (3) offers attractive return on investment and the potential for growth” (Momaya and Selby, 1998, p642).

**Further characteristics of competitiveness**

Many authors have engaged in an intellectual debate about competitiveness and contributed to a wider understanding of the subject. Besides the variation of definitions, a number of other interesting characteristics of the concept are useful to consider. In short, competitiveness may be described as something that is:

- **Multi-defined**: There is no general, generic definition of competitiveness and hence the term is subject to misinterpretation and consequent confusion (Porter, 1990; Boltho, 1996; Chaharbaghi and Feurer, 1994; Lall, 2001; Cho and Moon, 2000).
- **Multi-measured**: There is no single, generic measurement of competitiveness. Instead, measurements vary with the definitions (Chaharbaghi and Feurer, 1994; Buckley et al., 1988).
- **Multi-layered**: Competitiveness may be applied at national, industrial and firm levels (Momaya, 2004; Lall, 2001; Nelson, 1992).
- **Dependent**: The meaning of competitiveness depends on the values of the stakeholders of the entity under investigation (Momaya and Selby, 1998; Chaharbaghi and Feurer, 1994).
- **Relative**: Every measurement of competitiveness needs to be looked at in a relative sense, either against some maximum, ideal level or against its peers (Chaharbaghi and Feurer, 1994; Lall, 2001).
- **Dynamic**: The factors that influence competitiveness change with time and context, e.g. as the national economy moves from a less to a more developed stage (Momaya, 2004; Cho and Moon, 2000).
- **Process**: Competitiveness involves assets, processes and performance, where processes turn assets into performance (Buckley et al., 1988; Crouch and Ritchie, 1999).

Several of these aspects are covered in the conclusions drawn by Waheeduzzaman et al., (1996, p21): "As a construct, competitiveness is a cause, an outcome and a means to achieving a given status level” and “Like beauty, the measurement, definition and understanding of competitiveness belongs to the eye of the beholder”.

**Measuring competitiveness**

A review of existing literature yields an array of measures of competitiveness—see Table 4. Buckley et al. (1988) concluded that there are three categories of competitiveness measures, each with a different focus:

- Actual performance,
- Generation of assets (potential)
- The process that turns a potential into performance.

Furthermore, there are different measures for different levels of abstraction: the national, the industrial and the firm level (Momaya and Selby, 1998). This section reviews the most common and general measures of competitiveness on the three levels, whereas the next section covers how competitiveness has been measured at the construction industry level.
The World Economic Forum (WEF) and the International Institute of Management Development (IMD) both produce annual reports on the competitiveness of nations. The methodology employed is very similar in both cases, and in fact the two institutes issued a joint report up until 1993. Both reports use a large set of competitiveness indicators and collect their data using available statistics and feedback from surveys with business leaders. A relative weighting between factors is applied and the results are presented in various rankings. For the WEF, the ultimate competitiveness ranking is based on annual GDP growth per capita whereas the IMD ranks nations based on the status of the conditions that are thought to determine how enterprises can compete (WEF, 2004; IMD, 2004).

### Composite indices

The World Economic Forum (WEF) and the International Institute of Management Development (IMD) both produce annual reports on the competitiveness of nations. The methodology employed is very similar in both cases, and in fact the two institutes issued a joint report up until 1993. Both reports use a large set of competitiveness indicators and collect their data using available statistics and feedback from surveys with business leaders. A relative weighting between factors is applied and the results are presented in various rankings. For the WEF, the ultimate competitiveness ranking is based on annual GDP growth per capita whereas the IMD ranks nations based on the status of the conditions that are thought to determine how enterprises can compete (WEF, 2004; IMD, 2004).

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Level of abstraction</th>
<th>Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composite index</td>
<td>Nation</td>
<td>Potential and Process</td>
</tr>
<tr>
<td>Trade related measures</td>
<td>Nation and industry</td>
<td>Performance</td>
</tr>
<tr>
<td>Profitability measures</td>
<td>Firm</td>
<td>Performance</td>
</tr>
<tr>
<td>Productivity measures</td>
<td>Nation, industry and firm</td>
<td>Performance</td>
</tr>
</tbody>
</table>

### Trade-related measures

For nations as well as for individual industries, the international, i.e. export, market share is a frequently used as a measure of competitiveness (Krugman and Hatsopoulos 1987). This measure, however, reveals nothing about the margin of that market share, thus making profitable market share a more informative measure (Buckley et al. 1988). By including imports as an element for measuring competitiveness, balance of trade figures serve as an established measure of international performance at a national level (Krugman and Hatsopoulos, 1987).

Currency exchange rates are strongly related to international trade patterns and Boltho (1996) argues that, in the short term, the competitiveness of a nation can be surrogated by the real exchange rate.

### Profitability measures

Various profitability measures are often used for measuring the competitiveness of firms. Return on sales reveals how much a company earns in relation to its sales, return on assets determines an organisation’s ability to make use of its assets, and return on equity tells what return investors are getting for their investment.

The advantages of financial measures are the ease of calculation and that definitions are agreed worldwide (Tangen, 2003). However, despite the wide use of profitability measures, their shortcomings have been well documented; see for example Bourne et al., 2000.

Among the criticism is that financial information is constantly lagging by at least one reporting period and hence only shows the outcome of decisions that have already been made (Bassioni et al., 2004). Moreover, the narrow focus on the bottom-line may pressure managers into short-term maximisation and consequently discourage longer-term beneficial improvements (Crawford and Cox, 1990). The third criticism is that financial measures do not accurately penalise overproduction or appreciate the cost of quality (Bitichi, 1994).

### Productivity

Productivity often serves as a surrogate for competitiveness and may be applied both at the national and industrial levels as well as for individual firms (Buckley et al., 1988). Generally speaking, productivity measures describe the relationship between produced goods and services (output) and used resources (input), but an important distinction needs to be made between partial and total productivity measures:

<table>
<thead>
<tr>
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<th>Focus</th>
</tr>
</thead>
<tbody>
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</tr>
<tr>
<td>Productivity measures</td>
<td>Nation, industry and firm</td>
<td>Performance</td>
</tr>
</tbody>
</table>

Table 4 An overview of the focus and level of abstraction of the reviewed measures

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*Source: Data from WEF (2004) and IMD (2004)*
Partial productivity measures output levels in relation to one source of input, e.g. time, labour, capital or energy whereas total productivity measures calculate output levels in relation to the total sum of input resources (Tangen, 2003).

The main advantage of partial measures is that normally they are easy to feed and actually measure the reality. Moreover they are easy for the workforce to understand and the reasons behind any improvements can more easily be tracked (Sumanth, 1994). The most used partial measure is labour productivity, often measured as output per man-hour or per employee (Tangen, 2003).

The major objection to partial productivity measures is that they miss out on interrelationships between factors, perhaps most importantly the relationship between capital investment and labour productivity (Grossman, 1993). In this case, heavy investment in equipment and logistics may be omitted and forgotten if labour productivity is used as the single measure. Hence, partial productivity measures may be very misleading if used on their own (Sumanth, 1994).

**Competitiveness versus productivity**

According to Porter (1990), productivity is the only relevant measure of competitiveness. Furthermore, several definitions of competitiveness, for example the one developed by the OECD, orientate themselves around the challenge for nations, industries or firms to succeed in meeting the test of international markets and, to simultaneously maintain and expand the real income of people/employees (Tyson, 1992). Hence, it appears that productivity is the key to competitiveness, as it is solves the equation of how to simultaneously achieve optimal value for money and high wages. Thus “higher productivity is the synonym of improved competitiveness” (Wysokinska, 2004, p 12).

But why then is productivity not used as the one and only measure of competitiveness? The answer, according to Buckley et al. (1988, p 195) is that “there is an element in competitiveness which is not present in efficiency (productivity) and that element is the choice of the most appropriate objectives. In other words, competitiveness includes both efficiency (reaching goals at the least possible cost) and effectiveness (having the right goals)”.

**Models and analytical frameworks**

This section reviews various competitiveness frameworks and how these have been applied to the construction industry. For further discussion, it is important to note the cause-and-outcome relationship between the measurement of competitiveness and the understanding and explanation of it. Interestingly, one major criticism of the model used by the World Economic Forum (WEF) in their Global Competitiveness Report, is “that the model does not clearly differentiate between the factors which determine competitiveness of a nation (i.e. causes of competitiveness) and the indicators used to measure its competitiveness (i.e. outcomes)” (Destination Competitiveness, 2001, p 121).

The frameworks of competitiveness found in the literature can be divided into three categories, those that:

- Measure competitiveness
- Provide an explanation and understanding of competitiveness
- Integrate the explanation and measurement

**Frameworks for measuring competitiveness**

This section introduces two frameworks that have been developed with the main objective of producing an ultimate competitiveness score. The score would then enable an assessment of one company’s competitiveness compared with another.

**The three dimensions of competitiveness**

Chaharbaghi and Feurer (1994) introduce a framework for measuring firm competitiveness. They suggest that
a system for measuring competitiveness is dependent on “an organisation’s perception of customer and shareholder values, the competitive environment and the drivers that determine competitiveness in that environment” (Chaharbaghi and Feurer, 1994, p 54).

The model comprises three dimensions; Customer values, Shareholder values and Ability to Act and React. Each of these dimensions may be quantified using various criteria: e.g. cost and speed; financial key ratios; and financial terms or non-financial terms, e.g. innovativeness or risk management for the three dimensions respectively.

Together, these three dimensions build up a ‘room’ in which the organisation may map itself in relation to its competitors. The final position in this room “reflects the trade-off between satisfying customer and shareholder values and maintaining financial strength” (Chaharbaghi and Feurer, 1994, p 58). This framework has not appeared in any assessments, or been applied to any industry or firm case.

The Total Value Competitiveness (TVC)
This is a computer-aided decision support system, produced to enable a contractor to assess their own competitiveness, or for a client to assess the contractor’s competitiveness. Although it was specifically designed to suit the Chinese construction industry, the methodology may be of use in other countries.

Based on criteria identified by Li and Shen (2002), Shen et al., (2003) organised their TVC-framework in a three-level hierarchical structure. As illustrated in figure 2, the top-level parameters are; Social influence (CM-A), Technical ability (CM-B), Financing ability and Accounting status (CM-C), Marketing ability (CM-D), Management skills (CM-E) and Organisation structure and Operation (CM-F). Each of these parameters in turn have sub-categories and sub-sub-categories; in all there are 98 criteria, to enable assessments at different levels of the organisation. For each of the 98 criteria, there is a benchmark book that provides a benchmark score from 0 to 100. Furthermore, in order to acknowledge the varying importance of the various criteria, Shen et al., (2003) provide a weighted matrix for each of the different levels of the framework.

Frameworks for understanding competitiveness
This category of frameworks represents attempts to understand and provide an explanation to why some nations, industries or firms meet their objectives better, i.e. more efficiently, than their competitors.

The Diamond framework
By far the most established, applied and debated framework on competitiveness is the ‘Diamond Framework’, introduced by Porter (1990). He investigated why firms based in a particular nation are able to create and sustain competitive advantage against the world’s best competitors in a particular field. Porter concluded on a wide range of factors that influence, determine and explain this international success and categorised these factors under four
determinants, which were arranged in the shape of a diamond - see figure 3.

The first determinant, *Factor conditions*, covers factors related to human, physical and knowledge resources. *Demand conditions* describes the size, structure and sophistication of the home market demand for the products and services of a particular industry. *Related and supporting industries* reflects the presence or absence of internationally competitive related and supporting industries of a particular industry in a nation. The fourth and final determinant, *Firm strategy, structure and rivalry*, includes the strategies and structures of firms as well as the nature of domestic rivalry. For a more comprehensive description of the framework, see Porter (1990) and for examples of its proponents, its critics and the general debate, see Cho and Moon (2000) and Davies and Ellis (2000).

Ofori (1994) used the Diamond framework to formulate a long-term strategy for Singapore’s construction industry. Ofori and Betts (1994) found it to be a framework suitable for strategic planning in construction. Öz (2001) applied the Diamond framework to the Turkish construction industry in order to find its sources of competitive advantage.

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**Figure 3**  Porter’s Diamond framework

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**Figure 4**  The Generalised Double Diamond framework

As a result of the debate on whether or not Porter had dealt with multinational activity properly, Rugman and D'Cruz (1993) introduced the so-called *Double Diamond*, and applied it to Canada, Hodgetts (1993) to Mexico and Cartwright (1993) to New Zealand. As a next step Moon, Rugman and Verbeke (1995) generalised the *Double Diamond*, see figure 4 below, which, they suggest, will suit all countries and appropriately incorporate multinational activity (Cho and Moon, 2000). The *Generalised Double Diamond* was later applied and tested on Korea and Singapore (Moon, Rugman and Verbeke, 1998).

In figure 4 the inner-most diamond is identical to Porter's original diamond. The outer-most diamond is also identical in terms of the four determinants, but represents the global context. The dotted diamond is the result of the national diamond as well as international or multinational activities (Cho and Moon, 2000).
The extensions of Porter’s diamond framework have not received very much attention, but they serve as a good starting point for analysis of the interaction between a nation’s home base and the global context in which industries operate. Mutti (2004) adapted the Double Diamond for assessing the competitiveness of Brazilian contractors in the international market.

**The Nine-factor framework**

A second extension of Porter’s diamond is presented by Cho (1994). He suggests a regrouping of factors into two main categories: Physical factors and Human factors. The first category includes; endowed resources, the business environment, related and supporting industries and domestic demand. The four human factors are: workers, politicians and bureaucrats, entrepreneurs, and professional managers and engineers. Cho’s main argument is that the human factors manage and utilise the four physical factors to drive the national economy from one stage of international competitiveness to the next (Cho and Moon, 2000). This framework does not appear to have received any further attention or development.

**The competitiveness triangle**

A fourth and final framework for understanding and explaining competitiveness is the Competitiveness Triangle, proposed by Lall (2001). It is similar to Porter’s Diamond, but whereas Porter (1990) investigated what factors build up national productivity, Lall focuses her analysis on “the markets within which enterprise learning takes place and the failures that each market is liable to suffer” (Lall, 2001 p 20-21). Lall “puts government policy in the centre of the action”, while Porter places the role of government as an exogenous factor (Lall, 2001, p 21).

The Competitiveness Triangle contains three inter-connected determinants. Incentive markets, includes a nation’s macroeconomic management and trade policies and characteristics of the industry and home demand. Factor markets focuses on skills, especially technical skills, and finance for, and information on, technology. Institutional markets refers to bodies that support technological activities and development, e.g. institutions for R&D and training and development.

The Competitiveness Triangle has not been applied in any practical case study or received any further attention in the academic literature.

**Frameworks that integrate measurement and understanding**

The final category of frameworks includes those that integrate the measurement and understanding of competitiveness.

**The APP-framework**

Buckley et al., (1988) noted that definitions and measures of competitiveness vary, and distinguished three different views of competitiveness - the ability to perform well, the endowment of assets, and the management process. They concluded that all three perspectives must be included in order to reach a satisfactory view of a nation, industry or firm’s sustainable competitiveness.

This school of thought was later adapted by the WEF and the IMD in the 1993 World Competitiveness Report under the name of the world competitiveness formula: Assets (potential) x Processes = Performance (IMD and WEF, 1993).

The terms Assets, Process and Performance were adopted by Momaya (1998 and 2004) and Momaya and Selby (1998) to become the cornerstones of the APP-framework, see figure 5.

The first category, Assets, represents elements that traditionally have been considered as key sources of competitiveness, but which are “dormant factors unless they are transformed by competitive processes” (Momaya, 1998, p 41). Momaya focuses strongly on the competitive processes, as he views these to be the key to sustained competitiveness (Momaya, 1998 and 2004).

The APP-framework has been used by
Momaya and Selby (1998) in their study of the international competitiveness of the Canadian construction industry in comparison with Japan and the USA. To quantify competitiveness, they used 95 non-weighted criteria, which were collected through surveys and published statistics. A summary of the project’s review of competitiveness frameworks is shown in Table 5.

**DEFINING THE INDUSTRY**

The United Nations defines construction as comprising “economic activity directed to the creation, renovation, repair or extension of fixed assets in the form of buildings, land improvements of an engineering nature, and other such engineering constructions as roads, bridges, dams and so forth.”

However, the United Nations guidelines distinguish between construction activity, which may be carried out by any unit irrespective of its predominant activity, and the construction industry, which is confined to those units whose predominant activity falls within Category F (Construction) of ISIC Rev 3. ISIC is the United Nations International Standard Industrial Classification of All Economic Activities. This classification is the international standard for the classification of productive economic activities. The main purpose is to provide a standard set of economic activities so that entities can be classified according to the activity they carry out. The EU’s classification is called NACE and the ambition is to make these identical.

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**Table 5: Summary of frameworks for competitiveness analysis**

<table>
<thead>
<tr>
<th>Framework</th>
<th>Author, year</th>
<th>Level</th>
<th>Focus</th>
<th>Applied to construction</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Three Dimensions</td>
<td>Feurer and Chaharbaghi, 1994</td>
<td>Firm</td>
<td>Measurement</td>
<td>No</td>
</tr>
<tr>
<td>Total Value Competitiveness</td>
<td>Shen and Lu, 2002</td>
<td>Firm</td>
<td>Measurement</td>
<td>Yes</td>
</tr>
<tr>
<td>The Diamond</td>
<td>Porter, 1990</td>
<td>Nation, industry</td>
<td>Understanding</td>
<td>Yes</td>
</tr>
<tr>
<td>The Double Diamond</td>
<td>Moon, Rugman and Verbeke, 1995</td>
<td>Nation, industry</td>
<td>Understanding</td>
<td>Yes</td>
</tr>
<tr>
<td>The Nine-Factor Model</td>
<td>Cho, 1998</td>
<td>Nation, industry</td>
<td>Understanding</td>
<td>No</td>
</tr>
<tr>
<td>The Competitiveness Triangle</td>
<td>Lall, 2001</td>
<td>Firm</td>
<td>Understanding</td>
<td>No</td>
</tr>
<tr>
<td>Assets-Processes-Performance (APP)</td>
<td>Buckley et al., 1988; Momaya and Selby, 1998</td>
<td>Nation, Industry and Firm</td>
<td>Integration of understanding and measurement</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Previous work on measuring construction industry competitiveness

Momaya and Selby, 1998

Momaya and Selby (1998) conducted a comparison of the competitiveness of the Canadian construction industry in relation to that of the USA and Japan respectively. They adapted the framework developed by Buckley et al. (1988), which was also used by the WEF and IMD in formulating the so called competitiveness formula in the 1993 World Competitiveness Report (IMD and WEF, 1993), and hence structured their analysis in the categories of Assets, Process and Performance. In total, Momaya and Selby used 95 criteria to measure construction industry competitiveness and fed their framework using both available statistics and industry experts’ opinions obtained from questionnaires.

The conclusion was that the Canadian construction industry is competitive in terms of performance, but scores poorly on process and assets. This creates doubts about the industry’s future performance. Conversely, the Japanese industry gets good scores on assets and processes, but poorly on performance. The USA, finally, scores positively on assets, but negatively on both processes and performance.

Considering the three dimensions together, Japan was the most competitive construction industry of the three (16.49 as the total score), with the USA second (2.54) and the Canadian last (-13.95).

Öz, 2001

With the aim of identifying the competitive advantages that made Turkish contractors so successful in the international market places, Özlem Öz of the Middle East Technical University, Ankara, applied Porter’s Diamond framework to the Turkish construction industry. Her analysis, which is primarily based on interviews with 21 senior industry experts, concludes that the factors behind the Turkish success go beyond those factor conditions and chance events of “labour cost
advantages and geographic and cultural proximity to several promising markets.” Another important source of competitive advantage is the dynamic competition and rivalry in the domestic market, which puts pressure on companies to constantly upgrade its operations.

The analysis of the Diamond also points out a series of competitive disadvantages, for instance “financing difficulties and the weak international position of the Turkish design engineering and consultancy services industry.”

Finally, Öz’s analysis underlines the significant role played by the Turkish government.

**DTI 2004: Experian and UCL/Davis Langdon Consultancy**

In 2004, the UK Department of Trade and Industry (DTI) commissioned an investigation of the competitiveness of the UK construction sector. In fact, two parallel studies were carried out, one by University College London and Davis Langdon Consultancy (UCL/DLC) and a second by Experian Business Strategies (EBS).

In the UCL/DLC report, the authors admit that “the measurement of industrial productivity generally is problematic and the measurement of productivity in the construction industry is particularly difficult” (UCL/DLC, 2004, p 1). They use data provided by O’Mahony (1999), O’Mahony and deBoer (2002) and the UK National Institute of Economic and Social Research (NIESR) database and present the rates and trends of labour productivity (LP) and total factor productivity (TFP) of the construction sectors in the UK, USA, Germany and France.

It is concluded that, based on the 1999-figures, labour productivity per hour worked in the UK (100) compares well with that of Germany (101) but is below the USA (114) and France (108). As for TFP, the level of the UK (100) is in line with the USA (102) and France (98) and above that of Germany (85). The authors underline, however, that “the gaps in productivity levels are well within the margin of error of the data” (UCL/DLC, 2004, p 6).

The EBS report presents data for 1999 provided by the respective national accounts and concludes that “the overall evidence suggests that construction in the UK is no less productive than that in France and Germany but there is a large productivity gap between these countries and the USA” (EBS, 2004, p 2).

As for LP per person employed, using UK as the index of 100, the USA is top on 135, so having a significant LP advantage over France (96) and Germany (90). However, since UK construction workers work longer hours, the UK LP per hour worked is below that of France and Germany.

As for TFP, the US productivity advantage is intact, but instead UK TFP is higher than that of France and Germany, whether it is either based on per person employed or per hour worked.

When comparing the two studies, there is agreement on the fact that the USA has created a productivity advantage. However, this gap is much wider in the EBS study than in the UCL/DLC, especially for TFP-figures. Apart from that difference in results, both studies point out that UK TFP is higher than France and Germany, whilst UK LP per hour worked is lower than both European competitors. Also, both studies agree that France scores higher than Germany whatever the measure.
CHAPTER FOUR

Analysing construction competitiveness — the 5D challenge
**THE 5D-CHALLENGE**

Analysing competitiveness involves defining the concept and deciding on the measurement. From a review of the plethora of definitions, measurements and frameworks, it becomes obvious that competitiveness is a multi-faceted concept that may be analysed, defined and measured in a number of ways. In fact, there is no single approach to be used. Instead each research team should choose its approach based on the purpose of the research, the desired level of detail and time and cost constraints. The broad range of possible approaches is built on five dimensions:

D1 – Stakeholder perspective
D2 - Level of abstraction
D3 – Time dimension
D4 – Focus
D5 – Space boundary

The section below presents the five dimensions and its sub-dimensions.

**Stakeholder perspective**

Firstly, the approach to the analysis of competitiveness depends upon what stakeholders feel is important. The approach preferred by one stakeholder, may not suit another, and so a major challenge is to balance different stakeholders’ needs and to decide on an approach acceptable to everyone.

Potential stakeholders are: owners/shareholders, CEOs, employees, clients, trade associations, regulators and overall society — see Figure 6.

**Level of abstraction**

The choice of approach will depend on the level of abstraction of the study—see Figure 7. At the project level, a much higher level of detail can be reached in the measurements of say time, cost, defects and accidents. Studies at the project level can be used as case studies to investigate the linkages between a certain cause (e.g. time spent and extent of interaction among project actors) and outcome (time delivery or amount of rework) in order to identify best practice of project management.

*Figure 6  The stakeholders of the industry*

*Figure 7  Level of abstraction*
At the firm level, all projects completed in one fiscal year may be aggregated to show the firm’s performance in delivery and profitability. However, firms are often interested in more overall financial and market performance, which is not covered by the project approach.

By moving one level higher, to the industry level, the analysis is likely to lose a significant level of detail. Often, a valid sample of projects or firms’ performance is aggregated to represent the industry’s performance. However, whilst this gives an interesting overview, it makes very difficult to analyse cause-outcome-relationships.

**Time**

Most studies on competitiveness focus on an organisation’s performance, e.g. profits, productivity or past market shares. An alternative approach (see figure 8) is to try to assess the organisation’s future capabilities to make profits, grow or dominate the market. Obviously, for studies on future capabilities, the actual outcome is a matter of wait-and-see.

*Figure 8 The time dimension*

![Diagram](image1)

**Focus**

Buckley (1988), Momaya and Selby (1998) and DC (2001) all underline the need for an analysis to differentiate between the factors which determine competitiveness (i.e. causes of competitiveness) and the indicators that are used to measure competitiveness (i.e. outcomes), see figure 9. Added to this is the method of measurement and collection of data for the variables identified as being measures of competitiveness.

Alternatively, this dimension could be described as the difference between potential and performance. A potential provides strengths and advantages, but does not guarantee results. Performance, on the other hand, reflects results, actual outcome.

**Space**

Many definitions of competitiveness include an element of performance in the international market place. However, in some instances it is relevant only to investigate an organisation’s or industry’s performance in the domestic environment—see figure 10. This is especially true for construction, as it is still a local industry encircled by national borders with most of the labour being local, the materials procured locally, and the codes and regulations relevant to local conditions.

*Figure 10 The space dimension*

![Diagram](image2)

**Describing the approaches**

This section reviews and briefly describes potential approaches to analysing construction competitiveness.

**Production process performance**

*Cost and time of a hypothetical project*

The purpose of this type of study is to compare the cost and duration with which a hypothetical project could be delivered in a series of countries. The hypothetical project description is sent to key project actors, e.g. an architect, consultant and a contractor, who then calculate what it would take to deliver the project. In order to make relevant comparisons, input costs are adjusted to the national price levels and the resulting costs converted into a comparable currency or scale, often using purchasing power parity (PPP).
Productivity measures describe the relationship between produced goods and services (output) and used resources (input), but there is an important distinction that needs to be made between partial and total productivity measures: partial productivity measures output levels in relation to one source of input, e.g. time, labour, capital or energy whereas total productivity measures calculate output levels in relation to the total sum of input resources (Tangen, 2003).

Ofori (2001) suggests that the indicators to measure the success of the construction industry should include ‘total value added’ and ‘value added per worker’.

Features of approach
- Interesting to several stakeholders: CEO, client, trade associations and government
- Can be applied and compared at the project, firm or industry levels
- Measures an outcome, but can certainly be the starting point for investigating the causes of why one country, firm or project achieves the higher productivity
- Results of past performance
- Used to indicate domestic performance and trends of firms or the industry, as well as for inter-country comparisons

Traditionally, the basic criteria to project success have been time, cost and quality (Chan and Chan, 2004; Love and Holt, 2000), a trio named by Atkinson (1999) as the ‘iron triangle’. More recently, various commentators have added additional criteria, e.g. satisfaction of interpersonal relationships with project team (Pinto and Pinto, 1991), absence of legal claims (Pocock et al., 1996), and transfer of technology, environmental friendliness and health and safety (Kumaraswamy and Thorpe, 1996).

Several authors have made an attempt to organise these different indicators to project success into conceptual frameworks:

- The four dimensions of project success (Shenhar et al., 1997)
- The process, the system and the benefits (Atkinson, 1999)
- The micro and macro viewpoint (Lim and Mohamed, 1999)
- The success dimensions and measures (Sadeh et al., 2000)

Chan and Chan (2004), have comprehensively reviewed different
contributions to the abundance of indicators to project success and presents a consolidated framework illustrated in figure 11.

**Key Performance Indicators**

Perhaps the most tangible set of indicators actually used in the industry, is the set of Key Performance Indicators (KPIs), established by the UK construction best practice programme Rethinking Construction, now called Constructing Excellence. It was launched in response to the Egan Report (1998), for the annual measurement of the construction industry's performance. The indicators are for both project and firm level and are derived from the objectives set out by Egan (1998). The KPIs are the result of aggregated data from a representative sample of projects, where both clients and contractors provide the required information, some qualitative, some quantitative.

The idea behind the KPI system is to establish a national benchmark for the construction industry, against which companies can measure themselves and identify their strengths and weaknesses. This could then serve as the basis for improvement or marketing purposes.

The set of KPIs formulated for the UK construction industry had, by October 2005, been adopted by Chile, South Africa, New Zealand and Canada, and is thereby the most widely spread standardised set of industry performance indicators suitable for inter-country comparisons.

However, the KPIs have received criticism, perhaps most notably that they focus solely on measuring performance and so, as they do not give insight into the means of improving performance, are of limited use to intra-organisational management decision making on how to improve performance. This goes back to the earlier observation that some frameworks focus on measuring performance or competitiveness, others focus on the understanding of it and the third category integrates the two. For a comprehensive picture of the criticism, see Kagioglou, 2001.

**Competitive deliverer**

A set of performance indicators like the KPIs can be used to assess to what extent a firm is a competitive deliverer, i.e. does a firm achieve competitive deliveries and make a profit at the same time?

Features of approaches of project success
- Interesting to several stakeholders: CEO, client, trade associations and
government
• Are applied at the project level, but can be aggregated to indicate the performance of a firm or industry
• Measures an outcome, but can certainly be the starting point for investigating the causes of why one project, firm or country achieves the higher project success
• Results of past performance
• Used to indicate domestic performance and trends of firms or the industry, as well as for inter-country comparisons

Financial performance

Profitability
Various profitability measures are often used for measuring the competitiveness of firms. Return on sales reveals how much a company earns in relation to its sales, return on assets determines an organisation’s ability to make use of its assets, and return on equity gives the level of return investors are getting for their investments.

Wider view
Even if profitability measures are the most frequently used, there are situations where a wider set of financial ratios, e.g. debt-equity ratio is desired. Time series of key financial ratios may be used to assess the adaptability and responsiveness of firms to changing market conditions.

Features of approaches of financial indicators:
• Particularly interesting to shareholders and CEO, but is also relevant for trade associations and government
• Are mostly applied at the firm level, but can certainly be relevant at project and industry levels
• Measures an outcome, but can be the starting point for investigating the causes of why one project, firm or country achieves higher profitability
• Results of past performance
• Used to indicate performance and trends of firms or the industry under current, domestic or international, market conditions, as well as for inter-country comparisons

Market performance

Market share
A firm’s performance in the market is often measured by its market share. For individual firms, it may be interesting to both measure their share of the home market as well as that of the international market.

The aggregated market shares of an industry’s firms may serve as an indicator of the industry’s competitiveness in either their own market environment, i.e. home firms’ share of home market or in the international market place, i.e. home firms’ share of international market/export market share.

An interesting version of market share measures is how one country’s industry, i.e. the aggregated performance of firms, performs in competing countries’ home markets, e.g. Swedish firms’ market share in the Finnish market. The argument is that it is a stronger sign of competitiveness to be able to export to markets of similar or higher standard, e.g. for Sweden to Finland, than to less competitive home industries, e.g. Sweden to India.

Since market share measures reveal nothing about the profit margin of such shares, Buckley et al., 1988, suggest profitable market share is a more informative measure.

Features of approaches of market share indicators
• Particularly interesting to shareholders and CEO
• Are mostly applied at the firm level, but are also highly relevant at the industry level and hence for comparisons at both levels
• Measures an outcome, but can certainly be the starting point for investigating the causes of why one firm or country have a larger market share
• Results of past performance
• Used to indicate performance and trends of firms or the industry under current, domestic or international, market conditions, as well as for inter-country comparisons
Competitive bidder
A prerequisite for gaining market shares is of course a company’s ability to win bids. Even if winning bids in the international markets is often suggested to be an indicator of competitiveness, it ignores how the projects won were actually delivered and if they were profitable.

Features of approaches of market share indicators:
- Particularly interesting to shareholders, CEO and perhaps also clients
- Are mostly applied at the firm level, but may, given the similarities between firms from the same country, be applied also at the industry level
- Measures an outcome, but can certainly be the starting point for investigating the causes of why or why not a firm or industry wins bids in different market contexts
- Results of past, and sometimes current, performance
- Used to indicate performance and trends of firms or the industry under current, domestic or international, market conditions, as well as for inter-country comparisons

Export, import and trade balance
At the industry level, data for export and import of building services, products and materials are often used as measures of competitiveness. Export figures are of interest as they reveal something about the industry’s ability to succeed in the international market, and import figures as they gauge the home industry’s “competitiveness in providing construction resources” (Ofori, 2001, p 46).

The net value of exports minus imports is the industry’s trade balance: the more positive the difference, the more competitive the industry.

Features of approaches of international trade indicators:
- Interesting to several stakeholders: CEO, client, trade associations and government
- Are mostly applied at the industry level

Overall health of the industry
The overall well-being of the construction industry is of significant interest to trade associations, governments and society. The next section presents some of the indicators used to assess the industry’s health.

Failure rate of companies
The basic criterion for competitiveness is survival. This makes the failure rate of construction companies an interesting indicator of the health of the industry.

Capacity
Another basic criterion of competitiveness is the industry’s capacity to meet the level of demand generated by the home market.

Output and growth
Total output, output per worker, percentage contribution of the construction industry to nation’s gross domestic product and the growth rate of these measures are all popular indicators to assess the health of the construction industry.

Employment and industry attractiveness
From a society point of view, a very interesting indicator of the industry’s health is the total employment and number of jobs created in the industry.

One of the most discussed and monitored health indicators is the image and attractiveness of the industry.

Features of approaches of overall health indicators:
• Interesting to several stakeholders: CEO, client, trade associations, government and overall society
• Are applied at industry level
• Measures the current performance and of the industry, i.e. an outcome, but can certainly be the starting point for investigating the causes of why one industry is more or less healthy than before or another
• Results of past and current performance
• Used to indicate domestic performance and trends of the industry, as well as for inter-country comparisons

**Overall competitive advantage of the industry**
Perhaps the most established and applied framework to assess an industry’s competitive advantage is the Diamond Framework as developed by Porter (1990).

Features of approaches of overall health indicators:
• Interesting to several stakeholders: CEO, client, trade associations, government and overall society
• Are applied at industry level
• Measures a current status of the factors that affect the performance of the industry, i.e. causes
• Results of past and current status
• Used to indicate the domestic status and trends of the industry, as well as for inter-country comparisons of competitive advantage

**Indicators of future capabilities**
Figure 12 illustrates examples of indicators to assess future capabilities of a firm or industry.

Features of approaches of indicators of future capabilities:
• Interesting to several stakeholders: shareholders, CEO, client, trade associations and government
• May be applied at both the firm and industry levels
• Indicates the current status (neither cause nor outcome) of investments, strategies and management practices at firms and the industry
• Reflects current status
• Used to indicate the status and trends of firms and the industry, as well as for inter-country comparisons of future competitiveness

**Summary of observations**
• There are, for reasons explained above, numerous approaches to analyse construction competitiveness
• Most of the approaches are interesting to several stakeholders, however mainly CEOs, clients and trade associations, and there is something for everyone
• Results from approaches that focus at the project or firm level may often be aggregated to represent the industry
• Most approaches focus on measuring an outcome, i.e. actual performance, but are still good starting points for investigating the causes of that performance

*Figure 12 Indicators of future capabilities*

![Indicators of future capabilities diagram](image-url)
Most approaches build on past performance rather than future capabilities.
Most approaches may be used for both domestic and international comparisons of performance and trends of the industry and/or firm and/or project.

Table 6 summarises the basic features of each approach introduced above.

**Table 6 A summary of the approaches**

<table>
<thead>
<tr>
<th>Approach</th>
<th>Perspective</th>
<th>Level of abstraction</th>
<th>Cause/outcome</th>
<th>Time dimension</th>
<th>Domestic/International</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cost and time of hypothetical project</strong></td>
<td>CEO, Cl, Ta, Gov</td>
<td>P, I</td>
<td>C/O</td>
<td>S</td>
<td>D, I</td>
</tr>
<tr>
<td><strong>Input-output cost performance</strong></td>
<td>CEO, Cl, Ta, Gov</td>
<td>P, I</td>
<td>C/O</td>
<td>P</td>
<td>D, I</td>
</tr>
<tr>
<td><strong>Productivity</strong></td>
<td>CEO, Cl, Ta, Gov</td>
<td>P, F, I</td>
<td>C/O</td>
<td>P</td>
<td>D, I</td>
</tr>
<tr>
<td><strong>Indicators of project success</strong></td>
<td>CEO, Cl, Ta, Gov</td>
<td>P, F, I</td>
<td>C</td>
<td>P</td>
<td>D, I</td>
</tr>
<tr>
<td><strong>Profitability and financial ratios</strong></td>
<td>Sh, CEO, Ta, Gov</td>
<td>P, F, I</td>
<td>C/O</td>
<td>P</td>
<td>D, I</td>
</tr>
<tr>
<td><strong>Market shares</strong></td>
<td>Sh, CEO, Cl</td>
<td>F, I</td>
<td>C/O</td>
<td>P</td>
<td>D, I</td>
</tr>
<tr>
<td><strong>Competitive bidder</strong></td>
<td>CEO</td>
<td>F</td>
<td>C/O</td>
<td>P</td>
<td>D, I</td>
</tr>
<tr>
<td><strong>Trade balance</strong></td>
<td>CEO, Cl, Ta, Gov</td>
<td>I</td>
<td>C</td>
<td>P</td>
<td>D, I</td>
</tr>
<tr>
<td><strong>Health of industry; Failure rates; Capacity; Output and growth; Employment; Attractiveness</strong></td>
<td>Ta, Gov, OS</td>
<td>I</td>
<td>C</td>
<td>P</td>
<td>D, I</td>
</tr>
<tr>
<td><strong>Porter’s Diamond</strong></td>
<td>CEO, Cl, Ta, Gov, OS</td>
<td>I</td>
<td>C</td>
<td>P, F</td>
<td>D, I</td>
</tr>
</tbody>
</table>

**Abbreviations**

**Perspective**
- Shareholder (Sh);
- CEO;
- Employee (Em);
- Client (Cl);
- Trade association (Ta);
- Government (Gov);
- Overall society (OS)

**Level of abstraction**
- Project (P);
- Firm (F);
- Industry (I)

**Cause/outcome (C/O)**
- Past (P);
- Future (F);
- Snapshot (S)

**Time dimension**
- Domestic (D);
- International (I)

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CHAPTER FIVE

Our approach
OUR APPROACH
According to Lall (2001), a complete competitiveness analysis must: 1) define what competitiveness means and how it is to be measured and, 2) identify the most important factors influencing it, the interactions between these factors and how they affect the competitiveness of the subject under investigation.

DEFINITIONS

Construction industry
The construction industry comprises all actors who contribute to the delivery of building products and services to the end-user. More specifically, the key actors of the industry are small, medium and large:

- Clients
- Contractors
- Architects
- Engineering consultants
- Suppliers of building materials

Competitiveness
In the light of government commissions and general criticism about the construction industry's performance, referred to in the Introduction, adopting an approach using a single measurement of competitiveness, e.g. profitability or productivity, was never going to be sufficient. The study needed to include softer issues and the needs and expectations of more stakeholders than just the shareholders.

The research team shares the belief of Love and Holt (2000), who argue that, for an industry to sustain competitiveness, they will need to develop and better understand their relations with their stakeholders. The authors propose that traditional business performance measurements must be broadened to a stakeholder perspective measurement system that includes criteria derived from the three classical roles of the firm as a:

- Stakeholder entity reflecting the interests of customers and shareholders
- Goal-oriented profit centre
- System that engages with the environment

As for the formal definition of competitiveness of the construction industry, the research team follows the definition presented by Momaya and Selby (1998), but proposes that overall society, i.e. the society in which the construction industry operates, should be included as the fourth stakeholder of the industry. Society at large, or more exactly a nation’s tax payers, is indirectly the largest client of the construction industry. Moreover, the industry generally makes up a large percentage of a nation’s GDP, approximately 10% in the case of the UK (DTI, 2004), and is one of a nation’s major job-creators.

Consequently, inefficiencies in the industry have a large negative impact on the economic well-being of the country. Many construction processes, including city planning, have a significant impact on the physical environment and their deliverables have a long-term impact on the public’s social well-being. Interestingly, the Confederation of Finnish Construction Industries states in its mission that the construction industry should supply ‘practical, healthy, secure and cost-efficient buildings’, and ‘act in a socially responsible way to contribute to national wealth, whilst upholding its responsibility for the environment’ (RT, 2004).

Following on the discussion above, the research team built the definition of construction industry competitiveness on the satisfaction of the four key stakeholders of the industry; shareholders, clients, employees and overall society and suggests that a construction industry is competitive to the extent that:

- Its performance satisfies investors
  *Is profitable*
- Its performance satisfies clients
  *Is predictable in time and cost*
  *It achieves harmonious relationships*
  *Is innovative*
- Its performance satisfies employees
  and is attractive to competent labour
Achieves competitive wages
Achieves a safe and healthy work environment
• Its performance satisfies overall society
Behaves ethically
Complies with environmental and sustainability regulations

This is the definition that has served as the basis for developing the framework for analysing construction industry competitiveness.

**SHAPING THE ANALYSIS**

The approach employed in this research is a mixture of what was described above:

• It aims to consider the needs and expectation of: investors, employees, clients and overall society
• It focuses on the industry level, however some of the indicators and explanatory described below are derived from the firm or project levels
• It aims to provide a picture of both the performance of the industry as well as of the factors that have the strongest influence on that performance and how these two parts (causes and outcome) are interconnected
• It focuses on past performance, but attempts to point out current trends and future opportunities and threats
• It focuses on the outcome and causes in the domestic environment, but acknowledges the influence of the international
• Its primary use is to assess the past performance and current trends of the industry for domestic purposes, but may also provide some ground for inter-country comparisons

The framework for analysing construction industry competitiveness distinguishes between outcome and causes and consists of two separate, but interconnected, parts, 1) assessment and 2) explanation.

**ASSESSING CONSTRUCTION INDUSTRY COMPETITIVENESS**

The criteria used to assess construction industry competitiveness in this project cover the aspects outlined in the definition. Hence, it aims to assess the satisfaction of the four main stakeholders.

**MAPPING THE EXPLANATORY FACTORS**

The second major building block of the analysis is the framework for organising the factors identified that influence the performance of the construction industry. This section describes how the resulting framework – the Construction Competitiveness Hexagon – has been developed based on the Porter’s Diamond. The Hexagon framework has been filled with empirical data as retrieved from the Delphi survey and the interviews - see Chapter 2.

As the starting point for developing a framework for the mapping of explanatory factors, it is important to consider the conclusions drawn by Ofori (2003). He suggests that “in developing a model for analysing international construction, it would be relevant to consider the four determinants in Porter’s diamond, as well as culture and institutional arrangements and government’s influence. Chance would be an exogenous variable. Each of these seven factors should have an international dimension. Thus, each company’s or industry’s competitiveness would be depicted by a series of linked (national) diamonds” (Ofori, 2003, p 389). It is interesting to note that the construction industry was not the focus of any of the frameworks explaining competitiveness as discussed above, and thus it is likely that some aspects characteristic to construction have not been taken into account.

Following Ofori’s suggestions, the framework for understanding construction competitiveness originates from Porter’s Diamond framework, but includes a number of alterations. This section describes the transformation of the Diamond into the Hexagon, as well as the main features of each of the elements of the framework.
Porter’s factor conditions
The construction industry is labour intensive. A skilled workforce is one of the key factors for project success and at the same time labour forms a large percentage of the cost of a project. Moreover, the work environment, including health and safety, and investment in training are considered as important areas for construction. However, in Porter’s Diamond, factors related to human resources/labour are included in factor conditions. In order to highlight their importance for construction industry competitiveness, they are put in as a determinant of their own. Thus, Porter’s Factor conditions are split into Human resources and Factor conditions.

A similar alteration was suggested in the formulation of the Nine-factor model (Cho, 1994). Human resources, covers aspects like: availability, skills and commitment of labour; work environment (physical and psychological); work conditions (compensation system, work hours, labour market regulations) and workforce characteristics.

Factor conditions includes: availability, cost and sophistication of material, equipment and I&CT; financial market conditions (ease of access to loans, rate and stability of interest and exchange rates) and country characteristics (climate, geographical location, political stability, and infrastructure).

Porter’s demand conditions –
Porter allocated Demand conditions as a determinant in itself. As these conditions play an important role in the performance of a construction industry they are kept unchanged. This determinant includes for example: size and structure of home market and sophistication of clients’ needs and procurement practices.

Porter’s related and supporting industries
The scope of the framework that is to be developed is a nation’s construction industry, including material suppliers, designers, engineering consultants and contractors. In Porter’s Diamond these would instead have been treated as individual industries, i.e. designers would have been seen as a related and supporting industry to contractors.

This shift of focus implies that the area of related and supporting industries will not be given the same attention as it was by Porter. Thus, the role of Porter’s Related and supporting industries is left out of this framework.

Porter’s context for firm strategy and rivalry
The context for competition and collaboration within an industry is of major importance to the performance of that industry (Porter, 1990). However, since the agenda within the industry as a whole is different from that of an individual firm, it is appropriate to separate the macro and micro levels and devote each of the levels to one determinant in the adapted framework.

At the industry level, the focus is on competition and collaboration within the industry and its image. At the firm level, management practices, project management skills and in-house R&D are major areas of interest. Thus, Porter’s Context for firm strategy and rivalry is split into Firm strategies, management and organisation and Industry characteristics.

The former determinant relates to firms’ specific practices such as: goals and strategies; supply, financial and marketing practices; organisational structure, communication and decision-making mechanisms; R&D activity; and production processes. Industry characteristics is devoted to: presence and power of trade, client and employee associations; intensity, fairness and sophistication of competition; and integration and collaboration of industry stakeholders.

Government
The role of government was considered by Porter as an exogenous factor. However, government activity is of major importance to the construction industry, not only in shaping the business environment and setting
market regulations, but, for construction, also as a major client or market intervener.

In this adapted framework, Government is shifted from an exogenous parameter to a determinant of its own. This is supported by Lall (2001) who gives government a central position in her Competitiveness Triangle and also by the criticism that Porter’s Diamond underestimated the influence of government (van den Bosch and de Man, 1994; Stopford and Strange, 1991). This determinant covers issues such as: the tax system and bureaucracy, policies, incentives and regulations on, for example, environmental, ethical, health and safety issues, and the presence and power of a single construction authority.

The exogenous dimensions
To complete his Diamond, Porter adds the two exogenous dimensions of government and chance. His positioning of these dimensions is due to their influence on the other four determinants, but at the same time they are outside the immediate control of firms (Porter, 1990). In the suggested framework, adapted for the construction industry, the role of government has been shifted to become a determinant of its own. The impact of chance, however, can neither be neglected nor predicted or measured. For a nation’s construction industry, chance may refer to events either in the domestic or international market, for example, in the home market, the risk of political instability or geographical proximity to markets that are becoming more competitive (Öz, 2001).

Another area of criticism of the diamond framework is that the framework should incorporate the impact of culture (Ofori, 2003; van den Bosch and van Prooijen, 1992). In the adapted version of the framework, this suggestion is acknowledged and accordingly the role of national, industry and firm culture becomes an exogenous dimension. This dimension covers aspects such as: the attitudes of managers, workers and clients towards new technology, business ethics and environmental consciousness. Also, the cultural dimension takes into account what is perceived to have a positive or negative effect, e.g. the power of trade unions or extent of regulations, depends on stakeholders’ values and beliefs and will differ from country to country.

Thus, in this adapted framework, there are two exogenous dimensions – the role of chance and the impact of culture – that influence all of the six determinants of the framework, but are out of the industry stakeholders’ immediate control.

The domestic construction competitiveness hexagon
The Domestic Construction Competitiveness Hexagon is a framework that organises the factors that influence the competitiveness of nation’s construction industry, i.e. its ability to satisfy its stakeholders; shareholders, employees, clients and overall society. In summary, the suggested framework consists of six determinants, which are organised in the shape of a hexagon, and two exogenous dimensions, see figure 13. The determinants are, like the ones in Porter’s Diamond, mutually dependent in the sense that the state of one affects the others’ and thereby forms a dynamic system (Porter, 1990). For example, government policies will affect the sophistication of the clients’ needs, which will in turn have an effect on firms’ strategy.

International activity: the complete hexagon framework
The determinants of the domestic hexagon framework are inter-dependent and also affected by chance and culture. However, in times of increased globalization of supply and lowered barriers to entry markets previously dominated by domestic firms, there is an obvious international dimension that poses both threats and opportunities to a nation’s construction industry.

The international dimension captures the international aspects regarding: supply of material and equipment, mobility of workers, demand conditions, and competition.
The incorporation of international activity is also the area where the Diamond framework has received the most criticism (Rugman, and d'Cruz, 1993; Hodgetts, 1993; Cartwright, 1993). As discussed earlier, the result of that debate was the Generalised Double Diamond framework (Moon, Rugman, and Verbeke, 1995). In order to respond to the need of an international dimension, the domestic hexagon framework adapts this ‘double-design’ to form the complete Construction Industry Competitiveness Hexagon, see fig 13.

*Figure 13 The construction industry competitiveness hexagon*
CHAPTER SIX

Findings from the empirical study
INTRODUCTION

The following chapter covers the findings from the empirical work as described in Chapter 2 – Research methodology.

In order to position Finland, Sweden and the UK in a global context, the first section presents selected key observations of macroeconomic and construction related data. The background figures can be found in Appendix A.

The second section consists of the country sections for Finland, Sweden and the UK respectively. Each country section begins by introducing the country in terms of macroeconomic and construction-related statistics as well as an extract from the competitiveness rankings of the World Economic Forum and the International Institute of Management Development.

The country overview is followed by an analysis of the competitiveness of the construction industry. This analysis follows the structure of the definition of construction industry competitiveness as presented on page 39.

A construction industry is competitive, from the perspective of the four stakeholders - investors, clients, labour and overall society - to the extent that:

- Its performance satisfies investors
  *Is profitable*
- Its performance satisfies clients
  *Is predictable in time and cost*
  *It achieves harmonious relationships*
  *Is innovative*
- Its performance satisfies employees and is attractive to competent labour
  *Achieves competitive wages*
  *Achieves a safe and healthy work environment*
- Its performance satisfies overall society
  *Behaves ethically*
  *Complies with environmental and sustainability regulations*

The analysis attempts on the one hand to assess the performance, i.e. the actual outcome, of the industry on the criteria above and, on the other hand, describe the key causes, i.e. explanatory factors, influencing performance.

Having discussed the three countries separately, Chapter 7 brings them all together in a joint discussion.
GLOBAL POSITIONING – GLOBAL POSITIONING

The purpose of this section is to position the three countries of investigation – Finland, Sweden and the UK – in the international context. Firstly, the three countries are put into a global perspective with a number of key points coming out of that exercise. Secondly, each country is considered in turn. The empirical data from the research appears in Appendix A.

Key macroeconomic observations

- The USA is the world’s largest economy, 70% larger than the runner up China. The USA is also the second wealthiest economy per capita.
- For the mature economies of the UK, France, Germany, USA and the Nordic region, between 2000 and 2004:
  ◊ GDP Growth has been around 1.5-2%, over the latest. The USA has maintained a level of 3%.
  ◊ Inflation rates have stabilised themselves at around 1.5-2.0%.
  ◊ Unemployment rates have increased
  ◊ The average short-term interest rates have lowered significantly, from 5.0% in 2000, 4.1% in 2002 to 2.4% in 2004.
  ◊ Long-term interest rates have also lowered, however not as drastically.
  ◊ In the WEF Global Competitiveness Index, all five Nordic countries are found within the top 9.

Key construction observations

- As of 2004, Europe has grown to become the largest construction market, constituting 35% of the global market. Asia is second, 26%, and the USA third, 25%.
- The Nordic region enjoys the heaviest per capita investment in construction. The USA equals Japan and the UK is ahead of European peers France and Germany.
- Spain has the highest basic rate for skilled labour (€23.0/h), followed by Norway, (€22.2/h). China is by far the lowest: €0.88/h. EU average: €14.4/h.
- For unskilled labour, Japan is at the top of the basic wage pile, €12.7/h, followed by Sweden, €12.33/h. Again, China is by far the lowest: €0.37/h. EU average: €9.46/h.
- Norway, followed by Sweden, has the highest all-in rate for both unskilled and skilled labour.
- The Czech Republic experiences the highest percentage social costs of the all-in rate for unskilled labour (66.6%), followed by Norway (62.0%). EU average: 45.3%.
- For skilled labour The Czech Republic and Sweden both experience a social cost level of 55.5%. EU average: 41.8%.
- Spain enjoys the lowest social costs for both unskilled and skilled labour, 11.6 and 11.5% respectively.
- Denmark and Sweden have the highest VAT on construction, 25%. Besides China (0%), Japan and the Czech Republic enjoy the lowest rates, 5%.

The global construction market

The figures on pages 48 and 49 positions selected economies in the global construction market.
Global construction output, 2004

Changes in global construction output, 2000—2004

Global construction output (%), 2000

Global construction output (%), 2004

Sources: Euroconstruct, AsiaConstruct, National accounts
**European construction output, 2004**

- **UK**
  - US$212bn
- **Italy**
  - US$218bn
- **France**
  - US$202bn
- **Germany**
  - US$258bn
- **East Europe**
  - US$52bn
- **Denmark**
  - US$28bn
- **Spain**
  - US$177bn
- **Norway**
  - US$26bn
- **Sweden**
  - US$25bn
- **Finland**
  - US$24bn
- **UK**
  - US$212bn
- **W Europe**
  - US$3,375
- **E Europe**
  - US$1,703

**Construction investment per capita, 2004**

- **Canada**
  - US$2,493
- **USA**
  - US$3,651
- **S America**
  - US$6,445
  - **Brazil**
    - US$667
  - **Argentina**
    - US$775
- **Australia**
  - US$1,406
- **India**
  - US$76
- **China**
  - US$247
- **Japan**
  - US$3,638
- **Europe**
  - US$2,037
Key observations - Macroeconomics

- Finland is the second smallest of the Nordic economies.
- Finland is above the OECD-countries in average and only slightly behind strong economies like Germany, France and Japan in terms of wealth per capita. Nevertheless, Finland is only the fourth wealthiest of the five Nordic countries.
- Finland has, along with several mature economies, experienced only moderate growth in both GDP, 1.8%, and population, 0.4%, during the period 1990-2003.
- More recently, Finnish economic growth is the highest in the Nordic region.
- Unemployment figures remain very high, around 9%.
- Inflation has been lowering for a series of years, estimating an average level of 1.8% during 2000-2004.
- Interest rates have lowered significantly for a series of years, especially the short-term: from 4.4% in 2000 to 2.1% in 2004.
- Finland enjoys an overall trade surplus, however, alike Sweden, strong surplus on goods and deficit on services.
- Finland ranks 6th and top at the IMD and WEF overall competitiveness rankings respectively, scoring superior on Quality of the National Business Environment, but weaker (9th) on Company Operations and Strategies.

Key observations - Construction

- With US$24bn, Finland was the smallest construction market among the main Nordic countries in 2004.
- In terms of construction investment per capita, Finland is 3rd in the global ranking with US$4,603, well above the western European average.
- During 1999-2003, construction has averaged 5.5% of the Finnish GDP.
- During 2000-2004, construction output growth averaged 2.2% and GDP 2.8%.
- The total construction investments 2004 estimated €20.1bn, of which 40% was non-residential buildings, 39% residential and 21% civil engineering.
- Having experienced a series of years with slight growth, 2004 saw employment fall by 2%. The current workforce corresponds to 75% of the 1990-level. During the past decade, the self-employment rate has averaged 20.4%.
- During 2000-2004, construction prices have increased in about the same pace as the overall inflation rate: 2.0% for construction and 1.8% in overall inflation.
- Finland has the lowest VAT on construction of all Nordic countries, 22%. This is however still the fourth highest in the world.
- In 2004, the basic rate for unskilled and skilled labour was €9.2 (EU average €9.5) and €14.2 (14.4) respectively.
- Social costs constitute 42.1% (EU average 45.3%) and 42.3% (41.8) of the all-in rate for unskilled and skilled labour respectively.
- Finland drifts behind several leading construction economies on ISO9001-registrations, is higher in the pack on ISO14001 registrations, but nonetheless is a bit below average.

Key macroeconomic indicators

**Competitiveness rankings 2005**

| IMD WCY | 6 |
| WEF GCI | 1 |
| WEF BCI | 2 |
| WEF Company Operations and Strategies | 9 |
| WEF Quality of the National Business Environment | 1 |

| Population | 5,223,442 |
| Area | 338,145 sq km |
| GDP | US$151.2 billion* |
| GDP per capita | US$29,000* |
| Life expectancy at birth (total pop.) | 78.35 years |

*Current prices, PPPs, estimate 2004
Table 17 Key macroeconomic indicators

<table>
<thead>
<tr>
<th>Indicator</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
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<tbody>
<tr>
<td>GDP growth, %</td>
<td>5.4</td>
<td>1.0</td>
<td>2.3</td>
<td>2.1</td>
<td>3.1</td>
<td>2.8</td>
</tr>
<tr>
<td>Construction output, annual change, %</td>
<td>7.0</td>
<td>0.1</td>
<td>-0.8</td>
<td>1.0</td>
<td>3.8</td>
<td>2.6</td>
</tr>
<tr>
<td>Population growth, %</td>
<td>0.25</td>
<td>0.23</td>
<td>0.21</td>
<td>0.23</td>
<td>0.25</td>
<td>0.23</td>
</tr>
<tr>
<td>Unemployment, %</td>
<td>9.7</td>
<td>9.1</td>
<td>9.1</td>
<td>9.0</td>
<td>8.9</td>
<td>8.6</td>
</tr>
<tr>
<td>Inflation, %</td>
<td>3.4</td>
<td>2.6</td>
<td>1.6</td>
<td>0.9</td>
<td>0.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Construction prices, annual change, %</td>
<td>2.5</td>
<td>2.9</td>
<td>0.8</td>
<td>1.8</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Short-term interest rate, %</td>
<td>4.4</td>
<td>4.3</td>
<td>3.3</td>
<td>2.3</td>
<td>2.1</td>
<td>2.5</td>
</tr>
<tr>
<td>Long-term interest rate, %</td>
<td>5.48</td>
<td>5.04</td>
<td>4.98</td>
<td>4.14</td>
<td>4.3</td>
<td>4.8</td>
</tr>
<tr>
<td>Trade balance – goods (Billion USD)</td>
<td>11.7</td>
<td>10.7</td>
<td>11.0</td>
<td>10.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trade balance – services (Billion USD)</td>
<td>-2.3</td>
<td>-2.3</td>
<td>-1.5</td>
<td>-2.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purchase Power Parity (National currency unit / USD)</td>
<td>0.99</td>
<td>0.99</td>
<td>1.01</td>
<td>0.99</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notable competitiveness strengths
In a global perspective, the single factor strengths are (WEF ranking 2003):
+ Hidden trade barriers (1)
+ University/industry research collaboration (1)
+ Business cost of crime and violence (1)
+ Organised crime (1)
+ Business cost of corruption (1)
+ Extent of collaboration among clusters (1)
+ Ethical behaviour of firms (1)
+ Production process sophistication (1)
+ Compliance with international (environmental) agreements (1)
+ Prevalence of environmental management systems (1)

Notable competitiveness weaknesses
In a global perspective, the single factor weaknesses are (WEF ranking 2003):
– Regulatory obstacles to business (72)
– Value-added tax rate (69)
– Prevalence of foreign technology licensing (60)
– Number of days to resolve a dispute (45)
– Hiring and firing practises (38)
– Pay and productivity (30)

Key construction parameters
Construction investments
Total construction investment in 2004 totalled €20.1bn - 5.4% of Finland’s GDP. Residential output was estimated in 2004 as €7.9bn, of which 56% was investment in new build and 44% in repair and maintenance. Non-residential building totalled €8.0bn, distributed as 57% new build and 43% repair and maintenance. Total investment in the civil engineering segment was €4.2bn, made up of 69% new build and 31% maintenance. In total, the public sector’s spending on construction was estimated as €3.3bn, or 16.4% of the total investment in construction.

Employment figures
In 2004, the construction industry employed 148,000 people - 6.26% of the total Finnish workforce. Figure 34 illustrates the employment situation for operatives from 1990 to 2003.

During the early 1990s, employment fell by 46%, but has since the low point in 94 picked up again by an average rate of 4.3% per year.
Still, current employment only corresponds to 75% of the workforce before the crisis. Also, variation in employment is significant: between 1990 and 2003, the standard deviation corresponds to 17% of the average workforce.

Moreover, it is interesting to note the upturn in self-employment during the downturn in overall market. Since 1993, the self-employment rate has averaged 20.4%.

It is widely suggested that the growth rate of construction output is strongly linked to GDP growth and short- and long-term interest rates.

A further interesting comparison is the development of construction prices in relation to the inflation of the country—see Figure 36.
ASSESSING THE COMPETITIVENESS OF THE FINNISH CONSTRUCTION INDUSTRY

Investor satisfaction: profitability

The first stakeholder for the construction industry to satisfy is the investors. This study has used profitability as the indicator of investor satisfaction.

"I would say that profitability in Finland is high enough, and it has improved over the past few years, especially the housing segment in the Helsinki region."

This research has shown that the Finnish construction industry is at least equal to an international norm for profitability of between 1.5% to 4% of annual turnover, and recently a bit higher. For example, the Finnish branches of Skanska, NCC and YIT have better profitability than their Swedish counterparts.

Figure 37 illustrates the profitability of the three main sectors of the construction industry. For contractors and the construction products industry, the ratios used is net profits before extraordinary income, whereas for

"Not bad, profitability in Finland is not bad, but it is a problem in construction all over the world."

Summary of findings

The Finnish construction industry is at least equal to an international norm for profitability of between 1.5% to 4% of annual turnover.

Between 2000 and 2004, contractors, architects & engineering consultants and the construction products industry achieved average profitability levels of 4.9, 7.3 and 5.1% respectively. This is well above the Swedish levels.

Profitability affects the sustained competitiveness of the industry in several aspects as it links to investment in R&D, staff training, new technology and other processes to improve business.

The most important factors influencing profitability are:

- Market conditions, input costs and output prices: output growth of 2.3% in average from 2000-2005 is the highest in the Nordic region. Output prices are perfectly in line with input costs. This suggests that the current price levels leave no room for profits
- Clients’ evaluation criteria: procurement on lowest price rather than best value
- Competition: competition on price rather than best value

Figure 37 Profitability levels for contractors, architects and engineering consultants and the construction products industry, 95-05. Sources: RT, SKOL ry and STD

![Graph showing profitability levels for contractors, architects, and construction products industry from 1995 to 2005.](image-url)
architects and engineering consultants the ratio displayed is the result margin, i.e. the net result as a percentage of the turnover.

Contractors have steadily improved their profitability, from the alarming level of 0.5% in 1995 to levels of 5.1%, 6.3% and 5.8% for the past three years. Architects and engineering have also improved their levels, from a low of 4.5% in 1995 to 7.8% in 2003. The third major part of the sector, the construction products industry reached some really good levels in the late 1990s, but has since seen these halved to an expected value of 5.0% in 2005.

Average values for the past decade for three sectors are 4.1%, 6.9% and 6.8% for contractors, architects and engineering consultants and the construction products industry respectively. Seen over the last five years, however, contractors reach an average of 5.3% whereas the construction products industry lower their average value to 5.1%. Architects and engineering consultants too have experienced better times during the early 2000s than late 1990s.

Construction enterprises have enjoyed some good years with an average turnover growth rate of 11.8% for the period 1995-2002 - see Figure 38. Since the more difficult times in the early 1990s, including years with negative operating margin, the operating margin averaged 8.0% between 1995 and 2002. Return on investment increased dramatically in the late 1990s and averaged 17.9% between 1995 and 2002.

The basic criterion of competitiveness is of course survival. Figure 39 presents the number of closures and openings of construction enterprises (sector F) between 1995 and 2003.

The most notable observation is that since 1995, there has been a positive net result of openings minus closures. The low year of 1996 saw a growth of just 160 enterprises, whereas the average since 1995 estimates some 600 enterprises per year.

**Explanatory factors: profitability**

Profitability levels in the construction industry will vary from company to company and between countries. It is a function of the market conditions, the sub-sectors in which the company operates, the success or otherwise of the company’s projects, and the efficiency of the business. For example, contractors generally have high turnovers in relation to their capital employed, and with prudent financial planning, projects can be cash positive very quickly from commencement on
The most important factors that influence profitability are:

- Market conditions and price and cost levels
- Clients’ evaluation criteria
- Competition

**Market conditions, input costs and output prices**

As illustrated in Figure 40, the Finnish construction industry has enjoyed a good market development. Since 2000, the average growth rate for total construction turnover index has been 6.4% and 6.3 and 7.9% for the two sub-sectors building construction and civil engineering respectively. This is probably the most influential factor of profitability.

From figure 41 it is clear that the factor price index (FPI) and building price index (BPI) have been a perfect match for the past decade. Between 1996 and 2004:6, the FPI has averaged 109.4 and BPI 105.5. Similarly, the average annual growth rate has been 2.0% for the two indices. This suggests that the room for profit making has been stable.

Figure 42 compares the FPIs for contractors and architects and engineering consultants with BPI and consumer price index (CPI). For both the

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**Figure 39** Openings and closures of building enterprises

*SIC45b and SIC45c* Source: Statistics Finland

**Figure 40** Annual change (%) of turnover index for total construction, building construction and civil engineering works, 96-04:6. Source: Statistics Finland

![Diagram showing number of enterprises]
The whole period 1996 to 2005 and over the past five years, FPI for architects and engineering consultants has increased at a much higher pace than that for contractors: 2.9% and 2.0% respectively for the period 1996-2005 and 2.5% and 3.4% for 2000 to 2005. The FPI for contractors and the BPI perfectly match. The relatively low inflation rate implies that FPI for architects and engineering consultants has more than doubled the average CPI, whereas that of contractors and the BPI has averaged a growth rate 60% higher than CPI.

As for the main elements of FPI as compared with CPI, it becomes clear that during the past decade both labour and material costs have increased more than CPI. CPI has been low at an average rate of 1.4% whereas labour costs averaged an annual growth rate of 2.7% and materials 2.1%. The other inputs, mostly costs related to clients’ procurement, have been astonishingly low at an average annual growth rate of only 0.5%.

Finally, considering the annual change of the BPI and its main elements (Figure 44) the most notable observation is that ‘blocks of flats’ and ‘offices and commercial buildings’ have matched each other’s change rates perfectly – 107.9 for the period 1995 to 2005 - whereas ‘industrial buildings and warehouses’ have drifted away with
Both architects and engineering consultants claim they have suffered from price stagnation. Moreover, the clients’ tendency to procure on lowest price, has made the price difference between mainstream and high-value-adding firms disproportionate. In 2004, the average real price for architectural and engineering services was €60/h and the total income per employee was €76,700. In the light of FPI for architects and engineering consultants increasing by 29.2% from 1995 to the end of 2004 and that the 1995 income per employee was €60,000 The 2005 invoice value should be about €78,000/employee, considering that the cost of salaries increased by 38% from 1995 to end of 2004. (SKOL, 2005).

“The design consultants in this country are so poorly paid so they don’t have time or money to develop much.”
Clients’ evaluation criteria
Clients tend to procure on lowest price rather than value added, as they believe that the only way to ensure good value for money is through fierce price competition. However, change is happening slowly with partnering agreements beginning to emerge, and limited use of public-private partnerships.

Competition
Price competition is fierce. However, there is very limited competition, or pressure, to innovate and deliver added-value. This is a consequence of clients’ tendency to procure on lowest price.

Furthermore, architects and engineering consultants, especially the larger ones, increasingly experience competition from two sides: from smaller firms competing for medium projects, and from large international competitors competing for larger projects. The planning phase is undervalued and clients tend to procure on lowest price rather than value added, as they believe that the only way to ensure good value for money is through fierce price competition. Consequently, there is very limited room for value-adding processes, which in turn limits profitability.

The competition and price stagnation described above, forces companies to very high invoicing ratios. In 2004, the income per employee was estimated as €76,700/year, which corresponds to an invoicing ratio of 76% (SKOL, 2005).

Client satisfaction
The second stakeholder for the industry to satisfy is the client. This report has studied the parameters of time and cost predictability, relationships and innovation in terms of client satisfaction.

There is not a culture of client satisfaction in the Finnish construction sector, and the quote below perfectly summarises the interviewees’ opinion on client satisfaction in the Finnish construction industry.

“If you use normal tender based models you cannot reach very high levels of profitability.”

The impression is that keeping time and cost budgets is not an issue, but it is a matter of debate how to define a ‘finished’ project and ‘agreed changes’ respectively. Often, the client will get access to something that is functional for its use on time, but that will still require extra work and polish before being perfectly finished. Also, one interviewee mentioned that there is no direct relationship between a higher price and the higher quality.

Another important notion, and in fact a major challenge for the industry, is that ‘client satisfaction’ should be measured from the end-user perspective. Also, to enable end-user interaction already in the planning process, is thought to have a series of positive effects (see Explanatory factors below).

“I believe clients are satisfied, but not overwhelmed. They get what they have ordered for, but not more than that. They are not positively surprised.”

Explanatory factors
The three main factors behind keeping schedules are, just like for Sweden: good planning tools, skilled workforce and a strong culture to keep schedules and budgets. As a result of several years of research at HUT, the line-balancing planning tool/DDS system has had a significant positive impact on predictability and has become the standard among Finnish contractors.

The most important factors influencing predictability and relationships are:

- Clients’ competence and experience to specify requirements and manage projects
- Changes during the process
- The practice for companies to seek for additional costs
- Clients’ procurement criteria
- Form of collaboration
- Handling of disagreements
- Clients’ time horizon
- The early stages
- The building permission process
- Common understanding and trust

The most important causes for the low
Summary of findings

In general terms, according to the interviewees, the likely outcome of projects in the Finnish construction industry is that they, considering agreed changes:

- Finish on time
- Have difficulties to finish on budget (from a client perspective)
- Are not characterised by harmonious relationships; lack of trust, disagreements of what is included in the original price and what is actually a ‘change’.
- Do not include notable innovation

To get a proper picture, project process performance needs to be measured at the project level, for instance through something like the KPI system used in the UK. The most important factors influencing predictability and relationships are:

- Clients’ competence and experience to specify requirements and manage projects: generally poor
- Changes during the process: too many changes too late
- The practice for companies to seek for additional costs: exists and appears to be an accepted part of the game
- Clients’ procurement criteria: procurement on lowest price rather than best value
- Form of collaboration: to a too low extent encourages planning and interaction among project actors to exchange experiences and establish common goals and incentives
- Handling of disagreements: common but solved at a local level
- Clients’ time horizon: short
- The early stages: see form of collaboration
- The building permission process: delays and uncertainties
- Common understanding and trust: lack of

The most important factors influencing the extent of innovation are:

- Profitability: too low, despite reasonable levels, to allow for heavy investments
- Repetition: too much of prototypes
- Clients’ demand: lack of incentives to innovate, add-value and solve problems
- Industry’s time horizons: too short and driven by short-term profits
- R&D investments: strong commitment by both industry and government

Table 18 lists the leading Finnish industries in terms of number of ISO9001-registrations. This figure obviously must be related to number of firms in each industry, but it appears that construction is under-represented in this list, having a mere 4% of the registrations. As observed in section ‘Global positioning – Construction’, Finland is ahead of Denmark and Norway on registrations related to market size, but only achieves half of the Swedish score and are well behind the leading countries on prevalence of quality management systems.

Clients’ competence and experience

The interviewees all point out the importance of strong client competence. A competent client, who is actively involved and engaged in the process, provides lower risks for changes and rework during the process and hence better chances for delivery on time and budget.

Among the interviewees, the importance of client competence is repeatedly emphasized. As for actual competence, the picture is mixed: some argue clients are weak in general, whereas others say that the larger clients are sufficiently strong and knowledgeable. It is generally agreed that local authorities are the weakest link in client competence.

As for the actual situation of today, the picture is mixed. Some argue clients’ competence must strengthen overall, whereas others say that the larger clients are sufficiently strong and professional and employ sophisticated tools for
Until today, Finland has seen a couple of PPP-projects: examples. The collected opinion is that it will come more and more, as the local authorities have no other source of financing but face increasing demand, both in housing but especially in infrastructure. The government is considered to have mixed opinions on the benefits of PFIs. The majority of the interviewees, on the other hand, believe that PFIs will improve relationships and provide common incentives, which will in turn improve whole-life planning, profitability and predictability.

Changes during the process
Changes and the negative effects on predictability and relationships, is an often cited source of frustration during the project. Changes can occur due to:

- Badly specified needs and requirements
- Changed conditions for client: change of tenant, late set op of tenant, change in tenants needs, change market conditions
- Flaws in plans or drawings

There are more of changes and rework, and hence lower predictability, for design and build and project management contracts, as design and production processes overlap. Predictability is better with traditional tendered contracts. Also, if the contract specifies that changes at all, alternatively changes beyond certain dates, incur additional costs, has successfully discouraged clients from making changes. Generally, predictability is better for companies doing project development, as they are

<table>
<thead>
<tr>
<th>Industry</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>1568</td>
</tr>
<tr>
<td>Machinery &amp; equipment</td>
<td>179</td>
</tr>
<tr>
<td>Basic &amp; fabricated metal</td>
<td>165</td>
</tr>
<tr>
<td>Electrical &amp; optical equipment</td>
<td>156</td>
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<tr>
<td>Wholesale &amp; retail</td>
<td>127</td>
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<tr>
<td>Transport, storage &amp; communication</td>
<td>87</td>
</tr>
<tr>
<td>Rubber &amp; plastic products</td>
<td>81</td>
</tr>
<tr>
<td>Pulp, paper &amp; paper products</td>
<td>74</td>
</tr>
<tr>
<td>Chemicals, chemical products &amp; fibres</td>
<td>72</td>
</tr>
<tr>
<td>Construction</td>
<td>62</td>
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<tr>
<td>Wood and wood products</td>
<td>45</td>
</tr>
<tr>
<td>Engineering services</td>
<td>42</td>
</tr>
<tr>
<td>Concrete, lime and plaster</td>
<td>17</td>
</tr>
</tbody>
</table>

Table 18 Number of IS9001-registrations - leading Finnish industries 2004 Source: ISO Survey 2004

“In this country it is very important that your time schedule and your cost, quality and performance meet target.”
able to control the whole process and have greater incentives to actually finish on time and budget.

Many of the issues with changes is hoped to be solved by new procurement forms, e.g. partnering. When the client and other project actors interact and keep a continuous dialogue on the progress of the project, the risks of sudden and dramatic changes and cost overruns are thought to be smaller.

The interviewees agree that the industry must improve its handling of changes during the process overall, as it affects predictability, profitability and relationships.

Furthermore, a common source of disagreement, see Disagreements below, and root to lack of trust is that clients do not realise the effects of the changes they ask for, and hence do not allocate time or money for it. In the least preferred scenario, the client gets the view that his budget has unfairly overrun, whereas contractors feel that they have not been compensated for all additional costs.

The search for additional costs
As described in Sweden, there is a habit among Finnish contractors to, despite their knowledge and experience to identify flaws, include in the bid, exactly what is specified in the initial plans. The chain of consequences is often changes – extra work or rework – additional costs – disputes – damaged relationships and lack of trust. This habit is stems from clients focus to procure on lowest price, which has triggered fierce price competition as the only form of competition and only opportunity to win contracts. Another trigger is the low profitably levels in the industry. At the other side of the table, the problem is that clients choose a form of procurement that does not allow for sufficient interaction among the key actors of the project, alternatively do not ensure that drawings are completed before submission to potential bidders.

Thus, parts of the problem can se solved through interaction among key actors in the early stages and the establishment of common goals and incentives to keep schedules and budget. This will encourage all actors to investigate all potential flaws and take action to minimise changes and rework.

The effects of this practice are obviously solely negative, even it is believed that the situation is worse in other countries, and this is considered to be an important factor to change for creating a more healthy industry climate.

Clients’ procurement criteria
A factor strongly related to client competence, is the procurement criteria employed. The general consensus is that most clients procure on lowest cost and believe that price competition is the only way to get value for money.

Generally, clients are not able to properly assess value-for-money-relationships and several interviewees ask for more advanced tools for making such assessment. On such tool could be software including key performance indicators and classifications on e.g. whole-life effects, environmental performance and space efficiency. It is mentioned that there are several sets of building classifications available, but no one that is consistently used.

Today, companies find it difficult to communicate and motivate a higher price that comes with the extra value.

This prevailing focus on lowest price rather than best value discourages producers from innovating and maximising added value and encourages the habit of seeking opportunities for additional costs. Also, as pointed out above, it limits profitability and, as will be discussed in depth later, does not stimulate whole-life planning.

Doubtlessly, one driver for a more healthy industry is clients starting to procure on value rather than lowest price, and to more evaluate firms’ willingness to cooperate, capability to deliver and their reference projects.

Form of collaboration
The use of lowest cost as the main procurement parameter and competitive tendering and the form of procurement does not appear to be a healthy combination for delivery on time and
cost, good relationships or innovation. Yet it is very common. Instead, a procurement form like partnering is widely believed to have significant potential to improve all four indicators for client satisfaction.

**Handling of disagreements**

The most common source of disputes is changes during the process, what is included in the original price and what the additional cost or delay of a change actually is. This sort of disagreement is a part of the game and occurs throughout the industry, also among major builder and professional clients. However, even if there are cases taken to arbitration, most disagreements are sorted out at a much lower level, e.g. during building meetings or in the week-to-week contact between the project manager and the client representative. It is not in the Finnish culture to take each other to court.

An interesting notion raised by one interviewee, is that in a small country like Finland, there are not so many major clients with repeated business, e.g. three plants in the paper industry. As a consequence, if a construction company fails or cheats at one of these, everyone will soon know and the company's reputation is flawed. So it is in a way the buyers market and construction companies really need to behave and deliver.

**Client’s time horizon**

Clients tend to be short-term focused, striving to minimising the initial cost rather than optimising the whole-life cost. Naturally, this makes it difficult for companies to commercialise whole-life efficient services, solutions or materials.

The early stages

Despite the widespread understanding of the importance of the early stages in a project, the interviewees agree that too little time and energy is invested in planning and proactive thinking. The actors involved in the process do not sufficiently allow themselves to interact and exchange knowledge and experiences from previous projects. Planning time is undervalued and neither are the drawings completed, nor is the supply chain set up, before going on to site.

Thus, the most important driver for predictability is the interaction of all important actors, including the client, in the early stages of the project. The main challenge here is how to enable end-user interaction and the inclusion of end-user needs in these early stages. This is where 3 and 4D-modelling plays an important role, and this is an area where the Finnish construction industry has reached quite far today.

A properly managed planning process is thought to drastically decrease the extent of changes, stoppages on site and the amount of rework. This in turn would improve predictability, profitability, relationships and most likely end-user satisfaction.

As for the distribution of time in the building process, the vast majority of interviewees believe that more time should be invested in the planning phase. But of course, it is not about for any actor to get more time, but to invest the available time in the most efficient way.

“Our clients are uneducated, they don’t know how to procure ... It seems like what ever method we use, it ends up with a focus on price. Even for the most experienced clients.”

A couple of interviewees mentioned that the time allocated for planning before construction starts is getting shorter, despite the fact that there is more work to be done during construction. This is due to the overall delivery time getting shorter, but pressure to start building.

**Common understanding and trust**

A frequently argued driver of success is to, as a part of the interaction in the planning phase, establish common goals and incentives for all those involved in the project.

During this process, the different actors

“How do you value something you cannot measure?”

“We must simplify the assessment of what is value, like the categories for washing machines: type A, B, C ...”
learn from each other and create an understanding and respect for one another’s expertise and contribution.

The current lack of trust is considered to be an important factor for the health of the industry, and has partly been caused by the habit to seek for additional costs. According to several interviewees, this form of working, i.e. a form of partnering, is becoming more and more popular and asked for by clients.

**Building permission process**
The Finnish building permission system is very similar to the Swedish, with strong rights for public complaints. The interviewees describe the Finnish system as time consuming, bureaucratic and a common source of delays. This is particularly true for the Helsinki area. There has been a lot of dialogue between the industry and authorities on this matter, and the latter part have made promises to make the system more efficient.

The Finnish building permission is described as inefficient and a frequent source of delay. It is not uncommon that public complaints take cases further to a higher court. This delays the process, but at the end of the process the verdict is that there was no reason for the complaint. Too often, the building permission process causes delays, whereas the starting or completion dates are set. The, of course, tends to shorten planning time even more and is indirectly a cause for rushed or no completion of drawings and plans and consequently rework, changes and additional costs.

**Explanatory factors: innovation**

**Profitability**
As discussed above, profitability in the construction industry is too low to allow for investments in R&D.

**Lack of repetition**
One main feature of construction, which distinguishes it from most of the manufacturing industry, is the prevalence of prototypes and consequent lack of repetition. Since basically every project is unique, there is not such a clear learning curve as in the manufacturing industry and new teams are established for each project. Furthermore, this lack of repetition discourages investment in innovation, as an innovation useable for one particular project, may not be useful for another in the foreseeable future.

The construction industry is project rather than process oriented and consequently, there is very little knowledge transfer between projects. This phenomenon is reinforced by the short-term-ism in the industry.

**Demand and incentives**
As discussed above, clients tend to procure on lowest cost rather than value. Also, they tend to use forms of procurement that strictly specify what is ordered and hence do not stimulate or leave much space for innovation or value-added. Consequently, client demand, and so financial incentives, for the industry to innovate is very weak.

Another barrier to commercialising innovation is the, quite natural, suspicion towards something new and unfamiliar: it is easier to stick to something that is already established. However, several interviewees describe the Finnish industry as quite willing to absorb new technology and materials.

**Industry’s time horizons**
Like clients, production companies are short-term-oriented. If immediate benefits of an innovation are not obvious, then commitment to innovate is low. Investments in innovation requires long-term commitments (ownership or maintenance), significant long-term effects and opportunities for repetitive use.

**R&D investment**
Investments of money, time and resources in R&D activities are of course linked to the low levels of profitability, lack of incentives and repetition as described above. However, it is still interesting to consider the level of investment, as it reflects the
government/industry commitment to innovation and improvement.

**Government**
The government has shown commitment to R&D in construction through TEKES and VTT, which undertake and coordinate significant R&D activities.

**Industry**
The whole industry relies on a few large companies, as the many small companies do not have the capacity to invest in R&D. The construction industry’s R&D-expenses for 2004 were estimated as €27.1m (Statistics Finland, 2005).

There has been much effort to develop tools to better illustrate and visualise the project for the client and the effects of changes. IT tools to improve and make communication within project teams (e.g. exchange of drawings) is becoming more efficient. The interviewees agree that the building products industry has shown a much stronger commitment to R&D than the rest of the industry. As for continuous improvements, the larger firms are said to have developed structures for debriefing projects and making sure that experiences are transferred between projects. The most effective key is to keep teams from one project to another.

**Keys to success**
Clients must be encouraged to employ procurement forms that stimulate innovation, improvement, added-value and creativeness, e.g. functional contracting. A second key to success is thought to be an increased extent of industrialisation. Then the construction industry would become more similar to the manufacturing industry in terms of longer production batches, repetitive processes and learning curves and hence facilitate continuous improvement. Also, it would encourage innovation and investments to increase productivity.

**Attracting labour to the industry**
The most obvious area where the industry actually competes is on attracting and retaining competent labour. To assess the industry’s attractiveness, this report has used the number of students/applicants for construction-related courses.

**Summary of findings**
The Finnish construction industry is:
- Overall increasingly attractive to students: the total number of students on construction-related courses increased by 17% from 2000 to 2003.
- Very attractive to architects: recruitment never an issue. Between 2000 and 2004, the average number of new students was 106 - an increase of 22% 2000-2004.
- Increasingly attractive to civil engineers (4½ year university courses): from 2001 to 2004 the average number of new students was 241.
- Between 2000 and 2003, the total number of architecture and building students at upper secondary level increased by 36%. Applicants per seat 2003: 2.1.
- On the operative programmes, the number of applicants has increased by 103% from 1999 to 2005. Applicants per seat in 200: 2.4.
- At the operative second level programme the current levels have bounced back to levels similar to those before the crisis in mid-1990s. Applicants per seat 2005: 1.3.

The most important factors influencing labour attractiveness are:
- Image: unfavourable
- Wage levels: competitive for blue collar workers, particularly in the building services segment. Average annual growth rate from 2000 to 2005: 3.4%.
- Relationship between trade union
Attracting students
One important indicator of the industry’s attractiveness to competent labour is the number of students seeking their future in construction-related educations.

Figure 45 shows an increase of 17% from 2000 to 2003, whereas the percentage of female students actually has decreased from 19.1 to 16.7% during this period.

As for architecture and building students at upper secondary level, figure 46 below, the total number has increased by 36% between 2000 and 2003, bringing it up to 2.2% of the total student force in 2003.

For construction operative programmes (Figure 47), there is also a clear positive trend. The total number of first-choice applicants has increased by 103% since 1999 and the number of applicants per seat by 85%, up to 2.4 in 2005.

Figure 48 illustrates how the number of students at the 2nd level of the construction operative program dropped, and which reflected the market development of that period, by alarmingly 69% from 1990 to the lowest level in 1996. In that year, there were two seats per applying student. Since then, the figures have steadily picked up again and are now back to about the same levels as before the crisis in the early 1990s.

The number of new students at university level (Figure 49) has been continuously increasing for architects, whereas construction engineers saw a rapid increase from 2000 to 2001 but has since decreased to reach a level 04 similar to that of 2000. On average between 2000 and 2004, there have been 241 new construction engineering students and 106 architectural per year entering at university level.

The figures illustrate positive trends and give no particular reason to worry about future recruitment, especially for architects. Regardless of market downturns, unemployment and lower wages than professions with a similar level of education, it has never been a problem to recruit architects university courses are easily filled.

However, concerns over recruitment seem to be valid regarding site managers and other engineers. The wage levels, and even more so wage development, are lower than other professions with similar levels of education. Furthermore, the perceived image of the industry; low profitability, conservative and with conflicts between clients and builders, between actors and between employers’ federation and trade union, discourages engineers from making construction their career.

Explanatory factors—labour attractiveness
Figure 48 illustrates that during the severe downturn in 1991-1992 the sector lost a significant portion of prospective employees. The significance of the crisis may be reflected by the fact that one of the three universities with construction courses, Oulo, had to close down. With the market going down, firms going bankrupt and people losing

“Of course people should have the right to complain, but one person could delay the construction of flats for 100 families with 2 years!”
Figure 45
Total number of students at construction related educations (upper secondary to second stage of tertiary level), 00-03. Source: Statistics Finland

Figure 46
Total number, and percentage of total student force, of architecture and building students at upper secondary level, 00-03. Source: Statistics Finland

Figure 47
Number of seats and applicants and applicants per seat at construction operative programmes, 99-05. Source: RT

Figure 48
Number of seats and applicants and applicants per seat at construction operative programmes, 2nd level, 90-05. Source: RT
their jobs, the overall attractiveness of the industry went down as well. At the same time, during the rest of the 1990s, other industries, especially IT, were having good times and so increased their attractiveness. The effect is that the construction industry lost a several generations of workers, a gap which has been difficult to bridge. More recently, other industries, again especially IT, have experienced more difficult conditions whereas construction has been enjoying better times.

It is debatable whether or not the concept ‘competitiveness’ exists at the construction industry level, i.e. whether or not the construction industry competes? From the interviews, it is obvious that one area where the industry does compete is in the competition against other, domestic, industries for competent labour.

In summary, a lot of effort has gone into improving the industry’s attractiveness and it is now picking up again. Potential recruits now see that construction offers good salaries and improving work conditions. However, the workforce is an ageing one and there are not enough people to replace them. The most important factors for creating attractiveness of competent labour are:

- Image
- Wage levels
- Relationship between trade union and employers’ organisation
- Wage negotiation system
- Work conditions
- Job security
- Health and safety
- Image of the industry

Image of the industry
The image of the industry is the most important factor for the attractiveness of and recruitment to the industry and public perception has a huge impact. As the most intangible of factors, it is the most difficult to immediately improve. A negative image is mostly a result of the industry’s health and safety record.

Wages
The operatives of the Finnish construction industry are well paid. Good wages are seen as the most important factor to make the sector attractive to competent operatives. As of October 2005, the real hourly wage level is €16 for building services, €14 for building construction and €13 for civil engineering.

The interviewees agree that operatives should be well compensated, better than the manufacturing industry, due to the harsh nature of their work that:

- Requires problem solving skills
- Requires ability to work

“What drives the architect is not making money, but to create something ...” ... “to win awards, media coverage and be the one your peer talk about.”
independently
• Is physical work
• Is accident prone
• Has harsh working conditions

Figure 50 shows the hourly wage rates for blue collar workers of the four main sub-sectors of the Finnish construction industry. Ever since 1998, the wage rank sees building services at the top, followed by the building products industry, building construction and lastly the civil engineering sector. In terms of growth rates, however, the order has somewhat shifted: the civil engineering sector has enjoyed an average annual growth rate of 3.8%, followed by the building products industry with 3.7%, building construction 3.4 and lastly building services with 3.0%.

Figure 51 illustrates the annual change of wage levels for blue collar workers in construction and manufacturing as well as the overall CPI. Seen over the last decade, manufacturing workers have enjoyed a higher annual growth rate: 3.7% compared to construction with 3.3%. Over the past five years, these growth rates have been more even: 3.5% and 3.4% respectively.

Finally, one common and interesting comparison is that of construction wage levels as a percentage of manufacturing blue collar workers. As seen from figure 52, construction blue collar workers have constantly been below the wage levels of manufacturing blue collar workers. The gap closed somewhat around year 2000, but construction blue collar workers average 97.4% of the manufacturing industry counterparts.

Relationship employers’ organisation and trade union
The interviewees describe the relationship between the employers’

"Not any more. The situation has improved dramatically the over the last few years." (on recruitment problems)
organisation RT, and the trade union, Rakensussuiliito, as a healthy and positive one, a lot better than what it used to be. There have not been any strikes for numerous years. In comparison to the Swedish story, the union in Finland is not considered to play such a powerful role for the climate of the industry and is not described by the employers as a barrier for change and improvement.

Wage negotiation system

As in Sweden, wages in the Finnish construction industry are determined through collective agreements. RT and Rakensussuiliito, whose membership estimates 80,000 workers, negotiate for blue collar labour, and RT and the Union of Salaried employed for the white collars. The agreements normally run for one to two years, however the agreement with Rakensussuiliito as signed on March 1 2005 is running for three years (February 28 2008).

Wages are roughly determined as 2/3 based on time worked and 1/3 on performance (speed). Moreover, the workforce is divided into different wage groups, defined based on skills rather than age or experience. The collective agreement then specifies minimum wage levels for each wage group, but may be higher in certain regions or at certain firms.

In terms of work hours, the norm is 40 hours per week and eight hours per day from Monday to Friday. As for overtime, it can be agreed with for instance 50 hours a week, as long as the six-month-average equals 40 hours a week.

The relationship on wage matters between RT and Rakensussuiliito is described as neutral, tending towards collaborative. This is significantly different from the Swedish context. Still, if an agreement cannot be reached, the National Conciliator may be called upon to encourage consensus. In the event of agreements not being followed, cases may be taken to the Court of Labour.

Several interviewees mention the relatively good atmosphere between employers and employees in the industry, which may also be reflected by the absence of strikes and lockouts. The last major event was in 1988, whereas before that it was more common.

Work environment

The general consensus among the interviewees is that the work environment for operatives in the Finnish construction industry is better than the international norm. RT and Rakensussuiliito have successfully collaborated to improve conditions such as proper cantinas, changing facilities and equipment.

Job security

According to figure 53, unemployment among blue collar workers in construction remains at higher levels...
than the total Finnish economy. The gap was alarmingly high during and in the aftermath of the crisis in the mid 1990s, but has closed up somewhat since then. Yet, the average unemployment figure estimates 18.1% for the whole period 1990-2003 and 11.5% from 99-03. the corresponding figures for the overall economy is 11.1 and 9.4% for the two periods respectively.

Health and safety in construction

In comparison to other domestic industries, construction is still considered accident prone. Due to the special features of the work conditions in construction, however, the most appropriate comparison is probably between the construction industries of various countries. In such a comparison, Finland ranks relatively low compared with other highly developed countries.

Figure 54 shows the health and safety record of the Finnish construction sector (Sector F). For accidents with more than three days absence, the performance has actually got worse since 1995, even if the 2003 frequency of 74.6 accidents per 1,000 workers is a slight improvement compared to the last five years. The pattern is similar for accidents with three days or less absence, even if the differences are marginal and the level is very stable at

“For most accidents, some rule has been ignored.”
between 55.5 and 60.0 accidents per 1,000 workers. For the whole period 1995-2003 the average number of fatalities per year was 12 and the frequency 11.1 per 100000 workers, and there does not seem to be any notable improvement to report.

Health and safety is at the top of the contractors’ agenda and there has been a lot of effort going into this area. The importance of excellence in health and safety cannot be underestimated as the negative consequences are significant; personal damage, the costs involved but also the effects on the image of the industry and hence its attractiveness.

“Safety has become something very important in Finland”

Regulations are in place, so it is rather a management problem, or an attitude problem. Several interviewees believe that the challenge now is to establish a true health and safety culture among operatives.

Also, it is widely believed that the current trend towards industrialised construction, with a greater deal being constructed in an indoor environment, will help to improve the health and safety record.

Marketing activities
A further important factor for creating an interest of the industry is by marketing activities already at secondary school level (i.e. 13-16). And this is another area where Rakennusliito and RT have the same agenda and successfully have worked together.

Keys to success
In order to improve the image and recruitment situation of the industry, the great potential to recruit women and immigrants must be taken advantage of. This appears to be high on the agenda for the industry actors. Women comprise almost 25% of the workforce among architects and engineering consultants and a quite stable 7-8% among blue collar workers (Statistics Finland, 2005).

Explanatory factors
The main factors influencing the criteria of society satisfaction are:

- Codes of ethics
- The cultural norm
- Informal sector
- Cartels
- Environmental regulations and classifications
- Clients’ demand and incentives

Codes of ethics
In the light of some high-profile cases over the last few years and the unprecedented attention in media that has followed, everyone in the industry, also within companies, are today much more aware and cautious of how business is done and the risks involved in improper ethical behaviour. The risk of ruining your brand or reputation is devastating, both for a public and a local company.

So after all, it seems to have had a good effect on the industry’s ethical behaviour. In the light of the indications of unethical behaviour, many major companies, e.g. NCC, Skanska and YIT, and trade associations, e.g. RT and STD, have developed a code of business ethics.

The cultural norm
The high ethics in the construction industry is of course mostly a result of the high ethics in the Finnish cultural norm. In the 2003 Global Competitiveness Report, Finland score top of the world on the both ‘Ethical behaviour of firms’ and ‘Business cost of corruption’ (WEF, 2003). It has become a part of Finnish culture to demand environmental performance in line with standards and regulations.

Another factor being a part of the national culture is that people respect regulations and act in line with that belief.

Informal sector
The general opinion is that there is a grey sector in construction, but that the absolute majority of it is to be found among the lower end of the industry size-scale, often sub-contractors of third or fourth tier, and in the business carried out between the public and the small builder. Down at these levels, profitability is low, incentives to avoid heavy taxation are high, whereas monitoring and control by authorities is little and hence the risks of getting investigated insignificant.

The apparent consequence is that it implies unfair competition, which can leave ‘fair’ competitors with no other choice but to go down the same route. Also, it risks fuelling the public image of the industry as an unethical one. And it is seen as a major problem that the public only get to experience parts of the construction industry that is not representative to the overall picture. At the bigger end of the scale, this is not the way business is done. Public and media attention and the risks involved in getting the brand or reputation damaged, keep people in the industry away from improper behaviour.

In order to, primarily, stimulate private consumption of construction, but also to decrease the incentive to use informal labour, the government has introduced a tax deduction for renovation and additional construction work for private persons. Through this system, the private house-owner will get a tax deduction on undertaken construction work, given that he can prove that the work was carried out by a registered firm and that tax and social costs have been paid.

**Environmental regulations and classifications**

The general opinion among the interviewees is that the Finnish regulatory framework is among the more demanding than the international norm and that the country has reached far in environmental consciousness.

The upcoming area to be covered by regulations and classifications is energy consumption and efficiency. This is currently underway at the EU-level and is also thought to have a positive impact on making whole-life planning much more of a norm.

Also, RAKLI has developed a classification on environmental performance for residential buildings, offices and retail buildings, both during construction and for the completed building.

**Clients’ demand and incentives**

In accordance with the national norm, clients too demand that environmental regulations and standards should be followed and respected. When it comes to going beyond what is governed by standards and regulations, however, “you rarely find a client who is interested in paying for and go beyond that”.

For the building material sector environmental performance is said to be a qualifying parameter rather than a competitive advantage.

Generally, the demand for whole-life optimisation is low and the industry finds it difficult to communicate whole-life-benefits and make clients willing to pay for it. As discussed above, clients tend to use lowest cost as the most influential procurement criteria. Also, clients have a tendency to act short-term-oriented. Consequently, even if whole-life issues may be on the agenda in the beginning of the procurement process, at the end of the day clients focus on minimising the initial cost, which rules out most of the plans and actions to optimise the whole-life cost.

It is strongly emphasised that companies and clients must have the access to calculation tools for realising the cost and effects of whole-life planning. According the interviewees, the necessary tools for calculating whole-life costs are available. However, historical data for actual whole-life performance is still missing, which is a problem when trying the communicate whole-life-effects.

The reasoning above is particularly valid for clients who intend to sell off buildings as quickly as possible, and hence whose life-cycles are short. This means that the incentive for whole-life...
planning is significant only for clients who have a long-term commitment, e.g. clients who will own, maintain and operate their building for a long time.

In the light of this discussion, PFIs are thought to provide an incentive for whole-life planning. Also, public clients ought to procure with the life-cycle in mind. The PPA is designed to procure for best value, but still public clients tend to be short-termed and procure on lowest cost.

According to the interviewees, whole-life planning must originate from clients: clients must be committed to whole-life effects and include it in the procurement and planning processes. The lack of whole-life planning is mainly down to lack of demand, which in turn is down to clients’ lack of financial incentive. The factor that may change this is increasing energy prices. Also, the industry could increase clients’ awareness of how costs are distributed over the life-cycle: little planning, some building and a lot of maintenance cost.

Another aspect of whole-life planning is whole-life productivity: is the building flexible for different clients and changing clients’ needs over the life-cycle. Again, this is mostly relevant for clients with long-term commitment and ownership.

**Society satisfaction**

‘Overall society’ is the fourth and final stakeholder covered in the investigation of construction industry competitiveness. The three indicators of society satisfaction are: business ethics, environmental consciousness and whole-life planning.

"It is on the agenda, but more talking than action. Companies do not think about life cycles, they think about money."

"The day the clients really ask and are willing to pay for it, we can do it.”

**Summary of findings**

The ethical behaviour of firms in the Finnish construction is believed to be higher than the international norm, and is a result of a strong sense of ethics in the Finnish national culture. In fact, several interviewees mention that the high ethics in Finland is considered to be a problem when doing business with Russia, where the rules of the game are completely different. In the worst case scenario, Finnish companies have to choose between winning the contract and following their business ethics. Nevertheless, there have been cases of inappropriate behaviour: cartels in the asphalt sector and use of informal labour.

Companies in the Finnish construction industry comply with existing regulatory frameworks and are considered to perform very satisfactorily. However, according to the latest ISO-survey, Finland is below the average of ISO-registrations in relation to market size and far behind leading Sweden.

Projects in the Finnish construction industry are generally not planned with whole-life effects in mind. No doubt the awareness and attention is there, but at the end of the day, there is still very little real outcome.

In order to get a proper picture of these criteria, business ethics, environmental performance and whole-life planning must be assessed at the project level.

The impact on society is increasingly important for construction industry competitiveness as it influences the image of the industry and hence its attractiveness to competent labour.

The most important factors influencing these criteria are:

- Codes of ethics: common.
- Regulations: in place, transparent and demanding
- The cultural norm: positive attitude to ethics, environmental consciousness and compliance with regulations
- Clients’ demand: lack of incentives for whole-life planning and environmental performance beyond regulations
**Sweden**

**Key observations - Macroeconomics**

- Sweden is the largest of the Nordic economies.
- Sweden is above the OECD-countries in average, but nonetheless the least wealthy among the Nordic countries.
- Sweden has, along with several mature economies, experienced only moderate growth in both GDP, 1.9%, and population, 0.4%, during the period 1990-2003.
- More recently, economic growth is second in the Nordic region and 2005-6 are expected to achieve healthy levels again after slow years 2001-2003.
- Unemployment figures remain high, around 5%.
- Government has succeeded in their efforts to keeping inflation under control, achieving an average level of 1.7% during 2000-2004.
- Interest rates have lowered significantly, especially the short-term: from 4.1% in 2002 to 2.0% in 2004.
- Sweden enjoys an overall trade surplus with a good surplus on goods and a slight deficit on services.
- Sweden ranks 14th and 3rd at the IMD and WEF overall competitiveness rankings respectively, being strong on Company Operations and Strategies, but weaker on Quality of the National Business Environment.

**Key observations - Construction**

- With US$25bn, Sweden was third (by market size) among the Nordic countries in 2004.
- In terms of construction investment per capita, Sweden is, with US$2,782 per capita, far behind the Nordic neighbours and below the west-European average.
- During 1999-2003, construction averaged 4.3% of the Swedish GDP.
- During 2000-2004, construction output grew at an average rate of 1.8%, this is behind the average GDP change for the same period, 2.5%.
- The total construction investments 2004 estimated €18.62bn, of which 36.7% was residential buildings, 33.7% non-residential and 29.6% civil engineering.
- Following a series of years with slight growth, 2004 saw employment rise by 1.6% for the construction sector and 1.8% for architects and engineering consultants. Nonetheless, the current workforce only corresponds to 75% of the 1990-level.
- During 2000-2004, construction prices have in average doubled the overall inflation rate: 3.4% for construction, 1.7% in overall inflation.
- Together with neighbour Denmark, the Swedish construction industry experiences the highest VAT on construction in the world.
- In 2004, the basic rate for unskilled and skilled labour was €12.3 (EU average €9.5) and €15.7 (14.4).
- Social costs constitute 55.6% (EU average 45.3%) and 55.5% (41.8) of the all-in rate for unskilled and skilled labour respectively.
- Sweden is the world leader in ISO14001 registrations, ahead of many leading construction economies, but below average, on ISO9001 registrations.

**Key macroeconomic indicators**

**Competitiveness rankings 2005**

| IMD WCY | 14 | WEF GCI | 3 | WEF BCI | 12 | WEF Company Operations and Strategies: 7 | WEF Quality of the National Business Environment: 14 |
### Table 19  Key macroeconomic indicators

<table>
<thead>
<tr>
<th>Indicator SWE</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP growth, %</td>
<td>4.4</td>
<td>1.2</td>
<td>2.0</td>
<td>1.7</td>
<td>3.3</td>
<td>3.3</td>
</tr>
<tr>
<td>Construction output annual change, %</td>
<td>2.6</td>
<td>1.9</td>
<td>0.3</td>
<td>2.3</td>
<td>1.7</td>
<td>3.6</td>
</tr>
<tr>
<td>Population growth, %</td>
<td>0.06</td>
<td>0.08</td>
<td>0.16</td>
<td>0.27</td>
<td>0.33</td>
<td>0.37</td>
</tr>
<tr>
<td>Unemployment, %</td>
<td>5.6</td>
<td>4.9</td>
<td>4.9</td>
<td>5.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflation, %</td>
<td>1.3</td>
<td>2.6</td>
<td>2.4</td>
<td>2.0</td>
<td>0.2</td>
<td>1.4</td>
</tr>
<tr>
<td>Construction prices, annual change, %</td>
<td>4.5</td>
<td>4.5</td>
<td>3.5</td>
<td>2.6</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Short-term interest rate, %</td>
<td>4.0</td>
<td>4.0</td>
<td>4.1</td>
<td>3.0</td>
<td>2.0</td>
<td>2.3</td>
</tr>
<tr>
<td>Long-term interest rate, %</td>
<td>5.37</td>
<td>5.11</td>
<td>5.30</td>
<td>4.64</td>
<td>4.6</td>
<td>5.0</td>
</tr>
<tr>
<td>Goods trade balance (US$bn)</td>
<td>14.2</td>
<td>12.8</td>
<td>15.9</td>
<td>18.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Services trade balance (US$bn)</td>
<td>-1.5</td>
<td>-0.6</td>
<td>-0.8</td>
<td>-0.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purchase Power Parity (National currency /US$)</td>
<td>9.31</td>
<td>9.46</td>
<td>9.61</td>
<td>9.67</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Notable competitiveness strengths

In a global perspective, the single factor strengths are (WEF ranking 2003):
+ Total R&D-spending (WEF ranking: 1)
+ Company spending on R&D (2)
+ Capacity for innovation (2)
+ Managers’ willingness to delegate authority (2)
+ Extent of staff training (4)
+ University/industry research collaboration (4)
+ Stringency of environmental regulations (4)
+ Clarity and stability of environmental regulations (4)
+ Prevalence of environmental management systems (4)

### Notable competitiveness weaknesses

In relation to the world, the single factor weaknesses are (WEF ranking 2003):
– VAT rate (WEF ranking: 77)
– Hiring and firing practices (77)
– Flexibility of wage-determination (70)
– Efficiency of tax system (63)
– Prevalence of foreign technology licensing (51)

### Key construction parameters

#### Construction output

Total construction investments 2004 totalled €19.51bn (SEK174bn), and construction contributed to the Swedish GDP by 6.2%. The distribution of the total investments is illustrated above. Residential estimated €7.16bn, of which 63% was investments in new built and 37% in renovation. Non-residential building totalled €6.57bn, distributed as 63% private and 37% public sector. Total investment in the civil engineering segment was €5.77bn, 50% in the private and public sector respectively.

#### Employment

In 2004 the construction industry employed 420,000 people—10% of the total workforce. Figure 55 illustrates the
employment figures for the construction sector, architects and engineers, and women in construction respectively. Employment dropped by an average of 7.5% pa during the early 1990’s recession. Since the real low point was reached in 1997 the employment situation has improved but the current level only corresponds to 75% of the total workforce before the recession. Moreover, variation in employment is significant with a standard deviation in 1990-2004 of 14% of the average workforce. Architects and engineers also experienced a drop in employment from 1990-93, but since then has been very stable, with a standard deviation of only 690 people (3% of average workforce) between 1994 and 2004—80% of the 1990 workforce level. It is widely suggested that the growth rate of construction output is strongly linked to GDP growth and short- and long-term interest rates —see Figure 56.

An interesting comparison is the development of construction prices in relation to the country’s inflation — see Figure 57.

Figure 55 Construction sector employment 1990-2004

Figure 56 Construction output v key drivers

Figure 57 Construction prices v inflation
ASSESSING THE COMPETITIVENESS OF THE SWEDISH CONSTRUCTION INDUSTRY

Investor satisfaction: profitability
The first stakeholder for the construction industry to satisfy is the investors. This study has used profitability as the indicator of investor satisfaction.

Summary of findings
Profitability levels of firms in the Swedish construction industry did not generally meet the financial targets of firms. In 2003, contractors averaged 2.3% on return on sales and 17.7% on return on equity. The corresponding figures for architects, engineering consultants and material suppliers were 3.6/22.8%, 2.6/21.7% and 3.2/18.2% respectively.

The Swedish construction industry is at least equal to an international norm for profitability of between 1.5% to 4% of annual turnover.

Profitability affects the sustained competitiveness of the industry in several aspects as it links to investments in R&D, staff training, new technology and other processes to improve business.

The most important factors influencing profitability are:
- Market conditions, input costs and output prices: reasonable output growth of 2.1% in average from 2000-2005. Output prices have increased more than input costs. In 2003 BPI estimated 114% of FPI. This suggests that the current price levels leaves room for profits.
- Clients’ evaluation criteria: procurement on lowest price rather than best value
- Competition: competition on price rather than best value
- Extent of sub-contracting

Table 20 (SCB, 2003) shows the return on sales (RoS) and return on equity (RoE) for various branches of the industry. The main observations are:
- For the Swedish construction industry, the average RoS and RoE is 2.7% and 19.3% respectively. These levels were perceived by the interviewees to be, the least, equal to the international levels.
- Many Swedish firms have stated their aim is to achieve profit margins of between 4-5%. The average values on RoS for contractors falls between 2 and 2.5%, which means that the target is generally not achieved.
- Profitability in professional service firms (architectural and engineering) is generally targeted at 6-8%. The average values for architects and engineering consultants fall between 2.6 and 3.6%, which means that the financial target is not achieved.
- Larger firms all across the industry have lower RoS and RoE than small- and medium-sized firms.
- The best financial performance is shown by medium-sized architectural firms.
- The worst financial performance is by medium-sized contractors in the ‘construction of other buildings’ category.

Explanatory factors: profitability
Profitability levels in the construction industry will vary from company to company and between countries. It is a function of the market conditions, the sub-sectors in which the company operates, the success or otherwise of the company’s projects, and the efficiency of the business. For example, contractors generally have high turnovers in relation to their capital employed, and with prudent financial planning, projects can be cash positive very quickly from commencement on site. As a result, return on sales is relatively low, whereas return on equity is much higher. Sales may not be the best measure of profitability, as extensive sub-contracting can reflect the true size of turnover in the business.

Studies have been made that generalise profitability across the construction sector. Profitability in the construction
industry is regarded as a problem worldwide. Profitability in construction is lower than in some other industries and creates a challenge to have the surplus for investment in research and development investments in new technology, staff training or other process development to improve business.

The most important factors that influence profitability are:

- Market conditions input costs and output price levels
- Clients’ evaluation criteria
- Competition
- Extent of sub-contracting

**Market conditions, input costs and output price levels**

The market conditions of the past five years were discussed in the Swedish country overview (page 84), and concluded an average growth in construction output of 2.1% for the period 2000-2005.

Figure 58 shows that the building and factor price indices have, with 1999 being the exception, never perfectly matched. For the best part of the 1990s BPI was below FPI, suggesting that there was very limited room for profitability or alternatively a productive industry. During the 2000s, the situation has been the reverse, hence suggesting that the room for profitability has increased or that productivity has decreased. In 95, BPI estimated 81.4% of the FPI, in 03 BPI was 114.3% of FPI. Between 1990 and 2003, however, BPI has averaged 97.6% of the FPI, which indicates that there in average there is a decent match in input costs and output prices, but, as opposed to Finland, there

### Table 20 Profits levels of main construction sectors—2003

<table>
<thead>
<tr>
<th>Sector</th>
<th>Ratio</th>
<th>Small</th>
<th>Medium</th>
<th>Large</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction of housing</td>
<td>RoS</td>
<td>2.5</td>
<td>2.5</td>
<td>1.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Construction of housing</td>
<td>RoE</td>
<td>27.3</td>
<td>22.1</td>
<td>22.8</td>
<td>24.1</td>
</tr>
<tr>
<td>Construction of housing</td>
<td>RoC</td>
<td>5.7</td>
<td>5.4</td>
<td>4.3</td>
<td>5.1</td>
</tr>
<tr>
<td>Construction of other buildings</td>
<td>RoS</td>
<td>4.5</td>
<td>0.4</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Construction of other buildings</td>
<td>RoE</td>
<td>25.9</td>
<td>2.5</td>
<td>16.9</td>
<td>15.1</td>
</tr>
<tr>
<td>Construction of other buildings</td>
<td>RoC</td>
<td>7.7</td>
<td>1.4</td>
<td>6.7</td>
<td>5.3</td>
</tr>
<tr>
<td>Construction of civil engineering works</td>
<td>RoS</td>
<td>2.5</td>
<td>3.1</td>
<td>1.4</td>
<td>2.3</td>
</tr>
<tr>
<td>Construction of civil engineering works</td>
<td>RoE</td>
<td>21.9</td>
<td>8.6</td>
<td>11.3</td>
<td>13.9</td>
</tr>
<tr>
<td>Construction of civil engineering works</td>
<td>RoC</td>
<td>8.6</td>
<td>4.6</td>
<td>3.1</td>
<td>5.4</td>
</tr>
<tr>
<td>Contractors on average</td>
<td>RoS</td>
<td>3.2</td>
<td>2.0</td>
<td>1.6</td>
<td>2.3</td>
</tr>
<tr>
<td>Contractors on average</td>
<td>RoE</td>
<td>25.0</td>
<td>11.1</td>
<td>17.0</td>
<td>17.7</td>
</tr>
<tr>
<td>Contractors on average</td>
<td>RoC</td>
<td>7.3</td>
<td>3.8</td>
<td>4.7</td>
<td>5.3</td>
</tr>
<tr>
<td>Architectural activities</td>
<td>RoS</td>
<td>4.2</td>
<td>4.7</td>
<td>1.8</td>
<td>3.6</td>
</tr>
<tr>
<td>Architectural activities</td>
<td>RoE</td>
<td>28.1</td>
<td>28.7</td>
<td>11.5</td>
<td>22.8</td>
</tr>
<tr>
<td>Architectural activities</td>
<td>RoC</td>
<td>9.3</td>
<td>13.0</td>
<td>6.5</td>
<td>9.6</td>
</tr>
<tr>
<td>Engineering activities</td>
<td>RoS</td>
<td>2.9</td>
<td>3.4</td>
<td>1.6</td>
<td>2.6</td>
</tr>
<tr>
<td>Engineering activities</td>
<td>RoE</td>
<td>23.8</td>
<td>27.7</td>
<td>13.6</td>
<td>21.7</td>
</tr>
<tr>
<td>Engineering activities</td>
<td>RoC</td>
<td>6.0</td>
<td>7.6</td>
<td>2.6</td>
<td>5.4</td>
</tr>
<tr>
<td>Building material suppliers</td>
<td>RoS</td>
<td>2.4</td>
<td>4.9</td>
<td>2.3</td>
<td>3.2</td>
</tr>
<tr>
<td>Building material suppliers</td>
<td>RoE</td>
<td>15.0</td>
<td>16.3</td>
<td>23.4</td>
<td>18.2</td>
</tr>
<tr>
<td>Building material suppliers</td>
<td>RoC</td>
<td>5.9</td>
<td>7.5</td>
<td>5.8</td>
<td>6.4</td>
</tr>
</tbody>
</table>
is no match year-on-year.

**Annual change of FPI, BPI and CPI**

Figure 59 illustrates how the annual change of FPI and BPI in relation to the overall consumer price index (CPI). In the longer run, 1990-2003, FPI match CPI, whereas BPI has grown at a significantly higher rate: 3.0, 2.9 and 5.0% respectively. In the shorter run, 1999-2003, inflation has been very low, which has not been reflected in the FPI or BPI. Between 99 and 03 the annual change of CPI averaged 1.6%, FPI 2.9% and BPI a stunning 8.0%.

**Annual change of main elements of FPI**

Considering the main elements of FPI, figure 60, it can be concluded that the overall FPI has been pulled upwards by rising material costs, and not by labour costs as often claimed. In the longer run, 1990-2004, materials have averaged an annual growth rate of 3.8%, labour costs 2.4% and clients’ costs 3.4%. In the shorter run, between 1999 and 2004, the trend of average growth rates is intact; materials: 3.6%, labour costs: 2.6% and clients’ costs: 3.3%. The average change of CPI for the two periods was 3.4 and 3.3% respectively.

**Figure 58 Factor price and building price index (1968 = 100), 1990-2003**

*Source: Statistics Sweden*

**Figure 59 Annual change of factor building and consumer price index, 1990-2003**

*Source: Statistics Sweden*
Service price index

Both architects and engineering consultants have suffered from price stagnation, and the fact that the price difference between mainstream and high-value-adding firms is small and have in general not achieved their financial targets. The price level is currently about SEK 700 per hour. Figure 61 reveals that, between the first quarter of 2003 until the second quarter 2005, the price index for architects and engineering consultants has increased by 4.2 and 8.3% respectively. Much of this difference is explained by the massive increase of 5% from the first to the second quarter of 2005. Overall CPI for the same period has grown by 0.7%. Thus, at least the price index for architects and engineering consultants has increased substantially more than overall CPI.

"We are at the same level today as we were some ten years ago!"

Both architects and engineering consultants have suffered from price stagnation. The price difference between mainstream and high-value-adding firms is small and have in general not achieved their financial targets. The price level is currently about SEK 700 per hour. The planning phase is undervalued and clients tend to procure on lowest price rather than value added, as they believe that the only way to ensure good value for money is through fierce price competition. Consequently, there is limited room for value-adding processes, which in turn limits profitability.

The competition and price stagnation described above, force companies into very high resource utilisation. One large architectural firm said that their architects engaged in projects charge 88-90% of their time.
Clients’ evaluation criteria

Clients tend to procure on lowest price rather than value added, as they believe that the only way to ensure good value for money is through strong price competition. However, change is happening slowly with partnering agreements beginning to emerge, and limited use of public private partnerships. Consequently, there is limited room for marketing and selling value-adding processes, which in turn limits profitability.

Competition

Price competition is fierce. However, there is very limited competition, or pressure, to innovate and deliver added-value. This is a consequence of clients’ tendency to procure on lowest price.

Extent of sub-contracting

Since profitability is linked to the extent of value added, the more that is subcontracted, the lower the margin. This means that in times when work and risks are transferred to sub-contractors, and also considering the large capital employed, it is reasonable to expect margins of 2-3%.

Potential

According to the interviewees, there is a great potential to improve profitability levels. The opportunities lie in focusing on, and reducing, the supply chain, consolidated material supply, improved logistics, reduction of rework and non-value adding activities. Another factor is a shift towards partnering agreements.

“I think we would need some 5% to achieve this. And that is completely up to ourselves - we can reach 5% if we manage ourselves properly!”

Client satisfaction

The second stakeholder for the industry to satisfy is the clients. This report has studied the parameters time and cost predictability, relationships and innovation.

“I believe clients are satisfied, but not overwhelmed. They get what they have ordered for, but not more than that. They are not positively surprised.”

Summary of findings

In general terms, according to the interviewees, the likely outcome of projects in the Swedish construction industry is that they, considering agreed changes:

- Finish on time
- Have difficulties to finish on budget (from a client perspective)
- Are not characterised by harmonious relationships; lack of trust, disagreements of what is included in the original price and what is actually a ‘change’.
- Do not include notable innovation

The most important factors influencing predictability and relationships are:

- Clients’ competence and experience to specify requirements and manage projects: generally poor
- The early stages: to a too low extent encourages planning and interaction among project actors to exchange experiences and establish common goals and incentives. Also, there is a rush to get started on site.
- Changes during the process: too many changes too late
- The practice for companies to seek for additional costs: exists and appears to be an accepted part of the game
- Clients’ procurement criteria: procurement on lowest price rather than best value
- Form of collaboration:
- Handling of disagreements: common but solved at a local level
- Clients’ time horizon: short
- The building permission process: delays and uncertainties
- Common understanding and trust: lack of

The most important factors influencing the extent of innovation are:

- Profitability: too low to allow for heavy investments
- Repetition: too much of prototypes
- Clients’ demand: lack of incentives to innovate, add-value and solve problems
- Industry’s time horizons: too short and driven by short-term profits
- R&D investments: upward trend
In order to get a comprehensive picture of the actual performance on parameters of client satisfaction, a project-level approach is needed such as the UK KPI system.

Table 21 lists the leading Swedish industries in terms of the number of ISO9001-registrations. This figure must be related to number of firms in each industry, but it shows that construction is under-represented in this list, with just 3.6% of the registrations. As observed in section ‘Global positioning – Construction’, Sweden is ahead of Denmark, Norway and Finland in registrations related to market size, but are well behind the leading countries on prevalence of quality management systems.

<table>
<thead>
<tr>
<th>Industry</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>3469</td>
</tr>
<tr>
<td>Wholesale &amp; retail</td>
<td>597</td>
</tr>
<tr>
<td>Basic &amp; fabricated metal</td>
<td>528</td>
</tr>
<tr>
<td>Electrical &amp; optical equipment</td>
<td>351</td>
</tr>
<tr>
<td>Machinery &amp; equipment</td>
<td>285</td>
</tr>
<tr>
<td>Transport, storage &amp; communication</td>
<td>203</td>
</tr>
<tr>
<td>Rubber &amp; plastic products</td>
<td>186</td>
</tr>
<tr>
<td>Construction</td>
<td>125</td>
</tr>
<tr>
<td>Engineering services</td>
<td>84</td>
</tr>
<tr>
<td>Building materials</td>
<td>16</td>
</tr>
</tbody>
</table>

The most important causes for the low activity of innovation are:

- Profitability
- Lack of repletion/prevalence of prototypes
- Lack of demand and incentives
- Industry’s time horizons
- R&D investments

Clients’ competence and experience

Both government reports, Skärpning Gubbar and Byggkommisionen, point out the importance of strong client competence, the current lack of it and hence the need to strengthen clients’ competence to manage the construction process, assess value and specify needs and requirements. Also, it has become one of the key areas for the newly appointed Construction Industry Coordinator (CIC) to work with, as stronger client competence is seen as one of the keys to improved performance of the industry. As one client representative puts it:

"My feeling is that projects are delivered on time, but perhaps what is delivered is not that beautiful to look at."

Explanatory factors: predictability and relationships

The three main positive factors behind client satisfaction are: good planning tools, skilled workforce and a strong culture to finish on time. The most important causes for not achieving client satisfaction are:

- Clients’ competence and experience to specify requirements and manage projects
- Changes during the process
- The practice for companies to seek for additional costs
- Clients’ procurement criteria
- Form of collaboration
- Handling of disagreements
- Clients’ time horizons
- The early stages
- The building permission process
- Common understanding and trust

A competent client, who is actively involved and engaged in the process, provides lower risks for changes and rework during the process and hence better chances for delivery on time and budget.
Among the interviewees, the importance of client competence was repeatedly emphasized. As for actual competence, the picture is mixed: some argue clients are weak in general, whereas others say that the larger clients are sufficiently strong and knowledgeable. It is generally agreed that local authorities are the weakest link in client competence.

Several interviewees point out that for an organisation to afford in-house client competence, it requires a certain size and capacity of the organisation and that they have repeat business. Hence, larger client organisations with repeated business could be expected to secure in-house client competence, whereas one-off clients must be guided by the industry. A good example of client competence using experience from previous projects, is the technical council at Akademiska Hus.

Public clients

Public clients are described as the weakest link in terms of client competence. During the procurement processes, public clients are guided by the Public Procurement Act (LOU), which aims to seek the best value, not necessarily the lowest price. Despite these guidelines, projects procured under the LOU tend to be chosen based on lowest cost. However, there have been some bizarre cases, where public clients who did not go for the lowest price were taken to court by the unsuccessful bidders.

Several of the interviewees, but particularly the Building Commission, urge public clients to show the way and pioneer on alternative procurement forms, new materials or ways of working. Furthermore, the Building Commission prescribes that public clients should develop measurable criteria, including whole-life effects and innovation, and strive for best value.

Changes during the project

Changes and the negative effects on predictability and relationships, is an often cited source of frustration during the project. Changes can occur due to:

- Badly specified needs and requirements
- Changed conditions for client: change of tenant, change market conditions
- Flaws in plans or drawings

The interviewees agree that the industry must improve its handling of changes during the process, but it is a balancing act. Furthermore, a common source of disagreement and the root of lack of trust is that clients do not realise the effects of the changes they ask for, and hence do not allocate time or money for it. In the least preferred scenario, the client sees his budget has been unfairly overrun, whereas contractors feel that they have not been compensated for all additional costs.

Many of the issues with changes may be solved by new procurement forms, e.g. partnering. When the client and other project actors interact and keep a continuous dialogue on the progress of the project, the risks of sudden and dramatic changes and cost overruns are thought to be smaller.

The search for additional costs

As described in Finland, there is a habit among Swedish contractors to, despite their knowledge and experience to identify flaws, include in the bid, exactly what is specified in the initial plans. The chain of consequences is often changes – extra work or rework – additional costs – disputes – damaged relationships and lack of trust.

This habit stems from clients’ focus on procuring on lowest price, which has triggered fierce price competition as the only form of competition and only opportunity to win contracts. Another trigger is the low profitability levels in the industry. On the other hand, the problem is that clients choose a form of procurement that does not allow for

“If anything is sacred in this industry, it is time. Projects should be finished on time. We have a very strong tradition on that point.”
sufficient interaction between the key actors of the project, alternatively they do not ensure that drawings are completed before submission to potential bidders.

Thus, parts of the problem can be solved through interaction among key actors in the early stages and the establishment of common goals and incentives to keep to schedules and budgets. This will encourage all actors to investigate all potential flaws and take action to minimise changes and rework.

The effects of this practice are obviously solely negative, even it is believed that the situation is worse in other countries, and this is considered to be an important factor to change for creating a more healthy industry climate.

**Clients’ procurement criteria**

The general consensus is that most clients procure on lowest cost and believe that price competition is the only way to get value for money. They are not able to properly assess value-for-money-relationships and consequently companies find it difficult to communicate and motivate the higher price that comes with the extra value. This prevailing focus on lowest cost rather than best value, discourages producers from innovating and maximising added value and encourages the habit of seeking opportunities for additional costs. Also, as pointed out above, it limits profitability and, as will be discussed in depth later, does not stimulate whole-life planning.

Doubtlessly, one driver for a more healthy industry, is clients starting to procure on value rather than lowest price, and to more evaluate firms’ willingness to cooperate, capability to deliver and their reference projects. Change is happening slowly with partnering agreements beginning to emerge, and limited use of public private partnerships.

**Form of collaboration**

The use of lowest price as the main procurement parameter and competitive tendering and the form of procurement

"... we (clients) must be more demanding and be stricter in our requirements, follow up the process to make sure that we get what we have ordered and paid for. That is all it takes, because if the client becomes more demanding, everyone else must improve their performance and what they deliver."

"It is almost always preferable to have a competent client. The worst thing however, is a client who thinks he is competent."

There are competent clients, and those projects often turn out very well. It is when you have incompetent clients you get the problems."
“On the one hand you want to minimise changes in your process, but on the other hand you want to offer your client the opportunity to make late decisions.”

does not appear to be a healthy combination for delivery on time and cost, good relationships or innovation. Yet it is very common. Instead, a procurement form such as partnering is widely believed to have significant potential to improve all four indicators for client satisfaction.

As illustrated in figure 62, there has been a stunning shift from different types of contracting to own management. In 1980, own management was only used as the form of contract on only 3% of the multi-dwelling projects, but had grown to 49% in 2003. Of the various types of tendering, general contracting by tender has decreased dramatically and consistently, from 52% in 1980 to a mere 2% in 2003. Distributed contracting by tender has also decreased, however not as significantly: from 21% in 1980 to 9% in 2003. The real shift for the form of contract happened between 1980 and 1982, and has since then been very stable at an average rate of 6%. Finally, total contract by tender has increased in use: 23% in 1980 to 40% in 2003, however having decreased from 66% in 1994.

This suggests that clients to an increasing extent have chosen to shift more of the responsibility over to one main contractor, who in turn sets up the rest of the supply chain.

Handling of disagreements

The most common source of disputes is changes during the process, what is included in the original price and what the additional cost or delay of a change actually is. This sort of disagreement occurs throughout the industry as well as among major builder and professional clients. Some cases are taken to arbitration but most disagreements are sorted out at a much lower level. It is not in the Finnish culture to engage in litigation.

Time horizon

Clients take a short-term focus, striving to minimise the initial capital cost, rather than optimising the whole-life cost. It is difficult for companies to commercialise whole-life efficient services, solutions or materials.

The early stages

Despite a widespread understanding of the importance of the early stages of a project, too little time and energy is invested in planning and proactive thinking. The actors involved in the process do not allow themselves to interact and exchange knowledge and experiences from previous projects. Planning time is undervalued whilst drawings are often incomplete and the supply chain not set up before going on site.

The vast majority of interviewees believed that more time should be

“Building permission system

A common source of uncertainty in the planning phase, is the building permission process. In Sweden this process is described as inefficient and a frequent source of delay. Too often, the building permission process gets delayed, although the starting or completion dates are set. Delays in building permissions tend to shorten planning time even more and is indirectly a cause for rushed or non-completion of drawings and plans and so can lead to rework, changes with the resulting additional costs.

The overall purpose of the planning practices is to ensure transparency and openness and the true democratic right to influence one’s own environment.

“We would never employ someone just because he asks for the lowest money!”

Det finns fem huvudsakliga delar av bygglovssystemets process (Boverket, 2005)
• Pre-permission. Ursprungligen, den klienten som presenterar ett plan om läget, ändamål och grundläggande drag av byggnaden till lokala myndigheter. Lokala myndigheter kommer att bedöma om det eller inte det läger som är rekommendationer för byggnaden och tillhandahåller en förutbestämt beslut för att låta klienten fortsätta med planeringen av byggnaden. Pre-permission utgör och expireras efter två år.
• Final permission. Den faktiska bygglovssystemen baseras på en utvärdering av läget och form av byggnaden och om det eller inte det är kompatibelt med det omgivande landskapet och stadsplanering. Ett till och med att beväger på närmesträdgårdernas välbehag behöver vara beaktat. Byggnaden behöver ha sörjande exteriörformer, färg och ästhetik.

Enligt Statistiska centralbyrån finns ingen data tillgänglig på effektiviteten av processen. Dock, nästan varje fall beror på storleken och placeringen av de olika projektet och kan ta från en vecka till flera månader. I sådana fall motverkas det ofta av ofullständiga planer och dokumentationer från klient eller allmänhet. Vidare, andra orsaker till förseningar är lokala miljö- och brandkommittéer:
• The building announcement. För att vid minst tre veckor innan byggnadsstart, klienten ska informera lokala myndigheter.

"Far too often, you just get going and start digging. But with more time and resources invested in the planning stage, I think you would get better results. And make money out of it too."

local authority and provide an overview of the planning of the construction.
• Construction consultation. Upon receiving the building announcement, the local authority calls for consultation with the client. Particularly, the detailed planning of the construction is discussed and how quality control is to be carried out. The outcome of this stage is the building control plan.
• Building control plan. This document covers the key points agreed during the construction consultation and describes how and when these key points are to be monitored and documented.

Common understanding and trust
One driver of success is to establish common goals and incentives for the actors in the project as a part of the planning phase. The actors can also agree on a project framework in terms of say, economics, time schedules, quality and design.

During this process, the different actors are thought to learn from each other and create an understanding and respect for one another’s expertise and contribution, thus improving the current lack of trust. According to several interviewees, this is a form of working that is becoming more and more popular and requested by clients.

Explanatory factors: innovation

Profitability
Profitability in the construction industry is too low to allow for substantial investment in R&D. The architects and engineering consultants who were interviewed spoke of huge pressures on resources and very little time to think about innovation, improvement and upgrading.

Lack of repetition
A feature of construction, which distinguishes it from most of the manufacturing industry, is the lack of standardisation/repetition. The project-
based nature and fragmentation of the industry discourages investment in innovation, as an innovation useable for one particular project, may not be effective for another or even if it was the new project team may not have the relevant skills to implement it. This phenomenon is reinforced by the short-term-ism in the industry.

**Demand and incentives**

Clients tend to procure on lowest cost rather than value and use forms of procurement that strictly specify what is ordered and hence do not stimulate or leave much space for innovation or value-added processes. Consequently, as pointed out by the Building Commission, client demand, and thus financial incentives, for the industry to innovate is very weak.

Another barrier to commercialising innovation is a suspicion towards new materials, technology or work methods. It is easier to stick to something that is already established, than to take the risk to pioneer something new.

**Industry’s time horizons**

Like clients, production companies are short-term-oriented. If immediate benefits of an innovation are not obvious, then any commitment to innovate is low. Investments in, or client demand for, innovation requires long-term commitment, notable long-term effects and opportunities for repetitive use.

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**Table 22  R&D investment - private sector**

<table>
<thead>
<tr>
<th>R&amp;D investment - private sector SEKm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995  1997  1999  2001  2003</td>
</tr>
<tr>
<td>343   443   386  506   619</td>
</tr>
</tbody>
</table>

*Source: Statistics Sweden*

---

**Table 23  R&D investment - public sector**

<table>
<thead>
<tr>
<th>R&amp;D investment - public sector SEKm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998  1999  2000  2001  2002  2003  2004  2005</td>
</tr>
<tr>
<td>165  35   44   102  121  83   91   186</td>
</tr>
</tbody>
</table>

*Source: Statistics Sweden*

---

**R&D investment**

Investment of money, time and resources in R&D activities are of course linked to the low levels of profitability, lack of incentives and repetition as described above. However, it is still interesting to consider the size of any investment, as this reflects government and industry commitment to innovation and improvement. Government investment in R&D in construction has decreased significantly over the last decade.

**Industry**

The whole industry relies on a few large companies (Skanska, NCC, Peab and Thyrens), as the many small companies do no have the capacity to invest in R&D.

In the national statistics, the R&D expenditure of private construction firms is presented together with energy and water supply and cannot be separated for confidentiality reasons. This makes it difficult to really assess the private sector’s investment, but it seems likely to believe that construction also has increased its investments and that it exceeds the investment by the public sector. In relation to total R&D investments of the private sector (Table 22), construction and energy-related R&D estimated 0.65 and 0.86% in 2001 and 2003 respectively. This appears to be disproportionate to the size of the industry.

Much of the construction-related research is coordinated by the Swedish Construction Industry’s Development Fund (SBUF), which disposes about MSEK50 per year to conduct practically useable research (SBUF, 2005).

Public investments in construction related R&D has shifted notably over the last seven years, but overall appear to be significantly lower than that of the private sector (Table 23).
Employee satisfaction
The most obvious area where the industry actually competes is on attracting and retaining competent labour. To assess the industry’s attractiveness, this report has used the number of students and applicants at construction related educations.

Industry’s ability to attract students
Figures 63-66 below present the positive trends on the attractiveness to the industry of students at the upper secondary/university levels.

Upper secondary level
Figure 63 illustrates the positive trend in number of applicants to construction-related courses at the upper secondary level. Overall, the number of applicants has increased by 61%, 58% for male and a stunning 195% for female applicants. As of 2005, construction-related courses were the first-choice for 9.7 and 0.4% of all male and female students respectively.

As of 2005, construction-related programs were the first-choice for 9.7 and 0.4% of all male and female students respectively.

Master level – civil engineer
Figure 64 shows that the number of applications to civil engineering programs at the university level increased by 62% between 2001 and 2005. In the same period, applicants per seat has increased from 1.2 to 1.9, taking the average value to 1.5.

Master level – architects
For architectural students (figure 65) at university level, attractiveness to the industry remains very high with an average of 7.9 applications per place. Luleå University of Technology responded to this demand by opening an architectural programme with 30 places.

Bachelor level – building engineers
Figure 66 illustrates the positive trends for the attractiveness of building engineering programmes at the bachelor level. From 2001 to 2005, the number of applicants increased by a total of 207%,

Summary of findings
The Swedish construction industry is:

- Very attractive to architects: recruitment never an issue and between 2001 and 2005, the average number of applicants per seat has been 7.9!
- Increasingly attractive to civil engineers (4.5-year-university programs): from 2001 to 2005, the number of applicants per seat has increased from 1.2 to 1.9 and averaged 1.5.
- Increasingly attractive to building engineers (3-year-university programs): from 2001 to 2005, the number of applicants per seat has increased from 0.9 to 1.3 and averaged 1.1.
- Increasingly attractive at the upper secondary level: from 2001 to 2005 the total number of applicants has increased by 61% in total, 58% for male and 195% for female students.

The most important factors influencing the industry’s ability to attract students:
- Image: unfavourable
- Wage levels: competitive for blue collar workers, relatively low for white collars
- Relationship between trade union and employers’ organisation: collaborative on recruitment and work conditions-related issues, unproductive on wage determination matters
- Wage negotiation system: collective agreement. Employers find it too inflexible, not stimulating a healthy work environment and has too weak a link between wage increases and productivity improvements
- Work conditions: good and high on the agenda
- Job security: unemployment among blue collar workers relatively high. Average for 2002 to 2005: 8.9%.
- Health and safety: improving. From 2000 to 2004, the frequency of accident was reduced by 19% and sick-cases by 13%. Average rates 1995-2004: 16.0 and 7.1 per 1000 workers for accidents and sick-cases respectively. Fatalities per 100,000 workers: 5.5.
somewhat matched by the 109% increase in the number of seats. For the same period, the number of applicants per seat has increased from 0.9 to 1.3, taking the average value to 1.1. Overall attractiveness of students to the industry

All the above graphs illustrate positive trends and give no particular reason to worry about future recruitment especially for architects. However, there is a concern over recruitment of site managers and other engineers. The wage levels, and wage development, are not as good as other professions with similar levels of education. Furthermore, the perceived poor image of the industry discourages engineers from seeking a career in construction.

Figure 63 Students on construction program—upper secondary level
Source: Statistics Sweden

Figure 64 Students on civil engineering program—master level
Source: Statistics Sweden
**Figure 65 Students on architectural program—master level**
*Source: Statistics Sweden*

**Figure 66 Students on building engineering program—bachelor level**
*Source: Statistics Sweden*
Several interviewees argue that people in the construction industry has a bad habit of complaining a lot about their own industry, which of course does noting to help creating a more positive image.

Unfortunately, several of the issues pointed out above are the results of irrelevant comparisons, are no longer true or have been created at the lowest level in the industry.

Despite actions to improve the image, each time there is negative publicity in the press, it affects the image badly and all previous efforts are cancelled out.

**Wages**

Swedish construction operatives are well paid. Good wages are seen as the most important factor in making the sector attractive to competent operatives. As of October 2005, the minimum wage according to the collective agreement is SEK 109, the real hourly wage level is average SEK155.2 and SEK131.3 for performance-based and time-based system respectively.

The interviewees agree that operatives should be well compensated, better than the manufacturing industry, due to the harsh nature of their work as it:

- Requires problem solving skills
- Requires ability to work independently
- Requires physical work
- Has a high accident rate
- Subject to harsh working conditions

Most employers in the interviews argue that operatives realise they are well paid, but are triggered by the union to ask for more. Wage development does not reflect market development or improvement in productivity. A reasonable level is around 110% of the manufacturing worker’s wage; the trade union has set its long-term goal as 120%.

“What drives the architect is not making money, but to create something ...” ... “to win awards, media coverage and be the one your peer talk about.”

**Explanatory factors**

During the severe downturn in 1991/92 the sector lost a significant portion of employees. With the market falling, firms going bankrupt and people losing their jobs and, the overall attractiveness of the industry went down as well. At the same time, during the rest of the 1990s, other industries, especially IT, were having good times and so increased their attractiveness. The effect was that the construction industry lost a generation of workers, a gap which has been difficult to bridge. More recently, other industries, again especially IT, have experienced more difficult conditions whereas construction has been enjoying better times.

It is debatable whether or not the concept ‘competitiveness’ exists at the construction industry level, i.e. whether or not the construction industry competes. From the interviews, it is obvious that one area where the industry does compete is in the competition against other domestic industries for competent labour. The most important factors for creating attractiveness of competent labour are:

- Image of the industry
- Wage levels
- Relationship between trade union and employers’ organisation
- Wage negotiation system
- Work conditions
- Job security
- Health and safety

**Image of industry**

Image is the most important factor in the attractiveness of and recruitment to the industry but is the most difficult to improve quickly. The interviewees describe the image of the industry as:

- Unsafe, dirty and dusty
- Low tech, non innovative
- Bad ethics: use of informal labour and cartels
- Inefficient: budgets are overrun and especially, housing is too expensive
- Bad relationships between client and builders, employers and trade union

Most interviewees argue that people in the construction industry has a bad habit of complaining a lot about their own industry, which of course does noting to help creating a more positive image.

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“What drives the architect is not making money, but to create something ...” ... “to win awards, media coverage and be the one your peer talk about.”
Hourly wages for blue collar workers

Figure 67 shows the hourly wage development for blue collar workers between 1993 and 2004. During this period wages for blue collar workers have in averaged increased at a lower pace in construction than both manufacturing and the total private sector: 2.8% for construction, 3.4 for total private sector and 3.6 for the manufacturing industry. The overall CPI for the same period averaged 1.6%.

In the shorter-term-perspective, between 2000 and 2004, the construction industry has picked up and has averaged an annual growth rate of 3.6%, whereas the total private sector and manufacturing industry estimated 3.4 and 3.4% respectively.

Monthly wages for white collar workers

The pattern illustrated for blue collar workers above is analogous also for white collar workers in the private sector (see figure 68). The monthly wage level in construction has increased at a lower rate (3.6%) than in the total private sector (4.4%) and the manufacturing industry (4.8%). In the shorter-term-perspective, between 2000 and 2004, the construction industry has picked up and has averaged an annual growth rate of 4.8%, whereas the total private sector and manufacturing industry estimated 4.2 and 4.5% respectively.

Figure 69 shows the hourly wage development for blue collar workers in the Swedish construction industry as compared to the total private sector, the manufacturing industry and the overall consumer price index.

Ever since 1992, the wages of construction blue collar workers have been higher than both manufacturing workers and those of the total private sector. In the aftermath of the crisis in the early 90’s, the gap closed somewhat and in 1998 reached a record low level of 2.8 and 7.5% of the manufacturing and total private sector worker respectively. Since then, however, the gap has widened again and for the period of 1999-2004, construction wages average 110.2% of the total private sector and 106.5% of the manufacturing industry blue collar.

“...the construction industry has this bad habit of complaining about their own industry, which of course does noting to help creating a more positive image.”

White collar workers in the construction industry (see figure 70) follow the reverse pattern described for blue collars. For the first half of the 90’s, construction wages were still higher, however less so, than in both manufacturing and the total private sector. Since 1996, construction wages have been relatively weaker, reaching the lowest level in 2000. Since then, however, the gap has again closed somewhat, but still, for the period of 2000-2004, construction wages average 96.2% of the total private sector and 90.9% of the manufacturing industry blue collar workers respectively.

Relationship between employers’ organisation and trade union

The relationship between the construction workers’ trade union, Byggnads, and the construction enterprises federation, BI, may be described as unhealthy and unproductive. However, this is mostly true for the matter of the wage negotiation practises and collective agreement, whereas the two parts successfully have collaborated on areas like health and safety and marketing and recruitment.

Several employers describe the union as extremely powerful and as one of the main barriers for improvement in the industry. The degree of unionisation among construction blue collar workers is considerable, see figure 71. Due to the relatively high unemployment figures of some 9%, the total membership of the union is actually higher than the total workforce, in average 102% between 2000 and 2004.

Wage negotiation system

These employees and employers are directly dependent under the collective agreement. On November 1 2005, the construction workers’ trade union, Byggnads, cancelled the just expired agreement and signed the new agreement, valid for 17 months.
Figure 67 Change of hourly wages (%) blue collars in the private sector
Source: Statistics Sweden

Figure 68 Change in monthly wages (%) white collar workers in the private sector
Source: Statistics Sweden

Figure 69 Hourly wage differences in construction and manufacturing and total private sector
Source: Statistics Sweden
Byggnads appear to be quite satisfied with the outcome, whereas BI (2005) stated that “as for general conditions there are few changes in this new agreement” and that “the surrounding world is changing faster than what we achieved from these negotiations”. The main features of the new agreement are (Byggnads, 2005):

- The basic wage level increases by SEK3 to SEK112
- The effective wage rate increases by SEK3.2 - about SEK550 per month
- The distribution of work-hours is more flexible. The local union is the part when overtime exceeds 200 hrs
- In case of conflict, the Swedish Labour Court is the deciding authority

The wage level is either determined based on time or performance. The time-oriented wage level is, apart from a few exceptions, expressed per hour worked. For new built, the initial position is performance-based wages. There are several types of performance based wage determination, for instance traditional accord, but one common feature is the division in one fixed part and one flexible. The employer and the local representatives of Byggnads are to negotiate on the precise levels of the performance-based wages. If these parts cannot agree the negotiations will travel to central level, between
Byggnads and Bi. In the case that these parts can agree either, the resulting wage level becomes the basic level as specified in the collective agreement (Byggnadsavtalet, 2000).

The specification of basic wage levels differentiates between blue collar workers with a skills certificate (yrkesbevis), workers who have turned 19 and spent more than 12 months in the industry, have turned 19 but spent less than 12 months, turned 18 or not turned 18. Thus, the basic level is equal for blue collar workers who have turned 20 and those close to retirement, provided they all have got a skills certificate (Byggnadsavtalet, 2000).

The performance-oriented system should be developed in such a way that the outcome is quantifiable and interpretable. The interpretation is carried out by the employer or his agent and the local representatives of Byggnads. The measurements and interpretations of achieved performance is to be assessed every 12th week (Byggnadsavtalet, 2000).

The trade union argues that the collective agreement stimulates efficiency and a positive work environment especially is what the workers want.

The employers describe the collective agreement as too centralised and inflexible and that it hinders wage differentiation between workers based on skills, experience or individual performance. Basically, the preferred system would allow the employer and the employees to determine on wage system and wage levels as well as work-hours, also for new built. Employers say the system does not steer towards better quality or work environment and that is not what the employees want. The frequent (quarterly) negotiations cause disproportionate wage increases, which makes construction more expensive and also make it more difficult to predict the costs of projects. Moreover, Bi has estimated the costs related to the negotiations and its interpretations and measurements to about SEK1.5bn for the construction sector (Bi, 2005).

Finally, the employers are disappointed that the government commission Skärpning Gubbar did not deal with the matter of the collective agreement. However, the Building Cost Commission suggests that the performance related part of the wage level should play a smaller role.

Work environment
The general consensus among the interviewees is that the work environment for operatives in the Swedish construction industry is better than the international norm. According to the 2005 member survey carried out by Byggnads, 80% of the construction blue collar workers find the work environment ‘good’ or ‘very good’. This figure has steadily improved for the past five years and 31% believe that the work environment is better today than five years ago. Nonetheless, 11% believe that work conditions have got worse (Byggnadsarbetaren, 2005).

Job security
The intensity of activity in the construction industry varies with the season. This affects the employment situation, as can be seen in table 24.

Table 24 Unemployment—blue collar workers (%)
Source: Byggnads

<table>
<thead>
<tr>
<th>Month</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>10.3</td>
<td>11.7</td>
<td>15.2</td>
<td>12.6</td>
</tr>
<tr>
<td>March</td>
<td>9.3</td>
<td>10.7</td>
<td>13.1</td>
<td>11.2</td>
</tr>
<tr>
<td>May</td>
<td>5.2</td>
<td>7.4</td>
<td>8.3</td>
<td>6.5</td>
</tr>
<tr>
<td>July</td>
<td>7.2</td>
<td>9.0</td>
<td>9.4</td>
<td>7.6</td>
</tr>
<tr>
<td>September</td>
<td>5.2</td>
<td>6.9</td>
<td>6.6</td>
<td>5.5</td>
</tr>
<tr>
<td>November</td>
<td>6.8</td>
<td>9.2</td>
<td>8.5</td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>7.3</td>
<td>9.2</td>
<td>10.2</td>
<td>8.7</td>
</tr>
</tbody>
</table>
Unemployment among construction blue collar workers is higher than the average level of the Swedish economy at an average of 8.9% between 2002 and 2005. Average unemployment in January is estimated at 12.5%, whereas the unemployment in July is 6.9%.

**Health and safety in construction**

In comparison with other domestic industries, construction is still considered accident-prone. Byggnads and BI have successfully collaborated to fight accidents and improve overall working conditions. Together, the two organisations have developed significantly increased awareness and understanding of the importance of a healthy work environment. Furthermore, workers are demanding that safety awareness is built into the company culture.

As illustrated in figure 72, even if the trend is going in the right direction, there is still a lot to be done. In the longer run, 1994-2004, the average rates for fatalities and accidents and absence from sickness averaged 6.4, 16.3 and 7.3 respectively. The accident rate and the frequency of absence from sickness have decreased by 33 and 19% respectively. The first category has been fairly stable at around 16 accidents per 1000 workers and achieved notable improvement in both 2003 and 2004. The second category on the other hand experienced a troublesome increase in frequency from 1996 before coming to a halt in 2001. There is no convincing year-on-year improvement to be seen. Omitting the extreme value of fatalities in 1994, also the fatality rate has decreased by a notable 59% but again there is no convincing year-on-year improvement.

In the shorter run, 2000 to 2004, the positive trends on accidents and sickness cases are intact: 19 and 13% respectively. As for the number and hence frequency of fatalities there is no real year-on-year improvement to be seen. The average rates for fatalities and accidents and absence from sickness averaged 4.6, 15.5 and 8.5 respectively.

One interviewee underlined the importance of clients also realising their responsibility for creating a safe working environment. Clients must demand improved health and safety and never make it a factor of competition.

The current trend towards industrialised construction, with a more being constructed in an indoor environment, will help to improve the health and safety record.

The importance of excellence in health and safety cannot be underestimated as the negative consequences are significant; personal damage, the costs involved but also the effects on the image of the industry and hence its attractiveness.

**Figure 72 Health and safety records—Swedish construction sector F**

*Source: Swedish Work Environment Authority*
Marketing activities

A further important factor for creating an interest of the industry is by marketing activities at secondary school level. This is another area where Byggnads and BI have the same agenda and have worked together successfully.

Women in construction

In order to improve the industry’s image and its ability to recruit, more women and immigrants must be attracted to the industry. Figure 73 shows that women make up almost 25% of the workforce among architects and engineering consultants and a fairly stable 7-8% among blue collar workers.

![Figure 73 Women in construction](source)

Society satisfaction

‘Overall society’ is the fourth and final stakeholder covered in the investigation of construction industry competitiveness. The three indicators of society satisfaction are: business ethics, environmental consciousness and whole-life planning.

Summary of findings

The ethical behaviour of firms is higher than the international norm, and is a result of a strong sense of ethics in the Swedish national culture. Nevertheless, there have been cases of inappropriate behaviour: cartels in the asphalt sector and use of informal labour.

Companies comply with existing regulatory frameworks and are considered to perform very satisfactorily. Sweden is the leading industry in terms of ISO14001-registrations in relation to market size.

Projects in the Swedish construction industry are generally not planned with whole-life effects in mind. No doubt the awareness and attention is there, but at the end of the day, there is still very little real outcome. In order to get a proper picture of these criteria, business ethics, environmental performance and whole-life planning must be assessed at the project level.

The impact on society is increasingly important for construction industry competitiveness as its influences the image of the industry and hence its attractiveness to competent labour.

The most important factors influencing these criteria are:

- Codes of ethics: common. Moreover BI run an ethical council, planned to be expanded to cover the whole sector
- Regulations: in place, transparent and demanding.
- The cultural norm: positive attitude to ethics, environmental consciousness and compliance with regulations
- Clients’ demand: lack of incentives for whole-life planning and environmental performance beyond regulations
Causes
The main causes for each of the three parameters of discussion are:

- Codes of ethics
- The cultural norm
- Environmental regulations and classifications
- ISO 14001 registrations
- Clients’ demand

Codes of ethics
In the light of some high-profile cases over the last few years (see below) and the unprecedented attention in media that has followed, everyone in the industry, also within companies, are today much more aware and cautious of how business is done and the risks involved in improper ethical behaviour. The risk of ruining your brand or reputation is devastating, both for a public and a local company. As a response, many major companies and trade associations, e.g. NCC, Skanska, STD, BI and SVR, have developed a code of business ethics. So after all, the high-profile cases seem to have had a good effect on the industry’s ethical behaviour.

Furthermore, since 1997, BI1 operates a Business Ethic Council (Byggetiska Rådet). As of today, the council has dealt with about 20 cases, most of which are cases where a small sub-contractor claims he has been unethically treated by one of the larger firms. Most often it is about the larger firm making too big exceptions from the standardised agreement or that the larger firm has used its superior in size to unfairly shift the power-balance. A further case could also be that the larger firm spreads to the other big firms the picture of one sub-contractor as an under-performer or that a firm is at the brink of bankruptcy. All four major firms, Skanska, Peab, NCC and JM, have been questioned by the council.

In the event of verdict of guilty, the case will be announced in the industry magazine ‘Byggindstrin’ and hence spread an unfavourable picture of the blameworthy company and illustrate examples of bad-practice. The future step of the council is to also involve other industry federations, for instance clients and architects and engineering consultants, to create an industry-wide code of ethics and a council to which all actors in the industry can report cases of unethical behaviour.

The cultural norm
It is now a part of the culture to demand environmental performance in line with standards and regulations. Another factor being a part of the national culture is that people respect regulations and act in line with that belief.

Environmental regulations and classifications
The general opinion among the interviewees is that the Swedish regulatory framework is more demanding than the international norm and that the country has reached far in environmental consciousness.

The upcoming area to be covered by regulations is energy consumption. This is currently underway at the EU-level and is also thought to have a positive impact on making whole-life planning much more of a norm.

What is still missing, though, is a one-and-only classification on what is an environmentally friendly building.

ISO 14001 registrations
An indication of the industry’s environmental awareness is its position as world leader—see section on global positioning: construction. In the domestic context construction is fifth in terms of ISO140001 registrations - see Table 25.

Clients’ demand
In accordance with the national norm, clients too demand that environmental regulations and standards should be followed and respected. When it comes to going beyond what is governed by standards and regulations, however, “you rarely find a client who is interested in paying for and go beyond that”.

1 The data on the Business Ethics Council were provided by Åke Rådberg, Chief legal expert, BI.
High profile cases

Informal sector
The general opinion is that there is a grey sector in construction. This picture is confirmed by an investigation conducted by Byggnads region Skåne in 2003. The study concludes that of the 408 sites Byggnads visited in the Skåne region, 140, i.e. one third, were fully or partly manned by informal labour. Given the standard turnover per employee, this implies that the Skåne construction market is drained of a value of SEK400 million per year. Byggnads believes, however, that this is only the top of the iceberg and that the actual figure is rather SEK1.2 billions per year (Byggnads, 2003).

In 2001, the Swedish Inland Revenue office estimated that unregistered activity in the construction industry corresponded to SEK 2-2.5 billion per year.
The interviewees agree that the absolute majority of the informal sector is to be found among the lower end of the industry size-scale, often subcontractors of third or fourth tier, and in the business carried out between the public and the small builder. Down at these levels, profitability is low, incentives to avoid heavy taxation are high, whereas monitoring and control by authorities is little and hence the risks of getting investigated insignificant.

The apparent consequence is that it implies unfair competition, which can leave 'fair' competitors with no other choice but to go down the same route. Also, it risks fuelling the public image of the industry as an unethical one. And it is seen as a major problem that the public only get to experience parts of the construction industry that is not representative to the overall picture.

At the bigger end of the scale, this is not the way business is done. Public and media attention and the risks involved in getting the brand or reputation damaged, keep people in the industry away from improper behaviour.

The key to success as suggested by the government is tax deduction for subcontractors. The Swedish delegation has considered the systems for tax deduction for contractors and subcontractors used in Norway, the Netherlands, Ireland, Germany and the UK. The suggestion is that the main contractor transfers 20% of the contracting sum into a special taxation account from which the sub-contractor then needs to apply to get money paid out. This would ensure that subcontractors fulfil their obligations of paying social costs.

The industry has reacted with reluctance to this suggestion, arguing that it will harm all companies, especially the cash flow for the smaller end of the industry, in their operations and introduce even more bureaucracy.

Another suggestion is for the industry to introduce contractual agreement that requires each company not to hire informal labour. Alternatively, the contractor at one level is required to control the non-existence of informal labour at the subsequent tier of subcontractor and so on throughout the chain of sub-contractors.

Cartels
In late October 2001, the Swedish Competition Authority was informed about cartel activity in the asphalt sector. The authority suspected that major actors in the asphalt sector had met at several occasions since 1993 to decide on price levels and to split the market between them. In late March 2003, an application for a summons was submitted to district court of Stockholm.

The Competition authority intends to sue a total of eleven construction companies for violation of the Competition Act. The total sum of summons of SEK1.6 billions makes this the most severe breach of Swedish competition law ever.

Naturally, high-profile cases like these again fuel the public image of construction as an unethical industry.
For the building material sector environmental performance is said to be a qualifying parameter rather than a competitive advantage.

Generally, the demand for whole-life optimisation is low and the industry finds it difficult to communicate whole-life-benefits and make clients willing to pay for it. As discussed above, clients tend to use lowest cost as the most influential procurement criteria. Also, clients have a tendency to act short-term-oriented. The obvious consequence is that clients focus on minimising the initial cost, which rules out most of the plans and actions to optimise the whole-life cost. It is a must that companies and clients have the access to calculation tools for realising the cost and effects of whole-life planning.

The reasoning above is particularly valid for clients who intend to sell off buildings as quickly as possible. This means that the incentive for whole-life planning is significant only for clients who have a long-term commitment, e.g. clients who will own, maintain and operate their building for a long time.

In the light of this discussion, PFI:s are thought to provide an incentive for whole-life planning. Also, public clients ought to procure with the life-cycle in mind. The PPA is designed to procure for best value, but still public clients tend to be short-termed and procure on lowest cost. A further reason for the lack of whole-life planning among public clients is the grant system. Since public clients are allocated a certain sum of money per year for construction, they cannot afford to spend more initially, even if this would be beneficial for the long-term. The Building Commission urges public clients to start including whole-life considerations in the procurement and planning process.

According to the interviewees, whole-life planning must originate from clients. The lack of whole-life planning is mainly down to lack of demand, which in turn is down to clients’ lack of financial incentive. The factor that may change this is increasing energy prices. Also, the industry could increase clients’ awareness of how costs are distributed over the life-cycle: little planning, some building and a lot of maintenance cost.

Finally, one interviewee raised the point that models for rent calculation must be adapted to compensate for a higher initial cost but improved whole-life cost.

Table 25  ISO14001 registrations 2004 for selected Swedish industries Source ISO Survey, 2005

<table>
<thead>
<tr>
<th>Industry</th>
<th>Number of:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>2722</td>
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<tr>
<td>Wholesale &amp; retail</td>
<td>408</td>
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<tr>
<td>Basic &amp; fabricated metal</td>
<td>304</td>
</tr>
<tr>
<td>Machinery &amp; equipment</td>
<td>223</td>
</tr>
<tr>
<td>Transport, storage &amp; communication</td>
<td>195</td>
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<tr>
<td>Construction</td>
<td>151</td>
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<tr>
<td>Rubber &amp; plastic products</td>
<td>125</td>
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<tr>
<td>Electrical &amp; optical equipment</td>
<td>122</td>
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<tr>
<td>Engineering services</td>
<td>40</td>
</tr>
<tr>
<td>Building materials</td>
<td>15</td>
</tr>
</tbody>
</table>

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Finally, one interviewee raised the point that models for rent calculation must be adapted to compensate for a higher initial cost but improved whole-life cost.
UK

Key observations - macroeconomics

- UK is the second largest of the European economies, slightly larger than France but a bit behind Germany.
- UK is just above strong economies like Germany and France and slightly behind Japan in terms of wealth per capita.
- It has managed to keep average GDP growth at 2.3% during 1991-2003, which is significantly higher than countries like Germany, France and Japan and almost the same as the OECD average.
- Along with several mature economies, population growth has been slow and estimates are not more than 0.3% during 1990-2003.
- Whilst several strong economies have struggled, the UK has achieved an average growth rate of 2.7% during 2000-2004, well above Germany and France and almost the same as the USA.
- Unemployment has been stable at relatively high levels of around 5%.
- Inflation rates were, on average, 2.2% between 2000 and 2004.
- Interest rates have lowered significantly, reaching average levels of 4.6% for the short-term and 4.9% for the long-term rates.
- The UK struggles with an overall trade deficit of about US$40bn. Services are strong, but the trade deficit on goods is significant.

- The UK drifts behind many other mature economies on the IMD and WEF overall competitiveness rankings: 22nd and 13th respectively. Nevertheless, UK scores well at both sub-indices Company Operations and Strategies and Quality of the National Business Environment.

Key observations - construction

- The UK is the third largest construction market in Europe with construction investment per capita (US$3,556) above the western European average.
  - During 1999-2003, construction averaged 5.6% of the UK GDP.
  - During 2000-2004, the average change in construction output has been in line with, or slightly higher than, GDP change: 2.9 and 2.7% respectively.
  - Total construction investment in 2004 (est.) was €146bn - 52% non-residential buildings, 42% residential and 6% civil engineering.
  - In 2004, employment for operatives fell by 6%, however this broke the previous positive growth in employment. The self-employment rate was 45%.
  - During 2000-2004, construction prices have, on average, been almost double the overall inflation rate at 4% (national inflation 2.2%).
  - At 17.5%, the UK enjoys a construction VAT rate lower than the international norm.
  - In 2004, the basic rate for unskilled and skilled labour was €8.8 (EU average €9.5) and €11.7 (€14.4) respectively.
  - Social costs constitute 26.8% of the all-in rate for both unskilled and skilled labour, EU average 45.3% and 41.8% respectively.
  - The UK is 4th in terms of ISO14001 registrations, but drifts behind several leading construction economies on ISO9001-registrations per output.

Population 60,411,457
Area 244,820 sq km
GDP US$1,782 billion*
GDP per capita US$29,600*
Life expectancy at birth (total pop.) 78.38 years

*Current prices, PPPs, estimate 2004
### Key macroeconomic indicators

**Competitiveness rankings 2005**
- IMD WCY: 22
- WEF GCI: 13
- WEF BCI: 6
- WEF Company Operations and Strategies: 6
- WEF Quality of the National Business Environment: 6

**Notable competitiveness strengths**
In a global perspective, the single factor strengths are (WEF ranking 2003):
- Financial market sophistication (1)
- Extent of incentive compensation (2)
- Efficacy of corporate boards (1)
- Intellectual property protection (2)
- Presence of demanding regulatory standards (2)
- Value chain presence (2)
- Extent of branding (2)
- Extent of marketing (2)
- Ethical behaviour of firms (2)
- Breadth of international markets (2)
- Buyer sophistication (1)

**Notable competitiveness weaknesses**
In a global perspective, the single factor weaknesses are (WEF ranking 2003):
- Regulatory obstacles to business (39)
- Prevalence of foreign technology licensing (31)
- Corporate income tax (31)
- Business cost of crime/violence (29)
- Total cost of starting a business (26)
- Firm level technology absorption (24)

### Key construction parameters

**Construction investments**
Construction output was €146.23bn (£102.36bn) in 2004, of which residential was €60.96bn, split into 45.6% in new build and 54.4% in renovation. Private and public output were split 74.4% and 25.6% respectively.

Non-residential building totalled €76bn, distributed as 58.8% new built and 41.2% repair and maintenance. 65.2% was private investments and 34.8% public sector. Total investment in the civil engineering segment was €6.3bn.

### Table 26 Key macroeconomic indicators

<table>
<thead>
<tr>
<th>Indicator</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP growth, %</td>
<td>3.9</td>
<td>2.3</td>
<td>1.8</td>
<td>2.2</td>
<td>3.2</td>
<td>2.6</td>
</tr>
<tr>
<td>Construction output, annual change, %</td>
<td>0.8</td>
<td>1.8</td>
<td>4.2</td>
<td>4.7</td>
<td>3.2</td>
<td>2.6</td>
</tr>
<tr>
<td>Population growth, %</td>
<td>0.25</td>
<td>0.32</td>
<td>0.21</td>
<td>0.23</td>
<td>0.76</td>
<td>0.32</td>
</tr>
<tr>
<td>Unemployment, %</td>
<td>5.4</td>
<td>5.0</td>
<td>5.1</td>
<td>5.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inflation, %</td>
<td>2.9</td>
<td>1.0</td>
<td>2.6</td>
<td>2.6</td>
<td>1.9</td>
<td>2.1</td>
</tr>
<tr>
<td>Construction prices, annual change, %</td>
<td>4.3</td>
<td>3.8</td>
<td>2.0</td>
<td>4.3</td>
<td>5.5</td>
<td>4.0</td>
</tr>
<tr>
<td>Short-term interest rate, %</td>
<td>6.0</td>
<td>5.1</td>
<td>4.0</td>
<td>3.7</td>
<td>4.3</td>
<td>4.5</td>
</tr>
<tr>
<td>Long-term interest rate, %</td>
<td>5.31</td>
<td>4.94</td>
<td>4.91</td>
<td>4.52</td>
<td>4.8</td>
<td>4.7</td>
</tr>
<tr>
<td>Trade balance – goods (US$bn)</td>
<td>-55.7</td>
<td>-58.9</td>
<td>-63.1</td>
<td>-78.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trade balance – services (US$bn)</td>
<td>20.5</td>
<td>19.1</td>
<td>23.0</td>
<td>23.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purchase Power Parity (National currency unit / US$)</td>
<td>0.641</td>
<td>0.632</td>
<td>0.628</td>
<td>0.637</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Employment figures**

In 2004, the UK construction industry employed 1074100 operatives, which is equivalent to 3.8% of the total workforce. Figure 74 illustrates the employment situation for construction workers from 1993 to 2004. After the downturn in 1996, employment figures have picked up again and seen a 52% growth to 2004. The total workforce today is 43% larger than a decade ago. Moreover, it is interesting to note the shift from a majority of self-employed to the current majority of operatives, even if the self-employment rate still is 45%. Since 1993, the self-employment rate has averaged 47.8%.

It is widely suggested that the growth rate of construction output is strongly linked to GDP growth and short- and long-term interest rates—see Figure 75.

A further interesting comparison is the development of construction prices in relation to the country’s inflation — see Figure 76.

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**Figure 74 Construction sector employment 1993-2004**

![Graph of construction sector employment 1993-2004](image)

**Figure 75 Construction output v key drivers**

![Graph of construction output and key drivers](image)
DIfferentiating between traditional and modern approaches and attitudes

The groundbreaking Egan report “Rethinking Construction”, published in 1998, was the starting point for a strong movement for change in the UK construction industry. The report identified a series of changes needed for the industry in order to raise its standards and improve its sustainable competitiveness.

According to the interviewees, this is something that has radically changed the industry and since then, many companies have adopted the ideas presented in the report. The differences between companies operating with a traditional approach to construction, and those having adopted a more “modern” way of thinking are in fact so significant that the interviewees frequently referred to two fundamentally different industries. On all occasions when the traditional and the modern approach were differentiated, the latter was considered to outperform the former. The interviewees referred to the “Rethinking Construction approach” as:

- Delivering the product on time and at cost.
- Scoring significantly better at client satisfaction surveys.
- Mostly using integrated teams where actors from the main stakeholders get involved in an early stage in the project, leading to quicker, easier and cheaper problem solving.
- Having an increased understanding of the other actors’ needs and, in particular, clients now have a better understanding for the process, and that changes in the project will also affect when it will be delivered and the final cost of it.

The most important change accomplished by the report and the actions following it is the way companies have increased their understanding of the needs of other actors in the industry, and the benefits that could be gained by a better co-operation and involvement of all actors throughout the value chain. Not only has awareness and understanding increased, there is also a considerable desire to actually do something about the current situation. It is clear that companies operating in the industry are dissatisfied with the way projects are procured, carried out and handed over, and that they believe the relationships within the industry must be improved to reach a sustainable situation.

Not all companies interviewed for this project claim to have adopted the ‘Egan message’ fully, and they may not make the most of the several industry bodies born in its aftermath, but they still want to see a shift made by the industry.

Figure 76 Construction prices v inflation

![Graph showing construction prices vs inflation]
ANALYSING THE COMPETITIVENESS OF UK CONSTRUCTION

Investor satisfaction: profitability

The first stakeholder for the construction industry to satisfy is the investors. This study has used profitability as the indicator of investor satisfaction.

Interviewees generally agreed that the UK construction industry was on approximately the same level as other construction industries in Western Europe. However, they also agreed that today's profitability levels are far too low to enable an effective level of long-term investment such as in training, technology etc. However, this problem is not unique to the UK construction.

Since 1997, Constructing Excellence has produced an annual Key Performance Indicators (KPI) for the industry. On of these KPIs measures profitability which is defined as “company profit before tax and interest as a percentage of sales”. According to the KPIs (figure 77), profitability in the industry has increased dramatically from 3.2% in 1999 to 8.7% in 2005. The average value between 1999 and 2005 estimates 5.9%.

Another way of looking at how well companies within the industry do financially is to look at the number of insolvencies of companies and the number of bankruptcies among self-employed (figure 46). Figures show a steady decrease of the latter, both in real numbers and as percentage of the number of self-employed. Insolvencies of companies decreased steeply during the second half of the 90s but has since 1999 stabilized at approximately 1500 a year. The relative number of bankruptcies, however, has started to increase since the beginning of the new millennium.

Summary of findings

According to the KPIs, profitability in the industry has increased dramatically from 3.2% in 1999 to 8.7% in 2005. The average value between 1999 and 2005 estimates 5.9%.

The UK construction industry is currently higher than an international norm for profitability of between 1.5% to 4% of annual turnover.

Profitability affects the sustained competitiveness of the industry in several aspects as it links to investments in R&D, staff training, new technology and other processes to improve business.

The most important factors influencing profitability are:

- Market conditions, input costs and output prices: total all work has grown significantly by on average 3.3% per year between 2000 and 2004, which is notably higher than, for example, Germany and France. For both housing and non-housing projects, the tender price has significantly outgrown the cost for contractors over the past five years. For 'roads' the pattern is the opposite.

- Existence of PPP/PFI: these projects generally lead to higher profitability than other projects

- Clients’ evaluation criteria: procurement on lowest price rather than best value

- Shortage of skilled labour

- Extent of sub-contracting and market fragmentation: high degree of sub-contracting leads to small margins and high market fragmentation

Figure 77 Profitability of the UK construction industry (KPI - all construction)
Explanatory factors: profitability

Profitability levels in the construction industry will vary from company to company and between countries. It is a function of the market conditions, the sub-sectors in which the company operates, the success or otherwise of the company’s projects, and the efficiency of the business. For example, contractors generally have high turnovers in relation to their capital employed, and with prudent financial planning, projects can be cash positive very quickly from commencement on site. As a result, return on sales is relatively low, whereas return on equity is much higher. Sales may not be the best measure of profitability, as extensive sub-contracting can reflect the true size of turnover in the business.

Studies have been made that generalise profitability across the construction sector. Profitability in the construction industry is regarded as a problem worldwide. Profitability in construction is lower than in some other industries and creates a challenge to have the surplus for investment in research and development investments in new technology, staff training or other process development to improve business.

With a profit margin as small as 2-5%, it does not take a lot to turn a potential profit into a deficit big enough to cancel out the profit from previous projects. Managing risk is an obvious challenge for sustained profitability, something that the interviewees consider being a natural part of the industry, and something that most actors are used to dealing with. They suggested the following reasons as the most common causes for the industry’s profitability:

- Market conditions, input costs and output prices
- Existence of PPP/PFI
- Clients’ evaluation criteria
- Shortage of skilled labour
- Extent of sub-contracting and market fragmentation

Market conditions, input costs and output prices

The UK construction industry has seen a significant growth over the last two years, predominantly driven by increased public investment and a strong housing market—see Table 27. Overall, total all work has grown by on average 3.3% per year between 2000 and 2004, which is significantly higher than for example Germany and France.

The Government’s pledge to increase the amount of new dwellings with social housing provision has fuelled a significant growth in this market segment. With a proposed increase in the number of social homes of 50% to a total of 70,000 homes between 2004 and 2007, the market is likely to remain positive in the near future. On the other hand, private housing has stagnated following record high prices, and increased interest rates.

Public spending has increased in non-residential work with investment in
Table 27 Construction output (£bn 2000 constant prices/% changes year on year)
Source: Construction Industry Forecasts by Construction Products Association

<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>Housing</strong></td>
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<tr>
<td>Public</td>
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<td>2080</td>
<td>2390</td>
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<td></td>
<td>9.9</td>
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<td></td>
<td>4.7</td>
<td>13.2</td>
<td>12</td>
<td>6</td>
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<tr>
<td>Total</td>
<td>9932</td>
<td>11205</td>
<td>12795</td>
<td>13750</td>
<td>14105</td>
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<td>7.5</td>
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<td><strong>Other New Work</strong></td>
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<td>9455</td>
<td>9980</td>
<td>10345</td>
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<td></td>
<td>22.9</td>
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<td>18.6</td>
<td>9.6</td>
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<td>5905</td>
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<td>-12.3</td>
<td>-3.1</td>
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<td>0.8</td>
<td>2.4</td>
<td>3.4</td>
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</table>

hospitals and educational projects increasing significantly over recent years. Many of these are delivered as PFIs and, in Table 25 are classified as commercial work - one of few segments showing a positive trend. The market is slow for both industrial and new office construction, where high costs of raw materials and high vacancy rates in existing offices are major concerns.

In 2004, the Highway Agency decided to cut its planned projects from 15 to 8, something that had consequences for the output in infrastructure. Also rail activity has declined radically since 2002.

Figures 79, 80 and 81 describe the development of contractors’ tender prices and the resource cost index which represents an estimated cost for contractors. The resource cost index is an estimation based on the costs of mechanical, electrical and building costs. For both housing and non-housing projects, the tender price has significantly outgrown the cost for contractors over the past five years, with an increase of 7.2% to 4.5% for housing and 6.5% to 4.6% for non-housing projects. This indicates that the contractors’ profit margin should have increased over the same period and correlates well with the profitability figures presented above. However, the KPIs measure profitability for all construction and not particular sectors, and so the correlation can only be a guide.
For roads, the situation is the opposite, the resource cost index has grown faster than the tender price. The increase in resource cost index averaged 6.1% over the past five years compared to 4.5% for the tender index.
**Existence of PPP/PFI**

The interviewees were unanimous in their opinion about the positive impact of PPP/PFI projects on the construction industry. This type of project is becoming increasingly important and can constitute as much as 50% of a company’s total workload. Most of the public projects in education and healthcare are now procured as PFI. This has the obvious benefit for the government as they are not forced to allocate the full sum of the project at once, but can spread the cost over a longer period of time. For the companies, PFIs mean a higher risk, but also a guaranteed income for many years and usually a higher profitability.

Although there are reports suggesting otherwise, according to the interviewees, PPP projects seem to be performing better than traditionally financed projects in several aspects:

- Profitability is higher, and income is guaranteed for many years.
- PPP projects perform better in terms of time and cost predictability.
- Life-cycle effects are given higher priority.
- More innovation and new solutions are generated. As the capital cost is less important for this kind of project, the company have economic space to be more innovative.

Furthermore, expertise in PPP and PFI is about to become a major opportunity for export for the UK industry. Having worked with this kind of financing construction projects, an enormous bank of expertise has been created, something that is sought after by other countries.

**Clients’ evaluation criteria**

Procuring projects on lowest price instead of added value is widely seen as one of the greatest obstacles for improvement of many aspects within the sector. As the price pressure gets increasingly fierce further down in the value chain the financial margins get very slim, the temptation to cut corners increases and a hostile working climate between the different actors is a likely outcome.

Instead of procurement based on lowest price, the interviewees would like to see a shift towards procurement based on added value, and a greater increase in the number of PPP/PFI projects. Using these methods to procure and finance projects leads to higher profitability for the parties involved and better value for money for the clients. They also increase the actors’ incitements for innovations and whole-life thinking.

**Shortage of skilled labour**

One of the conclusions in the Egan Report (Rethinking Construction, 1994) was the industry’s urgent need to improve training and skills on pretty much all positions in construction, not only for contractors. The interviewees agree that since the Egan report, much has happened in terms of training, mainly through the Construction Skills Certification Scheme (CSCS), one of 22 Sector Skills Councils covering all sectors of the UK industry. As such, it is responsible for representing the employers’ skills needs, and for catering for skills and productivity needs of the construction sector. The CSCS issues cards that list the holder’s qualification and are valid for either three or five years. It also shows that the holders have health and safety awareness, as they must pass CITB-Construction Skills Health and Safety test. Many contractors and clients now demand proof of competence before letting workers onto their sites. The scheme started in April 1995 and by the end of that year had 800 cardholders in 10 occupations. By April 2005 there were 700000 in 220 occupations. The aim is to exceed one million cardholders during 2006.

Despite an increased focus on the importance of more training in the industry, the median annual training days per full-time employee was as little as 1.0 in 2004 (according to the KPIs), representing a slight increase from 2003 when the median value was 0.8.

The industry has a large number of people who are self-employed or work for very small companies; this has an immediate impact on the amount of training investment. Of the more than 1.1 million people working in the
industry, 6.5% are self-employed and 26.8% are working in companies with seven or less employees - see Table 28. These companies employ a large part of the workforce, but cannot afford to invest capital in training and development of their staff to the same extent as larger firms.

In order to increase the amount of training provided in the industry, and to decrease the impact of company size on the investment in training, every construction firm with a total wage bill of £64,000 or more is liable to pay a CITB levy. The levy is then invested back into the industry in the form of training grants, for which all companies registered with the CITB can apply. Current levy rates are 0.5% of the wage bill for your direct employees and 1.5% of payments made to labour-only subcontractors. It was the interviewees’ impression that this was a potentially good system to give inducements for

**Table 28 Total employment of private contractors**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
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<td>82</td>
<td>92.3</td>
<td>76</td>
<td>98.4</td>
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**Table 29 The number of private contractors by the size of firms**

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<th>No. of private contractors in Great Britain (3rd Quarter) each year by size of firm</th>
<th>1995</th>
<th>1996</th>
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<th>2000</th>
<th>2001</th>
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<td>49,350</td>
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<td>15,737</td>
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<td>22,455</td>
<td>23,963</td>
<td>25,704</td>
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<td>8-13</td>
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<td>4,366</td>
<td>3,787</td>
<td>3,988</td>
<td>4,148</td>
<td>3,790</td>
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<td>9,819</td>
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<td>1,263</td>
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<td>999</td>
<td>1,782</td>
<td>1,821</td>
<td>1,906</td>
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<td>405</td>
<td>379</td>
<td>341</td>
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<td>560</td>
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<td>56</td>
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<td>51</td>
<td>68</td>
<td>62</td>
<td>75</td>
<td>75</td>
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<td>38</td>
<td>40</td>
<td>42</td>
<td>35</td>
<td>56</td>
<td>57</td>
<td>64</td>
<td>60</td>
</tr>
<tr>
<td>All Firms</td>
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<td>160,148</td>
<td>163,236</td>
<td>165,561</td>
<td>163,426</td>
<td>168,123</td>
<td>166,181</td>
<td>171,092</td>
<td>176,403</td>
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</table>
increased training, but that it was not taken advantage of enough.

**Extent of sub-contracting and market fragmentation**

There are about 172,000 registered private contractors in the UK. Out of these, 88% are employing less than 8 people, making the UK construction industry highly fragmented - see Table 29.

The fragmentation is a sign of the immense extent off sub-contracting in the industry, something that underlines the importance of good contractual arrangements. As long as the contracts are based on price, with no common incentives for cooperation between the various actors and the success of the overall project, there is a great risk that extensive subcontracting is counter-productive.

Furthermore, subcontracting makes it harder to keep teams from one project to another, thus decreasing the chances for continuous improvements and other benefits of long-term working relations. This fragmentation is likely to intensify in the future. Pressure is increasing on medium sized companies who are not big enough to compete for the major projects, yet too big for the flexibility needed for the smaller projects.

They are facing increasing competition, even more so since the Government’s decision to focus on prime contracting, which usually involves only a handful of the larger contractors.

**Client satisfaction**

The second stakeholder for the industry to satisfy is the clients. On the topic of client satisfaction, this report has studied the parameters time and cost predictability, relationships and innovation.

Most of the clients’ attention is on time, cost and quality, and not enough on performance. According to the KPIs, more than every second project (54%) in the UK fail to be delivered on time (figure 82). Likewise, 54% of the projects are delivered to a cost higher than agreed (figure 83). Despite these disappointing figures, the KPIs also show that clients in the industry are satisfied, with about 80% of the clients allocating a score of 8-10 for both service and product (figure 84). According to the respondents this was likely to be the results of the clients not being knowledgeable enough to put high demands on the industry. As they are unaware of what result they should require they will instead settle for what they get.

“Clients really should be dissatisfied because we should be able to do so much more.”

As for quality management, Table 30 reveals that construction is fifth amongst domestic industries for ISO 9001 certifications.
Summary of findings

In general terms, according to the interviewees, the likely outcome of projects in the UK construction industry is that they:

- Have difficulties in finishing on time: according to KPI 2004 54% of the projects failed to finish on time
- Have difficulties in finishing on budget: according to KPI 2005 54% of the projects failed to finish on time
- According to KPI 2005, 80% of the clients were very satisfied (8-10 out of 10) with both the product and service delivered by the industry
- Are not characterised by harmonious relationships; lack of trust, disagreements of what is included in the original price and what is actually a ‘change’.
- Do not include notable innovation

The most important factors influencing clients’ satisfaction are:

- Clients’ competence and experience to specify requirements and manage projects: generally poor
- The early stages: to a too low extent encourages planning and interaction among project actors to exchange experiences and establish common goals and incentives. Also, there is a rush to get started on site.
- Changes during the process: too many changes too late
- Customer focus: good customer focus, but too little on the end-user
- Clients’ procurement criteria and form of collaboration: procurement on lowest price rather than best value and too low extent of planning and interaction among project actors to exchange experiences and establishment of common goals and incentives
- Tools to assess value: lack of and hence difficult for clients to make value-for-money-assessments
- Existence of PPP/PFI: generally, these projects show better performance than other types of collaboration
- Handling of disagreements: common but solved without the need for litigation
- The building permission process: considered to be a source to delays and uncertainties. Yet, statistics reveal that the efficiency of the system has been stable and slightly improving. In 2003, 71% of all decisions were made within 8 weeks, and 87% within 13 weeks.
- Extent of innovation: low due to lack of incentives

Figure 83 Cost predictability (all construction) Source: Constructing Excellence
Figure 84  Client satisfaction (all construction)  Source: Constructing Excellence

Table 28  ISO14001 registrations 2004 for selected Swedish industries  Source ISO Survey, 2005

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<tr>
<th>Industry</th>
<th>No.</th>
</tr>
</thead>
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<td>Electrical &amp; optical equipment</td>
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</tr>
<tr>
<td>Basic &amp; fabricated metal</td>
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</tr>
<tr>
<td>Wholesale &amp; retail</td>
<td>1329</td>
</tr>
<tr>
<td>Machinery &amp; equipment</td>
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</tr>
<tr>
<td>Construction</td>
<td>800</td>
</tr>
<tr>
<td>Transport, storage &amp; communication</td>
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</tr>
<tr>
<td>Rubber &amp; plastic products</td>
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<tr>
<td>Engineering services</td>
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<tr>
<td>Chemicals, chemical products &amp; fibres</td>
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<tr>
<td>Wood and wood products</td>
<td>258</td>
</tr>
<tr>
<td>Concrete, lime and plaster</td>
<td>38</td>
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</tbody>
</table>
Explanatory factors: clients’ satisfaction

The most important factors influencing clients’ satisfaction are:

- Clients’ competence and experience
- The early stages
- Changes during the process
- Customer focus
- Clients’ evaluation criteria and form of collaboration
- Tools to assess value
- Existence of PPP/PFI
- Handling of disagreements
- Building permission process
- Extent of innovation

Clients’ competence and experience

A knowledgeable client is essential for being able to drive change and raise demands for higher standards of the industry. The interviewees pointed out that there is a big difference between projects for an experienced and knowledgeable client, and those for more occasional or less experienced clients. They all agree that projects run by a knowledgeable and demanding client is much more likely to have a successful outcome, than projects for a less skilled client, and that a knowledgeable and demanding client will increase the demands on the rest of the industry.

They were unanimous that there are huge differences between public and private clients. The private clients are perceived as in general being much more knowledgeable and having a clearer idea of what it is they want, whereas projects for a public client are more likely to run late, foremost because of frequent changes to plans.

According to the interviewees, clients in general have the impression that it is normal for construction projects not to be delivered on time and budget without defects, and therefore they do not expect to get what they were promised. The acceptance of delayed and more expensive projects than agreed creates a vicious circle as it confirms the clients’ opinion of the level of the industry. One of the directives in the Egan report was that public clients should drive the change within the industry by becoming best practice clients. Indeed, some public clients have been very proactive and are working hard to improve the way they procure construction, whilst still meeting the need for public accountability. Still public clients are generally performing a lot worse than their private counterparts. To a larger extent than private clients they fail to specify what they need, are not as good at steering the construction process and are more likely to change their plans about the project.

The early stages

A construction project in the UK is typically preceded by a too short and too hasty planning phase as a result of short deadlines for the project. Instead of being able to take time to finalise the planning and the details of the project, the contractors are forced to commence work on site early, and with incomplete designs. According to the interviewees, it is not uncommon for companies in the UK to start on site when only 30-40% of the design is completed, something that obviously increases the risk of having to adapt to changes as the project goes on.

There is much talk about the importance of spending more time during the design/planning phase, but very few actually make this happen. There are plenty of financial incentives for getting the project finished as quickly as possible, and therefore it takes a lot to resist temptation to rush ahead. Few project teams (contractors, clients, architects etc) manage to allocate the time they actually need to prepare properly. Instead they go ahead and hope to make up the rest as the project goes on.

Changes during the process

The main reason for delays in construction projects tend to be changes inflicted by either the client or the design team, or poorly managed stakeholders of the project.

It is crucial to allocate enough time early in the process for finding out exactly what the client wants. Many clients are in fact unaware of this themselves and therefore need a good project manager/project team to help the client define
what they need, and what is possible given the financial constraints. Getting the full team together at an early stage is highly beneficial as it helps to release the experience from the entire value chain and so minimise the risk of rework.

Changes after the bidding phase is finished are far too common, and cause for many problems. In a market situation where projects have traditionally been procured by the lowest bid and in intense competition it has become common practice among many contractors to try to make up for a nil-profit bid by charging large sums for extra work caused by changes on the client’s behalf. This has caused an embedded disbelief and mistrust between client and contractor. Clients frequently believe that they are being overcharged, whereas contractors feel that they do not get full compensation for their extra costs caused by the change of plans. Increased shared incentives and a client who better understands the construction process could deal with some of these concerns.

**Customer focus**

Although most of the industry seem to have a fairly strong client focus, there is still not enough focus on the end-user of the product. The short-term nature of many clients’ business makes for a focus on the construction process and the finished product. They judge the success of the project in terms of whether the product was delivered on time and to the agreed price, and its level of quality. There is still not much knowledge about, or focus on, what the end-user really wants and values.

As many clients have never built before, and never will again, there is a great responsibility for the industry to help the clients define what could be done and help increase the focus on the end-user. The challenge is twofold as the industry needs to get better at assessing the need of the end-user and also to communicate this information to the clients.

**Procurement criteria and form of collaboration**

“Too many clients are undiscriminating and still equate price with cost, selecting designers and constructors almost exclusively on the basis of tendered price.” The words are from the Egan report (1994), but could as well be used to describe the situation today. There have been several good initiatives since the report, but in practice, not enough seem to have happened since the Task Force submitted its report in 1994. However, there is a great concern about the current situation within the industry, and all interviewees wish to see a shift from the fierce price competition towards something that is an incentive for good climate and cooperation on the construction site.

Procurement based on lowest bid is seen by the client as the easiest way of making of getting value for money. However, instead of price-based competition, the interviewees would like to see an increased shift towards an approach where there is a guaranteed highest cost for the project, and any savings made during the project are shared according to predetermined rates. Interviewees from all sectors see great advantages in this way of contracting, as it not only gives a guaranteed price of the end product, but also works as an incentive for all parties in the value chain to cooperate to find better and cheaper solutions. There are a variety of standardised contracts readily available, but they are not commonly used.

According to official policies public projects should be procured based on more than merely lowest price and thus lead the way to a shift towards value-added procurement practices. However, according to a recent article in Construction News, the vast majority of public projects in the UK are still procured on lowest price. There are examples of alternative procurement practices, but all the same lowest price tend to be the most important factor when procuring projects.

**Tools to assess value**

There are few or no tools available for the client to help assess added value, although this is hopefully about to change by the work of, among others,
“The commercial clients tend to be knowledgeable and buy in their particular way, but they do not think beyond the moment they let the building. They think quite hard about the construction process but not at all about the future tenant.”

the Construction Client Group (CCG, affiliated to Constructing Excellence). The CCG strives to help both private and public clients with best practice solutions throughout the entire construction process.

Existence of PPP/PFI
PPP projects were claimed to perform better in terms of time and cost predictability. The main reason for this is believed to be that more time is allowed prior to the actual production is commenced. This means that a lot more of the design is completed when the construction phase is initiated. Furthermore, more time is spent on planning and managing.

Handling of disagreements
Disagreements and disputes are common within the industry, and considered to be just another natural, if unpleasant, characteristic of the way industry operates. The most common reason for disagreements are changes made to the project during the construction phase, and whether or not these should be compensated for with extra time and/or money.

Most of the disagreements are not more serious than that they can be resolved by the parties involved, either by themselves or through mediation. Very rarely are they turned into a litigation process.

Building permission process
Having an efficient planning permission system is a balance between what is the industry’s need for a quick decision, and the rights of the people affected by the decision. It is not uncommon that people affected by the first decision utilise their right to appeal against it, and so the process goes on. For the industry this uncertainty is frustrating as it gets very hard to plan for the future if one does not know which projects will be built and which will not. In the same time it was emphasized that the need for a democratic system is important, but they feel getting a decision must be quicker. Seen over the whole project from idea to completed construction, the most uncertainty was considered to occur over getting permission to build. According to the interviewees, this phase of the process that has not improved at all over the past 5 years, whereas almost every other phase has improved significantly.

According to statistics (figure 83), the interviewees are right in that there has not been a satisfactory improvement in the planning permission system, and the speed with which the decisions are being made. On the other hand, the KPIs on design and construction time show that also these phases have stagnated. Hence, blaming the planning permission system seems a bit unfair.

Statistics show that in 2003, 67 to 73 percent of the applications had been notified decision within 8 weeks, and between 83 and 88% within 13 weeks.

Despite these figures, the planning permission system (see figure 84) is considered to be a major area of concern for the industry. It is in particular the appeal process that is considered to be one of the parts of the construction process that causes the most uncertainty.

Innovation
There is not much innovation in the construction industry, according to the interviewees. The innovations that can be seen are generally on the technology side, some such as for machinery or the use of IT in design and for communication and on new construction materials. The general lack of innovations in the rest was mainly explained as being because one or several of the following reasons:

- There is not enough profitability in the industry to reinvest in R&D.
- The procurement of the projects are made in a way that does not support added value, but are instead focused
on lowest price. As many innovative solutions are considered to be more expensive and also involve a higher risk, this will generate a higher tender price and a lost project.

- The clients are not competent enough to set high standards, and demand innovative and forward thinking solutions to their needs.
- The construction industry is a very mature and low-tech industry. Therefore it is unlikely to see any radical innovations.

**Labour satisfaction attractiveness to the industry**

The most obvious area where the industry actually competes is on attracting and retaining competent labour. To assess the industry’s attractiveness, this report has used the number of students and applicants at construction related educations.
Summary of findings

The UK construction industry:

• Sees increasing labour satisfaction. In the KPI 2005, 51% of the workforce put 8-10 out of 10 (very satisfied) on the satisfaction with their jobs.
• Sees very positive trend on the number of applicants to construction-related courses: civil engineering up 23.7% and architecture up 43.9% from 2000 to 2004.

The most important factors influencing labour satisfaction and attractiveness to the industry are:

• Wage level competitive for blue collar workers, relatively low for white collars. Among blue collar workers, the annual earning increased by an average of 5.1% between 1998 and 2004, which is higher than both ‘all industries and services’ and ‘manufacturing’. In 2004 the annual earning in construction estimated 106.4 and 105.1% of all industries and services’ and ‘manufacturing’ respectively.
• Involvement of Union: successful in health and safety and recruitment issues
• Work conditions: good
• Health and safety: positive trends for all types of accidents. For 2004/05, the frequency of fatal injuries estimated 6.3 per 100000 workers and major injuries and over-3-day-injuries 3.9 and 6.9 per 1000 workers respectively.
• Image of industry: unfavourable
• Apprenticeship: total number of apprentices down 5.5% from 2002/03 to 2004/05
• Attractiveness to the industry of foreign labour: high
• Attractiveness of labour to the industry from minority groups: relatively low. In 2002/03, 97.6% of the workforce was ‘white’. As for women in construction, the average shares for 1996 to 2005 were 13 and 1% among employees and self-employed respectively.

Labour satisfaction and retention rate

Employees satisfaction is one of the KPIs - see Table 31. The KPI is aggregated from four different areas related to employee satisfaction:

• The amount of influence they have over their jobs
• Their pay and conditions
• The sense of achievement they get from their work
• The respect they get from line managers/supervisors

The scale is 1-10, where 1 is dissatisfied and 10 is very satisfied. The KPI then aggregates the average of the individual ratings for the four responses. Another indicator of labour satisfaction is the industry ability to retain staff. From table 31 it is observed that an increasing percentage and as many as half the workforce claim they are satisfied to very satisfied with their work (8-10 out of 10). As for the staff turnover, there is a continuous decrease in the number of people that have left and been replaced in the industry, expressed as a percentage of the average number of employees each year.

Table 31 Employee satisfaction and median staff turnover (KPI all construction)

<table>
<thead>
<tr>
<th>Year</th>
<th>Indicator</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Employee satisfaction (% scoring 8-10/10)</td>
<td>41</td>
<td>41</td>
<td>51</td>
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<td></td>
<td>Median staff turnover (%)</td>
<td>7.7</td>
<td>7.1</td>
<td>6.7</td>
</tr>
</tbody>
</table>

Industry’s ability to attract students

There has been increase in terms of the number of applications for higher degrees in construction, by the interviewees accredited the improved market conditions and the extra effort put into recruiting people. Figure 85 and 86 presents examples of this trend by illustrating the number of applications and acceptances for universities the past five years civil engineers and architects
respectively. As for civil engineering, the number of applications and accepted applications has increased by 23.7 and 28.3% respectively from 2000 to 2005.

The positive trend for civil engineering is topped by that of architects. From 2000 to 2005 the number of applications and accepted applications has increased by 43.9 and 41.8% respectively.

Figure 85 No. of applications and acceptances for higher degrees in Civil Engineering
Source. University and College Application Service, UCAS, code H2

Figure 86 No. of applications and acceptances for higher degrees in architecture
Source. University and College Application Service, UCAS, code K1

The positive trend for civil engineering is topped by that of architects. From 2000 to 2005 the number of applications and accepted applications has increased by 43.9 and 41.8% respectively.

### Construction Industry Joint Council – Private pay rates from 28 June 2004

<table>
<thead>
<tr>
<th>Classification</th>
<th>Basic Pay £ per hour</th>
<th>Weekly Rate based on 39 hour week</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Operative</td>
<td>6.77</td>
<td>264.03</td>
</tr>
<tr>
<td>Skill Rate 4</td>
<td>7.29</td>
<td>284.31</td>
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<tr>
<td>Skill Rate 3</td>
<td>7.73</td>
<td>301.47</td>
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<td>Skill Rate 2</td>
<td>8.26</td>
<td>322.14</td>
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<td>Skill Rate 1</td>
<td>8.58</td>
<td>334.62</td>
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<tr>
<td>Craft Rate</td>
<td>9</td>
<td>351</td>
</tr>
</tbody>
</table>

Table 32 Private sector pay rates according to current CIJC agreement
**Explanatory factors: labour satisfaction and attractiveness**

The most important factors influencing labour satisfaction and attractiveness are:

- Wage level
- Involvement of Union
- Work conditions
- Health and safety
- Image of industry
- Apprenticeship
- Attractiveness of foreign labour
- Attractiveness of labour from minority groups

**Wage levels**

Despite being on a high level of historical perspective, the interviewees agree that employees in the construction industry are generally fairly poorly paid, especially bearing in mind the poor work conditions, its often very physically demanding tasks, and that the industry is more accident prone than many other industries. Also the wages for white collars are considered to be low in comparison to other industries.

The agreement between Construction Industry Joint Council, consisting of representatives from the Construction Confederation, UCATT (Union of Construction, Allied Trades and Technicians), TGWU (Transport and General Workers' Union) and GMB (Britain’s General Union), sets rates of pay for around 600,000 construction workers on the country’s major building and infrastructure sites. The agreement sets the level of pay and a series of other conditions for the industry (see table 32).

This level is an agreed minimum wage level only, and not necessarily the same as the level the employee is actually paid in the end. Depending on market conditions at the time, the employee could earn several pounds more an hour than agreed minimum wage. According to the KPI:s the average weekly pay is £441, so much more than the agreed rate.

Level of wages fluctuate significantly and rapidly, and are very exposed to market conditions. Therefore, they vary considerably not only depending on at what time the wage is negotiated, but also on trade and geographical area.

With today’s shortage of labour, the wage levels are on a historically high level for every sector of the industry compared to the levels about ten years ago. Figure 87 below indicates that the wage levels in the construction industry have risen considerably, in average 5.1% per year from 1998 to 2004, which is more than both ‘all industries and services’ (4.0%) and manufacturing (3.8%) for the same period of time.

Comparing annual wages (see Figure 88), construction was lower than manufacturing in 1998, but has since

"Construction is certainly not well-paid, but we don't employ geniuses."

**Figure 87 Levels of pay for all full-time employees in manufacturing, construction and all industries and services**
been higher. In relation to ‘all industries and services’, construction was even in 1998, but has since been higher. Between 2000 and 2004, construction averaged 105.3 and 104.5% of ‘all industries and services’ and manufacturing respectively.

Wage levels of managers within the construction industry are the lowest of ten industries according to a recent survey by the Chartered Management Institute (CMI). According to their survey the average wage in the construction industry is £39,286, compared to £41,726 in manufacturing and £43,578 in the public sector. This pay gap is continuing to grow as managers in other areas received a larger pay rise, despite an increase for managers in construction with about 4.3%.

**Involvement of trade union**

The Unions are described to be highly involved, especially in most of the larger projects, as this is seen as a way of reducing the risks on sight. The interviewees describe the relation between companies and the unions as good, and much better than only ten years ago. The change is mainly seen to be following a much better industry climate these days, with better market conditions. The better climate has lead to a natural shortage of people in the industry, and so the labour conditions has improved significantly. The major concern for the unions now seem to bee the poor health and safety record, which indeed is a concern for the companies as well.

The highly fragmented industry, and in especially the number of people being self-employed, probably makes it harder for unions to organise the labour and to look after that agreements are being followed. Instead of trying to grasp the entire industry they tend to target larger contractors and big or troublesome projects.

**Work conditions**

High degree of self employment and frequent hiring of staff generate poor job security for the individuals. On the other hand there is more plenty of freedom of work this way. Many interviewees believe the way of organising the industry attracts people who enjoys the freedom of being self employed more than it is a drawback with poorer job security.

Interviewees agree that the site conditions have improved a lot over the past few years, in particular on the bigger construction sites. However, they also agree that UK is still far behind most of Western Europe on many aspects and that it is important to improve in this area. With today's shortage of labour, site conditions have become an important aspect when trying to recruit the best labour. That, together with the increasing demands raised by young potential employees, is likely to make for improved site conditions in the future.
Health and safety

Health and safety has been an area of great concern in the industry for many years, and rightly so as the industry accounts for about a third of all work-related deaths in the country: 32% during 2004/2005 (Health and Safety Executive, 2005). The main focus is, and has for long been, on the site conditions and how to adapt work procedures so that the construction of a design could be carried out safely. According to the interviewees, the health and safety is a main priority, and situation is getting better every day. This is supported by the KPIs, which present a continuous improvement on both safety and sickness absence (figure 89). The median number of days lost has decreased from 1.8 to 1.5 from 2003 to 2005 and the percentage of companies managing zero accident incidents over the year has increased from 31 to 50% from 2002 to 2005. This latter figure is highly dependent on the industry structure, as for obvious reasons, small companies have higher chances to avoid accidents than the larger ones.

Therefore, it is important to look into how the percentage of smaller companies have changed over the years in order to get the full picture of the industry’s progress (figure 90).

Also statistics from UK Health and Safety Executive supports the view of construction as continuously becoming a less incident prone industry (figure 91). ‘Major injuries’ has seen a continuous improvement all but in 2002/03, and has achieved an overall improvement of 23% from 1996/97 to 2004/05. ‘Over-3-day-injuries’ has topped this improvement with its 43% improvement since 1996/97. Finally, ‘Fatal injuries’ suffered some setbacks between 1999 and 2001, but has overall seen a satisfactory development. For 2004/05, the frequency of fatal injuries estimated 6.3 per 100000 workers and major injuries and over-3-day-injuries 3.9 and 6.9 per 1000 workers respectively.

According to UK regulations, all fatal accidents must be reported. It is therefore believed that these figures are very reliable. For the non-fatal...
accidents, however, there are no such regulations, and a severe under-reporting is decreasing the reliability of the figures. The reporting level in construction is estimated to be approximately 46% (Labour Force Survey, 2001/2002) for construction in general. Under-reporting is particularly severe among self-employed, who are believed to report only 5% of the non-fatal accidents. The effects of under-reporting becomes apparent when differentiating between accidents reported for employees and those reported for self-employed (figures 92 and 93).

Figure 91 No. of all (employees and self-employed) reported injuries - by severity

Figure 92 Injury rate by severity for employees Source Health and Safety Executive

Figure 93 Injury rate by severity for self-employed Source Health and Safety Executive
With the introduction of the Construction (Design and Management) Regulations, which were introduced in 1994, increased responsibility was given also the designers. By paying more attention to aspects impacting on health and safety throughout the life-cycle of the construction during the design phase of the projects many good solutions can been found that can reduce the risk of accidents. That the importance of the designers is significant was concluded by a recent study for the Health and Safety Executive (2004), as it concluded that almost half of all accidents in construction could have been prevented by designer intervention.

**Image of industry**

Today, the image of the construction industry is far from satisfactory. According to the interviewees, it is associated with dirty, hard work outdoors that is poorly paid and dangerous. Bearing this in mind, it is not very hard to see why people are not attracted to the industry in the numbers necessary.

**Apprenticeship**

The industry has eventually realised its urgent need to improve its reputation and status as employers as to being able to recruit the amount of people needed for the future. According to estimates by the Construction Skills, there is a need to recruit at least 500000 employees by 2010. Despite increased focus on an apprentice/trainee scheme within the industry, and considerably better pay for the trainees compared to the situation a few years ago, the total number of trainees have decreased by 5.5% since 2002/03 (table 33).

**Table 33** No. of first-year intakes for the academic year of 2003-2004

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<tr>
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<tr>
<td></td>
<td>Under 18</td>
<td>Over 18</td>
<td>Total</td>
<td>Under 18</td>
<td>Over 18</td>
<td>Total</td>
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<td>1,564</td>
<td>4,866</td>
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<td>8,479</td>
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<td>437</td>
<td>814</td>
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<td>Other Civil Engineering Operatives</td>
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<td>26</td>
<td>501</td>
<td>527</td>
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<td>General Operatives</td>
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<td>2,429</td>
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<td></td>
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<td>3,227</td>
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<td>Maintenance Workers</td>
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<td>90</td>
<td>49</td>
<td>116</td>
<td>165</td>
</tr>
<tr>
<td></td>
<td>28</td>
<td>143</td>
<td>171</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>23,339</td>
<td>25,405</td>
<td>48,744</td>
<td>21,557</td>
<td>27,596</td>
<td>49,153</td>
</tr>
<tr>
<td></td>
<td>19,309</td>
<td>26,762</td>
<td>46,071</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes**

1. The CITB Trainee Numbers Survey is a voluntary survey. The figures may, therefore, exclude trainees in a number of colleges and other training centres.

**Source of Data:** Construction Industry Training Board (CITB) – Construction Skills
One way of responding to the need of recruiting more people has been to increase the pay awarded apprentices. The last agreement (see table 34 below) meant an increase of between 7 and 10% depending on level. Pay levels for first level apprentices have increased with 27% since the introduction of the scheme.

### Table 34 Wage levels for apprentices in the private sector - current CIJC agreement.

<table>
<thead>
<tr>
<th>Apprentice Pay</th>
<th>£/hour</th>
<th>Per 39 hr week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>3.75</td>
<td>146.25</td>
</tr>
<tr>
<td>Year 2</td>
<td>4.84</td>
<td>188.76</td>
</tr>
<tr>
<td>Year 3 w/out NVQ2</td>
<td>5.66</td>
<td>220.74</td>
</tr>
<tr>
<td>Year 3 with NVQ2</td>
<td>7.2</td>
<td>280.8</td>
</tr>
<tr>
<td>Year 3 with NVQ3</td>
<td>9</td>
<td>351</td>
</tr>
<tr>
<td>On completion of apprenticeship with NVQ2</td>
<td>9</td>
<td>351</td>
</tr>
</tbody>
</table>

The need is also vast for recruiting engineers and people for managerial levels. People with degrees are reluctant to join the industry, as they don’t see it as being rewarding enough, it doesn’t pay as much, has vague career opportunities, and the status is lower than other industries. Therefore recruiting them is hard.

### The attractiveness of foreign labour to the industry

The UK is a very attractive industry for foreign labour, mainly from Eastern Europe, and many are coming there to seek employment. Given that the market is in high demand for well trained crafts men this is likely to keep increasing in the near future. The high demand has also the effect that the Unions’ resistance to the influx of labour is low, there is no need to try to stop immigrating labour when the market is as good as it is today.

### The attractiveness of minority groups to the industry

As in many other countries, the construction industry is predominantly attracting men. Although the industry has realised the need to diversify its employees, progress is much too slow in increasing the number of women (table 35).

Among the employees, the percentage of women has decreased over the past decade and, between 1996 and 2003, average 13%. For self-employed this figure is a mere 1%. As for ethnic diversity in the industry, 97.6% of the total workforce belonged to the ‘white’ category.

### Table 35 Employment in the construction industry by gender

Source: Labour Force Survey, Office for National Statistics

<table>
<thead>
<tr>
<th>Year</th>
<th>All</th>
<th>Women</th>
<th>Men</th>
<th>All</th>
<th>Women</th>
<th>Men</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>946</td>
<td>161</td>
<td>785</td>
<td>946</td>
<td>21</td>
<td>795</td>
</tr>
<tr>
<td>1997</td>
<td>1,040</td>
<td>131</td>
<td>909</td>
<td>1,040</td>
<td>16</td>
<td>746</td>
</tr>
<tr>
<td>1998</td>
<td>1,168</td>
<td>155</td>
<td>1,014</td>
<td>1,168</td>
<td>17</td>
<td>651</td>
</tr>
<tr>
<td>1999</td>
<td>1,162</td>
<td>147</td>
<td>1,015</td>
<td>1,162</td>
<td>13</td>
<td>662</td>
</tr>
<tr>
<td>2000</td>
<td>1,274</td>
<td>160</td>
<td>1,114</td>
<td>1,274</td>
<td>11</td>
<td>618</td>
</tr>
<tr>
<td>2001</td>
<td>1,293</td>
<td>175</td>
<td>1,118</td>
<td>1,293</td>
<td>16</td>
<td>655</td>
</tr>
<tr>
<td>2002</td>
<td>1,272</td>
<td>165</td>
<td>1,107</td>
<td>1,272</td>
<td>21</td>
<td>692</td>
</tr>
<tr>
<td>2003</td>
<td>1,304</td>
<td>165</td>
<td>1,139</td>
<td>1,304</td>
<td>20</td>
<td>762</td>
</tr>
<tr>
<td>2004</td>
<td>1,356</td>
<td>191</td>
<td>1,165</td>
<td>818</td>
<td>20</td>
<td>798</td>
</tr>
<tr>
<td>2005</td>
<td>1,357</td>
<td>205</td>
<td>1,170</td>
<td>841</td>
<td>20</td>
<td>821</td>
</tr>
</tbody>
</table>
Society satisfaction
‘Overall society’ is the fourth and final stakeholder covered in the investigation of construction industry competitiveness. The three indicators of society satisfaction are: business ethics, environmental consciousness and whole-life planning - see summary of findings.

Explanatory factors: society satisfaction
The most important factors affecting society satisfaction are:

- Codes of ethics
- Cultural norm
- Environmental regulations
- ISO 14001 registrations
- Clients’ demand

Codes of ethics
In response to the continuously increased focus on corporations’ ethical behaviour and corporate social responsibility, many of the larger companies having developed corporate codes of conducts dealing with all sorts of ethical issues. Furthermore many companies also produce an “ethical” report to go with their annual report.

There is common belief that there is a rather large informal sector within the UK, but that this is generally happening in the domestic sector only. Indeed there is a thin line what is informal work as such, and what is DIY or helping a friend with his or her DIY.

Contrary to Sweden and Finland, there is no recent history of cartels or similar misconduct, and according to the interviewees it is extremely unlikely that there would be market conditions for organising such a thing. The UK market is much larger than any of the other countries in the study, so the likelihood of getting a cartel between all actors is considered extremely small, if not impossible. In addition, a fair competitive arena is of great concern for UK government, and so lots of attention is being given to control that no such misconduct would occur.

Summary of findings
The ethical behaviour of firms in the UK construction is believed to be higher than the international norm, and is a result of a strong sense of ethics in the national culture. Also, there is intense attention in the media to corporations’ ethical behaviour. There is evidence of an informal sector, whereas cartels are very unlikely to occur thanks to intense competition in all market segments and a strong focus by the authorities to ensure fair competition.

Companies in the UK construction industry comply with existing regulatory frameworks and are considered to perform very satisfactorily.

Projects in the UK construction industry are generally not planned with whole-life effects in mind. The topic is receiving more and more attention, but very rarely would a superior whole-life cost solution be chosen ahead of bids with considerably lower initial costs.

In order to get a proper picture of these criteria, business ethics, environmental performance and whole-life planning must be assessed at the project level.

The impact on society is increasingly important for construction industry competitiveness as its influences the image of the industry and hence its attractiveness to competent labour.

The most important factors influencing these criteria are:
- Codes of ethics: common among larger corporations. Intense attention in media on corporations’ ethical behaviour and high risks involved in loss of reputation.
- Regulations
- The cultural norm: positive attitude to ethics, environmental consciousness and compliance with regulations
- ISO14001-registrations: construction is the leading industry in UK and 4th in the world in relation to market size, but only has 198 registrations.
- Clients’ demand: lack of incentives for whole-life planning and environmental performance beyond regulations.
Environmental regulations

Companies generally follow regulations very well, mainly because there are high risks involved in not doing so. However, some regulations are very hard to enforce and therefore people will try to get around them. One example of such regulations is waste dumping. For all bigger projects, there are likely to be fairly rigorous controls of material coming in and going out from site, and hence the chances of getting away with this type of activity is limited. However, it was commonly believed that this type of activity was relatively common for smaller projects, and that the risk of getting caught was very small. It is likely that it is mainly smaller companies that resolve to waste dumping as to avoid fees at recycling stations. The bigger companies cannot afford to take the risk involved, as it not only means breaking strict regulations, but also getting plentiful poor publicity.

Moreover, the UK has a regulatory framework and active authorities to ensure fair competition.

The cultural norm

The high ethics in the construction industry is of course mostly a result of the high ethics in the UK cultural norm. Moreover, it has become a part of the culture to demand environmental performance in line with standards and regulations. Another factor being a part of the national culture is that people respect regulations and act in line with that belief.

ISO14001

Many bigger companies in the UK are certified according to the ISO 9001 system for quality, but only a few interviewees are even aware of its equivalent ISO 14001 for environment. According to the ISO Survey of Certifications there are 198 companies registered for ISO 14001. Despite the low figure, this is the industry with the highest number of ISO 14001 registrations in the UK. The number of companies registered for ISO 9001 are significantly higher with 800 (see table 36).

Clients’ demands

The absence of whole-life planning of costs and also environmental impact is not directly the result of poor levels of knowledge among designers and contractors. Indeed, there is still a huge need for more facts on how materials and also how technical solutions perform over a long period of time, but mainly it is about getting clients to appreciate what savings actually could be made over the products lifecycle. The only exception from the poor focus on whole-life costing is for PPPs, where the developer has big long-term interests in the performance of the project.

“The contractors planning for whole-life costs of the project? NOT true! Not at all... Why would they? That is somebody else’s business. They are not forced to, so they won’t. That would only make them less competitive.”
PFI/PPP is in fact considered to be one of the greatest drivers for a focus on, and knowledge of, life-cycle costs. With a more long-term interest in the finished product, the contractor has incentive enough to take into consideration solutions that are efficient for the full life-cycle and not only having low initial costs. In doing so they gain valuable experience that can be brought on to other projects. Unfortunately, as described elsewhere, these experiences do not seem to be taken advantage of to desirable extent.

The short term business horizon by many clients is a major obstacle for getting a focus on whole life costs. As many clients only are interested in developing a project and then sell it on, they prefer to keep costs low. They believe they will not be able to benefit from improved whole-life solutions as the end users will favour a cheaper product. Hence they are reluctant to pay the higher initial cost. Making the clients aware of and appreciate the benefits of a good whole-life focus is a major challenge for the industry in order to develop more sustainable projects.

Many clients are still not at all aware of potential savings that could be made over a longer time horizon by taking whole life costs into account when procuring the project. One of the reasons is the lack of evidence on the long-term effect of material, technical solutions etc. Another reason is that designers and contractors fail to inform the clients on potential benefits, and the implications of the different options. They must improve their skills at selling ideas and solutions to their clients.
CONCLUSIONS

Why
Given the role played by the construction industry in mature economies - a GDP-contributor, job-creator, shaper of the built environment and resource-consumer - the competitiveness of the construction industry is of interest not only to firms, but also to employees, clients, policy makers and the public.

What
The analysis of competitiveness involves defining the meaning of competitiveness, how it is to be assessed and mapping the explanatory factors influencing it. This study takes a broad approach to the concept and includes four key stakeholders – investors, clients, employees and overall society – in the definition of a construction industry’s competitiveness, to the extent that:
- Its performance satisfies investors
  *Is profitable*
- Its performance satisfies clients
  *Is predictable in time and cost
  *It achieves harmonious relationships
  *Is innovative*
- Its performance satisfies employees
  and is attractive to competent labour
  *Achieves competitive wages
  *Achieves a safe and healthy work environment*
- Its performance satisfies overall society
  *Behaves ethically
  *Complies with environmental and sustainability regulations*

How
The backbones of the empirical work are the Delphi-study and interviews conducted with senior industry experts covering a range of industry perspectives. More than 100 experts in Finland, Sweden and the UK were engaged in the study. This opinion-based approach is complemented by the analysis of official statistics.

Analysis and results
The competitiveness of the construction industry of Finland, Sweden and the UK is assessed using criteria derived from the definition. The results show an overall more satisfactory than dissatisfactory performance (see pages 133). The explanatory factors are fed into the Construction Competitiveness Hexagon framework, (p 136-137), divided into similarities and differences between the countries (p 136-140) and result in four key areas (p 140-142). The results show a strong focus on factors at the micro level, particularly related to clients’ procurement criteria, form of collaboration, profitability and the image of the industry.

Lessons learnt
The concept of ‘competitiveness’ can, both in general and for construction, be defined, measured and analysed in a number of different ways. The choice of approach mainly depends on the purpose and aims of the research, but should: include a wide range of stakeholders, recognise the differences between different sub-categories of the industry and the matter of choosing an appropriate comparator and level of analysis (see pages 143-148).

The step forward: the Construction Competitiveness Toolbox
The Construction Competitiveness Toolbox (CCT) is user-friendly software for use in industry associations, by policy makers or within firms, to analyse the competitiveness of the construction industry or its individual firms. It allows users to identify what factors are most influential for construction competitiveness, assign their relative importance and score their performance. The input provided by the user is then transformed into the Construction Competitiveness Hexagon Framework, to give an overview of the competitiveness position as well as to facilitate comparisons between countries, sectors or firms (see pages 149-151).
DISCUSSION OF EMPIRICAL FINDINGS

Having studied the competitiveness of the construction industry of Finland, Sweden and the UK separately this chapter initially discusses the empirical findings for the three countries together. Firstly, the industry’s performance on each of the competitiveness criteria is assessed. This is followed by the discussion on what are the most important explanatory factors of construction industry competitiveness and how these sit in the theoretical framework – the Construction Competitiveness Hexagon. The factors of the Hexagon are further categorised into similarities and differences between the countries. Moreover, four key areas of construction industry competitiveness are identified and described:

- Procurement criteria
- Profitability
- Form of collaboration/interaction
- Image of industry

The third main theme of the chapter brings together key theoretical findings and experiences and lessons learnt by the research team during the study. This leads to the research team’s suggestion on how to move forward in the assessment of construction industry competitiveness: the introduction of the Construction Competitiveness Toolbox.

The overall structure of the chapter is illustrated in the flowchart below.
Comparing the competitiveness of the construction industry of Finland, Sweden and the UK

Following from the definition as outlined in ‘Our approach’, the competitiveness of the construction industry in each of the three countries has been studied based on the extent to which:

- Its performance satisfies investors
  *Is profitable*

- Its performance satisfies clients
  *Is predictable in time and cost*
  *It achieves harmonious relationships*
  *Is innovative*

- Its performance satisfies employees and is attractive to competent labour
  *Achieves competitive wages*
  *Achieves a safe and healthy work environment*

- Its performance satisfies overall society
  *Behaves ethically*
  *Complies with environmental and sustainability regulations*

Table 37 summarises the empirical findings – quantitative and qualitative - related to each of the criteria above. The colours represent the following:

- Green: Area of no real concern
- Amber: Area of concern, but not acute
- Red: Area of real concern

From the table there are some interesting observations:

- Overall, Finland, Sweden and the UK perform similarly and quite well
- The common ‘green’ areas are: applicants for construction-related courses, business ethics and environmental performance
- The common ‘amber’ areas are: relationships between clients and project actors, level of innovation and extent of whole-life planning
- The only ‘red’ areas are the predictability of the UK industry, less than every second project (54%) is on time and budget, and the health and safety record for Finland, which has shown no real improvement since 1995.
### Table 37 Summary of empirical findings with the RAG (red, amber, green) scale applied

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Finland</th>
<th>Sweden</th>
<th>UK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profitability</td>
<td>High</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Predictability</td>
<td>High on time, lower on cost</td>
<td>High on time, lower on cost</td>
<td>Low on time and cost</td>
</tr>
<tr>
<td>Relationships</td>
<td>Lack of trust and cooperation, Disagreements are common.</td>
<td>Lack of trust and cooperation. Disagreements are common.</td>
<td>Lack of trust and cooperation. Disagreements are common.</td>
</tr>
<tr>
<td>Innovation</td>
<td>High awareness, low tangible output</td>
<td>High awareness, low tangible output</td>
<td>High awareness, low tangible output</td>
</tr>
<tr>
<td>Applicants to construction-related courses</td>
<td>Very positive trend on the number of applicants on construction-related courses</td>
<td>Very positive trend on the number of applicants on construction-related courses</td>
<td>Very positive trend on the number of applicants on construction-related courses</td>
</tr>
<tr>
<td>Wages</td>
<td>Competitive for blue collar workers, less so for white collar.</td>
<td>Competitive for blue collar workers, less so for white collar.</td>
<td>Competitive for blue collar workers, less so for white collar.</td>
</tr>
<tr>
<td>Health and safety</td>
<td>Recent slight positive trends</td>
<td>Recent positive trends.</td>
<td>Overall positive trends.</td>
</tr>
<tr>
<td>Business ethics</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Environmental performance</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Extent of whole-life planning</td>
<td>High awareness, low output</td>
<td>High awareness, low output</td>
<td>High awareness, low output</td>
</tr>
</tbody>
</table>

However, the assessment and comparison of the competitiveness of the construction industry is not at all that straightforward. The majority of parameters; predictability, relationships, innovation, business ethics, environmental performance and the extent of whole-life planning, are presumably best assessed at the project level, not by interviews at the macro level. Moreover, profitability is the result of current and local market conditions and economic cycles, which limits the validity and relevance of most inter-country comparisons. Comparisons of health and safety records are complicated by the use of different definitions and categories in different countries.

A final and vital note on making assessments like the above is the matter of choosing the comparator. Different criteria are best assessed using different comparators, and so the verdict could vary.

Through this study, the research team felt that it is more straightforward for industry experts to identify the explanatory factors and their inter-connections, than to actually make the assessment of how well the industry performs on criteria such as those above. The research team believes that most of the value is found in the process of assessing the competitiveness rather than the actual outcome of the assessment, i.e. the explanation rather than the results.
Feeding the hexagon framework

The analysis of the competitiveness of the Finnish, Swedish and UK construction industries has resulted in a large number of factors that influence the competitiveness of the construction industry. The second source for identifying explanatory factors was the Delphi study, as described in chapter 2. As described in the section ‘Our approach’, the strategy has been, having identified the explanatory factors, to feed them into the Construction Competitiveness Hexagon (Figure 94).

Figure 94: The explanatory factors to feed into the Construction Competitiveness Hexagon

Before feeding the explanatory factors into the Hexagon framework, it is interesting to look into the results of the Delphi-survey.

Results of Delphi-study

When summarising the responses of each expert panel, up to 109 different factors of competitiveness were suggested by at least one of the experts (105 from Finland, 109 from Sweden and 82 from the UK). There can be two different explanations for the vast diversity of factors suggested in the first round. Firstly, the respondents could all have different perceptions of the meaning of competitiveness and therefore consider different factors being important. Secondly, they could ascribe the same meaning to competitiveness, but still have different opinions of how a competitive industry can be achieved. Regardless of which of these two alternatives is correct, the results are an indication of how complex the notion of competitiveness really is.

Table 38 presents the top 15 factors for Finland, Sweden and the UK. The factors are sorted in descending order, with the factors receiving the highest ‘scores’ at the top. Figures in brackets represent the number of experts voting for that particular factor, and the total score respectively.

In the top 15 factors, no one factor was represented in the list of all three countries. Instead, there seemed to be a difference in which sort of factors are of priority among the different panels.

The Finnish panel pointed out four factors directly linked to companies (or the industry’s) attitudes towards R&D and how well research is carried out and implemented by industry. The same category of factors generated only two factors in the top 15 for Sweden and none at all in the UK. The top 15 for the Swedish panel have a strong emphasis on the production process with a list dominated by factors related to an industrialised way of working (e.g. extent of off-site production, lean production, repetitive processes and standardisation).

Another notable fact among the Swedish experts is that, despite the constant debate in the Swedish construction industry about governmental intervention and especially its taxation policy for the industry, no factors directly related to these issues were represented in the top 15 factors. It is touched upon by mentioning the level of private and public R&D investment (16th place), but apart from that, one has to go to 57th place to find the next one, related to the total cost of labour.
<table>
<thead>
<tr>
<th></th>
<th>Finland</th>
<th>Sweden</th>
<th>UK</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>R&amp;D as part of firm strategy, visions and goals (8/32)</td>
<td>Extent of off-site prefabrication in production (5/20)</td>
<td>Staff training at all levels (training investment per employee) (4/14)</td>
</tr>
<tr>
<td>2.</td>
<td>Extent of use of ICT across the value chain (6/27)</td>
<td>Lean production in construction (5/16)</td>
<td>Industry-wide commitment to improve the industry’s performance (4/14)</td>
</tr>
<tr>
<td>4.</td>
<td>Ability to interpret and understand clients’ needs and values (5/24)</td>
<td>Repetitive processes in construction projects (4/15)</td>
<td>Problem-solving ability of employees (4/13)</td>
</tr>
<tr>
<td>5.</td>
<td>Partnering as a form of procurement (6/23)</td>
<td>Sophistication of logistical solutions (4/15)</td>
<td>Managers attitudes and priorities towards change (4/12)</td>
</tr>
<tr>
<td>6.</td>
<td>Ability to commercialise R&amp;D results (6/22)</td>
<td>Industry’s openness to innovations (4/14)</td>
<td>Employees’ attitudes towards new technology (2/11)</td>
</tr>
<tr>
<td>7.</td>
<td>Level of R&amp;D investment (6/22)</td>
<td>Standardisation of the production process (4/14)</td>
<td>Partnering as a form of procurement (3/11)</td>
</tr>
<tr>
<td>8.</td>
<td>Ability to create financial solutions for clients and projects (7/22)</td>
<td>Extent of use of ICT across the value chain (3/14)</td>
<td>Partnering as a means of collaboration between companies in the industry (3/11)</td>
</tr>
<tr>
<td>9.</td>
<td>Ability to implement strategies at all levels (5/21)</td>
<td>Predictability of project cost (3/14)</td>
<td>Level and stability of interest rate (3/11)</td>
</tr>
<tr>
<td>10.</td>
<td>Ability to assess and manage risks (6/20)</td>
<td>Predictability of project time (3/14)</td>
<td>Inflation (3/11)</td>
</tr>
<tr>
<td>11.</td>
<td>R&amp;D collaboration between industry and research institutions (6/19)</td>
<td>Exchange and feedback of information and experiences from project to project (3/14)</td>
<td>Predictability of project time (3/10)</td>
</tr>
<tr>
<td>12.</td>
<td>Adaptability of firms to market changes (5/19)</td>
<td>Ability to commercialise R&amp;D results (4/13)</td>
<td>Ability to create financial solutions for clients and projects (2/9)</td>
</tr>
<tr>
<td>13.</td>
<td>Human resource management as part of firm strategy, visions and goals (4/18)</td>
<td>Intellectual property protection system (copyright regulations) (4/13)</td>
<td>Human resource management as part of firm strategy, visions and goals (3/9)</td>
</tr>
<tr>
<td>15.</td>
<td>Whole life thinking in the design and delivery of projects (4/17)</td>
<td>R&amp;D collaboration between industry and research institutions (4/12)</td>
<td>Degree of clients’ involvement in projects (3/19)</td>
</tr>
</tbody>
</table>

Finally, the UK experts’ list was dominated by HR-related factors (such as staff training and attitudes among managers and employees) and financial issues, e.g. the level and stability of interest rates, inflation and the ability to provide financial solutions for clients and projects. The differences in the results countries could be due to the respondents having different cultural backgrounds. This interpretation finds support in some common critiques of Porter’s diamond, e.g. Van den Bosch and van Prooijen (1992) who conclude that cultural factors play a major role in competitiveness.
However, and maybe more likely, the differences could also be a result of what are the “hot topics” in the particular countries at the time.

**Observations**
The results indicate that industry experts in different countries emphasize different types of factors as being the most important for the competitiveness of a construction industry. For example, in the list of top 15 factors, factors related to R&D issues appear to be considered as being more important among the Finnish respondents than in the other countries. Swedish experts on the other hand, were more concerned with the actual construction process whereas their UK counterparts suggested more HR related factors than any other country.

Further studies will have to be conducted in order to explore whether or not these differences are the results of cultural differences or other contextual factors, such as for example the prevailing debate in the country at the time.

The vast amount and the diversity of the suggested factors, together with the fact that the different countries seem to prioritise different factors, underline the huge complexity of competitiveness. The results of this study is pointing towards the need for a holistic approach to the subject, incorporating all main stakeholders of the industry. Ignoring this, and instead settling for a narrower scope, would risk missing out on several important aspects of competitiveness.

**Completing the Hexagon framework**
The explanatory factors derived from the analysis of the construction industries and the Delphi-study in the three countries shape the contents of the Construction Competitiveness Hexagon framework - see the illustration on the next page.

**Similarities and differences**
Using the structure and contents of the Hexagon framework, the following section maps some selected key similarities and differences for the three countries and points out examples of relationships between one and other factors.

**Firm strategy and management**

<table>
<thead>
<tr>
<th>Similarities</th>
</tr>
</thead>
<tbody>
<tr>
<td>High sophistication of tools for efficient and effective project management.</td>
</tr>
<tr>
<td>Low intensity of innovation activity. <strong>Causes:</strong> lack of demand, incentives \ and dynamic competition; short-term-ism; low profitability levels.</td>
</tr>
<tr>
<td>Little extent of continuous improvement. <strong>Causes:</strong> lack of repetitive projects; teams are split up from project to project, prevalence of prototypes.</td>
</tr>
<tr>
<td>Too little time invested on interaction, learning and exchange of experiences among actors in planning process. <strong>Causes:</strong> planning time is undervalued; procurement practices do not stimulate interaction and collaboration, but rather maximisation of own profits at the expense of the project’s best.</td>
</tr>
<tr>
<td>Too infrequent with project actors establish common goals and incentives. <strong>Causes:</strong> price competition; lack of common incentives; low profitability.</td>
</tr>
<tr>
<td>Use of ICT: high</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profitability: higher in Finland and the UK than Sweden. <strong>Main cause:</strong> more favourable market conditions.</td>
</tr>
</tbody>
</table>
Firm strategy and management
- Adaptability of firms to market changes
- Customer focus
- Profitability
- Ability to assess and manage risk
- Ability to create financial solutions for clients and projects
- Investment and commitment to innovation
- Extent of continuous learning: exchange and feedback of experiences from project to project
- Standardisation of the construction process: repetitive processes
- Focus on lean construction
- Extent of industrialisation: extent of off-site production, sophisticated logistical solutions
- Sophistication of planning tools for project management
- Time invested in the early stages
- Establishment of common goals and incentives
- Extent of subcontracting
- Use of ICT

Human resources
- Skills of workforce
- Wage levels
- Wage negotiation system
- Work conditions
- Health and safety
- Investment in training
- Role played by the union

Chance aspects
- Recent crisis in industry
- Performance of domestic "competing" industries
- Proximity to low-cost countries

Factor conditions
- Efficiency and stringency of building permission process
- VAT on construction
- Social labour costs
- Corporate tax level
- Interest rates

Demand conditions
- Clients’ evaluation criteria
- Clients’ choice of form of collaboration
- Clients’ commitment to whole-life planning
- Role played by the public sector as a client
- Existence of tools to enable value-for-money assessments
- Existence of PFI/PPP
- Extent of partnering as a form of collaboration

Government
- Engagement in improving the performance of the industry
- Commitment to R&D

Culture
- Managers, workers and clients attitude towards:
  - Business ethics
  - Regulations
  - Environmental consciousness
  - Safety
  - Disagreements, litigation
  - Internationalisation
  - Innovation
  - Risk
  - Change

International dimension
- Import of material
- Influx of foreign labour
- International competition in home market

Industry characteristics
- Image of industry
- Collaboration between trade associations
- Collaboration between employers’ federations and trade unions
- R&D collaboration between industry and research institutions
- Ability to handle changes during projects
- Time horizons in industry
- Trust between project actors
- Fragmentation rate of industry
- Self-employment rate of industry
- Unionisation rate of the workforce

National Hexagon
- Chance
- Factor conditions
- Human resources
- Demand conditions
- Firm strategy and management
- Culture
- International dimension
- Industry characteristics
- Government
- Culture
- National Hexagon
**Human resources**

**Similarities**
- Wage levels: attractive for blue collars.
- Wage levels: unattractive for white collars.
- Strong emphasis on work conditions and health and safety.
- Skilled workforce.
- Good and improving work conditions. *Causes: successful collaboration between employers and trade unions.*
- Investment in staff training: low.

**Differences**
- Health and safety record: poor and not really improving in Finland, better and improving in Sweden and the UK.
- Wage determination system: Sweden and Finland - blue collar wages defined by collective agreement. UK - wages are market driven, determined by supply and demand of labour.

**Factor conditions**

**Similarities**
- The building permission system considered to be a source of delays and uncertainties.
- Currently low interest rates.

**Differences**
- VAT levels: 25% in Sweden, 22% in Finland and 17% in the UK.
- Social costs on unskilled/skilled labour: 55.6/55.5% in Sweden, 42.1/42.3% in Finland and 26.8/26.8% in the UK.
- Corporate tax: 28% in Sweden, 26% in Finland and 30% in the UK.

**Government**

**Similarities**
- No similarities found.

**Differences**
- Engagement in the competitiveness of the industry: more active government in UK through Constructing Excellence, KPIs and demonstration projects.
- Commitment to R&D: stronger focus in Finland through TEKES and VTT.
### Industry characteristics

#### Similarities
- Unfavourable image of industry. **Causes:** unsafe; high unemployment; macho-culture; high-profile cases of cartels and use of informal labour.
- Successful collaboration between employers and trade unions to improve health and safety and work conditions and to market the sector.
- Insufficient ability to handle changes during the process. **Causes:** insufficient investment in interaction and planning and a lack of common incentives and goals among project actors.
- Short-term-ism.
- Lack of trust and respect between project actors.
- High fragmentation rate of the industry.

#### Differences
- Self-employment rate: super-high in UK, high in Finland and low in Sweden.
- Health of relationship between trade union and employers' federation on wage negotiation: major issue and barrier in Sweden, smooth in Finland and insignificant in the UK.
- Power of union/unionisation rate: very high in Sweden, high in Finland and low in the UK.

### Culture

#### Similarities
- Positive attitude towards business ethics, reflecting the national culture.
- Positive attitude towards complying with regulations.
- Positive attitude towards environmental consciousness.

#### Differences
- Attitude towards safety: stronger in Sweden than in Finland and the UK.
- Attitude towards internationalisation: much more openness in the UK than in Finland and Sweden.
- Attitude towards disagreements/litigation culture: more in UK than Sweden and Finland, where disputes are solved at a more local level.

### Chance

#### Similarities
- Market crisis in the early 1990s.
- Performance of domestic, competing industries: when construction was having a downturn, the IT industry boomed, attracting all competent labour.

#### Differences
- Geographical proximity to low-cost markets: Finland and Sweden have an obvious opportunity to import from, for instance, the Baltic states and Poland.

### International dimension

#### Similarities
- No similarities found.

#### Differences
- Import of material: much more international trade of products and services in the UK than in Finland and Sweden. **Causes:** UK do not have as traditional and rigid supply channels as Finland and Sweden; UK firms and clients more open towards internationalisation.
- Influx of labour: much higher influx of labour in the UK than in Finland and Sweden. **Causes:** still quite a new opportunity in Finland and Sweden, barriers imposed by trade unions in Sweden; difference in attitude towards internationalisation.
- International competition: much more intense and has a longer history in the UK than in Finland and Sweden. **Causes:** attractiveness of market size and growth opportunities; difference in attitude towards internationalisation.
**Observations**

- Overall, the countries are about as similar as they are different
- The areas where the countries are the most similar are ‘Human resources’, ‘Industry characteristics’ and ‘Firm strategy and management’
- The ‘International dimension’ along with ‘Government’ and ‘Factor conditions’ are the three areas where the countries are the least similar
- Interestingly, there is a strong emphasis on factors at the micro level: ‘Firm strategy and management’, ‘Human resources’ and ‘Demand conditions’ and notably little on the macro level, i.e. ‘Government’ and ‘Factor conditions’
- Positive similarities include: skilled workforce, good work conditions, strong emphasis on health and safety, high attractiveness of architects, attractive wage levels for blue collar workers and positive attitudes towards business ethics and environmental performance
- Less preferred similarities include: too little time invested in the early stages, procurement on lowest price rather than best value, inability to handle changes during the process, unfavourable image of industry and lack of trust between industry actors.

**The four key areas**

It is possible to distil some key factors from the complete set of factors. Many of the most important factors are linked to the production process, with the second most important set of factors being related to recruitment, retention and labour attractiveness. The four key factors identified in this analysis are:

- Procurement criteria
- Profitability
- Form of collaboration/interaction
- Image of industry

The section below explains the importance of each of these key factors.

**Procurement criteria**

To a large extent, clients of construction products and services use lowest price as their most important and, in many cases, their only procurement criteria. This behaviour has multiple causes, for instance:

- Clients’ lack of experience and competence to procure construction and set evaluation criteria and assess a mainstream deliverer from a value-adding one
- Lack of tools and classifications to facilitate value-assessments, including assessments of whole-life costs and effects
- The often short-term-ism leading clients to minimise the initial cost

As illustrated in figure 95, the consequences of the choice of procurement criteria are plentiful. With clients mainly procuring on lowest price, companies will find themselves facing fierce competition with price as the only parameter. This will discourage any initiatives for suggesting value-adding or innovative solutions as well as the upgrading of their own operations. Since whole-life planning often sees a higher initial cost for a lower whole-life cost, companies are discouraged from suggesting whole-life optimal solutions. The same is true for environmental performance beyond what is required by regulation. Finally, in an industry with price as its only parameter, room for profitability is often limited, which implies a number of consequences (see below).

**Profitability**

Profitability is vital to not only keep the business alive but also fund development and upgrading. Often, profitability is linked to market conditions, price levels and hence the economic cycle of a nation. As described above, profitability is often limited in a market where price is the sole means of competing.

Profitability is an issue in construction worldwide with Finland, Sweden and the UK being no exceptions. The effects of low levels of profitability are linked to companies’ willingness to invest in staff training, upgrading in equipment and technology and R&D activities. With low margins, risks must be minimised and
so companies are often eager to minimise their risks, making them reluctant to doing things in a different way. For instance, even if there may be alternative routes to collaborate and achieve higher profits, such as partnering, companies will focus on securing their profit in the traditional way. In extreme cases, low margins and price competition will stimulate the practice to seek additional costs. (Figure 96)

**Form of collaboration**
The form of collaboration chosen for the project is largely decided by the client and hence dependent on his experience and competence to evaluate the form most appropriate for particular circumstances.
Ideally, the form of collaboration should leave time for interaction among the project actors in the early stages of the project. Experiences and expertise are exchanged, plans are completed, the supply chain set up and common incentives and goals are established. Together, the actors establish the basic values of the project and compromise on a buildable design. This will create trust among the project actors and make everyone work for the best of the project, because the more successful the project, the more benefits for each of the actors.

The positive effects of the interaction and investment in the early stages are a more productive process, with less rework and smoother handling of changes during the process. Moreover, the process is more predictable in time and cost and will deliver a product of good quality. Ultimately, this will have a positive effect on the profitability for all actors. (Figure 97)

**Image of the industry**

With the first set of factors strongly related to the performance of the production process, this second set instead are connected to the industry’s attractiveness to competent labour (Figure 98). This is found to be largely dependent on the image of the industry, which in turn is created by a number of factors. Interestingly, the image of the industry has proven such an important factor, but yet is intangible and difficult to immediately shift and improve.

The factors that build the image are illustrated in figure 98 below. Wage levels are undoubtedly the most important driver for the image (attractiveness) of the construction industry. Physical work conditions, health and safety matters and unemployment are parameters that influence the image and are quite easily assessable. However, the industry’s culture and the social status of the construction worker are less visible but nonetheless important. The cultural aspect is thought to be improved by a more explicit inclusivity policy for example, more women in the industry.

Unquestionably, high-profile stories about cartels and informal labour harm the industry’s image, but also more minor arguments between the unions and employers’ federations generate a picture of an industry in conflict.

**Figure 98 Image of the industry**

![Diagram of industry image factors](image)
DESIGNING A STUDY ON CONSTRUCTION COMPETITIVENESS

One of the most commonly discussed drivers of success of construction projects is the time invested in the planning phase and the establishment of clear objectives. The lack of this investment of time is a frequent cause of changes and rework. Interestingly, the same could be said about a research project: the time invested in the seemingly slow, low-value-adding planning process is vital for project success and minimisation of rework. Furthermore, just as was noted for construction projects, it is about completing the plans before going onto site.

The following section presents experiences and lessons learnt of the research team during the study.

Choosing the approach
As concluded in the section “Analysing construction competitiveness”, there is no single approach to analysing construction competitiveness. The choice of approach mainly depends on the purpose and aims of the research: what is the research all about, what research question is it aiming to answer? A second parameter to consider is time and cost constraints, as some approaches require more complex data collection than others.

Based on the purpose and aims of the research, the following parameters are needed to consider when deciding on which approach to employ:

- Perspectives: which stakeholders should be considered
- Level of abstraction: project, firm or industry
- Focus: cause or outcome
- Space dimension: domestic or international
- Time dimension: past, present or future

Defining competitiveness
There are numerous suggested definitions of competitiveness to be found in the literature - see section on Definitions. In order to guide future decision making, as well as external participants of the research, the research team decided to formulate a more or less formal working definition of competitiveness, based on the discussion of the parameters above.

Setting the scope
Having decided on the philosophical standing point of what competitiveness means and what approach should be employed, the next step was to set the scope of the research.

The research team has learnt that, even if it is frequently used, the term ‘construction industry’ is very complex and not very helpful as the level of analysis: it only serves as an aggregated term for a number of sub-categories - see figure 99. Thus, in the initial phase of the study, it was decided to consider the differences between the categories below and which of these categories to include in the research.

Moreover, to facilitate collection and comparison of statistics, it has proven useful to base the scope on the classifications used in EU or UN classification of industrial activity.

- Sectors: the difference in agendas, objectives, power, competences, risks, and complexities for e.g. contractors, architects, engineering consultants, building material suppliers and facilities managers
- Segments: the differences in market conditions, risks and complexities between, e.g., construction of housing, other buildings and civil engineering
- Sizes of firms: the difference in agendas, objectives, capabilities, power, management practices, competences, risks, and differences between small, medium, large and multinational firms
- Clients: the difference in agendas, capabilities and procurement behaviour and constraints between private and public as well as between professional and one-off clients
- Contracts: the differences in
procurement criteria, room for collaboration and common incentives and aims between actors and room for innovation between e.g. competitive tendering, partnering, PFI, and functional procurement.

Hence, setting the scope of the study is a multi-dimensional exercise. On top of the sub-categories mentioned above it may, especially for larger countries, become relevant to introduce a geographical dimension and so divide the country into a number of sub-areas.

**Setting the sample size**
The combination of parameters above, i.e. the number of sub-sections involved, will dictate the total sample size required for ensuring statistical validity. Even if the total population is the same, e.g. the size of the industry is fixed, the larger the number of sub-populations, the larger the total sample size will be. This means that in order to keep the sample size down, the study should keep the number of sub-categories down. Consequently, the scope would be narrower or the level of detail less.

Furthermore, different indicators require different populations to be used. For project specific indicators, the population is the number of projects, for firm specific indicators, the population is the number of firms and for the workforce the population is preferably the number of employees in the industry.

As discussed in the *Research methodology* section, this research could not achieve totally representative samples because of the lack of resources in relation to the scope of the study and the number of sub-populations that were covered.

**Identifying the experts**
For interviews, surveys and workshops, perhaps the most important matter is to define the experts with whom to engage. This depends on the purpose and scope of the project, which will then guide decisions on what expertise and
organisations to look for. Having identified the categories of expertise, time and resources will limit the number of individuals per category.

In this research, as discussed in Our approach above, the individuals were identified based on their formal positions in the organisations and with the aim of keeping it at CEO/general director/president level. For further information see the Data collection section. With hindsight, the majority of the interviewees were the 'right' people with only a few who could not really give a representative opinion.

Defining the comparator
As discussed in the Our approach section above, one of the most important matters when trying to assess performance is to decide on what should be compared with what. Inappropriate comparators may give misleading results and hence an unfair picture of the true performance of an indicator.

Examples of comparators to consider are:
- Target values of the project, firm or industry
- The industry norm, i.e. what it is reasonable to expect of the industry
- Other, similar industries in the domestic environment
- The national norm, i.e. what it is reasonable to expect of the country
- True or false

Finally, for international comparisons, there are again different comparators to consider:
- The international norm, i.e. all countries
- Countries at a similar stage of development, e.g. Sweden compared with Western-Europe, USA, Japan and Australia
- Countries at a similar stage of development, size and culture, e.g. Sweden compared with Denmark, Finland and Norway.
- Performance of company X compared between all the countries in which the company operates

Aggregation from project and firm levels to sub-sector and industry levels
As concluded in "Analysing construction competitiveness" above, the project level enables a far higher degree of detail. The higher the levels of abstraction the lower the level of detail giving instead a better overview of the general performance.

Different criteria are best assessed at different levels:
- **Project level**: client satisfaction, time and cost predictability, relationships, innovation, work conditions, business ethics, environmental consciousness and whole-life planning
- **Firm level**: profitability
- **Sub-sector level**: labour attractiveness, wage levels, image, investor attractiveness
- **Industry level**: labour attractiveness, image

Most indicators are best assessed at the project level, financial measures at the firm level and less tangible indicators at the sub-sector and industry levels. The exercise to assess the performance of the industry includes activities at all three underlying levels, producing results which may then be aggregated to shape the picture of the industry as a whole.

Weighting
Different parameters, (competitiveness indicators or explanatory factors in this research) are of differing importance. In order to acknowledge this, the research team has considered the so-called weighted evaluation matrix to yield the relative weightings on the Hexagon framework, both between the determinants and between the factors within each of the determinants. However, there is no clear advice on how to ensure the validity of such weighting exercises, as they are likely to become matters of subjectivity, and the team was not convinced by its value.

The appropriateness of weighting different sub-categories of the industry,
i.e. segments and sectors, as well as geographical sub-categories, is undisputed. To get an objective picture, the recommendation is to weight sub-sections in proportion to their respective percentage of total output.

**Data collection**

Based on what has been outlined so far in terms of choice of approach, scope of study, calculation of sample sizes and decisions on comparators, the next step is to decide upon what means of data collection to use. At this point, theory and plans meet reality.

The most common tools for collecting data are:
- Interviews
- Surveys/questionnaires
- Workshops/focus groups
- Statistics

The choice of tool often becomes a compromise between what was formulated in theory (ideal data) and constraints imposed by reality, e.g. time, cost, access to data and the representative participants’ commitment to take part (realistic data).

As presented in the *Research Methodology* section, this research has used a variety of tools, for which a series of selected challenges and recommendations are presented below.

**Interviews**

Interviews proved to be a very useful tool to collect data on a wide range of issues, both in terms of cause and outcome. As described earlier, the interviews were structured around a number of headings, which corresponded to the criteria, as derived from the definition, to assess competitiveness.

For each of these criteria, the interviewee was asked for a score on a scale from one to seven, using different criteria for different indicators. Each of the indicators was then followed up by a series of probes, searching for the most important factors that influenced the performance of the indicator. The initial question of the score on that particular indicator triggered a very fruitful discussion on both outcome and causes. Often, the interviewees brought up perspectives and examples that had not been considered before. Hence it is very important to use a series of headline questions, but leave room for further creative dialogue.

The main difficulty was to ensure that all interviewees actually answered the same question, i.e. shared an understanding of what the indicator was all about, and that they looked at it from an objective perspective as possible. Moreover, not every interviewee could be expected to have a representative opinion on all indicators.

The obvious weakness is that an opinion, by definition, is a matter of subjectivity. Thus, there is the risk that the interviewee, even if being asked about the industry as a whole, answers from the perspective of his/her organisation and his/her agenda. Furthermore, as noted earlier, the ‘industry level’ is not a practically useful level of abstraction. Many of the interviewees mentioned that it was different across and between sectors, segments and firms.

Some interviewees were very thoughtful, others more spontaneous in their answers. Moreover, some interviewees had a very positive nature, while others were more pessimistic. It was clear that a cultural aspect was involved. By collecting opinions from a wide range of perspectives, some of this bias is hopefully managed.

When making international comparisons, a clear source of uncertainty is the cultural aspect. People in some countries are more humble than others and may, despite representing a leading industry, give a very modest opinion about the industry. Moreover, although the comparator of choice for some indicators was ‘the international norm’, this is a practically impossible comparator, as it is difficult to give an informed opinion.

Despite being a popular method, there are uncertainties about the interviewee stating their opinion on a scale, e.g. ‘totally dissatisfying’ to ‘totally
satisfying’. As described above, interviewees will answer that question from different perspectives, with different attitudes and knowledge. For a relatively small sample, as in this research, the scale can certainly be used to indicate a standing point, but not for detailed statistical exercises.

Finally, it is interesting to note the reliability of the opinions and arguments delivered by the participants. During the series of interviews, the same, quite specific, arguments or examples came up so often it became doubtful whether this was the participant’s actual opinion or something they had picked up from an industry magazine, newspaper, research report or seminar. Since most participants use the same or similar channels of information, the risk is that opinions converge into something generated by the media.

It is essential to get all stakeholders who are to be included in the research to be represented. Interviewees were contacted first by an e-mail including a brief description of the study and the background to and the reason why the person has been contacted, followed up with a telephone call to confirm participation. It proved very successful to attach a list of the other interviewees of the project. If the study can feature a couple of ‘industry stars’, then others are more likely to follow.

Just before the meeting, the questions were sent and then used as the structure of the conversation. It was important to be up-to-date with the firm’s activity and ensure the interview was recorded.

**Surveys**

As described in *Research Methodology*, the research team made an attempt to calculate what sample sizes were required for statistical validity. However, with the experience of the Delphi-study and the difficulty of reaching sufficient response rates, the plan of a widespread survey was abandoned. In the same way as the UK KPI system works, a survey to a representative sample was considered to be the only way to get a proper picture of performance indicators at the project level. However, this was beyond the constraints of this research.

Also, with hindsight, much of the value of the interviews – the creative dialogue – would have been missed if surveys had been used instead.

**Delphi survey**

The Delphi survey was very valuable as it provided the collective view of industry experts of the factors that influence the competitiveness of the construction industry from a range of perspectives. Moreover, the participants were asked to put a relative ranking on a scale from 1-5 and, from this, it was possible to shape a national set of the most influential factors of competitiveness and make some inter-country comparisons. Table 38 shows the top 15 factors in the Delphi study for Finland, Sweden and the UK.

Not surprisingly, the difficulty with the Delphi was to get the participants to participate. With the lack of any general recommendation of sample size, ten experts per country were approached, i.e. 30 in total. As for response rates, the research team aimed at 100%, but this proved to be problematical. We concluded that there was no added value in continuing with a second loop in view of the effort involved for the level of response. The Delphi methodology, although very attractive in theory, in reality it requires true commitment from the participants if it is to work.

Another difficulty, just as with the interviews, was to ensure that all interviewees actually answered the same question, i.e. shared an understanding of what the exercise and the concept of competitiveness was all about. As with arranging the interviews, the recommendation was to start by sending an e-mail including a brief description of the study and the background and purpose of the contact. This was followed up with a telephone call to confirm participation. Again, it proved worthwhile to attach a list of the other participants in the exercise.

**Workshops**

The workshops arranged in the early stages of the project were certainly
useful for brainstorming purposes and for getting opinions from a wide range of perspectives. Also, at a later stage, workshops could be a valuable tool for data collection; for assessing performance of indicators, identifying factors that influence performance as well as for relative weightings.

With workshops, the benefits are obvious, but the arrangements are resource-hungry and all the experts to be at the same place at the same time. It is important at the workshop to ensure that all interviewees answer the same question, i.e. they share an understanding of what the exercise and the concept of competitiveness is all about.

Statistics

The main benefit of statistics is to get an objective complement to the subjective opinions from the interviews and Delphi survey.

The challenges involved in collecting statistics include access and validity. Moreover, international comparisons are often complicated as different countries often

• Use different categorisations for the industry, e.g. sectors or segments
• Use different definitions of measurements, e.g. types of accidents
• Use different means of data collection and hence achieve different grades of reliability

For future studies on measuring construction industry competitiveness

Having discussed some of the areas that need to be considered when undertaking a study on competitiveness in construction, this section briefly outlines notions on how such a study could be best performed.

First and foremost, in order to enable international comparisons of competitiveness in construction it is a necessity for all participating countries to agree on the same methodology, format and presentation and set up national task groups with the administrative responsibility. Moreover, this requires the standardisation of industry statistics or at least the awareness of the matter of comparability and that statistics can easily be misinterpreted.

In summary, definitions and means of data collection must be comparable across countries. Only once the consistency of this process can be assured will international comparisons be reliable enough to form the basis for policy making and reform programs.

As discussed above, the methodology involves deciding on what approach to employ, how to define competitiveness and what sub-categories of the industry to cover. For the construction industry as a whole, the research team suggests the following approach:

• Include a wide range of stakeholders, e.g. companies, clients, employees, policy makers and overall society
• Recognise the differences between different sub-categories of the industry, see structure above
• Include softer parameters, e.g. image and workers’ and managers’ attitudes
• Recognise that different parameters are best assessed at different levels of abstraction; project, firm, sub-category and industry
• Recognise that different parameters are best assessed using different comparators
• Recognise the difference between cause and outcome
• Realise the complexities of comparing statistics between countries
• Take into consideration the often low response rates on surveys in the construction industry
THE CONSTRUCTION COMPETITIVENESS TOOLBOX

Introduction
The Construction Competitiveness Toolbox (CCT) is user-friendly software to be used among industry associations, policy makers or within firms, to analyse the competitiveness of the construction industry or its individual firms.

It allows users to identify what factors are most influential for construction competitiveness, assign their relative importance and mark their performance. The input provided by the user is transformed into the Construction Competitiveness Hexagon Framework, to give an overview of the competitiveness position as well as to facilitate comparisons between countries, sectors or firms.

The backbones of the toolbox

Welcome
Initially the user is introduced to the topic of competitiveness in construction in general and the Construction Competitiveness Hexagon in particular. See Figure 100.

Step 1: Selecting factors
The first part of the competitiveness analysis is about, from a list derived from the study, selecting the most important factors influencing construction competitiveness. Alternatively, the user may pursue directly with a pre-defined set of factors for each of the six determinants in the hexagon.

Step 2: Relative importance
The factors selected in the previous step are transferred into the Weighted Evaluation Matrix (WEM), which facilitates the user to, for each of the determinants, assign the relative importance of each factor in relation to each any every other factor. The raw score derived from the WEM is transformed into a relative importance expressed on a scale from 0-100 (Figure 101).

Step 3: Performance
In the third step of the analysis, the user assigns the performance of each of the factors chosen using the RAG-scale: from ‘red’ for dissatisfactory performance, via ‘yellow’ for acceptable performance to ‘green’ for satisfactory performance (Figure 101).

Step 4: Calculation of competitiveness scores
By combining the relative importance from step 2 and the performance from step 3, the final step of the analysis calculates the competitiveness scores for each of the determinants (Figure 102) and draws the resulting Construction Competitiveness Hexagon (Figure 103).
**Construction Competitiveness Toolbox**

**Welcome**

The Construction Competitiveness Toolbox (CCT) is user-friendly software to be used at workplace within firms, among industry associations or among policy makers, to analyse the competitiveness of the construction industry or its individual firms.

It allows users to identify what factors are most influential for construction competitiveness, assign their relative importance and rank the performance of the organisation. The input provided by the user is transferred into the Construction Competitiveness Hexagon, to give an overview of the situation as well as facilitate comparisons at the industry and/or firm level.

**Theoretical Background**

This section provides a brief introduction to competitiveness, and some of the challenges associated with assessing and comparing measures of competitiveness. It also suggests a short reading list for the user interested in developing a deeper understanding of underlying theories.

**Weighted Evaluation Tools and RAG-scale**

In this section it is explained how the Weighted Evaluation Tools is used to help the user rank the importance of factors of competitiveness by weighting each factor against others. The section also explains how the factors are scored using a RAG scale.

**Competitiveness Hexagon and Radar Chart**

Here the Construction Competitiveness Hexagon is briefly explained. You will get an understanding of the framework and the complete network of factors that underpin it. You will also be introduced to how the results will be presented after the exercise has been completed.

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**Figure 100**

Welcome page

**Figure 101 Weighted evaluation matrix and scoring process**

### Competitiveness Factors

A: Firm’s strategies and management

#### Relative Importance Matrix

<table>
<thead>
<tr>
<th>Factor</th>
<th>A1</th>
<th>A2</th>
<th>A3</th>
<th>A4</th>
<th>A5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ability to create financial solutions for clients and projects</td>
<td>8</td>
<td>9</td>
<td>7</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Ability to commercialise R&amp;D results</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Extent of use of ICT across the entire chain</td>
<td>6</td>
<td>5</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
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#### Performance Matrix

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### Construction Competitiveness

- **B: Human resources**
- **C: Demand condition**
- **D: Industry characteristics**
- **E: Government**
- **F: Firm’s strategies and management**

#### Scoring Key

1. Unsatisfactory performance
2. Between acceptable and unsatisfied
3. Acceptable performance
4. Between acceptable and satisfied
5. Satisfactory performance

---

150
**Figure 102 Example of final step - Determinant A**

**Figure 103 Final step of analysis - the completed hexagon**
CHAPTER NINE

References
References


IMD and WEF. (1993) *World Competitiveness Report,* International Institute of Management Development (IMD) and World Economic Forum (WEF), Lausanne, Switzerland.


Mutti, C. do Nascimento, (2004). The drivers of Brazilian contractors’ competitiveness in the international market, PhD, Department of Construction Management and Engineering, University of Reading, UK


Oz, O. (2001) Sources of competitive advantage of Turkish construction companies in international markets, Construction Management and Economics, 19(2), 135-144.


APPENDIX A

Empirical data
Size and growth rates of key economies

Figure A1 GDP in US$bn for 15 largest economies and the Nordic region, 2004
Source: CIA Factbook 2005

Figure A2 GDP per capita in US$1,000 for the 15 largest economies and the Nordic region, 2004
Source: CIA Factbook 2005
Figure A3 Average population change in percent for selected countries, 2004
Source: OECD 2005

Figure A4 Average GDP change in percent for selected countries, 1991-2003
Source: OECD 2005
Figure A5 Construction output by sector in 2003 - four large economies

Table A1 GDP change, 2000-2005
Source: OECD, 2005

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Table A2 Population growth, 1998-2003
Source: OECD, 2005

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### Table A3 Unemployment 2000-2003

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### Table A4 Inflation 2000-2003

*Source: Euroconstruct, 2005*

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### Table A5 Short term interest rates

*Source: Euroconstruct, 2005*

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Figure A5  Construction output by sector in 2003 - four small economies

Table A7 Construction growth 2000–2004 for the four large and small economies

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Figure A6 Construction output change in relation to GDP change
Figure A7a  Construction as a % of GDP - large economies
Source: OECD Factbook, 2005

Figure A7b  Construction as a % of GDP - small economies

Table A8  Construction prices, annual change %

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Figure A8 Construction prices and inflation

Figure A9 Labour cost, skilled labour, 2004
Source: Gardiner & Theobald, 2005

Figure A10 Labour cost, unskilled labour, 2004
Source: Gardiner & Theobald, 2005
**Figure A11**  
*Social cost as part of all-in rate, 2004*  
*Source: Gardiner & Theobald, 2005*

**Figure A12**  
*General and construction-related VAT, 2004*  
*Source: Gardiner & Theobald, 2005*

**Figure A13**  
*ISO19001:2001 Prevalence of quality and environmental management systems*  
*Source: ISO Survey, 2005*
Figure A14 ISO 14001:200 Prevalence of quality and environmental management systems
Source: ISO Survey, 2005

Figure A15 ISO 19001:200 registrations (per US$bn) in relation to construction output;
Source: ISO Survey, 2005

Figure A16 ISO 14001:200 registrations (per US$bn) in relation to construction output;
Source: ISO Survey, 2005
APPENDIX B

Research team’s publications
This section presents the papers that have been produced so far.

**Rethinking competitiveness for the construction industry**

*ARCOM conference, Edinburgh, September 1-3, 2004*

Henricsson, J.P.E, Ericsson, S., Flanagan, F. and Jewell, C.A.

The concept ‘competitiveness’ is an important element in the debate on the performance of nations, industries and firms. The purpose of this paper is, firstly, to highlight the need to ask the right questions in order to specify the meaning and measurement of ‘competitiveness’ and secondly to introduce a new definition of competitiveness for a nation’s construction industry. An examination of the extant literature on ‘competitiveness’ and its associated measures, reveals that there is a vital link between ‘competitiveness’ and the principal goals, the mission, of a nation and firm respectively, but also that these missions are not completely covered by the measures used today. This observation enables the formulation of a definition of ‘competitiveness’ for a nation’s construction industry. It is concluded that ‘competitiveness’ for a nation’s construction industry must consider the needs and expectations of companies, clients and society respectively and simultaneously and cannot be captured by a single measure.

**Keywords:** competitiveness, definition, measurement, productivity, profitability.

**Framework of the Hexagon Understanding construction industry competitiveness**

*CIB conference, Helsinki, June 13-16, 2005*


The link between competitiveness and the sustained prosperity of a nation, industry or firm, is a well established argument and the basis for policy making and strategic changes. However, in order to develop, implement and monitor any initiatives for improving competitiveness, there is a need for a framework through which competitiveness can be measured and understood. This paper reviews the existing frameworks for analysing competitiveness and especially their application to the construction industry. Based on this review of frameworks, a new model to analyse construction industry competitiveness is introduced. Most importantly, the new model distinguishes between the indicators that are used to measure actual competitiveness, i.e. relative efficiency in achieving objectives, and the factors that influence and explain differences in the competitiveness of construction industries.

**Keywords:** Competitiveness, construction industry, frameworks, measurement
Deconstructing construction competitiveness - the initial results of a Delphi survey in Finland, Sweden and the UK

COBRA conference, Brisbane, July 4-8, 2005
S. Ericsson and J.P.E. Henricsson

The competitiveness of the construction industry is an important issue for many countries as the industry makes up a substantial part of their GDP – about 8% in the UK. A number of competitiveness studies have been undertaken at company, industry and national levels. However, there has been little focus on sustainable competitiveness and the many factors that are involved. This paper addresses that need by investigating what construction industry experts consider to be the most important factors of construction industry competitiveness. It does so by conducting a Delphi survey among industry experts in Finland, Sweden and the UK. A list of 158 factors was compiled from competitiveness reports by institutions such as World Economic Forum and International Institute of Management Development, as well as from explorative workshops in the countries involved in the study. For each of the countries, experts with different perspectives of the industry, including, consultants, contractors and clients, were asked to select their 30 most influential factors. They then ranked their chosen factors in order of importance for the competitiveness of their construction industry. The findings after the first round of the Delphi process underline the complexity of the term competitiveness and the wide range of factors that are considered important contributors to competitiveness. The results also indicate that what are considered to be the most important factors of competitiveness is likely to differ from one country to another.

Keywords: competitiveness, construction industry, Delphi.

Measuring construction industry competitiveness: a holistic approach

COBRA conference, Brisbane, July 4-8, 2005
J.P.E. Henricsson and S. Ericsson

The link between competitiveness and sustained prosperity of a nation, industry or firm, is a well established argument and serves as the basis for making policy decisions and directing strategic change. The importance of construction industry competitiveness is currently receiving considerable attention from countries such as Finland, Sweden and the UK. This paper critically reviews the existing measures of competitiveness, challenges productivity and profitability as the dominant measures of construction industry competitiveness and introduces a more holistic set of measures that addresses the needs of investors, employees, clients and overall society. The research also reports upon the application of this more holistic set of measures for measuring competitiveness and presents results for the Swedish construction industry. The paper principally sets out to present the preliminary findings of an ongoing research project, which will eventually compare the competitiveness of the Swedish construction industry with that of Finland and the UK.

Keywords: benchmarking, competitiveness, construction industry, Sweden.
APPENDIX C

Interviewees
**INTERVIEWEES**

The following tables present the interviewees for the main interview phase of the study.

### Finland

<table>
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<th>Perspective</th>
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<td>Contractor</td>
<td>Tuomas Säkilahti</td>
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<td>Head of Building Department</td>
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<td>Helsinki University of Technology</td>
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<td>Founder and Chairman</td>
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<td>Jonathan Green</td>
<td>Researcher</td>
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