The Consulting Engineering Sector

Europe
The Consulting Engineering Sector

in Europe

ING Economics Department
ING Corporate Clients
2008
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Today’s world might best be characterised as an increasingly dynamic playground. Economic growth and buoyant world trade, increasing concerns about the environment and climate change, explosive demand for commodities, the current turmoil in financial markets, an ageing population in the western world, increasing migratory flows, changing demand for housing and working space, different consumption patterns and leisure activities, the spread of new communication technologies in conjunction with active insourcing and outsourcing of skills, and the like. All these factors are in some way interdependent and form the stage on which companies and people play their roles.

Consulting civil engineering firms play an initiating, cementing and added value role within the construction chain. Advisory services are provided to governments and private investors, to contractors and developers, to buyers or end-users while sometimes these firms act as principal. Studies of feasibility, socio-environmental impact and technical and financial matters often complement the range of services provided. Furthermore, consulting civil engineers play a vital role in aligning stakeholders and working out alternatives. Consulting engineers offer management services for entire projects as well as facility management services. All the above-mentioned dynamics influence the activities of engineers, although engineers also respond pro-actively to these dynamics creating new activities, new markets and new roles.

To acquire a better grip on this dynamic and economically important sector, ING was eager to analyse the main economic and business environments of the players in this domain, to discuss some of the main trends and try to understand better what services are provided to capitalise on these changing market conditions and trends. This study aims to support a reflective discussion of strategies and possible investments in new markets and products. By better understanding what drives consulting civil engineering firms and what strategies they pursue, ING should be able to respond even more alertly. Of course, ING can provide a wide range of products and services to accommodate further growth across the European industry and beyond.

We sincerely hope that this report will give you food for thought. We would also like to invite you to discuss its contents with us, as we are constantly striving to improve our analyses and broaden our knowledge of the industry and the companies active in it. In combination with our financial expertise, we welcome the opportunity to explore ways in which we can be of assistance to you in reaching your goals and moving your organisation forward.

Yours sincerely,

ING Corporate Clients
Engineers, Construction and Building Materials

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Jean Bonnet tel: +31 20 6523037
Civil engineering consultancy services are defined as intellectual services aimed at optimising investment projects in industry, construction and infrastructure at all stages of a project from the initial phase to its final operation. Hence, the client base of civil engineering consultancy firms is predominantly formed by national and local governments, contractors, investors and industrial firms. Demand for civil engineering consultancy services is therefore closely linked to the general economic environment and construction output. Strategically, consulting engineering firms pro-actively tend to capitalise on trends and developments in the marketplace.

In general, there seem to be two types of engineering consultancy firms. The first group is formed of specialists that provide a single service to their – usually global - client base or that provide several services to a specific sector. The second group consists of generalists that provide as many multidisciplinary services as possible to their client base, usually in a smaller geographic area which is characterized by high GDP and well-embedded democratic checks and balances.

Review of the market

- The market of civil engineering consultancy is characterised by a competitive environment with low entry barriers and a strong impact of political decision-making. Demand for basic engineering services especially is very price driven (commodity).
- Whereas countries like the Netherlands and the UK traditionally have a large sector of independent engineering firms, in other countries they form an integral part of construction companies or industrial conglomerates.
- The general image of civil engineering services is rather dull. As image influences the career choice of students and recent graduates, the sector could use an upgrade in perception. The major companies try hard to demonstrate their attractiveness by expanding internationally and increasing their brand awareness.
- The UK has the biggest engineering consultancy sector in Europe with a turnover of approximately € 50 billion per year. As a share of the construction market Sweden has the largest engineering sector with 32.5% followed by Denmark with 29.8%.
- In most countries small engineering enterprises dominate the market. For example in Germany over 90,000 engineering companies are registered. However, a limited number of major players form the front line. These players usually have established networks in several countries.
- Denmark has the highest share of engineering firms with more than 20 employees followed by the Netherlands and the United Kingdom. Consolidation is an ongoing process in the market, with firms seeking to diversify their activity portfolio and/or their geographic presence. Other reasons for consolidation are to gain market share (bargaining power) and to position their brand vis-à-vis the market and potential employees.

Trends

- New procurement methods like Design & Build are on the rise. Clients bring the design and construction and sometimes even the exploitation or maintenance in one large package to the market. To reduce costs, smaller contracts are assembled and marketed as
one. These changes seriously affect the market dynamics for civil engineering consultancy firms. Firstly, in order to market Design & Build contracts, clients need to make a functional specification and to install a specifically designated management agent for the project. Both offer ample opportunities for civil engineering consultancy firms. Secondly, the increased size of the contracts requires larger engineering firms in terms of risk bearing capacity, personnel and management skills. Thirdly, the changing nature of contracts implies a shift in demand for independent engineering consultancy firms, with implications for the size of the engineering firm, the skills and knowledge of engineers in handling such projects and their risk management abilities. However, contractors and developers are developing their own engineering departments in response to these Design & Build contracts and are trying to push engineering firms out of the market. By the reverse token, engineering firms are increasingly acting as main contractors and are inviting other parties in the production chain to operate as subcontractors. Smaller firms are thus being forced to enter into partnerships, ad hoc or otherwise, or to specialise in niche services.

The traditional services rendered by civil engineering firms (basic or detailed engineering) are low margin business with a relatively low added value. To increase margins and obtain more predictable cash flows, engineering consultancy firms are focussing on all elements of the value chain. Activities such as development, design, maintenance management and even facility services are a logical diversification for engineering firms. This trend may perhaps also provide a (partial) solution towards increasing efficiency (fewer failure costs) in the construction chain as a whole.

Civil engineering consultancy companies grasp opportunities derived from perceived trends in the world, as these trends and developments affect their clients. Although the list of global dynamics is almost inexhaustible, a few are mentioned below:

- **Global warming**: resulting in droughts and serious water safety issues for many public authorities.
- **Demand for sustainability**: resulting in all sorts of studies and advisory services.
- **Inner city developments**: resulting in highly complex logistical and construction issues.
- **Urbanisation**: resulting in concentrated demographic pressure in relatively smaller areas.
- **Leisure consumption**: resulting in the design of entirely new concepts and landscaping.
- **Outsourcing by governments and multinationals for instance**: resulting in increased demand for facility management services and the like, with seriously higher margins.
- **Environmental demand**: resulting in demand for remediation services and a diversity of soil and water quality treatment projects.
- **Mobility**: resulting in complex logistic challenges with implications for nature, pollution and the technologies applied.
- **Increasing sanitary standards**: resulting in entirely new concepts of care and health, but also growing attention to safe drinking water and an ecologically safe food chain.

**Country Comparison**

- In terms of growth over the past years 2003-2005, the Romanian engineering sector showed by far the highest growth rate of all countries with an impressive 25% per year. The engineering sector in Germany in this period faced a decline due to a downturn in German construction output and tight budgetary control by the state (figure 0.1).
- The largest construction markets, Germany and the UK, are expecting the lowest growth rates for 2008 and 2009. In these mature markets, maintenance and renovation projects are gaining in importance over new buildings. The highest expected growth rates in construction are expected in Poland and Romania and are mainly driven
by civil engineering. These countries are still catching up and therefore have ample need for infrastructure investments, new buildings and city renovations. The European Union makes funds available to speed up such processes. Both the catching up and the acquisition of these funds offer great opportunities for engineering firms.

- In the Eurozone economic growth was 2.6% in 2007, which is slightly lower than in 2006. For 2008 and 2009 a more modest growth rate of respectively 1.4% and 1.6% is expected. CEE countries are experiencing substantially higher growth rates than Western European countries.

- Western European countries on average have a good business environment which results in very conducive business legislation, market openness and efficient tax systems. The best business environment can be found in Denmark. Poland and Romania have the worst business climate with market openness seriously restricted and stringent regulations in several areas.

- The success of a consulting engineering firm is very much determined by the knowledge and skills of its employees. In the Netherlands the absolute number of engineering students is decreasing while staff are ageing which leads to a tight labour market for experienced and recently graduated engineers. Whereas economic sense implies that a shortage of labour should increase the price of engineering services, this logic is still not notably happening in the Netherlands in contrast to the UK market. Engineering companies are outsourcing work to countries with sufficient supply of new talent (and lower labour costs) like Romania to solve the labour shortage.
1 Introduction

The main angle of approach in this report is the European consulting civil engineering sector itself. The focus will lie on engineering directly related to construction. Market conditions for this sector are influenced by the macro economic development and of course in particular the growth of the construction sector.

Chapter 2 starts with an overview of the main macro economic trends in Europe. The second section focuses on the business environment which engineering consultancy firms have to cope with, which varies between countries. The third section discusses the construction market. The residential, non-residential and civil engineering market is analysed and subsequently the main trends in the European construction market are described. The chapter closes with an overview of the labour market for European engineering companies.

Chapter 3 analyses the European engineering consultancy sector itself. It starts with a review of the facts and figures of the sector. Section 2 discusses the most important trends facing consultancy firms. The last two sections of the chapter take a closer look at the different market sectors and the value chain in which engineering firms are operating respectively.

Chapter 4 concludes with a micro analysis of European engineering consultancy firms of a selected number of companies. The position of the companies is defined on the basis of the company’s geographical diversification, product mix, and return.

Finally it is important to note that this report is on the European civil engineering consultancy sector and is based on public reports and several interviews. The countries that are specifically covered are the Netherlands, Germany, Belgium, France, Denmark, Sweden, the United Kingdom, the Czech Republic, Poland and Romania.
2 Economic overview

Market conditions for engineering consultancy companies are influenced by economic developments. One of the leading indicators in particular is the growth of the construction sector. This chapter therefore focuses on the economic climate, the business environment and the construction sector in Europe.

2.1 Macro economic outlook

Growth in the global economy is still driven by the US and China. But the strength of the US in particular is declining, while China is searching for ways to consolidate its growth levels at a lower but healthier and more sustainable pace of around 10%. In the Eurozone growth is also weakening.

Economic growth in the US is weak at the moment. The downturn started in 2006, when growth slowed to 2.9%. The year 2007 failed to bring more prosperity and 2008 especially will not do so either. US economic growth is expected to slow down to 1.0% in 2008 (figure 2.1). The housing market is facing a further substantial decline and is threatening to cause renewed instability in the financial markets. The problems in the financial sector have compounded the US housing market’s problems. Falling house prices damage confidence, income and employment growth. A renewed slashing of residential construction seems likely given that until now cuts in construction have barely managed to keep pace with the slow-

Figure 2.1  Real Gross Domestic product growth (% yoy)

Source: Eurostat & ING (Forecast 18 April 2008)
down in sales. Subdued inflation will allow the Federal Reserve to respond with a further rate cut and the funds rate is expected to fall to 1.0% in the third quarter of 2008.

In 2007 China surpassed the US as the largest contributor to global economic growth. At the same time it became the largest trading partner for all Asian countries. As in 2006 economic growth was above 11% in 2007. Growth will slow somewhat in 2008 and 2009, but will stay around 10%.

After a few years of very weak economic growth the Eurozone has found its way up. 2007 was a good year economically with an economic growth of 2.6%. The growing business investment has been the most important motor of the European economy. In addition employment is high. Growth is expected to slow in the coming years to 1.4% in 2008 and 1.6% in 2009, due to weaker foreign demand and a stronger Euro. The previous strong momentum of economic growth will be challenged by higher credit costs and currency appreciation which makes it likely that the euro, having hit a new high at the beginning of 2008, will depreciate later (table 2.1).

As in the rest of the Eurozone, economic growth in the Netherlands has peaked. Notwithstanding the slowdown in the growth rate of economic activity, the labour market is expected to become even tighter going forward into 2008 and the assumption is that vacancies will less easy to fill. This applies particularly to engineers who are hard to find. Although slowing, economic growth will probably still be high enough for the growth rate in labour demand to outpace the labour supply. This means a continuation in the decline of the unemployment rate to 4% in 2008 and (further) upward pressure on wages. Higher wages may put pressure on the competitiveness of Dutch exporters. As the economy at large has peaked, the growth rate of private fixed non-residential invest-

### Table 2.1 Macroeconomic indicators

<table>
<thead>
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<th>2006</th>
<th>2007</th>
<th>2008F</th>
<th>2009F</th>
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<tr>
<td><strong>10yr bond yield</strong></td>
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<td>United States</td>
<td>4,7</td>
<td>4,0</td>
<td>3,5</td>
<td>4,3</td>
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<tr>
<td>Eurozone</td>
<td>3,95</td>
<td>4,33</td>
<td>3,75</td>
<td>4</td>
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<tr>
<td>UK</td>
<td>4,74</td>
<td>4,51</td>
<td>4,2</td>
<td>4,9</td>
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<tr>
<td><strong>3 months interest</strong></td>
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<tr>
<td>United States</td>
<td>5,36</td>
<td>4,7</td>
<td>1,3</td>
<td>2,3</td>
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<td>Eurozone</td>
<td>3,75</td>
<td>4,68</td>
<td>3,8</td>
<td>3,7</td>
</tr>
<tr>
<td>UK</td>
<td>5,33</td>
<td>5,99</td>
<td>4,5</td>
<td>4,2</td>
</tr>
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<td><strong>Foreign Exchange</strong></td>
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<tr>
<td>EUR/USD</td>
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<td>1,46</td>
<td>1,5</td>
<td>1,35</td>
</tr>
<tr>
<td>EUR/GBP</td>
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<td>0,72</td>
<td>0,85</td>
<td>0,82</td>
</tr>
<tr>
<td>EUR/SEK</td>
<td>9,15</td>
<td>9,44</td>
<td>9,23</td>
<td>8,9</td>
</tr>
<tr>
<td>EUR/CZK</td>
<td>27,5</td>
<td>26,6</td>
<td>24,7</td>
<td>24,3</td>
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<tr>
<td>EUR/PLN</td>
<td>3,86</td>
<td>3,58</td>
<td>3,31</td>
<td>3,32</td>
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<td>EUR/RON</td>
<td>3,38</td>
<td>3,61</td>
<td>3,55</td>
<td>3,42</td>
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</table>

* end of period

Source: ING (Forecast 18 April 2008)
ments also seems to be slowing down. Higher unit labour costs, deteriorating competitiveness and a higher interest rate burden may all be expected to put a brake on investment activity. Nevertheless, preconditions for investments remain favourable as profits continue to be high.

After years of subdued growth, the German economy shifted into a higher gear from 2005 onwards. The expansion has been driven mainly by net exports on the back of strong worldwide demand for capital goods and efforts to improve competitiveness. Business investment also contributed to stronger growth, but consumption has remained surprisingly weak despite the sharp decline in unemployment. A VAT increase in January 2007 further curtailed household spending in the first half of this year. With wage growth picking up and job insecurity declining, a more substantial growth contribution from consumption can be expected in 2008. However, net exports are bound to suffer from the stronger euro and tighter credit conditions are likely to slow growth in capital expenditure. Therefore GDP growth is expected to slow to 1.3% in 2008 down from 2.6% in 2007.

In Belgium, downward risks for the growth outlook have clearly increased since the summer of 2007, in the aftermath of the turmoil on the financial markets. The economy grew by 2.7% in 2007. For 2008, a slowdown of GDP growth to 1.6% is expected. As such, it is expected that the drag of the crisis on the economy will remain limited. Inflation in Belgium fell due to lower energy price increases stemming partly from the liberalisation of some parts of the gas and electricity markets.

Like other European countries France experienced a slowdown in growth in 2007 (1.9%). In 2008 a GDP growth of 1.4% is expected. The better outlook on the labour market and the shrinking of the government budget deficit are important factors for future economic growth. The recovery remains rather hesitant in comparison with other Western European countries and as a consequence a modest growth is expected for the French economy.

In Denmark economic activity lost its momentum in 2007, with real GDP growth reaching 1.9%, substantially lower than the 3.5% in 2006. The main reasons for the slowdown are widespread capacity constraints in the domestic economy and moderation in private consumption. In 2008 a further slowdown in activity is foreseen with growth of 1.3% and in 2009 the economy will pick up slightly with an expected growth of 1.4%.

Sweden has seen strong economic development for a few years and the Swedish economy will be entering 2008 with more growth momentum than the Eurozone. For the years 2008 and 2009 growth rates of approximately 2.5% are expected which are above European average. We foresee an interest rate hike by the Riksbank to 4.5% in 2009. Assuming money market conditions settle down, yield differentials should be moving substantially in favour of the SEK. This will result in a lower EUR/SEK of 8.90 by the end of 2009.

After high growth rates in the beginning of this century in the United Kingdom, the country experienced a slight dip in 2005. In 2006 the economy bounced back and grew by 2.8%. Higher house prices have boosted consumer confidence and spending, and have increased household disposable income by 6 %-points. However, there are now clear signs of weakening activity in the housing market and there is a threat of a consumer slowdown for 2008. For 2008 a GDP growth rate of 1.5% is expected which is around the Eurozone average. The diminishing growth is the effect of a global downturn. The lower growth rate should help to ease inflation pressures and offer significant scope for looser monetary policy. UK interest rates are likely to fall to 4% by the end of 2008.
In the **Czech Republic** GDP growth edged up slightly in 2007 to 6.5% from 6.4% in 2006. In 2008 and 2009 a deceleration is expected to 5%, due to fiscal tightening and expectations of an EU slowdown. With the tax package aiming at reducing the public deficit having been approved last year, the government in 2008 will probably focus on further reforms, such as changes in the state pension scheme. The adopted fiscal measures increase the probability that the government can reduce the public deficit from 3.5% of GDP in 2007 to under 3%, and hence meet the Maastricht fiscal criterion in 2008-10. However, approved gradual cuts in the corporate income tax up to 2010 (from 24% to 19%) increase the risk of deteriorating revenue. From June 2007 to February 2008, the CNB gradually raised the key interest rate by 1.25% to 3.75%. In 2008, the koruna is likely to track its long-term real appreciation trend, supported by productivity gains and the narrowed interest rate differential against the Eurozone.

**Poland** has witnessed a remarkable decline in unemployment from in excess of 20% to 10% over the last three years. This has been propelled by emigration and stricter labour offices, but the economy has also been adding over half a million jobs every year. The solid domestic demand is unlikely to be shaken in the next few quarters, as employment and wage growth are accompanied by public investment spending plans and continuing healthy corporate profits. Inflation remains well below the 2.5% target in 2007, but food prices and growing unit labour costs should ensure a tightening attitude from the central bank. The expected earliest possible Euro adoption date is 2011, but it is more likely to be 2012. This would mean earlier entry into the European Exchange Rate Mechanism (ERM2), and thus a strengthening of the long-term appreciation trend.

Economic growth has been impressive in **Romania** in the last seven years. The Romanian economy is showing persistent signs of overheating and the current impressive macroeconomic performances is expected to be as good as it gets for the Romanian economy for some time. The exuberant wage expansion (above 20%) accompanied by strong private credit growth (around 50%) increases the vulnerability of the Romanian economy. Nevertheless, economic growth will remain highly fuelled by the catching-up process. On the negative side, there is an expected upward pressure on both inflation and interest rates and a weaker RON (EUR/RON 3.55 by the end of 2008). So after the historical step of EU accession, the long-term prospects for the Romanian economy still remain well-anchored.

2.2 Business environment

Civil engineering consultancy companies face different degrees of actual and potential competition as the business environment varies between countries. This section focuses on the business environment that engineering consultancy firms have to cope with.

The business environment is a fundamental factor in the competitiveness of individual engineering companies. Challenges may be found in taxation, the labour market, business regulations and so on. For example, bureaucratic hurdles for businesses, regulations and legislation may hamper work-in-progress. Delays, cost overruns and contractual disputes may cause serious damage, especially as engineering sales often depend on a limited number of big contracts.

Table 2.2 presents an overview of the business environment in the different countries reviewed in this report. The individual score for each country is listed, as are estimates of the development of the business environment and some strengths and weaknesses.
Among the Western European countries the best business environment can be found in Denmark. In this country competition legislation is very conducive to doing business, as are the openness and efficiency of the legal framework. Second in line is Sweden, where the efficiency of the tax system and the low burden of regulations score positively. The business environment in France is valued least, due to rigid labour regulations and high real corporate taxes.

While the Western European countries generally score better on market openness, competition legislation and efficiency compared to Central and Eastern European Countries (CEE), the opposite is true for labour flexibility and level of government and policy instability. Of the CEE countries reviewed, Poland and Romania have the worst business climate with market openness seriously restricted and stringent regulation in several areas. Bureaucracy is also a problem when it comes to the allocation of investment, e.g. for public housing infrastructure.

### Table 2.2 Quality of business environment, 2007

<table>
<thead>
<tr>
<th>Country</th>
<th>Score Trend</th>
<th>Strength (+)</th>
<th>Weaknesses (-)</th>
<th>Explanatory notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Netherlands</td>
<td>••••</td>
<td>+</td>
<td>-</td>
<td>Competition legislation, Public sector contracts</td>
</tr>
<tr>
<td></td>
<td>=</td>
<td></td>
<td></td>
<td>Efficiency of the tax system, labour regulations</td>
</tr>
<tr>
<td>Germany</td>
<td>••</td>
<td>+</td>
<td>-</td>
<td>Efficiency of legal framework, Competition legislation</td>
</tr>
<tr>
<td></td>
<td>=</td>
<td></td>
<td></td>
<td>Restrictive labour regulations, Burden of regulations</td>
</tr>
<tr>
<td>Belgium</td>
<td>••</td>
<td>+</td>
<td>-</td>
<td>Efficiency of the tax system, Burden of regulations</td>
</tr>
<tr>
<td></td>
<td>▲</td>
<td></td>
<td></td>
<td>Restrictive labour regulations</td>
</tr>
<tr>
<td>France</td>
<td>••</td>
<td>+</td>
<td>-</td>
<td>Competition legislation</td>
</tr>
<tr>
<td></td>
<td>▼</td>
<td></td>
<td></td>
<td>Labour regulations, Real corporate taxes</td>
</tr>
<tr>
<td>Denmark</td>
<td>••••</td>
<td>+</td>
<td>-</td>
<td>Access to credit, Efficiency of legal framework</td>
</tr>
<tr>
<td></td>
<td>▲</td>
<td></td>
<td></td>
<td>Flexibility of wages</td>
</tr>
<tr>
<td>Sweden</td>
<td>•••</td>
<td>+</td>
<td>-</td>
<td>Easy doing business, Efficiency of the tax system</td>
</tr>
<tr>
<td></td>
<td>▲</td>
<td></td>
<td></td>
<td>Flexibility of wages</td>
</tr>
<tr>
<td>UK</td>
<td>••</td>
<td>+</td>
<td>-</td>
<td>Flexibility of wages</td>
</tr>
<tr>
<td></td>
<td>▼</td>
<td></td>
<td></td>
<td>Regulations</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>••</td>
<td>+</td>
<td>-</td>
<td>Corporate tax rate on profit</td>
</tr>
<tr>
<td></td>
<td>=</td>
<td></td>
<td></td>
<td>Access to credit, Burden of regulations</td>
</tr>
<tr>
<td>Poland</td>
<td>••</td>
<td>+</td>
<td>-</td>
<td>Corporate tax rate on profit</td>
</tr>
<tr>
<td></td>
<td>▼</td>
<td></td>
<td></td>
<td>Market openness, labour regulations</td>
</tr>
<tr>
<td>Romania</td>
<td>••</td>
<td>+</td>
<td>-</td>
<td>Corporate tax rate on profit, flexibility of wage</td>
</tr>
<tr>
<td></td>
<td>=</td>
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<td></td>
<td>determination</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Market openness</td>
</tr>
</tbody>
</table>

Source: IMD, WEF, ING calculations

Relative scoring range is 1-5 (high score is good)

Trend: ▲ position is improving. ▼ position is getting worse = stable position

The business environment is based on criteria of IMD and World Economic Forum. The score depends on the value of 12 criteria which are grouped into 4 categories of variables: Fiscal policy (corporate income tax rate, real corporate taxes, efficiency of the tax system, access to credit), Regulations (bureaucracy, burden of regulations, regulatory obstacles to doing business), Market openness (access to public sector contracts by foreign companies, the extent to which foreign companies are discriminated by legislation, competition legislation) and the labour market (rigidity labour regulations, flexibility of wage determination)
2.3 Construction

2.3.1 The construction market
There are huge differences between construction output in European countries. Figure 2.2 shows construction output as a share of GDP. The share of the construction industry increased in the period 2003-2007 in all countries except Germany. The decrease in Germany was caused by a lengthy construction recession in reaction to the construction boom in the mid-1990s and the permanent pressure on public budgets because of the financing of German reunification. The construction sectors of the new EU member states Poland and Romania are still very modest in relative terms implying a large upward potential.

Construction output in the long run is mainly driven by population growth because this is a decisive factor in the long-term demand for housing, office space and infrastructure. In most European countries, population growth is limited or even negative. Other demographic factors fuel growth as well. For instance family dilution and ageing populations demand a different kind of housing stock and trigger new build in the housing market of most mature Western European countries. Nevertheless demographic developments are not the only driver for the construction sector. In countries that have a large development gap, e.g. CEE Countries, GDP growth rate can be expected to be higher because of a catching up effect. Countries with high economic growth rates often have rapidly growing construction markets because economic development leads to new demand for buildings and infrastructure. For example Poland and Romania have high GDP growth rates and simultaneously powerfully expanding construction markets.

In European countries construction business cycles can be observed which last for approximately six years. The construction industry is affected relatively late in the business cycle due to the long term nature of obtaining building permits and the longer tenor of projects. However, it seems that construction output is becoming directly correlated to the economic cycle more than ever before. The fewer options for governments in EMU countries to counter cyclical movements by running deficits

Figure 2.2 Construction output as share of GDP, 2003-2007

Source: Euroconstruc, Intellinews and ING Estimates
could be part of the explanation of this phenomenon. The highest growth rates in the current business cycles in many European construction sectors were reported during the year 2006.

Construction output in the Netherlands increased strongly with almost 4% per year in the period 2005-2007. In the years 2007-2009 production output is expected to grow further with more than 3% annually (figure 2.3). Residential building represents more than 50% of the total construction output and had the highest growth rate of all segments in 2006. From 2007 to 2009 growth will flatten to almost 2% in 2009 and will almost equally be driven by all three sectors, residential, non-residential building and civil engineering.

The German construction market, with production at more than € 240 billion, is the biggest in Europe. Growth is rapidly recovering from a long downturn and for the first time this century in 2006 showed positive growth of 4.3%. For the years 2007-2009 an average lower growth rate of 1.6% is expected mainly due to fewer housing completions. Nevertheless, the residential construction market, at € 129.4 billion, is by far the biggest submarket in Germany.

The Belgium construction market peaked in 2006 with growth of 7.5%. For the period 2007-2009 a lower average increase of 2.5% is forecast. The importance of the maintenance and renovation market will increase due to steps taken by the authorities to reduce CO₂ emissions in buildings. The ‘old’ government has already taken a series of new measures to encourage energy savings in dwellings. A new government is expected to continue on this path since most

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**Figure 2.3 Construction output size (2007) and growth in real terms, 2005-2009**

![Diagram showing construction output size and growth](image)

Source: Euroconstrut & Intellinews

The size of the circles and the mentioned number represents the output in € billion in 2007.
political parties have proposals to this end.

**France** faced a very favourable construction market in 2006 which grew by 4.5%. In the year 2007 the weaker overall economic development resulted in a lower growth rate of 2.4%. For 2008 and 2009 a further dampening is expected. The housing market in particular will experience a slowdown due to tighter credit terms, which are keeping new building in check. The growth rates for civil engineering and non-residential building market will also flatten with expected average growth rates of 2% and 1.6% respectively.

**Denmark**, after Norway, has the second biggest construction market of all the Scandinavian countries with production of € 28.7 billion. Construction output boomed in 2006 at 11.9% mainly due to a sharp increase in the non-residential sector. To meet the enormous demand for labour, workers were attracted from other countries and people were recruited from other sectors. Last year (2007) was a year of consolidation with little room for further growth. For 2008 and 2009 an average moderate growth rate of 0.9% is forecast. The very tight labour market is the major restriction on further growth.

The **Swedish** construction market, with an average growth rate of 4.5% for 2007-2009, has the highest forecast for the “old” EU countries. Also in the years 2005-2007 the construction industry performed well with a growth rate above average. The Swedish construction sector has recovered well after some years of decreasing activity. New construction declined more than the renovation and maintenance market (R&M) which made the Swedish construction sector more dependent on the latter. The total output of € 24.9 billion in 2007 is fairly equally split among the three different market segments (figure 2.4). Residential building is the biggest with a share of about 40%. The non-residential and civil engineering market both cover around 30% of the market.

The construction industry in the **UK** grew in 2006 by 1.2%. The increase was sufficient to take construction output beyond the € 200 billion mark.
Reducing budgets on maintenance investment by some government departments and a fall in private housing renovation resulted in a modest overall growth rate. The government's aim to make all social housing in the UK “decent” will result in a growing output for residential renovation in 2008 and 2009. With an expected average growth rate of 2.5% for the period 2007-2009 the UK construction market will perform considerably better than in 2005-2007. These higher growth rates are being supported in particular by non-residential construction which is profiting from the upturn in office construction and the improvements being made to the nation’s stock of education facilities. For the 2012 Olympic Games in London a new Olympic park will be constructed. If everything goes as planned by the summer of 2008 the site will be fully prepared and will have water and power to enable construction work on the Olympic Village to begin. All this will provide a small boost to civil engineering work until 2012.

In the **Czech Republic** an average growth of 5% is expected for the period 2007-2009. Compared with other CEE countries the growth rate is moderate but still high compared to Western European countries. After negative growth rates in 2006 and 2007, civil engineering is expected to show 6.7% growth in 2008 due to investments in new railway corridors. The increase in household income improved the demand for housing construction which resulted in a growth rate of more than 14% for the residential market. For 2008 a lower increase of 2.5% is expected.

In **Poland** construction output of €30.9 billion in 2007 is also very modest compared to other big European countries. This also means that there is major upward potential. The forecast for 2008 is an increase of 15.2% and for 2009 of 12.0%. An even a bigger rise in construction output is expected for the years 2010-2012 due to the organisation of the European Championships in Poland in 2012.

The **Romanian** construction industry recorded an increase of 19.4% in 2006 and 17.0% in 2007. For 2008 and 2009 growth rates of 10.9% and 10.5% respectively are forecast, as the industry becomes more mature. This means that the construction sector will be the most dynamic sector in Romania for the coming years with almost double the growth rates of the total economy. In absolute terms construction output is still modest with less than €9 billion in 2007. The sector is mainly driven by civil engineering an area where Romania lags far behind Western European countries.

### 2.3.2 Residential construction

Residential construction has led construction growth over the last years reflecting the buoyancy of housing markets worldwide, with the exception of Germany. In our forecast, growth rates were at their peak in 2006 and will be more moderate in the period 2007-2009.

The **German** residential construction sector with a €129 billion output is still the biggest in Europe. Increasing rates of home ownership encourage renovation and therefore boost the maintenance, repair and improvement (MRI) market. Accounting for 61% of the German total residential market, MRI is the largest in Europe (figure 2.5). An extra impulse to the MRI market in Germany may come from the obligatory ‘energy passport’ that has to be drawn up with the changing ownership of existing buildings. This aims to increase the transparency of the energy expenses for new occupants and might lead to more renovations in high energy consumption homes.

In the **Czech Republic**, **Romania** and **Poland** the residential construction market is still relatively small compared to Western European countries and to other construction sectors. Nevertheless the production of new dwellings is increasing in these countries. In 2007, 142,000 new dwellings were completed in Poland and for 2008 and 2009 an increase to 153,000 and
Despite growth in new housing activity in some countries, the sector’s future is mixed on the whole since the countries reviewed have an ageing population (see section 2.4). At first the negative effects will be limited, because the number of households as well as the average amount of living space per household will continue to grow in all countries over the next years. Elderly people have an above-average likelihood of living in one or two-person households. Eventually this demographic change will inevitably be felt by the construction industry because supply will adjust to the fall and change in demand over time. Some of the elderly in Northern European countries also tend to migrate to warmer climates. Nevertheless, at the moment the strongest (temporary) migration takes place from CEE countries to Western Europe which means additional demand in the receiving areas.

### 2.3.3 Non-residential construction

The non-residential sector constitutes for the most part new non-residential investment (although for Sweden it is the other way around with 73% MRI). Figure 2.6 presents an overview of the size of the non-residential sectors per country.

After the peak in investment in the late nineties trickled through in the first years of the 21st century, the European non-residential market saw demand fall sharply in line with the global economic cycle. Supply lags, especially in office space, created problems of excess supply which postponed new initiatives. Nevertheless this period of decline seems finally to have come to an end in all countries and the outlook for the 2007-2009 period is positive.

The market for the construction of industrial buildings is heavily dependent on the economic cycle which on average hits this part of the construction sector relatively fast. In this sector the structural trend of off-shoring investment to low-cost countries is expected to adversely affect the investment in Western European countries but benefit growth in developing countries. The time lag for industrial buildings is around six months because develop-
ment and construction generally proceed rather quickly. By contrast the office market has a time lag of at least 18 months as plans take more time to be developed.

A decisive factor in the demand for office space is the size of the working population. A negative trend in this respect is that the number of people of working age will decline even before the overall population starts to decrease. Moreover firms cut costs by limiting the amount of office space per worker and making use of ICT for teleworking and teleconferencing. On the other hand the services sector is still the fastest growing sector, which means that the percentage of white-collar workers will increase. What’s more the market for the replacement of existing offices will remain impressive. In Germany for instance office space is estimated at around 335 million m². The current life cycle of office buildings has shortened in recent years to around 60 years, so 1.7% of stock has to be replaced every year. This means that demand for office space will be around 5.7 million m², if the white-collar labour force remains stable.

The Netherlands suffers from a high vacancy rate for offices (in Amsterdam 16.4% in mid 2007) and relatively low occupancy rates in the industrial sectors. This is also the case for Belgium. The influence of a high vacancy rate on new investment depends on whether the vacant offices are relatively new or mostly consist of outdated buildings. The latter is the case and there is still a need for new offices at A1 locations because the existing older stock does not meet the wishes of potential users. This tallies with the outcome that office vacancy in Amsterdam is mostly concentrated in the older offices at less attractive locations.

A striking feature of figure 2.6 is the low level of

**Figure 2.6 New non-residential construction by sector, € billions, 2006**

![Figure 2.6 New non-residential construction by sector, € billions, 2006](image-url)
non-residential building in Sweden. The volume of building has decreased by about 60% since 1990 mainly due to a drop in demand for offices from the private sector, particularly after the decline in the IT sector. While in 2007 and 2008 the downward trend will be reversed with expected growth rates of 9.7% and 4.5%, the level of building will still be very low.

2.3.4 Civil engineering
The development of civil engineering differs in individual countries mainly with respect to size and geographical position. Figure 2.7 gives an overview of the size of the new civil engineering sectors in the countries covered by this report.

**France** still has the largest civil engineering market with production at more than €41 billion in 2006. Production growth regained momentum in 2006 (6.9%) and 2007 (5.2%). Central government has new investment plans like the Perpignan-Figueras link and the construction of the Bretagne-Pays de Loire and South Europe Atlantic high-speed lines for a total budget of more than €4 billion. Despite that, investments levels will taper off in 2008 (1.5%) and 2009 (1.4%) due to a shortage of local investment.

**Germany**, after France, has the largest civil engineering market of the countries compared with €33.4 billion in 2006. New work and MRI in civil engineering suffered from budgetary restrictions during the years 2004 and 2005. Nevertheless the outlook is still positive, since the decrease of the last few years is being replaced by modest but accelerating growth figures which started in 2006 with a growth rate of 4.6%. The sector will increase by 4% per year between 2007 and 2009. Since the German road network is already excellent growth will mainly be supported by maintenance expenditure on the railway system.

**Romania** has the smallest civil engineering market with €4.3 billion in 2006. Despite the lowest output, the market covers 57% of total construction output in Romania. **Poland** also has a relatively large civil engineering market; with €9 billion in 2006 it has more than a 40% share of total con-

**Figure 2.7** New civil engineering market (MRI inclusive) by segment in € billions, 2006

![Figure 2.7](image_url)

Source: Euroconstruct & Intellinews

* Splitup by sector not available
struction output. For 2008 and 2009 growth rates are expected of around 20% per year. With regard to the preparations for EURO 2012 900 kilometres of new highways are planned, as well as a modernisation of the main railways and eight airports.

Cohesion Fund
An important source of financing for infrastructure and environmental protection for the “new” EU countries is the EU’s Cohesion Fund. The fund has a budget of €70 billion for the period 2007-2013 and aims to strengthen economic and social cohesion in the community, particularly in the domains of trans-European transport networks and the protection of the environment. The Cohesion Fund is aimed at Member States whose Gross National Income (GNI) per inhabitant is less than 90% of the Community average. For the 2007-2013 period Poland, the Czech Republic and Romania will receive €22.1 billion, €8.8 billion and €6.5 billion respectively for improvement of their infrastructure and investments in sustainable development (namely energy efficiency and renewable energy). Engineering firms can assist in application procedures because local governments often have difficulties with the red tape.

There are major differences in the amount of MRI in civil engineering. Of the Western European countries Belgium and Sweden have by far the lowest rates of MRI, which could point to a catching up effect in the coming years. A low rate of MRI in Poland and Romania is less surprising, because the basic infrastructure in these countries still has to be completed. In most Western European countries the portion of MRI is increasing.

2.3.5 Trends in construction
In the construction sector trends are visible which can also affect engineering consultancy firms. The most important trends will be discussed below.

Reduction of failure costs
Costs arising from failure within the production process are still rather high in construction when compared to other sectors. These failure costs are a consequence of certain features of the industry like the fact that projects take place in new locations, in new environments and have a unique design. Contractors attribute most of the costs of failure to poor preparation before starting. The solution is better project management and the incorporation of all the stages of a project in the plan. Engineering firms can attribute to lower failure costs by involving construction companies at an early stage.

Focus on life cycle costs
In reaction to high failure costs, increasing energy prices and greater attention to the environment, the trend in construction is towards developing buildings with lower costs for a longer period (life cycle costs). Not only are the development costs taken into account but the costs of maintenance, energy consumption, rebuilding and the final demolition are included as well. In other words, the whole life cycle of the building is looked into when a project is started. The difference with the present situation is that companies are not only looking at the cost at the time of building, but are also taking into account all the costs that arise during the building’s lifetime. Hence construction decisions will change over time in a more durable way.

Consolidation
Another main trend in the European construction market, especially in the civil engineering sector, is consolidation. Given the fierce competition, cyclical pressure and the increasing costs to pitch for private finance initiatives (PFI), growth in company size is the only logical development. Most companies are unable to surmount these pressures through autonomous growth. That’s why the construction market has been characterised by a major consolidation process in the past few years. The main reason for consolidation is to obtain advantages of scale which gives companies sufficient mandate to compete with other European companies. The France construction company Bouygues
is still the biggest construction company in Europe with a turnover of almost € 27 billion in 2006. Vinci was founded in 2000 when Groupe GTM and Vivendi merged (table 2.3).

As figure 2.8 shows, the average size of contractors in terms of employment differs widely in the construction markets in the countries reviewed. The figure gives the size classes of contractors in terms of employees as a percentage of all contractors. In Romania the share of construction with more than 20 employees is the largest (12.5%) followed by Germany with 5.8%, while in Poland this is only 2.1%. The difference between these countries may indicate that the consolidation process is already well under way in Germany, while in Poland and Sweden there has been no consolidation or less in the construction market. The high figure in Romania is probably inherited from the centralised planned economy that was in place until fairly recently.

In spite of all these developments, the conclusion remains that the construction market is still strongly fragmented. On average 96% of the firms in the countries covering this report have fewer than 20 employees. Unlike the engineering sector, the building industry, in the future too, will remain a national business that requires its large companies to have a local presence (figure 2.8).

Table 2.3 Top 5 European contractors in 1998 & 2006

<table>
<thead>
<tr>
<th>1998</th>
<th>Turn over in € mln.</th>
<th>2006</th>
<th>Turn over in € mln.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Bouygues (France)</td>
<td>15.387</td>
<td>1 Bouygues (France)</td>
<td>26.770</td>
</tr>
<tr>
<td>2 Group GTM/ Suez Lyonnaise (France)</td>
<td>8.732</td>
<td>2 Vinci (France)</td>
<td>25.798</td>
</tr>
<tr>
<td>3 SGE/ Vivendi (France)</td>
<td>8.415</td>
<td>3 Hochtief (Germany)</td>
<td>15.625</td>
</tr>
<tr>
<td>4 Skanska (Sweden)</td>
<td>7.104</td>
<td>4 ACS (Spain)</td>
<td>14.806</td>
</tr>
<tr>
<td>5 Philipp Holzmann (Germany)</td>
<td>5.218</td>
<td>5 Skanska (Sweden)</td>
<td>13.958</td>
</tr>
</tbody>
</table>

Source, Osiris, Amadeus, Euroconstruct & ING Estimates

Figure 2.8 Size classes of constructors broken down by number of employees as % of all contractors, 2004

Source: Eurostat, ING Calculations
Diversification

Construction companies do not restrict themselves to building alone but seek to link up with their customers at an early stage and continue to serve them after construction is completed. Construction groups are diversifying into construction related services in the value chain, such as engineering consultancy, property development and facility management. These services are often of a higher value than building. British and Spanish firms are forerunners in this field. An example in Germany is Hochtief which has the capability to accompany the entire life-cycle of a building with its business model PreFair. In this business model Hochtief brings in its architects and engineers in the pre-construction phase followed by facility management when the building is completed. (see also section 3.4).

Private Finance Initiatives

Private Finance Initiatives – also referred to as Public Private Partnerships PPP, concessions or DBFOT – entail the private sector financing some of the assets needed for the construction of public infrastructure and buildings like roads, hospitals and schools and at the same time receiving in return the right to operate and provide long term services on the project. At first the driving force behind PFI from a governmental point of view was a lack of sufficient financial resources due to budgetary constraints. But PFI has more advantages for public authorities such as an improvement in efficiency and effectiveness because the risks are spread and commercial skills, knowledge and approach are brought into the process at an early stage.

The main advantage of PFI for the construction sector is that it helps to smooth construction cycles because support services and maintenance help to reduce volatility as does the longer life cycle of PFI projects. All of this leads to more stable cash flows which are essential in the cyclical and competitive business environment. The transformation however contains additional risks for construction firms, because they take part as commissioners of PFI projects. The risks also relate to the smaller cash flows in the early years and the fiscal treatment of for instance hospitals in the future. Moreover, the calculation risks for construction companies

Figure 2.9 Experience and expertise with PFI in the countries reviewed

<table>
<thead>
<tr>
<th>expertise</th>
<th>Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standardisation and incremental improvements</td>
<td>UK 9</td>
</tr>
<tr>
<td>Widespread use of pfi across sectors</td>
<td>France 7</td>
</tr>
<tr>
<td>Pathfinder projects</td>
<td>Germany 5</td>
</tr>
<tr>
<td>Political commitment</td>
<td>The Netherlands 4</td>
</tr>
<tr>
<td>Testing concept</td>
<td>Poland 2</td>
</tr>
<tr>
<td>Interest</td>
<td>Romania</td>
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<tr>
<td>Czech Rep.</td>
<td>Sweden</td>
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<tr>
<td>Sweden</td>
<td>Denmark</td>
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</tbody>
</table>

Source: ING
increase because of longer term contracts and the related insecurities regarding future cash flows.

In all European countries there are traces of PFI in construction works. Nevertheless the extent to which the private sector finances the construction of assets needed for public services differs widely across countries (figure 2.9).

Of the countries reviewed, private finance initiatives are most established in the United Kingdom. Since 1992 almost 800 projects have been signed with a capital value of over €70 billion. By 2006 almost 11% of all government spending in the UK was being channelled through PFI contracts. Most of these related to the construction market. In the UK PFI projects cover all sectors of construction, but infrastructure works have by far the biggest share (50%). In the Netherlands PFI activity is modest with five completed projects: two road projects, one rail, one waste water and one school. In Poland the authorities make limited use of PFIs confining them to the road and waste management sectors though there is growing interest among hospitals and local authorities in PFI projects (table 2.4).

The growing use of PFI models leads to changes in the construction market. For example the size of projects will increase due to the bundling of smaller projects to overcome the higher PFI transaction costs. Project size will also increase because of the long term service contracts in PFI. Additionally market conditions will change because the awarding authorities are aiming at financially sound partners, who must have proven expertise with PFI models to reduce the operational risk. All of this will give the large and internationally-experienced companies a competitive advantage, which will lead to a split in the market between companies that have the resources and expertise to manage PFI contracts and those that lag behind in this respect.

Recent developments in the UK are showing a decreasing interest of contractors in PFI projects.

Table 2.4 PFI's by country

<table>
<thead>
<tr>
<th></th>
<th>Airports</th>
<th>Housing</th>
<th>Health&amp; Hospitals</th>
<th>Heavy Railways</th>
<th>Light Railways</th>
<th>Roads</th>
<th>Schools</th>
<th>Water (inc. Waste water)</th>
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<td>Romania</td>
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</tbody>
</table>

••••• Substantial number of closed projects, majority of them in operation
•••• Substantial number of closed projects
••• Many procured projects, some projects closed
•• Projects in procurement
• Discussions ongoing

Source: PwC oktober 2005
Fewer than 50% of the tenders have more than four bidders. This is the result of long procedures and high tender costs. Besides that, the collapse of the tube firm Metronet has not encouraged new PFI projects either. Metronet (shareholders in the world’s largest engineering firm WS Atkins, Balfour Beatty and Bombardier) aimed at modernising two thirds of the London Underground for £ 17 billion in 30 years. After four years Metronet ran out of money after overspending £ 2 billion. The government stepped in to ensure the tube did not grind to halt.

2.4 Labour market

Tightening labour markets
The success of a consulting engineering firm is very much determined by the knowledge and skills of their employees, the ability to retain skilled professionals and the availability of new motivated and competent talent. However in many countries in Europe the labour market is tightening as a result of economic growth and ageing. In the UK for example, there are 20,000 unfilled jobs in the consulting engineering sector which results in a 13% vacancy rate for all jobs. In this section we present an overview of the labour market for engineering companies in the countries that are covered in this report.

The availability of sufficient employees will be a growing difficulty for engineering firms. Ageing working forces in many European countries are leading to a growing number of resignations. Simultaneously, a decreasing number of young people is resulting in a declining market for new talent. Figure 2.10 shows that in many countries the number of younger people (25-34 year) will decrease between 2007 and 2017 and the number of elderly people (55-64 year) will increase. This means that the available workforce will decline as is happening in the Netherlands, Belgium, the Czech Republic, France and Romania. The Czech Republic will experience the largest drop in young people from a share of 16.8% in 2007 to 13.3% in 2017. However, not all countries will face both developments. In Germany the percentage of young people will slightly increase but the share of older ones will dramatically grow from 11.4% in 2007 to 14.2% in 2017. For example, in Poland the share of young people will stay more or less the same with 15.7% in 2007 and 15.8%

Figure 2.10 Development population age 25-34 (left) and age 55-64 (right) as % of total, 2007-2017

Source: Eurostat, ING Calculations
in 2017. Nevertheless, the number of elderly people will increase from 11.0% in 2007 to 14.4% in 2017.

Recruitment of graduates
For the recruitment of new employees engineering consultancy firms are especially dependent on the number of graduates from engineering studies at universities. In almost all countries (except for Denmark and the Czech Republic) the share of engineering students versus the total number of students at universities is decreasing (figure 2.11). The Netherlands has the biggest drop of almost 3%-point in the period 2000-2005. This shows a weakening interest in engineering among new students. Nevertheless, in most countries (except for the Netherlands and Belgium) the absolute number of students in engineering faculties is increasing. In the Czech Republic for example the number of students has increased by more than 60% from 40,800 in 2000 to almost 66,200 in 2005.

International recruitment
Recent research in the Netherlands and the UK attributes the diminishing interest of students in engineering studies to the lack of knowledge of what engineers do and the fact that they have no particular image. The Dutch branch organisation suggests starting a campaign aimed at students. In the UK engineering consultancy firms try to fill vacancies by international recruitment. Almost 90% of the firms reported using international recruitment. To support the recruitment of new talent some engineering firms have good contacts with universities. Vacancies are also frequently
filled up with freelance professionals who are employed on a project base, returnees who had a career break and early retired people who return to their profession.

**Labour Costs**

Another important factor for engineering firms are labour costs. Personnel costs have a big effect on margins because approximately 60% of the revenue of engineering consultancy companies goes on wages. There are huge differences between salaries in the countries that are covered in this report. In Romania for example, the average hourly wage costs in services were €2.37 compared to €23.81 in the UK (figure 2.12). On the other hand, the growth rate of labour costs in the UK was 0% against more than 13% in Romania. For 2008 and 2009 we expect strong growth rates of wages of 20% and 14% in Romania. For the UK we expect growth rates of approximately 4% in 2008 and 2009. This means that Romania is far behind but catching up although it will take many years before the wages are at the same level as in Western European countries.

**Subcontracting**

The relatively low labour costs in Poland, Romania and the Czech Republic give engineering consultancy companies the chance to outsource work to these countries which can considerably reduce

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*Text box 2.1 What is an engineer?*

“Job titles can be a tricky business, especially when you’re Dutch but find yourself working in an English-language setting. Get somebody’s job title or profession wrong and you’ve probably made yourself a business enemy for life.

Difficulties arise not so much in straightforward managerial roles - after all, many Dutch people working in finance or marketing already have English-language titles - but in professions that lie just beyond the usual financial parameters. Examples abound, ranging from the world of transportation to the arts and even journalism.

Engineer is a case in point. For Dutch speakers who are accustomed to the very specific circumstances under which the word ‘ingenieur’ and the abbreviations ‘ir’ and ‘ing’ are used, it can be confusing to see that engineer, in English, is a wide-ranging term. The word can be used, for example, to describe a ‘treinmachinist’ (railway engineer) but it also crops up in places where the Dutch opt for ‘technicus’. This explains why recording studios, in English, are manned by sound engineers and why, mostly jokingly, garbage men are sometimes referred to as sanitation engineers….”

Source: Dutch financial times, 17 October 2007

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**Figure 2.12 Hourly labour costs in services in € in 2005 and % growth 2000-2005*.**

![Hourly labour costs in services in € in 2005 and % growth 2000-2005](source: Eurostat, ING)

* Sweden 2000-2003

* The size of the circles and the mentioned number represent the hourly labour costs in services in € in 2005
the costs of projects. For example Arcadis subcontracts drawings, project planning and calculations to Egypt and Romania. This made the company 32% cheaper than other competitors during a tender to the Dutch Ministry of Waterways and Public Works. The increasing number of students graduating from engineering studies at universities in Romania provides sufficient supply of new talent for outsourcing work to this country (see above).

2.5 Conclusion

The global economy is still driven by the US and China. China is consolidating its growth rate at a lower but healthier rate of around 10%. In the US the economy is weak at the moment due to the problems in the financial markets. Growing business investments have been the most important motor of the European economy. Growth is expected to slow down in 2008 and 2009 due to the strong euro and weaker foreign demand. Of the countries reviewed in this report, GDP growth is expected to be highest in Poland and Romania due to the catching-up process.

Market conditions for engineering firms very much depend on the growth rate of the construction sector. The largest construction markets, Germany and the UK, are expecting the lowest growth rates for 2008 and 2009. The highest expected growth rates in construction are expected in Poland and Romania although their construction sectors are still very modest in relative terms. The high growth rates in these countries are being driven in particular by civil engineering. Both countries will receive huge disbursements from the EU Cohesion Fund to improve their infrastructure and investments in sustainable energy in the period 2007-2013. This offers great opportunities for engineering firms that are specialized in these markets.

The knowledge and skills of employees are a key-factor in the success of consulting engineering firms. However the labour market is tightening as a result of ageing and economic growth. The absolute number of engineering students is increasing in almost all countries and especially in Denmark and Romania. However the share of engineering students versus the total amount is decreasing which shows a weakening interest in engineering among new students. International recruitment of new talent is a good alternative for filling vacancies. Another option is to outsource work to countries with sufficient supply of new talent like Poland and Romania. An additional advantage of this is the low labour costs in these countries.
3 The engineering market

This chapter presents an overview of the engineering consultancy industry for the countries that are covered in this report. The chapter will focus on the engineering directly related to construction. The first section gives the facts and figures on the market, while section 2 discusses the latest trends. Section 3 and 4 take a closer look at the different market sectors and the value chain.

3.1 Review of the market

Engineering consultancy services can be defined as intellectual services aimed at optimising investment projects in industry, construction and infrastructure at all stages of a project from the initial phase to its final operation. These services which require highly specialised knowledge are provided by private engineering consultancy firms, contractors who provide engineering services as a secondary activity and public administrations. The main aim is to optimise investment projects by proposing a custom-made solution. The range of these services includes advice, design, monitoring, management and assistance with building and construction projects.

Civil engineering consultancy is very closely associated with construction, in some countries to an extent that it becomes difficult to differentiate these two industries accurately. In France for instance there is a tradition that major construction firms have integrated departments which carry out design and other consulting engineering activities. In the traditional Dutch, Scandinavian and British system of engineering services procurement has placed more emphasis on the independence of engineering consultants.

The engineering consultancy sector can be characterised by:

- competitive markets;
- volatile business patterns;
- low barriers to entry;
- strong impact of political decision-making.

Most of these features lead to fierce competition among engineering firms. In the event of an economic downturn, margins may be squeezed as companies may have to accept work at uneconomic rates to cover overhead costs (e.g. labour costs) which are largely fixed especially in Western Continental Europe. This applies particularly to mono service providers. Engineering firms that are more diversified are inconvenienced less by the volatile market. They have a wider spread of different activities which makes them less vulnerable to a downturn in a particular market. On the other hand, fierce competition is also a reaction to uncertainty and the threat of discontinuity because engineering firms are unable to keep stocks of services and products are unique, since projects are different every time.

Traditionally a large share of engineering consultancy services is still provided in the United Kingdom, where they were already being offered for the first time in the 18th century. In absolute terms, the UK (€ 50.0 billion turnover) has the biggest autonomous engineering consultancy sector of the countries that this report covers fol-
lowed by France (€ 45.8 billion) and Germany (€ 36.4 billion). With € 0.9 billion Romania has the smallest engineering sector. In terms of GDP and construction another picture arises. As part of GDP the share of the engineering sector is the largest in the Czech Republic (3.2%) closely followed by Denmark (2.9%), the UK (2.7%), Sweden (2.6%) and at a greater distance the Netherlands (2.2%). Almost the same picture appears in terms of construction. In this case Denmark (29.8%) comes after Sweden (32.5%). In this comparison the Dutch engineering market approaches the Polish market with respectively 18.6% and 18.7%. Romania has the smallest engineering sector, both in terms of GDP and construction (figure 3.1).

Engineering consultancy firms in Europe derive on average about 25% of their turnover abroad. The UK leads the ranks with an export of approximately 35% ING estimates. International firms need local specialists who know the specific situations of the national markets and their regulations. Large enterprises can therefore operate as main contractors and cooperate with some small specialised firms as subcontractors. Dutch consultant engineering firms are by tradition internationally oriented. German firms are on average more focussed on the domestic market.

In the years 2003-2005 the growth rate of the turnover of the engineering sector in the Netherlands was moderate with on average 1.6%. For the period 2006-2008 the growth is expected to be higher due to an improvement in the growth rates in construction. The German engineering sector faced a decline in turnover in the period 2003-2005, resulting in large overcapacity. The main reason was a downturn in construction output in this period. As already mentioned in the previous chapter, demand for engineering consultancy services is closely linked to the general economic environment and construction output. The Romanian engineering sector shows by far the highest growth rate of all countries with almost 25% annually in the years 2003-2005. With an expected growth rate of construction of

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**Figure 3.1 Engineering turnover as share of GDP and construction output, 2005**

![Figure 3.1 Engineering turnover as share of GDP and construction output, 2005](image)

*Source: Euroconstruct, Eurostat, Intellinews, and ING Estimates*
more than 15% the outlook for the engineering sector is also very auspicious (figure 3.2).

In most countries small enterprises dominate the market. Most of these small firms are one-man firms. The highest number of companies was registered in Germany with more than 90,000 followed by France (80,600). Denmark, with less than 6,000 engineering firms, has the lowest number.

The sector shows a high increase in scale, especially in Denmark, the United Kingdom and the Netherlands. In Denmark the share of engineering firms with more than 20 employees is the biggest (4.3%) followed by the Netherlands and the United Kingdom. The biggest Danish engineering firm is the Rambøll Group with a consolidated turnover of EUR €529 million in 2006. In Sweden the concentration is the lowest with 1.2% and no firms are in the European top 10. The largest engineering firm in Sweden is SWECO with a turnover of €432.7 million in 2006 (figure 3.3).

The largest engineering firm in Europe in terms of employees is the French company Altran technologies with more than 16,000 employees. In terms of turnover the English company WS Atkins leads the ranks with €2,419 million. The European top 10 is dominated by English firms which reflects their large market share in Europe. The Dutch firms Arcadis and Fugro are in third and fourth place respectively. Fugro has the highest turnover per employee of the top 10 in Europe (table 3.1).

The third Dutch engineering group is Grontmij. With almost 4,500 employees and a turnover of €543 million, it is the 16th engineering firm in Europe. It should be noted however that companies vary greatly in activities and services.
Figure 3.3 Size classes of engineering consultancy firms broken down by number of employees as % of firms with more than 20 employees, 2005*

Table 3.1 European's top 10 consulting engineering groups, 2006

<table>
<thead>
<tr>
<th>Company name</th>
<th>Country</th>
<th>Number of Employees</th>
<th>Turnover in mln €</th>
<th>Turnover per employee in €</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Altran technologies</td>
<td>France</td>
<td>16,605</td>
<td>1,495</td>
<td>90,057</td>
</tr>
<tr>
<td>2 WS Atkins plc</td>
<td>UK</td>
<td>15,865</td>
<td>2,419</td>
<td>152,449</td>
</tr>
<tr>
<td>3 Arcadis group</td>
<td>The Netherlands</td>
<td>9,685</td>
<td>1,233</td>
<td>127,310</td>
</tr>
<tr>
<td>4 Fugro NV</td>
<td>The Netherlands</td>
<td>9,262</td>
<td>1,434</td>
<td>154,859</td>
</tr>
<tr>
<td>5 Mott MacDonald Group</td>
<td>UK</td>
<td>9,205</td>
<td>903</td>
<td>98,077</td>
</tr>
<tr>
<td>6 Assystem Group SA</td>
<td>France</td>
<td>8,521</td>
<td>642</td>
<td>75,355</td>
</tr>
<tr>
<td>7 Alten Group</td>
<td>France</td>
<td>7,620</td>
<td>576</td>
<td>75,630</td>
</tr>
<tr>
<td>8 Mouchel Group (formerly Mouchel Parkman)</td>
<td>UK</td>
<td>7,065</td>
<td>662</td>
<td>93,659</td>
</tr>
<tr>
<td>9 ARUP Group</td>
<td>UK</td>
<td>6,825</td>
<td>701</td>
<td>102,667</td>
</tr>
<tr>
<td>10 WSP Group plc</td>
<td>UK</td>
<td>6,355</td>
<td>659</td>
<td>103,729</td>
</tr>
<tr>
<td>16 Grontmij Group</td>
<td>The Netherlands</td>
<td>4,474</td>
<td>543</td>
<td>121,368</td>
</tr>
<tr>
<td>19 DHV Group</td>
<td>The Netherlands</td>
<td>3,782</td>
<td>352</td>
<td>93,072</td>
</tr>
<tr>
<td>22 Royal Haskoning Group</td>
<td>The Netherlands</td>
<td>3,592</td>
<td>280</td>
<td>77,951</td>
</tr>
</tbody>
</table>

Source: Swedish Federation of Consulting Engineers and Architects, November 2007
3.2 Trends

Consolidation
Consolidation is a reaction to several market developments. Mergers and acquisitions are significant on the domestic and on the international market. An increasing number of internationally active clients of engineering firms demand service providers that are specialists in multiple countries. Consolidation also enhances opportunities in the labour market as it often provides companies with greater access to larger (landmark) projects and to work abroad if they expand into other countries. This helps to attract employees as engineers are keen to work for a company that designs prestigious projects, like Palm Deira or the Millau Bridge. On the other hand economies of scale are adopted to handle investments in IT, rising salary costs and the growing size of projects. Acquisitions are also used to buy expertise that a company does not have in-house. This leads to consolidation in the sector. The expansion of firms is largely the result of acquisitions.

Recent examples of acquisitions are the acquiring of the UK-based environmental consultant Vectra by Arcadis to strengthen its position in the UK and the take-over in November 2007 of Idesol Engineering Company in Chile. Other examples of continuing consolidation are the acquisition of Intelligent Space Partnership in September 2007 by the largest UK firm WS Atkins and the acquisition of the Carl Bro Group by Grontmij which was announced in 2006 and has been completed successfully.

Outsourcing
International companies are concentrating more and more on core activities. Non-core functions such as facility management or environmental activities are outsourced. A comparable trend is visible in government where the focus is on policymaking while the implementation is outsourced to engineering companies for instance (see also changing procurement methods). An additional trend is that customers want an integrated process from design to operation. For example DBFO (Design, Build, Finance and Operate) contains all these stages. This trend offers opportunities for consulting engineering firms to sell their services. An interesting growing market for engineering consultancy firms is the higher added value facility management market (see also section 3.4.3). On the other hand engineering firms are outsourcing lower added value services such as detailed engineering to low cost countries like Romania, Egypt and India (see also section 2.4).

Private Finance Initiative
A major trend in construction is PFI (Private Finance Initiative) which is also affecting the engineering consultancy firms (see also chapter 2.3.5). In PFI projects the risks of life cycle costs are allocated to the contractor’s consortium in which the engineering company can participate. Often complex financial structures are used to fund these projects. Engineering consultancy firms require sufficient knowledge to evaluate the financial risks. The insourcing of financial engineers or the (further) recruitment of financial experts are therefore necessary.

Changing procurement methods
With clients’ growing interest in new procurement methods like PFI and Design & Build the independent role of engineering firms is changing. In these new procurement methods there is no longer a separate role for engineering firms. Clients bring the design and construction to the market as one complete package (figure 3.4). As a result, large construction firms are developing their own engineering departments to be able to cope with these Design & Build assignments and are pushing engineering firms out of the market.

On the other hand new opportunities are arising
for engineering firms. Clients still need to make a functional specification (SF) and they need their own management agent (MA). The SF gives a description of the requested behaviour of the structure. The MA involves the monitoring and managing of a project. Both roles can be outsourced to engineering firms which gives them a different role in the building process compared to a traditional procurement method.

Another trend among clients is the bundling of contracts to reduce costs. For example the Dutch Ministry of Waterways and Public Works aims to reduce the number of contracts in the province of Zeeland from a current number of 1,000 contracts per year to 10 long-term agreements. This trend is affecting smaller engineering firms and smaller contractors because they often lack the capacity for these larger contracts. In combination with the process towards more Design & Build methods engineering companies are being encouraged to enter into partnerships with two or three smaller contractors that do not have their own engineering department. Such a consortium has the design knowledge and sufficient construction capacity for these large Design & Build projects. The development of these consortiums is also important for the clients as it helps to ensure sufficient competition.

Expanding in the value chain
Consultant engineering firms are trying to overcome some market characteristics since they may put a strain on sales and profit growth. One common strategy is a strong focus on all the elements of the value chain. Companies are turning to delivering multiple services under long term contracts as a way of diminishing earnings volatility, overcoming low barriers to entry and providing more stable cash flows. This is elaborated in more detail in section 3.5.

\[\text{The impact of this change for the Ministry is huge which implies that this will not happen overnight.}\]
**Sustainability**

Buildings by definition are the biggest energy consumers of all and here lies a tremendous opportunity for engineering consultancy firms that can implement energy saving solutions in new and existing buildings. They can advise on sustainable solutions and materials, whereby calculating and explaining the long term savings to clients is vital. The German market is a trendsetter in this matter as Germany does not have its own sources of energy and is largely dependant on foreign supplies for an economy that largely relies on heavy energy consuming industries.

**Environmental issues**

Climate change has serious consequences for the environment. Issues that are therefore gaining more and more in importance are sustainable energy sources such as solar energy, wind and water. They will be used more intensively in the near future. The environment and sources of renewable energy are becoming increasingly prominent on both political and corporate agendas. New investments in sustainability in the energy sector will be beneficial to the engineering consultancy firms. Moreover, rising sea levels will lead to a growing demand for flood protection. Dutch engineering firms have extensive experience in the hydraulic engineering market and combined with their good reputation they can stand up to the competition.

In regions suffering from water shortages, engineering firms can assist in water resources management. There is a growing demand for cost-effective water treatment methods. Treatment of municipal and industrial waste water and waste management is another growing market due to the increasing lack of clean water (see also section 3.3.3).

*Figure 3.5 Investments in building: output size (2007) and growth in real terms, 2006-2009*

Source: Euroconstruct, Intellinews and ING estimates (Total construction growth rates for Romania)

The size of the circles and the mentioned number represent the investments in € billion in 2007
3.3 Market sectors

Large engineering firms operate in different market sectors. All these markets have their own forecasts and developments. The most important markets for many companies are the building, transportation and environment markets. These three markets are looked at more closely in this section.

3.3.1 Building

Engineering firms provide all kinds of customers with advice on and the management of renovations and the development of new residential and non-residential buildings. Their activities cover the entire value chain from the urban development and architecture of the building(s) to the final completion and asset and facility management afterwards (see also section 3.4.3).

The growth in investments in the building market is expected to continue in 2008 and 2009. The highest growth rates in 2008 and 2009 are expected in the smallest markets of Poland and Romania with on average respectively 8.1% and 10.7%. In contrast, the lowest growth rates in 2006 and 2007 were in the biggest markets the United Kingdom and France with 2.4 and 2.8% in these years respectively (figure 3.5).

Besides varying growth rates there are other differences among engineering consulting firms in the diverse building markets. In Sweden, Denmark, France and Germany more than 50% of investments in buildings are driven by maintenance and renovation. In Poland the share of the maintenance and renovation market is decreasing from 35% in 2005 to an expected 28.3% in 2009 (figure 3.6). This is the result of a higher growth rate of investments in new buildings due to the catching up effect. For engineering firms this has different implications. Development services for new building projects are available in Poland and other CEE countries on a larger scale. Urban development, architecture, project planning and detailed engineering are therefore services that are needed relatively more in CEE countries than in Western European countries where there is greater demand for services for facility management and advice on maintenance and redevelopment.

Figure 3.6 Renovation and maintenance as share of total building, 2005-2009

Source: Euroconstruct, No data available for Romania
3.3.2 Transportation
The development of an economy very much depends on the quality of the infrastructure network. The development and maintenance of roads, (light) railways including bridges and tunnels and airports and harbours are the main projects. In this market governments and municipalities are the principal customers for engineering firms and local contacts are essential. The increasing number of PFI projects offers opportunities for consulting engineering firms to act as advisors to the government or as partners in the consortiums developing the project.

Consulting engineering firms can deliver a wide range of different services for infrastructure projects:
- consultancy in development (feasibility studies, capacity and passenger or cargo flow studies, project management);
- architecture, structural, functional and technical design;
- project management (organisation of client bidding procedure and project management of the construction phase);
- creation of social and political support.

All the countries that are covered in this report are expected to have on average a positive growth rate for infrastructure investments in the years 2008 and 2009. The largest growth is expected in Poland with an enormous expected increase of almost 50% in 2008 and 20% in 2009 (figure 3.7). This is the result of the major catching up effect and the receipt of EU funds (see also section 2.3.4).

The biggest infrastructure market is still France with total investments of €25.8 billion in 2007.

Figure 3.7 Investments in infrastructure: output size (2007) and growth in real terms, 2006-2009

Source: Euroconstruct, No data available for Romania.
The size of the circles and the mentioned number represent the investments in € billion in 2007.
In the second market, Germany, massive revenues from the truck toll system and increasing tax receipts since 2005 will have a positive effect on future investments. Up to 2010 €12.5 billion is to be invested in the maintenance of the railway sector. For this project alone, more than 2,000 switches and more than 5,500 kilometres of rails are due to be replaced. In 2008 two large projects will be launched: the new Berlin airport and the deep water harbour in Wilhelmshaven.

The decline in infrastructure investments in the United Kingdom during the years 2006 and 2007 looks like being overcome in 2008 and 2009. A growth of 3.2% is expected in 2008 and 13.2% for 2009. The Highway Agency has selected three consortia to mount bids for the project to widen the M25 London ring road. A big railway investment is the modernisation of the Thameslink for €8.1 billion. The programme will be delivered in two phases and the first should be completed in time for the Olympic Games. Another big railway programme is the new East to West rail link in London for a total of €23.5 billion which will start in 2010.

3.3.3 Environment, energy & water works
The growing attention to sustainability results in stricter environmental regulations and will offer ample opportunities for engineering consultancy services. Activities for engineering firms comprise projects relating to surface water, groundwater, air and soil quality as well as ecology and nature projects and projects relating to climate change. These markets are especially attractive for engineering firms because they are less cyclical than the building market and thus reduce cash flow volatility.

*Sea level rise*
Climate change results in rising sea levels and opens up market opportunities for consulting

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**Figure 3.8 Water stress in Europe in the 2070’s**

<table>
<thead>
<tr>
<th>Water stress in %</th>
<th>20 - 40 moderate</th>
<th>&gt; 40 (severe)</th>
<th>No data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ratio of water withdrawals to availability in the 2070’s</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: WWF 2006
engineering firms to offer plans, advice or developments to authorities to maintain safety levels. Dutch engineering consultancy firms especially have a good track record since almost any building activity in the Netherlands involves some kind of water management as the country is below the sea level and some big rivers flow through it.

Extreme floods are Europe’s most frequent natural disaster. Climate change will mean that floods will become more frequent in central, northern and north eastern Europe. Sudden, localised flooding events and droughts in the south of Europe are also expected to increase. (figure 3.8).

**European Water Framework Directive**
Because water is not subject to national boundaries the EU member states have agreed to the European Water Framework Directive (EWFD). The goal of this directive is to ensure that the quality of the surface water and groundwater in Europe has a good ecological status by the year 2015. The EWFD is based on a river basin district approach to ensure that neighbouring countries are jointly responsible for managing the rivers and other waters they share.

The expected growth in investments in water and energy works are the biggest in **Poland** (figure 3.9). An estimated growth of more than 10% is expected for 2008 and 2009. With the help of the EU, Poland has more than € 22 billion to spend up to 2013 (see also section 2.3.4) on treatment, sewer systems, dike construction and water management. With more than 23,000 kilometres of rivers and given the EWFD regulations, Poland offers great opportunities for consultant engineering firms specialising in water management.

*Figure 3.9 Investments in energy and water works: output size (2007) and growth in real terms, 2006-2009*

Source: Euroconstruct, No data available for Romania.

The size of the circles and the mentioned number represent the output in € billion in 2007.
The high growth of the market in Sweden in the years 2006 and 2007 was due to tougher goals for energy consumption in new buildings. In many Swedish regions investments are being made in heating plants that use biofuel and wind energy to lower the use of electricity and oil. Investments in windmills have been low in Sweden but are now growing fast. The government has set a long-term goal of ten times more energy being generated by wind in 2015 than in 2007. The growth of energy works will continue in Denmark due to the building of two very large off-shore wind farms.

In Germany two large off-shore wind farms are under construction and the energy industry is planning 23 new power plants, which should be added to the electricity grid by 2011. Already 600 biogas plants are running in Germany and there are plans for 2,000 new installations. The new Flood Control Act entered into force in May 2005 after the flood disaster of the Elbe in 2002. In future planning new housing areas in flood plains are prohibited by federal law. Exceptions are possible if nine closely defined requirements are met. They include the criteria that no lives are at risk, no significant property damage is to be expected and that the structure of new buildings is adapted to flood events. Given their strong expertise in water management Dutch engineering firms can deliver added value in these projects.

### 3.4 The value chain

Increasingly clients of engineering consultancy firms want an integrated construction process with a single party without delays between development, completion and operation. Engineering firms are responding to this demand for continuity by offering (consultancy) services in the whole value chain from development to facility management. The reason for doing this is:

- their search for higher added value activities rather than basic engineering. Development, design, project management and facility management offer higher profitability than basic engineering (figure 3.10);
- Early involvement gives engineering firms the chance to offer more services at further stages of a project;
- the creation of a more constant cash flow.

![Figure 3.10 Estimated EBIT margin in the value chain](source: Annual report Grontmij 2007, ING Estimates)
wider spread of activities ensures a better control of business risks and makes the engineering firm less vulnerable;
• demand from clients for an integrated construction process.

The activities, development & design, project management and facility management will be discussed below.

3.4.1 Development and design
Consultancy firms are trying to participate at earlier stages in the value chain and offer consultancy services for the development and architects for the design. Early involvement gives the companies the chance to offer more services for a project at later stages. These services often generate a higher profit margin than basic engineering.

Architectural operations
Not many engineering companies have major architectural operations yet. Exceptions are the Swedish engineering and architectural group SWECO and Atkins. Mergers between architectural and engineering companies seem to be gaining ground to offer a wider range of activities in the value chain. Recent examples in Europe are the Irish firm, Project Management group, that acquired Devereux Architects, the UK firm, Capita Symonds, which has purchased smaller architectural firms to add to its first acquisition of Percy Thomas and in Finland the purchase of EVATA by Pöyry.

3.4.2 Project management
To fulfil clients’ needs for an integrated construction process engineering firms offer project management services. This involves the planning, monitoring and control of all aspects of the project to achieve the objectives on time and at the specified cost, quality and performance. Project management is the key to the success but construction and engineering firms need different expertise to tackle all the stages and minimize the different management risks (figure 3.11).

The increasing size of projects and the growing complexity makes the role of project management more and more important. Engineering firms can deliver high added value in this discipline due to their expertise in the whole building process. Higher margins than in basic engineering make this market attractive for engineering firms.

3.4.3 Facility management
In their way up the value chain engineering consultancy firms are also offering more and more

Figure 3.11 Project stages and incidental risks

<table>
<thead>
<tr>
<th>Planning</th>
<th>Programming &amp; Design</th>
<th>Procurement</th>
<th>Construction</th>
<th>Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Poor scoping</td>
<td>- Over-design</td>
<td>- Incomplete documents</td>
<td>- Change orders</td>
<td>- Snag list issues</td>
</tr>
<tr>
<td>- Poor estimating</td>
<td>- Poor constructability</td>
<td>- Poor contracting strategy</td>
<td>- Delays</td>
<td>- Insufficient issues for testing</td>
</tr>
<tr>
<td>- Budget based on incomplete data</td>
<td>- Poor estimating</td>
<td>- Insufficient competition</td>
<td>- Quality concerns</td>
<td>- -</td>
</tr>
<tr>
<td></td>
<td>- Scope creep</td>
<td>- Fraud in the bidding process</td>
<td></td>
<td>- Claims</td>
</tr>
</tbody>
</table>

Source: Deloitte, ING
facility management services. These services give a higher return and a more stable cash flow than basic engineering and this makes them an interesting market. The trend of outsourcing non-core activities is stimulating this market. Recently the multinationals Philips, ABN Amro, Nestle Nokia Siemens, and Cadbury Schweppes have outsourced their facility management operations. This has resulted in an estimated growth in turnover of between 20%-30% in facility management services over the last three years.

Integrated facility management services
The role of facility management is to ensure that everything is available and operating properly for building users to do their work. Various facility management providers offer different services (box 3.1). Some clients prefer integrated facility management services and others just offer single services such as cleaning, catering or security.

Single service companies are used to doing this for the client company but are now more often performing this service for an integrated facility manager which outsources some of the facility services of an integrated contract. Some single service providers are expanding their services and are becoming integrated facility managers on their own, e.g. the company Faceo.

Different approaches
Engineering consultancy firms enter the facility management market in different ways. Some like Royal Haskoning only offer consultancy services to help to find the best value solutions. Other engineering firms, such as Arcadis Aqumen FM offer integrated facility management concepts. Arcadis Aqumen FM is a joint venture between Arcadis and the British company Carillion and offers facility services to AXA, DSM, HSBC and Logica CMG among others. Recently they were selected to perform facility management services for NXP Semiconductors and signed an expanded contract with Philips. The contract with NXP Semiconductors has a term of at least three years and comprises all activities and all sites of NXP Semiconductors. Arcadis Aqumen has recently been active in the Netherlands and the UK and is expanding into Ireland, Belgium and Germany.

Pan European
European multinationals require a pan-European service for their facility management. Providing a comprehensive pan-European service in different countries poses challenges in terms of cultures, languages, regulations and business mindset.

Many European multinationals are running their facility management through their local affiliates and want to put in place a centralized organisation by outsourcing it as a whole. Facility management

Text box 3.1 Facility management definitions

Facility Management
Facility management covers all aspects of an organization’s real estate assets and infrastructure. To define the term precisely, however, is a challenge as various facility management providers market themselves differently and may be serving similar clients but at different points along the subcontracting chain.

Integrated Facility Management
Integrated facility management involves the outsourcing of utilities management, waste services and maintenance operations by customers to a single supplier. The service may also include operating technical installations, delegated management of maintenance operations, building upkeep, security and property management services.

Single Service Providers
Are companies which provide single services such as cleaning, catering or security etc. They used to do this directly for the client company, but are now increasingly performing this service on behalf of real estate brokerage firms. As such, they are no longer in direct contact with the company.

Source: Property EU, December 2007
providers such as CBRE, Jones Lang LaSalle and Cushman & Wakefield all have significant coverage across Europe (table 3.3).

### 3.5 Conclusion

The civil engineering consultancy market can be characterised as competitive, with volatile business patterns, low entry barriers and with a strong impact deriving from political decision making. This leads to fierce competition and pressure on margins, especially during an economic downturn. To generate a more stable cash flow engineering firms can focus on more steady businesses like the environmental and water works market which is less cyclic than the building market for instance. Poland, with more than 23,000 kilometres of rivers and the EWFD regulations that stipulate good quality for surface and groundwater by 2015 offers great opportunities for engineering firms specialising in water management.

In search for higher profit margins engineering firms can offer additional services like development, design project management and facility management providing them with higher profitability than basic engineering. A wider spread of activities makes companies less vulnerable.

An increasing number of international clients of engineering firms demand service providers that are active in multiple countries. At the same time companies are concentrating more and more on core activities and want an integrated process from design to operation. To fulfil these needs contractors are developing their own engineering departments and pushing engineering firms out of the market. Nevertheless, clients still need to make a functional specification and a project has to be managed and monitored and this can be outsourced to engineering firms. The outcome is a different role in the building process for engineering firms.

Another trend is the assembling of contracts by clients to reduce costs which is affecting smaller contractors and smaller engineering firms because they often lack sufficient capacity for these larger contracts. In combination with the trend of more Design & Build, small and medium-sized engineering firms are encouraged to enter into partnerships with two or three small or medium-sized contractors. In this way they can combine the knowledge of design and have enough construction capacity for these larger Design & Build contracts.

### Table 3.3 Facility management companies offering pan-European services

<table>
<thead>
<tr>
<th>Facility Management Company</th>
<th>No of countries</th>
<th>Total Area (in mln m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cushman &amp; Wakefield</td>
<td>38</td>
<td>0.9</td>
</tr>
<tr>
<td>Jones Lang LaSalle</td>
<td>30</td>
<td>3.3</td>
</tr>
<tr>
<td>CBRE</td>
<td>30</td>
<td>23</td>
</tr>
<tr>
<td>M+W Zander</td>
<td>21</td>
<td>12</td>
</tr>
<tr>
<td>Hochtief FM</td>
<td>9</td>
<td>NA</td>
</tr>
<tr>
<td>Faceo</td>
<td>7</td>
<td>5.5</td>
</tr>
<tr>
<td>Arcadis Aquemen</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Pirelli RE FM</td>
<td>3</td>
<td>12*</td>
</tr>
<tr>
<td>Land Securities/ Trillium</td>
<td>3</td>
<td>4.65</td>
</tr>
</tbody>
</table>

* Italy only
** 1.5 outside Germany
*** In Europe, Middle East and Africa. 3.7 m² is in advanced negotiation
Company Analysis

This chapter will take a closer look at some larger European engineering consultancy firms, analysing the geographical diversification and the business mix of the companies in the civil engineering market.

3.1 Geographical split of sales

Many engineering firms have a strong focus on their home market. On average the engineering consultancy firms analysed in this report derive 60% of their sales in their homeland. Mouchel is almost entirely focused on the home market with 96% of sales in the UK. The French company Ginger also has great exposure in its own country. The Dutch firms Arcadis and the Scandinavian firm Pöyry are more geographically diversified due to a relatively small local market.

The advantage of geographical diversification is the full service that can be offered to multinationals that demand service providers active in multiple countries. Another advantage is a lower dependency on growth in a specific country. This results in a more stable revenue development. In contrast there are also engineering consultancy firms that have a more regional focus. They offer multiple services to local clients like municipalities and district water boards.

Figure 4.1 Geographical breakdown by sales
3.2 Business diversification

Engineering consultancy firms vary widely in terms of business mix. Scott Wilson and Ginger are specialised firms but there are also firms which are diversified. Basing themselves on knowledge of the local market, companies tend to offer all the engineering and advisory services that clients need. A sort of subset of engineering firms is formed by those that add specific sector focus, for instance water or environmental issues. WS Atkins and SWECO focus on seven different market sectors. A diversified business helps to mitigate volatility and ensures a more stable cash flow.

Source: ING Calculations based on latest available data. Company annual reports 2006 & 2007
Figure 4.2 Market sector breakdown by sales

Arcadis
- Buildings 23%
- Environment 36%
- Infrastructure 41%

Ginger
- Telecom 35%
- Environment 15%
- Construction 50%

Grontmij
- Environment, water & energy 41%
- Building & Industry 35%
- Transportation 24%

Jacobs Engineering
- Process, Scientific and Systems Consulting 6%
- Operations & maintenance 11%
- Construction 44%

Mouchel
- Regulated Industries 28%
- Highways 33%
- Government Services 39%

Poyry
- Energy 30%
- Forest Industry 39%

RPS
- Energy systems 32%
- Planning & Development 45%
- Environmental Management 23%

Sweco
- Architecture / Str. Engineering 17%
- Building Service Systems 12%
- Infrastructure 15%

White YG
- Environment 23%
- Engineering 43%
- Management Services 33%

WS Atkinson
- Asset Management 4%
- Project Management 16%
- Middle East / China 14%
- Rail 16%
3.3 Relative position

In figure 4.3 the companies have been positioned in relation to geographical spread, market sectors and sales. The horizontal axis represents the degree of specialisation whereas the vertical axis shows the degree of internationalisation. Jacobs has the highest sales of € 5.653 million and the close position at the origin of the axis cross shows that the company is average on geographical and business diversification. White Young Green almost has the same position in figure 4.3 but it has the lowest sales of € 242 million. WSP is classified as an international generalist in spite of the fact that their property division represents 56% of total sales (figure 4.2). The wide range of activities of this division and the corresponding company strategy classifies WSP as a generalist.

Figure 4.3 Geographical and business position of companies and sales

The size of the circles and the number represents the sales in € millions in 2007.
Explanation vertical axis: 75% of the sales of Arcadis are from abroad (outside The Netherlands). Explanation horizontal axis: 59% of total sales of Arcadis are not from their core business.
