CORPORATE STRATEGY IN CONSTRUCTION:
A COMPARATIVE ANALYSIS OF EUROPEAN MULTINATIONALS

by

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A thesis submitted to the Department of Civil and Environmental Engineering
in partial fulfillment of the requirements for the degree of

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ABSTRACT

The following thesis attempts to develop a descriptive model that explains
European multinationals response in the construction industry to a restructuring
of their upstream client base forced upon them by the unfolding pressures of
what is referred to as Globalization. It integrates frameworks and models from
strategic management, organizational theory, and economics in predicting
competitive forces and thus strategy formulation for European, multinational
construction companies.

Three extensive case studies of construction companies from different European
countries represent the underlying data that support this thesis’ propositions. The
companies’ strategic decision-making, the implementation process both from an
organizational and market perspective and the financial outcome have been
analyzed over a period of 5 years each, between 1996 and 2000. Data has
primarily been collected from annual reports; investment banks’ research reports,
press coverage, interviews and personal experience.

Thesis Supervisor: John B. Miller
Title: Professor of Civil and Environmental Engineering
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Many, hopefully lasting, friendships have developed. I would like to thank all of them, especially Messrs. Benjamin Cheatham, Melhem Samaha and Jose Suazo for bearing with me.

I reserve my last acknowledgement to my parents and would like to express my deepest appreciation for their support, love and encouragement throughout the time here in the United States of America.
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1. Introduction
After WWII the European construction industry had experienced high growth and healthy margins. A similar, though sometimes shifted, economic cycle emerged in all major countries. Fueled by the need to rebuild the continent throughout the 60’s and huge construction demand on the Arabian Peninsula in the 70’s and beginning 80’s as a result of spurring oil prizes led to static and inflexible corporate structures unable to cope with a maturing market and thus diminishing overall construction activity. Suffering from a disadvantageous industry structure, the effects of globalization and information technology seem to herald and facilitate a long overdue restructuring and thus a need for strategy formulation and firm-specific organizational structures.

2. Origin of Strategy
At the most fundamental level, strategy is about defining goals and then making choices based on these goals. Before making a choice, one analyzes the various options. These options are often mutually exclusive and therefore trade-offs have to be taken into consideration. Even though the idea is very straightforward, strategic thinking in a business context is met with considerable suspicion. There are two reasons. First it is fairly new in business and second, conclusive evidence between a company’s strategy and its effect on company performance is difficult to measure.

Even though the field of strategy has drawn explicit attention in business for just over 30 years coinciding with the foundation of well-known management consulting companies, the underlying dynamics and forces are very old. In fact, business strategy is the application of evolutionary theory coupled with human beings’ ability to reason and think logically. In both cases, there is a constant competition for scarce resources.

In evolution or natural competition, the fate of a species is dependent upon its ability to both prevail over competitors fighting for the same resources and to

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1 Henderson, Bruce: Founder of The Boston Consulting Group (BCG), 1989
successfully adapt to changing environmental conditions. The determinants of its fate though are by and large a function of pure chance and the laws of probability. In business, on the other hand, humans can use their unique abilities to anticipate and accelerate the direction of change or business evolution. Nonetheless, there is no denying the fact that strategy only reduces but never eliminates the effects of chance and probability. If two companies compete for the same customers with the same product, then one of the two will most likely fail in the absence of other competitive advantages.

The effect of reasoning and logic and thus strategy on business evolution is shown by the enormous pace and acceleration of technological improvements since the Industrial Revolution in general and WWII in particular. Progress in natural evolution is measured in generations or centuries, whereas companies publish their performances in quarterly reports. In fact today, technological breakthroughs threaten to outpace advances in the human sciences. The current discussion on biotechnology is an example where the humanities struggle to respond to technology and suggest ethical and moral boundaries for justifiable applications.

If strategy accelerates business evolution, then why is business strategy rather new? As shown in the first paragraph the underlying reason is that a prerequisite for strategy is both the existence of alternative options and the ability to pursue them. In a business context it means that companies need markets that are large, unregulated and legally enforceable. These are the very ingredients of a free market economy, a pretty young success story itself. Therefore, the richer the environment (competitors), the greater the number of variables or unknowns and hence the more important strategy becomes both as a proactive and a reactive instrument. Proactive in the sense that it helps to win against competitors and reactive in the sense that it helps not to be beaten by your competitors.
Business was, by no means, the first application of strategic thinking. Its most important fields have for centuries been politics and war. Famous contributions include Machiavelli’s “The Prince”\textsuperscript{2} and Clausewitz’ “On War”\textsuperscript{3}. Even in every day life the freedom to make choices necessitates thorough planning and thus a strategic approach. Job searches are such an example.

The process would most likely look as follows. Based on past experience, talents and objectives, one would hypothetically envision the perfect job. This job, in turn, would be translated into and compared to characteristics, which commonly differentiate job descriptions. These are industry (product), function, location and payment. After screening and thereby limiting the available opportunities, one comes up with a number of leftovers. Since all the remaining options only seem to be available, one has to account for external factors, which further reduce the number. These are the state of the economy, the company’s performance and the competition for the job. In the end, a plan is thought of to pursue the most promising options.

This example leads to the second reason why strategy is met with suspicion. How much of a successful job search is pure luck and what credit can be given to a strategic approach? What portion of a company’s profit increase has to do with intended and deliberate strategic action? The answer is: We don’t know. There could obviously be two reasons for that. Either strategy is lots of nonsense or we lack the adequate financial models, tools and frameworks to account for all the unknowns. The latter is more likely the case.

Suppose a composite material is tested for its long-term durability under different environmental conditions. The experiment isolates the variable, which is being tested. This means, all other conditions, i.e. length of testing or load pattern, are identical between the specimens. In doing this, a sound basis for comparison is

\textsuperscript{2}Machiavelli, Nicolo: The Prince (Italy 1513)
\textsuperscript{3}von Clausewitz, Carl: On War (Berlin 1832)
established. Once we move from the natural sciences to social behaviors, experimentation becomes more difficult, because variables cannot easily be isolated. On a higher level even, an organization consists of multiple humans, thus making any isolated quantitative analysis almost impossible, because there will never be two identical organizations acting in the same environment in the same way.

Obviously, the quantitative analysis of companies’ performances is an entire industry itself. Taking a look at their precision though, shows, that the correlation between the applied models and a company’s actual stock price is miserable. The existing models poorly reflect a company at any given point in time, because they can’t grasp the complexity of an organization and the external forces acting upon it. It is obviously even more difficult to isolate the effect of strategic decision making over a lengthy time period.

<table>
<thead>
<tr>
<th>Correlation of Financial Measures and Market Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVA (Economic Value Added)</td>
</tr>
<tr>
<td>ROE (Return on Equity)</td>
</tr>
<tr>
<td>EPS (Earnings Per Share)</td>
</tr>
</tbody>
</table>

*Graph 1*

It is the very essence of strategy to be an all-embracing concept. It tries to account for changing environments and anticipates competitors’ actions. Therefore, the inability to accurately measure its effects on a company’s performance by no means discredits the field. It rather reveals the need for better financial models.

3. Strategy in Construction

3.1 Cultural Barriers

As stated earlier, the potential impact of strategic thinking correlates with the openness of an economy. Therefore, cultures, which generally view company

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failures or “creative destruction” not only to be necessary, but wanted for economic progress, experience more emphasis on strategic thinking. Management consulting, for example, is a much more mature industry in the US than in Germany, because Germany’s economy is based on long-term relational contracts between all stakeholders, i.e. unions, banks, shareholders and employers, as a guiding principle, thereby conserving the status-quo. The hypothesis is that the downside risk from potential apathy is less than what is lost from continuous breakup in the Anglo-American model. The forces of global, especially capital, markets, though, seem to push Germany towards a more liberal approach now.

The extent of strategic thinking among industries differs just as much as it does between countries. A recent study among the largest 400 construction companies in the US revealed that companies demonstrate an awareness of the need for market expansion, but lack the ability to formulate and implement a plan for strategic positioning. The factors that, most likely, inhibit strategic thinking are the following. First, there is the industry’s setup, second, it is the project-based as opposed to product-based nature of the business and third, a client, instead of being offered a built building, generally asks for construction services.

The distribution of company sizes in any industry is usually driven by its maturity and the availability of economies of scale. These economies can be both cost and price-related. For example, the ratio of fixed to variable costs demands a minimum size or a global customer might pay a premium for being offered the same service around the globe. In construction, it is evident that the industry is essentially equally fragmented in most countries around the world. The reasons are twofold. Overhead or structural costs account for only 5% and markets have,

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5 Schumpeter, Joseph: Capitalism, Socialism and Democracy, 1949
8 UBS Warburg, USA, 2001
by and large, been local. Even large industrial customers have pursued a regional procurement strategy. These factors have limited a growth strategy’s potential competitive impact when compared to evolving, high fixed costs industries such as semiconductors.

Since construction companies have success rates of 10% - 30% only on the projects they bid for, a thorough understanding of each project’s participants and dynamics is crucial in allocating a company’s resources. Therefore, the project-based nature of the business trains construction companies’ tactical skills. The absence of any kind of medium or long-term product cycle, though, just as much hinders strategic thinking, because strategy differs from tactics with respect to the time horizon and the inclusion of external factors. Strategy tries to map medium-term actions and goals and it accounts for overall changes in the marketplace. These are attributes, which are not supported in the construction business\textsuperscript{9}.

Finally, construction is the response to requests. These are RFP’s (Request for Proposals) and RFQ’s (Request for Qualification). Similar to the last paragraph, such a reactive business does not encourage an environment where proactive thinking is abundant. Thus, companies risk concluding that the market size is, what is being asked for, not what might be needed. This, in it itself, limits opportunities, choices and a strategy’s success.

### 3.2 Components of Strategy

In a business context, a strategy’s ultimate goal is the creation of a firm specific competitive advantage. Generically, a competitive advantage improves the relative positioning of a company against one or many of the players that are part or threaten to be part of the chosen market. Commonly, these players are suppliers, customers, distributors and (potential) competitors. Thereby, a new

\textsuperscript{9} Tatum: Process of Innovation in Construction Firms, Journal of Construction Engineering and Management, 1987
business equilibrium in a static market is formed. A competitive advantage, in turn, ought to lead to superior firm performance. Typical performance indicators are either accounting-based (ROE, ROA) or market-based (price/earnings, stock price). This is notwithstanding the fact that conclusive evidence between the underlying models and a strategy’s effect, as stated earlier, is difficult to come by.

It has been argued earlier that strategy is about making choices. In order to make a choice, three questions have to be answered. How is change pressed ahead where is change needed and what is needed? In business, it corresponds to what are the drivers of a successful strategy, what is the unit of analysis and what field is being looked at? The last two are fairly straightforward, whereas the first dimension is the most crucial.

![Diagram](image)

**Fields**

**Graph 2**

### 3.2.1 Means of Strategy

One of the crucial questions in strategic management research is what creates or affects a company’s competitive advantage. Over the last 25 years, the focus of research for finding determinants of competitive advantage has gradually shifted
from an outside to an inside firm perspective. The analysis to explain a firm’s superior performance has moved from industry structure to a company’s resources, capabilities and more recently its internal organizational structure.

3.2.1.1 Industry Perspective
Porter\(^{10}\) has shown that a company’s performance is not only dependent upon its firm-specific sources of competitive advantage, but it is rather predetermined by the industry the company chooses to compete in. His work builds on the industrial organization economics school of thought, which was originally developed by Bain\(^{11}\) in the 50’s and states that industry structure determines a firm’s conduct, which then determines economic performance of the firm. Since a firm controls the output, it would try to achieve above-normal returns at consumers’ expense by creating monopolistic power or fixing prices. His ideas have influenced numerous forms of government intervention, such as anti-trust legislation, to maintain competitive markets. In the 80’s, Porter then “reversed the original objectives…. and instead of seeking ways to assist policy makers .... he uses the framework of industrial organization economics as a way to describe the attributes of an industry that make the industry less perfectly competitive and thus assist firms to find alternative ways in obtaining greater economic returns on their business investments.”\(^{12}\) The main characteristics are the relative power of buyers and suppliers, barriers to entry and exit as well as the threat of a substitute product.

In Bain’s theory, firm conduct and thus a firm’s economic performance is predetermined by the industry structure. Therefore individual firm conduct is irrelevant. Although the model adequately describes performance differences between industries, the model fails to describe obvious variations in relative firm performances within an industry. Therefore, Porter identifies an industry’s

\(^{10}\) Porter, M.E. Competitive Advantage: Creating and Sustaining Superior Performance, Free Press, New York, NY, 1985

\(^{11}\) Bain, J.S., Industrial Organization, John Wiley & Sons Inc, NYC, 1959

\(^{12}\) Kale, Serdar, Competitive Advantage in the Construction Industry: Firm-Specific Resources and Strategy, Illinois Institute of Technology, 1999
structure to be both a threat and an opportunity to each firm at the same time. Instead of being deterministic or fatalistic, a company's success depends on its ability to operate within such an environment and hence formulate a viable strategy. From there on, acknowledging the theories of economics as a starting point, but at the same time realizing the pitfalls of overly simplistic assumptions such as "perfect competition" and increasingly embracing notions from evolutionary theory and social behavior to describe company performance, the focus has shifted to firm specific sources of competitive advantage.

3.2.1.2 Firm Perspective

Resources are essentially a company's tangible and intangible assets. Tangible assets can be machinery or capital and intangible assets include the employees’ skills and the company's patents. In an effort to account for ever faster business and products cycles, which increases the threat of a company's resource to become suddenly obsolete as a source of competitive advantage on the one hand and appreciating a human brain's superiority over any machine in the long run on the other, researchers discovered a company's capabilities to be of more lasting value in today's dynamic business environment.¹³ An employee-specific skill has become a company-specific capability, once an organization has made a specific know-how available to the entire organization, thus multiplied its benefits and thereby created proprietary business processes. A capability is thought of to be a superior source of competitive advantage, because first it cannot be readily revealed unless a corporation is analyzed over some time and second it is imbedded into the entire organization. Hence, a company is less vulnerable to the departure of individual employees and copying a company's capability is made difficult due to the company's collective organizational learning curve.

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More recently, a company’s organizational structure has become a focal point as a potential source of competitive advantage. Ever since Adam Smith\textsuperscript{14} proclaimed the benefits of the division of labour, which leads to specialization and thus productivity increases, business organizations have chosen a hierarchical and static command and control structure. It took robots and semiconductors, which easily excel any human being’s processing speed, in the latter part of the 20\textsuperscript{th} century to realize that the true value of an organization’s employees is their ingenuity and creativity. The trade-off between retaining control within an organization and fostering as well as facilitating creative, cross boundary thinking by taking into account the structure of workflow, the boundary of an organization and the culture of the firm has, since then, been at the heart of organizational research and hence company performance.

3.2.2 Scope of Strategy

In the broadest sense the scope of a business strategy is confined by the size of the market, for now irrespective of how right the sizing has been. The market usually corresponds with an industry. An industry is made up of competing participants. These are companies. And finally, given the special nature of conducting construction work, the project is the smallest unit of analysis.

3.2.3 Fields of Strategy

With increasing popularity of business strategy as a field, the idea of strategic thinking has extended into virtually all parts of a corporation. Since the dominating corporate organizational structure has been a functional one along the company’s different activities, the field of strategy has evolved around these functions as well. Cheah\textsuperscript{15} proposes an open-model describing corporate strategy, which is composed of seven different fields. These are business, operational, information technology, marketing, technology, human resources and financial. These different fields of strategy can be represented along a

\textsuperscript{14} Smith, Adam: Wealth of Nations, 1776

\textsuperscript{15} Cheah, Charles Y.J.: Reconceptualizing Corporate Strategy, and Linking It All Together, MIT, 2001
continuum of increasing uncertainty. In this context, increasing uncertainty means that serious decision-making has to account for more and more external variables and unknowns. These could be macroeconomic changes, competitors’ actions and technological breakthroughs.

For practical purposes of this thesis, a separation of the seven fields into external strategy and internal strategy seems to be appropriate. Generally speaking, internal strategy deals with the optimization of business processes, whereas external strategy is concerned with securing the medium- and long-term viability of the business model.

3.3 Consequences
The project-based nature, a re-active mindset as well as local markets have led construction companies to perform much better within the fields of the internal strategy, than in formulating and implementing an external strategy. Allocating resources on a project-by-project basis and dealing with each project’s uncertainties in order to build prototypes over and over again is the core-
competence of a construction company. Strategic management has been given much less attention.

Developing from a skill-based, project-focused enterprise into a capability-based, knowledge-sharing company, though, is the major challenge for construction companies in the coming years. Whereas in consumer goods and process industries, resources such as specialized equipment, patents and brand recognition constitute significant parts of a company’s competitive edge, construction companies rarely have these assets. The resource base of a construction company is, by and large, its human capital. Highly trained and specialized project managers, superintendents, estimators, design engineers and skilled craftsmen build the backbone of a construction company. Unfortunately though, know-how and best practices is imbedded in these people as tacit knowledge\textsuperscript{16} and thus not made available to the company as a whole. Therefore, a company’s ability to take full advantage of this know-how, multiplying its

\textsuperscript{16} Slaughter, Sarah: Innovation and Learning During Implementation: A Comparison Of User and Manufacturer Innovations, 1993
benefits and thereby experiencing an organizational learning, and thus weaving its key business processes into hard-to-imitate strategic capabilities, that distinguish it from its competitors in the eyes of customers, is limited.

On top of the inherent cultural barriers in construction, neither the tools to facilitate such a transformation have existed until recently. Major differences between manufacturing and construction include building prototypes and assembling the product at its final point of use. Hence, the ability to automate the construction process by using robots and machines is limited per se. Automation, though, has been a major driver in transforming manufacturing industries into capabilities-based companies. The ongoing IT-revolution seems to have a similarly deep impact on transforming businesses and might help construction companies to make better use of its skills.

Currently, construction companies compete on a project-by-project basis. In an environment, where skills are imbedded in individual employees only, external strategies have little room for success. Economies of scale cannot be achieved and hence company size as a differentiating factor in competing for projects does not exist. For these reasons, the industry has been as fragmented as it is and even relatively large construction companies merely represent multiple small companies competing with others of similar sizes in their respective geographic markets.

In Competitive Advantage of Nations, Porter\textsuperscript{17} develops a model for strategic positioning in mature industries. Within the context of two aspects of the competitive environment, namely competitive advantage and scope, he deduces three main strategic options open to organizations that wish to achieve a sustainable competitive advantage. These are cost leadership, differentiation and a niche strategy. He describes mature industries are those, which have little or no growth in sales and tend to be dominated by large companies. These

\textsuperscript{17}Porter, Michael E.: The Competitive Advantage of Nations, The Free Press, 1980
companies seek to apply one of the three generic industries he identifies. Choosing none of the above and thus being “stuck in the middle” is a recipe for failure.

![Graph 5](image)

Construction certainly fits Porter’s definition of a mature industry. On the other hand, large companies do not dominate as he predicts and small niche players are rare. Rather, companies, by and large, compete on the same basis, irrespective of their size, for the reasons cited earlier. Both in the design and execution phase of a construction project, scale economies are missing due to the local nature of markets, and the inability to cost-effectively exploit and transfer skills on a company-wide scale did not permit a broad differentiation strategy. Hence, construction companies in Western Europe have found themselves in the course of the past two decades exactly where Porter does not want them to be: in the middle, being stuck in a downward spiral, competing on price only.

Construction has deteriorated into a structurally unattractive industry throughout most of Europe. Once again borrowing from one of Porter’s vast frameworks on
firm strategy and industry attractiveness, he developed the 5-forces tool\textsuperscript{18}, with which to analyze the attractiveness of industries. The determinants are the buyers' and suppliers' power, the threats of new entrants and substitutes and finally overall rivalry in the markets.

![Graph 6](image)

Entry barriers are low, since anyone can start a construction business without much capital or specialized assets, such as equipment or certificates. Although there are differences depending on the type of construction, strong customers and suppliers characterize the current boundaries of the construction industry. Process industries have large integrated players on both sides of the value chain. For example, building an oil refinery plant, involves companies, such as Shell and BP on the buyer side, ABB, Schindler and others on the supplier side and in the case of a power plant, Siemens and GE, being a buyer and specialty supplier (turbines) at the same, brutally put the screws on a construction company's bargaining power.

Whereas small and medium sized companies try to increasingly focus on a niche market both geographically and in the product dimension, the larger players have come to realize that their organizational structure and size would not permit a competitive advantage, but even turned into a structural disadvantage.

\textsuperscript{18} Porter, Michael, Competitive Advantage, The Free Press, NYC, 1985
Porter\textsuperscript{19} identifies four basic value-adding corporate business strategies\textsuperscript{20}. These are portfolio management, restructuring, transferring skills and sharing activities. A portfolio strategy becomes outdated, because, in increasingly efficient capital markets, investors can pick pure-plays themselves. Neglecting restructuring for the moment, the sharing of skills and activities between autonomous business units would justify a central corporate overhead and thus be a viable corporate strategy. Their absence in construction, though, has led to poor stock market valuations.

4. Formulating a Strategy

4.1 Setting the Stage

Industry Structure \rightarrow Company Strategy \rightarrow Organizational Structure

<table>
<thead>
<tr>
<th>Drivers</th>
<th>Consequences</th>
<th>Strategy</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Globalization</td>
<td>Outsourcing</td>
<td>Extent Services</td>
<td>Vertically disintegrate</td>
</tr>
<tr>
<td></td>
<td>Consolidation</td>
<td>Internationalize</td>
<td>Vertically disintegrate</td>
</tr>
<tr>
<td>IT</td>
<td>Capabilities</td>
<td>Specialization</td>
<td>Product Grouping</td>
</tr>
</tbody>
</table>

Exhibit 7

Triggered by the forces of globalization, structural characteristics of the construction industry will change. Both the size and the scope of the markets, which construction companies compete in, will alter. Facilitated by information technologies, economies of scale emerge, the creation of firm-specific capabilities is enabled, and hence company size matters and determines the choice of sources of competitive advantage. Whereas today in Europe, companies of all sizes compete on the same basis for the same projects in their countries’ regional and local markets, large and small companies will, in the

\textsuperscript{19} Porter, Michael E.: From Competitive Advantage to Corporate Strategy, Harvard Business Review, 1987

\textsuperscript{20} Corporate Strategy = Justifying the cost of coordinating multiple autonomous business units within a single corporation
future, develop complementary skills. Large, European construction companies will follow their global customers, vertically disintegrate due to the continuous heterogeneity of construction codes and regulations in various countries, specialize in products and source execution capabilities from regional contractors on the spot or by forming long-term joint ventures.

4.2 Globalization and IT Change Industry Structure

Information technologies and globalization have changed the way that firms formulate, implement and sustain competitive advantage. Moreover, information technology and telecommunications are catalysts behind the globalization of many industries affecting international corporate strategy formulation.

4.2.1 Globalization

A comparison of organizational structures of companies, which market construction services, reveals that in Continental-Europe\textsuperscript{21} the integrated design-build contractor at risk has historically emerged to be the dominating form, whereas in the US, a much richer variety, including construction managers with and without risk, design-build contractors, general contractors and engineering firms, exists. Since there is no difference in production technologies between the two regions, the cause for varied marketing approaches for the same end product must have its roots in a fundamentally different procurement method on the demand-side.

Once an industry evolves from growing into maturing, competition intensifies in the given market. Companies compete for the same opportunities, margins decline and one company’s gains are another’s loss. It is a zero-sum game. Then Porter’s Generic Strategies model unfolds its effects, thereby forcing companies to choose either cost or differentiation leadership. Increased pressure on a company’s cost structure leads to the outsourcing of non value-added activities. Whereas the development as such is essentially the same across industries and

\textsuperscript{21} The UK being somewhat a hybrid between the two
markets, the speed of the subsequent consolidation positively correlates with the size of the available market.\textsuperscript{22} Historically, market sizes had been aligned with national boundaries due to the inherent costs, i.e. taxes and tariffs, of selling products and services across countries.

For this reason, comparable industries in the US have traditionally consolidated faster than in Continental-European countries. In addition, industries with a high fixed to variable cost ratio benefit from economies of scale above average and thus consolidate more rapidly. High fixed costs result in relatively higher capital expenditures and thus a need for investments in constructed facilities. Therefore capital-intensive industries, such as oil&gas, automotive, chemical and pharmaceutical, represent important client bases for construction companies and their buying behavior directly impacts construction companies’ response to market and package their services.

In Germany, for example, BASF, a chemical and pharmaceutical conglomerate, or Volkswagen, the automotive giant, maintain to have substantial in-house design and engineering capacities comprising the entire value chain of a new plant up to the point of actual construction. These include the identification of the plant location, design, packaging the project, procuring the project and finally managing the various fields and disciplines. Similar organizations in the US have instead either moved to entirely source these activities from the construction sector or, in an effort to retain control, formed joint ventures with engineering and design companies.

\textsuperscript{22} Regulation being another major driver
Vertical Joint Ventures in the US

<table>
<thead>
<tr>
<th>Company</th>
<th>Partners</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>InterGen</td>
<td>Shell &amp; Bechtel</td>
<td>Power Plants (Nuclear)</td>
</tr>
<tr>
<td>URS/DuPont</td>
<td>URS &amp; DuPont</td>
<td>Remediation</td>
</tr>
<tr>
<td>Duke/Flour Daniel</td>
<td>Duke Energy &amp; Flour Daniel</td>
<td>Power Plants (Fossil)</td>
</tr>
<tr>
<td>Parson/BellSouth</td>
<td>Parson &amp; BellSouth</td>
<td>Telecom networks</td>
</tr>
<tr>
<td>Jacobs/Equistar</td>
<td>Jacobs Engineering &amp; Equistar Chemicals</td>
<td>Chemical Plants</td>
</tr>
</tbody>
</table>

Historic economic developments in the US provide a road map for future evolution of the construction industry on a global scale forced upon by the increasing effects of globalization. Consolidation and the outsourcing of activities in major capital-intensive industries in the US over the last 30 years resulted from deregulating markets. Deregulating markets essentially means tearing down barriers to entry, i.e. tariffs and taxes. At the very moment, countries around the world, realizing the limitations to prosperous growth within their own borders, form supranational organizations, which structure the ability for products, services or labor to move freely across borders. The degree to which markets are being liberalized among these countries, though, varies significantly. For example, the right to take on a job and live in a certain country irrespective of your nationality, as long as the country is part of the union, is a cornerstone of the EU. The same freedom to move does not apply to NAFTA or WTO.

*WTO OECD MERCOSUR ASEAN NAFTA EU*

Liberalization of Organizations Increases

*Graph 10*

The current phase of rapid deregulation throughout the world results into equally enormous consolidation pressures in capital-intensive industries in these countries. The pressures can be seen every day. Even though equity markets
have dried up around the world since last year, M&A activities in the European chemical, pharmaceutical, oil, gas and automotive industries has not decelerated. Once again making an analogy to the US, an increasing outsourcing of activities should coincide with increasing company sizes. Given the size of the European Union and the extent of liberalizing the market, such a development should be most rapid there. The disposal of activities on the client-side opens up opportunities for European contractors to integrate backwards and will put them in a better position vis-à-vis its international competitors, because location and thus client proximity will remain to be a competitive advantage.

The forces of globalization are not restricted to the private sector. In fact, countries and thus political systems increasingly compete with one another. The rationale is as follows. Corporate investment decisions are based upon the costs of the asset and its expected returns over the entire lifespan. These returns are discounted at a rate, which accounts for the riskiness of these proceeds. Risks come in several forms, among them being the environment or country risk, in which the asset is deployed. In the past, the differential between, for example the US and Venezuela has been huge. Therefore investments in emerging markets had to generate higher absolute returns to have the same value or ROI or EVA or whatever measure finance provides, in order to be considered by corporations. These days, an increasingly intertwined world economy, resulting from the before-mentioned trade unions and free market zones, makes it less likely, because more costly, that individual countries jeopardize private investments, thereby reducing the influence of country risk on investment decisions. This, in turn, affects political systems in more developed countries, such as France and Germany, because a more stable environment was an asset in attracting investments and thus offset higher taxation on corporate and capital gains in the past. Triggered from pressure to make the public finance system more attractive to global corporations, persistent budget deficits and a phase of decreasing ideology in European politics, countries have started to reassess the degree of

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23 Among other factors, such as skill base of work force and proximity to clients.
public sector involvement. The outcome is a varying, but widespread retreat from activities, such as infrastructure, health care and education in Europe, which opens up opportunities for the construction industry.

A second derivative from consolidation and outsourcing is a client’s insistence to be served around the globe by the same company. To minimize risk and retain control, clients want long-term relationships with their supplier base. This will lead to an overall reduction in the number of suppliers a company will work with and hence, the pressure to internationalize and grow, in order to deliver the same quality of service around the world is passed down the value chain. Analogies can be drawn to the automotive industry. Companies, such as DaimlerChrysler, GM or Toyota have radically cut the number of key suppliers for their products.

Given the rationale of the past few pages, one would expect that, due to a more radical consolidation in the US, pressures to grow would have been past down to the construction industry in some fashion. Conventional wisdom, though, tells one, that the US construction industry is not only fragmented as such, but more so than in most European markets. A quantitative proof goes beyond the work of this thesis, but two reasons put doubt on this assertion. First, the US is looked at on a national scale, which is not the nature of most construction markets and second, categories and rankings do not represent rivalry and competition well. They merely divide design and construction and sometimes distinguish between the allocations of risk (CM at and without risk). Reality, though, shows that most construction companies are highly specialized along the product dimension. Work is only pursued in specific industries varying from education, retail, institutional, commercial, heavy, restaurants to the mentioned industrial clients.

4.2.2 Information Technology

Information technology applications will help to provide such worldwide, consistent service in an organizationally cost-effective way. Current computing technologies are providing construction professionals with access to rapidly
expanding information repositories and evolving communication capabilities. This access has profound implications for the construction industry in several areas including better communication between dislocated offices within the same company, client relations and the management of the various participants of a single project.

The facilitation of real-time communication and sharing of information have always been considered critical to achieving efficiency, and this is what IT systems are attempting to deliver. Examples include collaborative teamwork, integration of inputs, sharing of knowledge, training and development. There is widespread recognition that IT is one of the enablers or facilitators for achieving construction business innovation and integration of the inputs from diverse contributors in a given project or organizational unit. However, this potential is not yet fully understood or captured by the bulk of the construction industry. The real-time integration of knowledge and expertise of diverse participants in the planning and decision-making processes on projects and business unit operations is being fostered by many client organizations. Although there are examples of prudent and effective use of IT as an integrating system, in the eyes of the vast majority of construction organizations, IT is still synonymous with word processing, electronic spreadsheets, simple database applications and, most recently, e-mail.

A prerequisite for taking advantage of information technologies is the computerization of workplaces and companies. A recent study in Canada has shown that the dissemination of computers in the industry has greatly improved. The research findings were that computer applications in the fields of word-processing, spreadsheets, database and project planning had increased on average by 25% to about 85% over a period of 5 years. At the same time

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business processes had remained to be virtually unaffected. Redesigning these processes, though, is the decisive transformation, which will enable a company to achieve scale economies and organizational learning effects. As stated earlier, know-how in the construction industry is primarily imbedded in people as tacit knowledge. Computerization promises to divide this know-how from its original bearer. The networking effect of the Internet, then, enables to collocate knowledge bearers, thereby promoting core competencies and making these organizational capabilities accessible to the entire company irrespective of the separation of its origin and the final use.

4.3 Impact on Company Strategy
The changing industry structure has a profound impact on how the industries' participants will compete for projects in the future. Size increasingly will matter and thus implications for multinational corporations (MNC's) and small to medium-sized enterprises (SME's) will differ.

As discussed earlier, the dominating organizational structure in Continental-Europe is the integrated design-build constructor at risk. It is likely that MNC's will
gradually dispose of their execution capabilities and position themselves exclusively in the design-engineering sphere, because mastering maximum global integration of capabilities and managing local responsiveness seem to become mutually exclusive paradigms within the same organization. Similar to partnerships upstream, stable geographically exclusive relations might also be sought by MNC’s with SME’s.

SME’s core competence will be their understanding of local regulatory restrictions, codes and rules, access to local labour markets and the efficient execution of projects. Among key managerial challenges for this group will be the creation of an organization that successfully copes with the cyclicality of construction demand, keeping in mind that there is no such thing as inventories in construction. This means having a cost structure, which is flexible enough to adapt fast, but enables the company, once it comes out of a downturn, to retain the company’s assets, which are execution skills and thus will remain to be imbedded in individuals. Information technologies should help to create organizational capabilities, although to a lesser extent as for MNC’s.

A third group of companies will follow a focused differentiation strategy. The group, in fact, already exists. These are regional specialty-contractors whose markets will remain to be local or regional, either because the client base does not consolidate or because operational economies of scale cannot be realized.

Graph 12
MNC’s on the other hand will form long-term relationships with clients in specific product areas, i.e. oil&gas, infrastructure, chemical&pharmaceutical or automotive. These industries retreat from services along the value-chain. This opens the opportunity to integrate backwards. They market their services on a global scale. This should provide some immunity to regional cyclicality of construction demand.

Promising information technologies, which enable economies of scale, and a changing industry structure, are prerequisites to formulate a cohesive external strategy and develop employee-skills into corporate capabilities.

5. Organization follows Strategy
The following chapter draws on contemporary research in organizational theory. It describes an organizational response to new business opportunities in construction, which are the result from a changing industry structure, and subsequently lead to the need to draft consistent strategy formulations among European, multinational construction companies. The themes, which are touched
upon, are how work and activities within the firm are structured, what are the inherent trade-offs and how have the trade-offs changed. In addition, the classical question of vertical integration or “make or buy” in the context of construction is analyzed.

5.1 Structure
Traditionally, customer access and proximity has been the main source of competitive advantage in European construction. Quality was taken for granted because of universally binding codes and product differentiation could not be built up in vast industries, because, as mentioned earlier, customers developed know-how in-house. Therefore operating responsibilities and authority had to be as close to customers’ decision-making processes as possible. Not surprisingly corporate organizational structures reflect this very fact. Companies are grouped around geographic divisions. These offices differ only in size, not so in its skills and extent of vertical integration, providing full development, design and construction services. In essence, these are networks of highly independent construction companies within a big construction company or holding.

In pre-globalization times this structure reflected an optimal trade-off to cope with the distinct characteristics of the construction industry. Growth could only be achieved if the company opened up entirely new offices in new local markets, because assets (depending on the nature of construction services offered, i.e. in infrastructure machinery such as cranes or in commercial office buildings project management know-how) could not be deployed economically beyond a certain distance from its origin. The divisional structure gives each office the advantage of forming cross-functional teams very rapidly and benefit from the resulting learning effect. Thus the need to coordinate is little. Close customer relations were assured and thus a flexible organization certain.

The pitfalls of such an organizational structure lie in its duplication of activities and the lack of collocation of functional activities. Certain engineering practices
were to gain efficiency and more specialization if a cluster for such activities existed. These operating inefficiencies did not have a solution before IT hit the corporate world. It is only beginning to facilitate the use of localized know-how beyond regions and borders. Even now, it remains to be seen if the obvious benefits outweigh the costs associated with a “wired” construction company. One must understand that the term “brick-and-mortar” finally fits here. Cross company utilization of specialized assets such as know how in tunneling in a specific office is not supported. The individual offices operate as unique profit centers whose reward structure does not stimulate sharing of know-how with other units. Sharing only exists if personal networks stimulate such partnering. Corporate headquarters’ ability to serve as a link between the offices is little due to its oftentimes-lacking power base.

Many customers have outgrown their large construction partners and built up a single interface to deal with all needed construction services worldwide. On the other side there is no matching single point or key account manager on the selling side. This leads to competition among offices for the same customer at the expense of future profits. It is, in essence, questionable if the entire construction conglomerate is more than the sum of its parts? Are any economies of scale exploited and do they exist in the first place?

To realize the optimal trade-off between proximity to its customers and facilitate collocation of its specialized assets to develop distinct competencies, an internal reorganization towards increasingly grouping the business units along product as opposed to pure geography seems appropriate. A proposition of this thesis is that there is a pressure on part of the MNC’s to use existing networks of offices around the globe more efficiently and specialize into specific industries such as oil, gas and others by forming long-term relations with its customers, who outsource these services due to pressures from globalization.
It has been argued that construction companies' organizational structure changes from market and customer proximity by duplicating business units to knowledge collocation by aligning business units along products and thus taking advantage from organizational learning and economies of scale. Since there are numerous solutions in the middle, often referred to matrix organizations, the question arises if there really is an optimum. Business case studies show that regrouping an organization along two dimensions after it has had a long past of being aligned exclusively along one dimension, is almost impossible. In addition, customers become ever larger and, for efficiency reasons, the number of contacts for a construction company will decrease as well. Thus the need to be located in every region shrinks, because decision-making for prospective projects is not regional anymore. In the longer term, grouping along products makes the most sense.

5.2 Boundaries of the Firm

The theory of vertical integration primarily builds on Ronald Course's work during the 40s and 50s and then Oliver Williamson's work during the 70s and 80s. Coase argues that firms only exist, should certain barriers prevent markets from performing properly on its own. Williamson named these barriers transaction

27 Williamson, Oliver, The Economic Institutions of Capitalism, The Free Press, NYC, 1985
costs, which result from information asymmetries among market participants, and thus, contracts in its various forms structure the relationship between two or more parties. Unfortunately though, written contracts, which are enforceable in courts, have its limitations in fully describing the behaviors, motives and actions of humans or bluntly, account for all sorts of future contingencies. The basis for dealing with such unforeseeable contingencies is, what Williamson refers to as relational contracts. They are by nature informal and not enforceable in court. In fact, they are mere promises between one or more parties and hence, subject to holdups or opportunistic behavior. Therefore, at the very heart of the matter lies a party’s incentive to act in one way or another and thus the concluding need by the other party to have a corresponding need to control his actions or vertically integrate, depending on the value of the holdup.

Gibbons\textsuperscript{28} sketches a model, in which an upstream party’s asset is needed in producing the downstream party’s final product. At the two extremes, the upstream party (A) could be either an independent supplier or an internal division of the downstream party (B).

\begin{center}
\includegraphics{Graph15}
\end{center}

\textit{Graph 15}

Depending on what the nature of the asset is, B might ask A to specialize the asset in order to be more valuable to B. B would then most likely reward A with

higher compensation to reflect the added value to its final product. 29 A significant portion of the added value to B, be it customer service or specialty equipment, is a promise to A, which cannot be grasped and thus enforced by a formal contract. B becomes subject to a potential holdup by A. In addition, A’s goal is to charge a large portion of the value added to B as a premium. Its bargaining position, though, increases with the value of the holdup. The holdup, in turn, increases with the value of the alternative use, to which B could assign the asset. In order to boost its bargaining position, A would take actions, which increase that alternative value. These actions are not in A’s interest, because they do not increase the value of the asset to A’s final product.

B’s obvious option is to buy A and thus neutralize A’s bargaining power, because B now has the control rights over the asset’s use. This would lead to conclude that integration is always better. This is far from true, because integration creates a new hold up problem. Since B would want continuous good quality from A, now a division within B, B could draft a bonus plan or similar incentives to perform. Such incentive schemes, though, are usually not enforceable and present a promise by the management. Hence, a new holdup is created. In addition, internalizing the A extinguishes the natural incentives provided by open markets to deliver a good quality product. All kinds of managerial tools need to be adopted to simulate the outside world incentives.

“Therefore”, Gibbons concludes, “relational contracts must be “self-enforcing”, in the sense that each party’s concern for its reputation must outweigh that party’s temptation to renege on the relational contract. Consequently, the guiding principle is to induce efficient actions by implementing the best feasible relational contract. This requires making the right choice about integration.”

The guiding principle behind the extent of vertical integration is the downstream party’s need to control the upstream party’s action, which, in turn, is a function of

29 Leaving other factors such as market power aside for the moment
the holdup's value. It is a tradeoff between the importances of the upstream's good or service to the company's production process and the amount of natural competition (and hence natural incentives to perform) in the upstream marketplace of the parts or service. Vertical integration can be represented by a continuum of different organizational arrangements with increasing control rights.

The interface that is being looked at in construction is between the design and the construction phase. The specialized assets, which are at stake for integration, are the SME's execution skills, their local knowledge of rules, regulations, codes, labor markets and, sometimes, specialty equipment. The decision on vertical integration is influenced by SME's and MNC's opposing cultures, an interdependence between design and construction phases, regional nature of construction regulation and competitive construction markets.

Cutthroat price competition and differentiated knowledge management in a few special industries require fundamentally different corporate cultures and thus managers. It seems doubtful that both diverging paradigms can be achieved within the same corporation. In addition, the fragmented nature of commodity construction services provides fierce competition and thus built-in incentives to offer fair prices. Thirdly, even though building regulation is being synchronized

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30 What has been referred to as the third group, the specialty contractors, is being disregarded for now.
somewhat on a supranational level, for instance the Eurocode in the EU, the process of obtaining permit or certificates and accessing labor markets will remain to be locally or regionally. Adequate know-how, though, cannot be developed and maintained within a single organization for all potential markets. These three reasons call for the outsourcing of the MNC’s execution skills.

On the other hand, it is very well known that claims are as much a part of construction as anything. The reason is simple. Since competition is fierce, but relationships between client and the company are usually not ongoing, it creates a huge holdup value for contractors to lock the client in with a low price and then exploit its dependence on the contractor. Finally, the interdependences of design and construction in optimizing the overall costs of the projects have been described in literature very often. For these two compelling reasons, a close relationship between the two entities is important.

MNC’s ought to form close and exclusive joint ventures with SME’s in specific geographic markets. Thereby, all the flexibility and blessing of a competitive market is retained, but an ongoing, thereby repetitive, supply relationship prevents the SME from taking advantage of a project by reducing the hold-up value.

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Graph 17

MNC’s ought to form close and exclusive joint ventures with SME’s in specific geographic markets. Thereby, all the flexibility and blessing of a competitive market is retained, but an ongoing, thereby repetitive, supply relationship prevents the SME from taking advantage of a project by reducing the hold-up value.

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6. Three Case Studies

6.1 AMEC

6.1.1 UK Construction Market

In a mature market and an industrialized country one expects a correlation between construction output and performance of the overall economy defined as the gross domestic product (GDP). Exhibit # (Output is adjusted for inflation) shows this phenomenon well, by indicating a contraction of the construction sector at the same the British economy was in a recession, both during the beginning 80's and then again the early 90's.

In comparison to other European Union (EU) member countries, the United Kingdom is tying second place with Italy and France for construction market size in absolute numbers, outpacing most others with an estimated growth of 3% in 2001. It is worth mentioning that the largest 5 building companies comprise roughly 15%\(^{33}\) of the market, which is significantly higher than in the US (4%), though less than in Germany (17%) for instance.

In 2000 construction output amounted to a total of roughly € 107\(^{34}\) bn. Quite extraordinarily, the current economic slowdown in the UK has thus far not

\(^{32}\) The Construction Industry Council, www.cic.org.uk, United Kingdom

\(^{33}\) Euromonitor: Global Market Information Database

\(^{34}\) Roughly the same as France and Italy. Germany with about € 200 bn a year.
resulted in a decline in construction work being ordered. This remarkable
development may be attributed to two major currents that have affected the
British construction industry over the last 5 – 10 years. These are the Private
Finance Initiative (PFI) and a gradual move from adversarial business
relationships to one, which embraces the notion of Partnering.

As mentioned in earlier chapters, misinterpreting Keynes and being lured by
demand-driven economics led to ever increasing public spending in many
nations of the Western world, which in turn resulted into mounting budget deficits.
Breaking with such developments among the first was Britain during the 80’s.
Nonetheless, the United Kingdom emerged from the 90’s recession with both
depleted public finances and at the time huge needs for investments into public
infrastructure.

“The Private Finance Initiative (PFI) is one of the main mechanisms through
which the public sector can improve value for money in partnership with the
private sector. It was launched in 1992 with the aim of delivering higher quality
and more cost-effective public services. It does this by encouraging partnerships
and by involving the private sector more directly in asset provision and
operation.” Preceding this initiative was a thorough analysis of the tasks the
public sector should continue to perform. In essence, what tasks would the
private sector be able to fulfill on its own and which ones would be a natural
monopoly, effect national security or led to inadequate quality. The analysis
concluded that airport operations, infrastructure investments, the public health
system and others, which historically and ideologically had been perceived of as
in the nation’s interest and thus in the public domain, could at least be shared if
not “outsourced” into the private sector. The PFI brought private sector efficiency,
innovative procurement methods and access to private capital to the table.

35 UK Department of the Environment, Transport and the Regions: www.local-regions.detr.gov.uk/pfi/
At about the time, the idea of Partnering introduced new contract methods such as the Guaranteed Maximum Price (GMP). The goal is to create a climate, where long-term relationships between the contractor and the customer, an open book approach in financial and technical communication and joint efforts to find cost reductions and improvements are incented.

The United Kingdom is an example of how the public sector well understood its unique role as both a policy shaping entity and at the same time being the largest client for construction services. The PFI along with increasing Partnering has improved the attractiveness of the construction industry and thus resulted in prosperous growth.

One of the companies that both benefited the most from the changing regulatory and business environment as well as aggressively formulated a corporate strategy to go after emerging business opportunities is AMEC p.l.c.

### 6.1.2 Company Background

In 1982 William Press and Fairclough construction groups merged to form AMEC p.l.c. Its legal predecessors can be traced back to the year 1848. Since 1982 AMEC has spread geographically as well as differentiated its business services through a number of acquisitions and joint ventures. They are currently active in over 40 countries and the majority of work done comes from outside the UK. AMEC is one Europe’s largest construction companies and one of the largest engineering companies worldwide with sales of € 6.4\textsuperscript{36} bn in 2000. Apart from traditional construction, AMEC has strong engineering and installation capabilities and is present in different services.

A new CEO, Peter Mason, sparked a strategic review for AMEC in 1996. As a result AMEC has moved into services and tried to improve margins on construction contracts. A strong international expansion has taken off, based on

\textsuperscript{36} Based on currency exchange rate Oct. 18\textsuperscript{th} 2001: 1 £ = 1.6 €
two major acquisitions in France and Canada. Non-core operations have been divested.

AMEC has an ambition to work with selected clients in selected industries and is strong in oil and gas. The objective is to serve these clients and industries on a global. AMEC has partnership agreements with major customers, e.g. British Petroleum (BP), and follows their clients around the world.

The construction business of AMEC is margin-focused with the goal to reduce the number of contracts competitively bid for. Instead, AMEC advocates a partnership approach, where buyer and seller share the benefits of a smoother way of working. AMEC claims to turn down jobs that do not give adequate margins.

The strategy change in AMEC has resulted in international growth, improved margins and significantly out-performing its peers on the stock market. In its 2000 annual report Peter Mason is quoted saying that AMEC has “one vision.... to be the leading provider of engineering and service solutions for the world's manufacturing infrastructure and process industries.”

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37 AMEC p.l.c.: Annual Report 2000
Exhibit # shows that AMEC is made up of three different business segments. These are “Client Support Services”, “Capital Projects” and “Investments” with their corresponding subdivisions. These units perform the following products and services along the value chain of constructed facilities. (Exhibit #)

![Design Construction Operation](image)

- **Feasibility Studies**
- **Process Evaluation, Modeling and Design**
- **Engineering Services**
- **Conceptual and Final Design**
  - Architectural
  - Mechanical and electrical
  - Structural
- **Energy Optimization**
- **Environmental Studies**
- **Life Cycle Cost Analysis**
- **Technology Assessment**
- **Risk Management**

**Construction**
- **Construction management**
- Facilities management
- Asset management
- Decommissioning
- Environment inspections
- Maintenance services
- Process optimization
- IT services

**Operation**

In capital projects, AMEC has its own blue-collar workforce in the UK and some other countries. Predominantly though AMEC assumes the role of a fee-based construction manager in areas outside the UK, especially so in the US. In certain countries they have established joint ventures with local companies, providing them with market know-how and readily available workforce. Thus AMEC follows long-standing client relationships in the process industry. Facilities management is mostly self-performed, though this depends on the value AMEC can add to on its own. Otherwise they are outsourced, for example the cleaning of building under management.

In terms of performance graphs # and # show the distribution of sales and profits for the FY 2000 along geographic and business segment dimensions:

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38 AMEC p.l.c.: [www.amec.co.uk](http://www.amec.co.uk)
AMEC earns most of its profits, which totaled €158 million in 2000 in the Services segment. That is worse mentioning because the Services' 45% of profits were generated with a third of the overall sales. In addition, the UK is still the most profitable market for AMEC, making up almost 75% of its profits. Thus, its relatively even distribution in absolute profits among the three business segments look very healthy, whereas its reliance on the home market exposes its vulnerability to a recession at home.

6.1.3 Formulating a Strategy

Before 1996 AMEC had been growing its sales consistently. Higher sales, though, had been the result of exposing the company to higher risk, lump sum bidding projects primarily in the UK. As a direct result margins had steadily declined.

AMEC's current situation is the result of two strategic reassessments since 1996. At that time Britain was just about to emerge from a long construction crisis, which had hit the industry hard, a falling stock price had destroyed tremendous shareholder value and in 1995 AMEC had successfully warded off a hostile bid from Kvaerner of Norway.
Upon joining the company in 1996 Peter Mason reevaluated all businesses. A few months later he decided to take the following 4 initiatives:

- Focus on Selected Core Activities
- Shift into Expanding Service Sectors
- More Partnering Work in Capital Projects to Improve Margins
- International Growth in Selected Industries

Although the macroeconomic picture looked fairly well, Mason thought the company needed a much more stringent focus and a need to redefine its core competences. The overall trend to outsource public activities to the private sector on top of the Public Finance Initiative (PFI), a healthy growing economy and deteriorated infrastructure meant good prospects for the construction industry as a whole. On the other hand, though, a long awaited consolidation of the industry was yet to come and hence persistent and fierce competition in the majority of AMEC’s markets would not lead to improved margins.

AMEC’s role as a highly integrated traditional construction company was to change. Instead the company would gradually move more into the role of a construction manager. The underlying reason is twofold. First, a smaller work force could more easily adapt to the cyclical demand of construction services and thus lead to a more flexible cost structure and second concentrating on a functional segment along the construction process means exposing the company to lesser risks. Being better in a specific field as well as outsourcing work and thus risk in part to your subcontractors reduces overall risk exposure.

The fact that operations and maintenance account for roughly 85% of a building’s life-cycle costs was not that new at the time. Changing though, similar to the Government’s initiative, was a comprehensive evaluation of capabilities in the private sector. Fiercer competition in a more global economy led companies to abandon those activities to which they could add any value. This reevaluation
opened up opportunities for the construction industry in general and AMEC in particular. In addition, services have the added beauty of recurring cash flows since they usually come as long term agreements and thus allow to better forecast a company’s financial position. On top, capital markets honor the improved “visibility” with a higher stock price.

The partnering approach has been explained above. It was meant to take AMEC out of the common construction arena of adversarial relations between a project’s participants by sharing the benefits of improved collaboration fairly.

Since a lump sum, low bidding contractor always comes at the very end of the thought process for the building, a good part of the industry has lost the client out of sight to an extent where a one fits all solution often seems appropriate. Time, money and quality are seen as equally imperative for all clients. Much to the contrary, they vary tremendously. A chip manufacturer, for instance, values the timely opening of its plant beyond all others, whereas a university might be, above all others, be interested in the quality of a new research laboratory. Hence, analyzing each client carefully and trying to understand its unique pain and needs, AMEC identified and focused on selected industries, where they thought to have unique capabilities and the growth perspective were attractive. These include, among others, the oil & gas industry with clients such as Shell, BP and Exxon, and the pharmaceutical & chemical industry, with clients such as BASF, Astra Zeneca and Smith Kline Beecham. Downtime of a pharmaceutical plant or an oil-drilling platform easily amounts to several million Euros a day. On the other hand these companies increasingly view activities such as the optimal design and the project management of such facilities beyond their core capabilities and thus worth outsourcing. AMEC’s objective became to move into that space, which had been abandoned by these companies. In doing so, AMEC sought to differentiate itself from competitors by developing proprietary knowledge, locking into long-term client relationships and building a trusted brand name.
Two years after AMEC had embarked on new turf, the strategy was scheduled for review. Mason and the entire board thought that results, both in the books and outside at the capital markets, supported their path. In fact, they decided that the initiatives, agreed upon in 1996, should be accelerated. Hence, AMEC should become even more selective in taking on capital projects work, repeat client work should account for an even higher percentage of the overall work done and the company ought to take on an even more life-cycle centered view of buildings and facilities in selected industries.

The Annual Report 2000 says: “Over the past few years, AMEC’s core business strategy has been to generate value for shareholders by transforming the company into a global, service-driven enterprise with a strong base of predictable, recurring revenues from long-term clients. We have focused our work in selected client sectors such as energy, pharmachem, other process industries and infrastructure, where we are able to differentiate ourselves from our competitors, add significant value for our clients and generate improved margins for AMEC.”

6.1.4 Implementation
A successful strategy consists of formulating one, but just as well implementing it at the same time. They are two sides of the same medal. In order to successfully achieve the 4 stated initiatives or goals, Mason undertook the following concrete steps.

- Alliances and Joint Ventures
- Acquisitions and Divestures
- Organizational Structure
- Withdrawal from Competitive Bidding

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First he led AMEC into a number of alliances and joint ventures. The underlying rationale was to quickly extend the global reach, without draining the company's financial flexibility and leveraging existing know how through new distribution channels. For example AMEC teamed up with Flour Daniel of the US to collaborate on offshore, deep-water oil and gas floating production platforms. AMEC brought its engineering and Flour Daniel its project management capabilities to the table. In turn, both partners gained a more critical and thus credible size. Past projects include a major contract with Shell in the Philippines. The US$150 million contract for the Malampaya energy project includes operational support services for deepwater sub-sea wellheads, an offshore production platform and loading spar, a 500-kilometer sub-sea gas pipeline and onshore gas-receiving terminal.\textsuperscript{40} In Angola, the alliance is performing project management and engineering services for West Africa's largest deep-water production facility. With 25,000 tons of topsides, the FPSO, located 60 miles off the coast, will process over 200,000 BPD.\textsuperscript{41} Other joint ventures are with KH Engineering in the Netherlands for chemical and pharmaceutical work and with the Public Work Department of Singapore in Asia.

Since 1996 AMEC has divested companies, which accounted for cumulative revenues of roughly € 960 million.\textsuperscript{42} On the acquisition front AMEC has completed a number of smaller ones. Their two largest acquisitions, though, are SPIE and AGRA.

SPIE is a leading French contracting and electrical engineering company, of which AMEC initially bought a 41.6% share in 1997, increased it to 46% in 2001 and has an option to buy the rest for a capped price until 2002. SPIE had sales of € 2.7 billion in 2000. 74% of these are generated in France. Its construction arm, Spie Batignolles, accounts for about 28% of sales, where it focuses on complex infrastructure projects. The electrical engineering segment comprises two

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\begin{itemize}
  \item \textsuperscript{40} Journal of Commerce Activity, January 2001: \url{http://www.joconl.com/archives/Jan2001/Jan24.html}
  \item \textsuperscript{41} Flour Daniel, USA 2001: \url{http://www.fluor.com/projects/offshore_floating_production.asp}
  \item \textsuperscript{42} Annual Report 2000: \url{www.amec.co.uk}
\end{itemize}
\end{footnotesize}
business units: Spie Trindel, which is good for 52% of revenues, installs and maintains all kinds of electrical equipment from high and low voltage to automatic devices and from energy production to telecommunications and information networks. Spie Enertrans finally is the energy and transportation arm. It constructs and maintains power plants and lines as well as railway networks. Operationally, AMEC has thus far integrated SPIE through a JV called AMEC Spie Rail, in order to leverage SPIE’s capabilities in the extensive railway privatization program in the UK.  

In April 2000 AMEC acquired a 100% stake in AGRA, an engineering and professional services company, located in Edmonton, Canada. It has revenues of roughly €1 billion. 85% of its business is generated in the US and Canada. Its core strength lies in environmental engineering, where it provides services in air quality, contaminant assessment and remediation, environment impact assessment, socio-economic impact studies and waste management. AGRA gives AMEC a substantial North American presence and allows it to roll out their unique capabilities through AMEC’s global distribution network.

Together these two major acquisitions have propelled AMEC a great deal closer to fulfilling its objective of becoming a truly global company. Both companies account for 55% of AMEC’s non-UK operations given its current stake in SPIE of 46%. After having fully integrated and bought (2002) and thus consolidated the company into its balance sheet, both will account for 75%. In an interview with the Financial Times (FT) this summer, Mason talked about the risk of acquiring large as opposed to a number of smaller enterprises. He concluded that there is a trade-off between building and preserving a company’s own culture on the one hand and creating momentum from change on the other when acquiring large companies. In a mature industry though, such as the construction, growth prospects can only be unleashed when changing the industry equilibrium, in

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contrast to high growth emerging industries, where cultures are more fragile and vulnerable to exogenous factors. Cisco’s success, for example, has often been attributed to its ability to integrate small start-ups. He went on saying that top management assumes an even greater responsibility and their ability to collaborate decides the merger’s fate. In AMEC’s case he cited this relationship as the single most important reason for their success.

The right organizational structure in place to deliver on the mentioned strategic promises was a daunting task. Over the following years this would be an evolutionary process since the company’s transformation would be dynamic and reacting to market opportunities. At Mason’s start he found a structure that was a mixture of overlapping and conflicting business units.

![Graph 24]
Services and Investments had been put together with manufacturing and homes. At that time these segments were still young, undeveloped and their contribution to the company’s bottom line were marginal. Given Mason’s intentions to focus on support services, the increasing importance of the PFI program and last not least the fundamental difference in doing business and hence types of risks encountered in these segments as opposed to homes and manufacturing, a reorganization looked inevitable. Due to AMEC’s reliance on the home market, a reshaping of business units along similar risk patterns and clients seemed the right solution. After the SPIE acquisition and the upcoming one of AGRA, the unfolding internationalization of the company made a reconsideration of its organizational structure necessary. Could a business unit structure provide the proximity to its clients, given that most markets and hence decision making were still functioning on a regional level, even though the clients itself had become global powerhouses. The answer was that a more decentralized and thus geographic alignment was the way to go for the engineering, construction and service units. Their greater autonomy on a regional scale was to ensure better client contact. Capabilities for the energy, pharmaceutical and investments were to be bundled and therefore worldwide units.

In its move to escape low bidding in capital projects, AMEC has successfully focused on a few industries and key clients. The degree of repeat business is a reasonable proxy for AMEC’s achievement in partnering with clients. Its annual report says that in 2000 75% of its sales in capital projects were generated from its top 10 clients.
The above graphs show how AMEC has thus far achieved in diversifying its business as well as broaden the segments it works in and has come a long way to becoming a global company in the AEC industry.

6.1.5 5-Year Performance

A return on sales in 2000 of 2.5% looks pretty impressive for a construction company. Still, this is just a snapshot in time and does not, as such, allow drawing any conclusions. To evaluate the success of both formulating and implementing a corporate strategy, it is worth looking at a 5-year time span for a number of different financial ratios and company figures to extract a trend. For analyzing AMEC’s financial performance and thus drawing conclusions on the success of its strategy it is advisable to exclude the 2000 numbers, because they include the acquisition of AGRA and thus don’t reflect past action. Its success will be better seen in a year’s hence.

One of the objectives, when Mason took AMEC’s helm, was to increase profitability, even at the expense of growing sales. The company managed to almost triple its operating profits within four years, even though sales were essentially flat. On the other hand, comparing absolute operating profits for these years don’t really tell much more than sufficient liquidity, because the nature of their business has changed and thus the extent to which new businesses have different funding needs. Hence one would compare apple with oranges. To
overstate the point, generating €1 billion in sales being in the chip industry likely requires different capital than building buildings. In AMEC's case, the upfront costs in pursuing projects within the PFI are relatively higher.

Again, excluding the 2000 numbers, AMEC's turnaround looks very impressive. A return on equity of between 25% and 30% is very healthy, given that they started at about 8% in 1996. The picture is almost identical for ROCE, where the denominator includes all interest bearing liabilities as well. This shows you that they have not taken on much debt either.

The last financial proxy for successfully formulating and then implementing a strategy is what capital markets think of the company.
Both in terms of absolute market capitalization as well as with respect to its peer group in the UK, represented by the FTSE Construction & Building Index, AMEC has shown a strong performance.

Finally it is interesting to see how AMEC has achieved in focusing on higher value added work and disintegrated vertically, thus relying on subcontractors more heavily in the project execution phase.
6.2 Grupo Dragados S.A.

6.2.1 Spanish Construction Market

Given that WWII had not resulted in discontinuities of its political institutions and/or destruction of its infrastructure, Spain underwent a different development than much of the rest of Europe, politically and economically. The Spanish economy was and is experiencing a similar but somewhat shifted economic cycle compared to countries such as France, Germany or Britain. Whereas the days of a buoyant economy fueled by strong investments in infrastructure and buildings had not been seen in these countries since the mid-70s, Spain is in the midst of such an up rise.

Joining the European Union\(^{46}\) (EU) on January 1\(^{st}\) 1986 proved to be a catalyst for Spain’s development in general and its construction industry in particular. The underlying reason is that one of the EU’s long-term economic imperatives is to balance the level of prosperity of its member states measured as the gross domestic product per capita. Bruxelles collects money and redirects it to countries or more specifically regions, which lie below the EU’s average. These so-called structural funds must be used for capital goods as opposed to consumer goods. Since Spain’s joining of the EU coincided with badly deteriorated public and to some degree private infrastructure there was a perfect match. At this moment the EU’s aspired enlargement eastward, politically sought and economically justified, threatens to put this very position in jeopardy.

It is interesting to note, that, during last year’s European wide 3\(^{rd}\) generation UMTS telecommunication licenses auctions, Spanish Telco’s are said to have roughly paid the amount of money to governments in Germany and the UK, which Spain had received over the years from the structural funds, which again are in large part paid for by these same two countries.

\(^{45}\) Called the “European Communities” at the time, until the Treaty on the “European Union” (EU) was ratified and took effect November 1\(^{st}\) 1993, thus increasing the degree of integration politically, economically and socially.

\(^{46}\) Along with Portugal
Coming out of an economic crisis throughout much of the 70s and early 80s, Spain and its construction industry have since experienced steady and high growth, being only interrupted during the recession in 1992/93. Spanish GDP rose 4.1% in 2000 and is expected to grow by 3% this year. Between 1997 and 2000 alone construction output increased a staggering 18%, is expected to grow 6.4% in 2001, 5.3% in 2002 and thus outpaces the economy as a whole (see Graph #). Throughout the 90s the construction sector has maintained a share of roughly 9% of GDP and even 13% of overall employment. This is higher than in most other Western countries.

Construction activity is primarily fueled from strong demand for tourist-related buildings and second homes, high levels of investments in infrastructure and a structural shortage of quality housing.

Declining working hours and increasing net income in the Western world have led to the unprecedented rise of the tourism industry around the world, leaving some countries overly exposed and dependent. Among other countries, Spain has tremendously benefited from this boom. Its vast coastlines in the south and the east provided the needed land. Having initially attracted the masses Spain is now successfully focusing on the more affluent, high-income (= spending) clientele.

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47 Estimation PriceWaterhouseCoopers: http://www.pwcglobal.com/gx/eng/ins-sol/spec-int/ece/country_reports.html
48 The Economist: Country Profile Spain
During much of the 90s house building had been the major growth driver. This segment seems to be slowing. At the same time infrastructure investments are hitting an all-time high with 29%\(^49\) of total construction output in 2000. After declining in 96 and 97 in the aftermath of the 90s recession the public sector has put together infrastructure programs similar to the PFI (Public Finance Initiative) in the UK, which now show its effect. These are the Infrastructure Plan\(^50\) between 2000 and 2010 and the National Hydrological Plan from 2000 to 2008.

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A combination of a relatively high concentration in the Spanish construction industry, where the largest 5 contractors account for 20%\(^51\) of the overall market, and very high investments into infrastructure facilities, such as bridges, roads and ports, led to healthy profits. Since infrastructure work is usually large and requires higher technical capabilities than for instance office buildings, the increased demand typically favored larger companies, who have these needed skills in-house. Thus, competitive forces in the civil engineering arena have been rather moderate and resulted into a number of prospering contractors, such as Ferrovial, Dragados, Acciona, FCC and ACS, over the last decade.

In addition, the Spanish construction sector has been among the most active and innovative when it comes to diversifying its businesses and using the huge cash flows generated from its construction activities elsewhere. Besides moving into

\(^49\) ABN Amro Bank N.V., The Netherlands  
\(^50\) Ministry of Public Works, Madrid, Spain  
\(^51\) El Panorama De La Construccion, Spain: October 2001
the services sector and applying promising procurement methods, such as BOT, to infrastructure projects at home and in its natural “backyard” Latin America, industries invested into include mobile telephony and energy.

6.2.2 Background
Today, Dragados is Spain’s second largest construction group with sales of €4.6 billion in 2000, of which 75% were generated in Spain. Founded in 1941 as Dragados y Construcciones the first international base was established in South America in 1950. Then the business diversified into real estate and transportation throughout the 60s, before an expansion of its international operations was to reduce its reliance on the home market during much of the 70s. Joining the EU led to relatively higher growth at home throughout much of the 80s, thus increasing its domestic share once again.

The Spanish construction crisis in the beginning of the 1990s struck Dragados hard and, as a response, a series of strategic initiatives were launched to diversify the operations and to internationalize the business with offices in Brazil, Argentina, and Venezuela among others. It has grown strongly internationally and tripled its international operations over the last five years. In 2000 it was the first of the large Spanish contractors to start an electronic marketplace for online collaboration and procurement (E-Difica.com). These initiatives were financed through the construction cash flow and the proceeds from divestures of non-core assets and poor-performing operations.

The most successful diversifications have been services and concessions that have grown strongly and now account for half the profits. The expansions into these areas have largely been organic and through joint ventures.

The strategic initiatives have, with some help from the Spanish construction market, helped fuel growth and improve margins for Dragados and the company has seen a significant revaluation in the stock market last year.
Dragados’ core business remains to be construction with 54% of its overall sales in 2000. Dragados Obras y Proyectos is the holding entity under which all construction activities at home and abroad are being managed. Dragados Construcccion is the primary operational unit, marketing its services in the traditional building and civil engineering fields. Specialty work is done by Drace, which was formed to bundle all specialty engineering and design knowledge, both to leverage its value due to collocation as well as to sell it to the outside market, instead of solely using it in-house. It works predominantly in the marine and environmental protection filed. Tecsa’s strength is railroad work, responsible for a big chunk of the high-speed connections currently under way between major Spanish cities. It has remained operationally independent because of its location in the Basque region. International construction work accounts for 22% of construction activities, 80% of which are performed by Dragados Construcccion and two subsidiaries in Argentina and Brazil.

In industrials, MASA is Spain’s leader in industrial maintenance and mechanical erection for major process industries, such as chemical and automotive. CYMI is responsible for electrification along railroads and high voltage lines, as well as performs electrical work for power plants and dams. Others include Dragados-Offshore, INTECSA-UHDE S.A. and Dycotel.
Dragados has taken significant advantage of the public sector’s move to outsource activities, no longer seen as being of higher social and national interest. These activities include street cleaning, waste collection, wastewater treatment, power distribution and health services. Stemming from the gained capabilities, Dragados extended into the private sector, where it has, most notably, become Spain’s leader in the management of port infrastructure installations.

Dragados’ inroad into the concession arena has been very successful. It claims to be the world leader in toll roads. Projects are either pursued independently or through Aurea, a company in which Dragados has a minority share of 35%, but assumes management control. It thus far focuses on the Spanish speaking markets in Latin American and Spain.

Today Dragados has balanced its activities between assuming the role of a traditional, highly integrated general contractor primarily at home and generating recurring cash flows from less cyclical, more predictable services. The latter already account for half its profits, which have increased ever since coming out of the last Spanish construction slowdown in 1994/95. Nonetheless, its dependence on the Spanish market shows its need to grow internationally.

6.2.3 Formulating a Strategy
At the end of the construction downturn during the mid 90s Dragados’ EBIT had decreased to 2.4%, whereas it had been at 4.5% just 4 years earlier. Sales had
been flat for two years and other financial indicators, such as ROE, ROCE, stock price, cash on hand and fixed costs (overhead) were equally discouraging. In the face of its deteriorating position and the extent to which it had been overly vulnerable to the economic downturn (90% of EBIT in 1993 came from cyclical construction business before heading into the downturn), a reevaluation of the company’s objectives and where it was heading was imminent.

To reduce its dependence both on the home market Spain and lower its exposure to the more cyclical building sector and regain profitability, Dragados’ chairman Don Antonio Durán Tovar made moved along three dimensions:

- Internationalization
- Improve operational effectiveness
- Diversify into promising growth markets

Even though geographically diversifying one's cash flows becomes gradually less effective in a time of “Globalization” during which increasing dependency of national economies due to rising trade of goods and services synchronizes the economic cycles 52 worldwide, Dragados still felt that growing internationally in specific target markets was important.

Low profitability was only in part to blame on the macroeconomic malaise. Moreover the company had boosted its overhead and thus operational restructuring and reorganization was needed to cut the fat and regain momentum. Fixed costs had reached 6.5% by 1995. This compares to an industry consensus for a healthy general contractor of roughly 5%.

The reason to diversify into other markets and segments were similar as to broaden its geographic presence. The goal was to find a product mix that would

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52 Underscoring this hypothesis is the fact that we might be on the verge of an economic slowdown taking all three major economies, the US, Japan and Germany into recession for the first time since the oil crisis.
balance the exposure to the country's economic cycle. Finding a mix would alleviate the effect a recession has on Dragados’ overall performance, but retains its ability to take advantage of an exuberant construction economy. In boom times, demand increases faster than certain ingredients of a market economy, for example labor protection laws, allow the industry’s capacity to go up accordingly. Thus demand outstrips supply and allows windfall gains, until equilibrium is finally reached again.

Since services in theory are less risky and generate recurring cash flows, basic economics would suggest that returns are smaller as well. On the other hand, though, a general trend towards outsourcing in public government as well as the private industry leads to higher growth margins here in the foreseeable future and thus allows relatively higher profits.

6.2.4 Implementation
The first internal program between 1996 and 1997 was named Dragados 2000. It was succeeded by Dragados XXI and still is in effect.

Looking for growing international markets as well as being able to differentiate itself from competitors there, made Latin-American an obvious choice. Broadening the geographic reach had been an initiative, which in fact dates back to 1993, but was delayed due to the problems at home.
Coming from 13% in 1995, Dragados has on average had a quarter of its sales outside of Spain over the last three years. In 2000, 59% of the € 1.1 billion international sales were generated in LatAm, primarily in Argentina. The right graph shows that this growth was not achieved on the back of higher risk, low margin construction business, but rather in the services, concession and industrial sector, thereby achieving two objectives at the same time.

Dragados has entered new markets by either buying market share there and then building the business or by forming joint ventures (JV) and alliances in order to be a credible force and sell unique capabilities.

In construction, Dragados has pursued a cautious but effective way in buying minority stakes in companies, increasing its ownership over time and then growing organically. Permanent bases in LatAm date back to 1950, when it opened an office in Argentina. This year Dragados acquired 50% in Via Engenharia. The company was renamed into Via Dragados. It operates in Brazil and on track to be one of the five largest service contractors there. Dragados retains the option to buy all the shares.

The JV between Dragados and Spanish rival FCC, which was started in 1996 for large-scale international civil engineering projects, failed in 1998. Concessions in the transportation sector have all been pursued in partnership with either AUREA, where it holds a minority interest, or others.

To improve its operational effectiveness Dragados restructured organizationally as well as cut costs. Coming from an amorph structure with business units without clear responsibilities and no comparable businesses along the same line of command, the five segments construction, services, industrials, concessions and real estate were established as profit centers with each having a single management team. These teams report to the holding executive committee headed by Don Antonio Durán Tovar. The holding assumes responsibility for
financing, investor relations and foremost strategic planning. Should the internationalization of Dragados continue in the future, a reorganization along geographic dimension as opposed to product lines might become necessary in order not to lose the proximity to the customers’ needs.

Between 1996 and 1997 the workforce was cut by 1100 people and non-performing assets worth €430 million were divested.

Dragados has achieved very impressive results in diversifying the company into new markets and services. In ports management, that is container handling, tug services and logistics, it has become Spain’s market leader after only three years. The market was created after ports were started to privatize in Spain. In waste treatment, Dragados gained a 45% market share within 10 years. Finally in the concession field, namely toll-roads, they have managed to take a leading global role within 8 years. Aggressively acquiring companies and then growing internally did achieve this.
6.2.5 5-Year Performance

Since 1996 Dragados has increased its sales consistently by 70%. More impressively, this growth has not been unprofitable at all. Rather EBIT almost tripled. In addition, increasing return on equity to 19% in 2000 gives shareholders good reason to stick to their stocks and increasing ROCE, measured as earnings before interest and taxes plus all income from financial activities over shareholders’ equity plus all interest bearing liabilities shows that Dragados has not leveraged the company’s balance sheet, but rather kept a stable capital structure with a debt to assets ratio of 75%. Financial assets outnumber long-term financial debt by more than 2 to 1 and on the current side assets comfortably beat liabilities by 3.4%. Both current assets as well as current liabilities, mainly accounts receivables and payables, make up the bulk (Current assets to total assets = 56%) of Dragados’ balance sheet, which is typical for any construction company. Typically the higher integrated a construction company the higher the share of current assets. This is due to the reason that traditional contractors usually take on projects at risks as opposed to the Anglo-Saxon Construction Manager, who is more of a broker between the client and his subs, thus being paid on a fee basis and thereby reducing the incentive to take advantage of his position. Projects at risk, in turn, mean that the company manages and distributes all cash involved in the project. For that reason it is a commonly agreed upon conclusion that managing cash flows more than absolute profits is the differentiating factor between successful companies and those that fail.
The questions to be answered are first how Dragados has performed relative to its peers and second how the quality of cash flows have changed over the years, to judge both its proneness to macroeconomic changes as well as the likelihood of extraordinary charges due to failed projects.

Dragados’ market capitalization has almost tripled over the time of analysis. In order to judge the success of both formulating its strategy and implementing it at the same time it is important to distinguish the extent to which its development can be attributed to this very strategy on the one hand and the generally booming construction market in Spain on the other. The above graph clearly shows that Dragados has not outperformed its peers in the Spanish market, notably Ferrovial, FCC and ACS, which have equally prospered over the last 5 years. On the other hand the proxy used to describe Dragados’ relative success represents only companies listed on the stock exchange. Since these, by nature, are only the large ones it fails to represent the vast number of small to medium sized
companies. Therefore, given the fact that Spain’s top 5 contractors have increased their market share over the last five years from 15,4% to the mentioned 20% today, it can be concluded that the bigger ones, including Dragados, have at least successfully outperformed the overall construction market.

Capital markets traditionally don’t get very enthusiastic about the construction sector. There are several reasons, but two of them stick out. First the industry is perceived as mature, having little growth potential and chronically unprofitable, thus attracting little capital. Second, the industry structure has gradually left contractors (compared to the client, developer or bank) with the overwhelming share of risks inherent in a construction project. Coinciding with the project-based nature of the business (no product cycles like industries such as automobile), the predictability or what investment bankers refer to “visibility” of construction companies’ cash flows has been very low, thereby increasing the perceived and real risks of the cash flows.

Hence, changes in a company’s business segments or product mix over time might result into a higher “visibility” and finally lead to a lower weighted average cost of its capital (WACC), which accounts for the very risk of cash flows by identifying a risk premium and asset beta (β). The asset beta measures the correlation of a company’s cash flows to the performance of the overall market. A company’s beta decreases, either by reducing the cash flows’ sensitivity to an economic slowdown or by offsetting one business segment against the other and thus hedging the sensitivity as well.

Revisiting Dragados’ change in business segments and qualitatively assigning a sensitivity factor allows judging the quality of their profits today and five years ago.
Construction as a percentage of overall sales has decreased from 74% to 54% this year. Given that these cash flows on aggregate have the highest risk attached to and given the growing importance of their civil work within construction with the least risk due to the public Infrastructure Program, a moderate economic slowdown does not seem to bother Dragados much. More importantly though, the increases in services and concessions and the recurring and low risk nature of these cash flows seem to be ample evidence that the company’s overall cash flows on aggregate are less correlated with the overall market and thus should have resulted in lower cost of equity and in the medium term its cost of debt as well, after the Basel II Accord takes effect introducing new lending regulation.

53 Basel II Accord http://www.bis.org/publ/bcbsca.htm
Finally, it is worth mentioning that the number of employees has increased proportionally with its sales over the last five years. It shows that Dragados has essentially remained to be as vertically integrated as they have been before, therefore in construction at least assuming the role of a traditional general contractor (GC).

![Graph 52: Number of Employees](image)

![Graph 53: Revenues per Employee (Thousand Euros)](image)
6.3 Hochtief

6.3.1 German Construction Market

Rebuilding infrastructure and housing capacity was the major priority throughout much of the 50s and 60s for the Western part of a country, which had emerged from a period of self-imposed destruction and had seized the opportunity to thrive given by the victorious powers due to farsighted political considerations and the immediate transition into a bipolar world order: the Cold War. The construction industry as a whole prospered tremendously during these times. Experiencing a setback after the first postwar recession in the early 70s the industry regained enormous momentum.

The industry’s development over the last 25 years is primarily the result of two events: The Oil Crisis and German Reunification. The consequences are twofold. On the one hand, temporarily exploding construction demands surpassed the existing capacity and thus resulted into healthy margins. On the other hand profits from these exogenous factors overshadowed an overdue consolidation of the industry as a whole and a restructuring on a firm level. These internal omissions coincided with the retreat of the public sector from investing into construction services in recent years, thereby magnifying their effects up to the very moment.

During the 80s recession most large construction companies managed to offset losses at home with windfall profits they were making on the Arabian Peninsula. The Oil Crisis magnified the West’s dependence on Middle East oil, led to an economic slowdown around the world, but also resulted into an unprecedented construction boom in countries around the Persian Gulf. The countries’ inexperience in procuring construction services and temporarily defying the economic principle of capital being a scarce resource made international construction for most companies a very joyful experience, indeed.
Feeling the moral obligation after 40 years of prosperity and realizing the political need to prevent an otherwise depopulated part of the country, the East’s living standards would have to match those of the West faster than a normal economic development would predict after the German Reunification in 1990. As a consequence the so-called “Neue Bundesländer” (Mecklenburg-Vorpommern, Sachsen-Anhalt, Brandenburg, Thüringen & Sachsen) received net transfers as high as 6.5% (1992) annually of the German gross domestic product over the last ten years to boost its economy. To put this into perspective, these numbers would mean reallocating $ 650 billion annually (GDP 2000 = $ 9963 bn) on all levels of public office, municipal, state and federal, to Texas and California. These two states account for roughly 20% (55 million) of the American population, just as the five “Neue Bundesländer” do. The money was and is invested into business building, infrastructure and alleviating the effects of unemployment, an unexpected by-product of a free market economy.

At the peak of the construction cycle in 1994 Eastern Germany made up 35% of all output. In 2000 this number was still 25%, compared to the 20% in population. For 6 years now, output has decreased every single year to around the same level seen in 1992. At the same time the overall economy has, except for 1993, steadily grown. In 2000 the German construction market, the largest in Europe (20% share), still generated € 240 billion54 of construction services.

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54 Deutsche Bauindustrie: http://www.bauindustrie.de
As mentioned earlier, fundamental reasons for the decline were the public sector's departure from investing into and prohibiting innovative procurement methods of construction services. Today 13% of construction output account for the public sector. This is an all-time low in German history.

Since rebuilding Eastern Germany was heavily debt financed, public budgets hit record debt levels by the mid-90s. This in turn endangered meeting the Maastricht Treaty, which structured the path for the introduction of the Euro in January 2002 and set certain entry barriers with respect to inflation rate, budget deficit and total country debt. Therefore a sharp reduction in public spending was the only solution given that tax levels gave no room. Unfortunately though, decreasing the public's involvement in everyday life turned out to be politically impossible. Therefore, the easy way out was to cut direct public investments, especially in infrastructure spending.

Programs such as the PFI (Public Finance Initiative) in the UK have lacked political support in Germany throughout all political parties. This reserve has been both ideologically motivated, meaning that infrastructure is the public domain, and represents respect for every car owner's vote, since operating and maintaining an automobile is already very costly. Finally though as a first cautious step, the German Parliament passed legislation in October 2001 to attract private capital for the accelerated renewal of public infrastructure:

- Only federal construction (20% of public spending)
- Extension of 10 existing “Autobahns” from 4 to 6 lanes only

Barriers to successful private sector involvement remain. First, excessively long and risky planning phases make an outcome unpredictable. Second, under the current scheme companies would be reimbursed out of funds from a national

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55 Ironically enough to alleviate German fears of potentially giving up its D-Mark for a weaker successor
56 Ministry of Transportation, Construction and Housing: http://www.bmvw.de/wwwroot-bmvbw-302.6806.htm
truck toll, but would lack the right to collect and adapt tolls themselves. Among those trying to be one of the main beneficiaries of the program will be Hochtief.

6.3.2 Background
Similar to most other German construction companies Hochtief’s success over the last 125 years resulted from the technical ingenuity of its engineers to a great extent. Combining traditionally strong engineering schools with the continuous need to rebuild the infrastructure after two wars, Hochtief gained a reputation for building civil engineering structures, first at home and then in Africa, Asia and the Middle East as well. Recent projects include both the Great Belt and the Øresund bridges connecting Denmark and Sweden in the Baltic Sea.

Today Hochtief consists of 6 legally autonomous units. Each functions as an independent profit center.

Hochtief Construction AG is essentially what the company used to be 10 years ago. It comprises the geographically dispersed German construction offices.

Hochtief International is a holding company for all its international subsidiaries, some of which have been founded many years ago, grown organically and bear its name, such as Hochtief do Brasil and Hochtief Construcciones in Argentina, whereas others have been more recently acquired, for example Ballast Nedam and Leighton Holdings Limited.

The most obvious move into new markets is Hochtief Airport. Since air travel has the highest growth rates in the transportation industry, Hochtief is pursuing concessions to build, operate and maintain airports. Leveraging its long-standing client relations in the public sector, Hochtief has, thus far, successfully been awarded licenses in Hamburg, Düsseldorf and Athens. A bid for a new international airport in Berlin is still pending.
Hochtief Development focuses on the German market. Its business is real estate development as well as facility management. Hochtief North America primarily consists of Turner Construction Company.

6.3.3 Formulating a Strategy

Anticipating the end of the German Reunification related construction boom Hochtief's CEO Dr. Hans-Peter Keitel set the following strategic goals:

- Expand the range of construction-related services
- Strongly increase international component of the business
- Restructure German construction business

Construction had proven to be a slow growing, mature market and very sensible to economic downturns. Hence, the search for construction related services would be an attempt to apply proprietary skills to high growth, less cyclical businesses.

The business logic for expanding internationally is straightforward. Hochtief wants to increase the share of repeat business in the private sector. This would create business relations based on mutual trust and supposedly result into higher margins. By nature though, potential clients with a recurring stream of capital projects can only be found in large manufacturing and process industries as well as in real estate. These industries in turn are the most blessed or cursed by what is commonly referred to as Globalization. Globalization leads to increased economies of scale and thus consolidation pressure. In order to handle such large organizations management would consolidate the supplier base as well. Hence, Hochtief had to increase its global reach.

By 1995 profits had been decreasing. The sharp downturn had shown Hochtief how the then existing structure both in terms of vertical integration and defining a division's market had not permitted them to respond adequately.
In pursuing the first two objectives of its strategy, namely expand into services and grow internationally, Hochtief looked for possible acquisition targets. Growing the needed skills and client contacts in-house would take too long. Finally Hochtief bought Turner Construction Company in the summer of 1999. Though keeping its second promise to grow outside of Germany with non-German sales amounting to 70% in 2000, the first objective seems in jeopardy. These account for only 3% of revenues.

Turner is essentially a pure play construction management company in very traditional segments, especially commercial buildings. Whereas the distinction between a general contractor and a construction manager is common in the US, a transition for contractors to take on more of a management role and work closely with subcontractors is currently underway in German construction. Therefore Hochtief is keen to learn from Turner in managing this process. On the liabilities side, Turner was bought at the peak of a 7 years US construction cycle and their return on sales of only 1.3% (1st half 2001) in a still booming construction economy look very poor. Especially, Turner will get Hochtief not a single bit closer to move into the entire arena of outsourced public activities, for example waste water treatment, water distribution, street cleaning or port management. These markets are expected to open up in Germany in the medium term. In addition integrating a company, which has the size of Turner, will be taking on a lot of management capacity on Hochtief's side. This comes at
a time where Hochtief is struggling to lead its German construction activities back into profitability.

Another acquisition, Leighton Holding Limited, provides Hochtief with a company that has strong skills in infrastructure and thus complements Hochtief Projektentwicklung in Germany. Leighton is based in Australia and operates all over Asia. Benefiting from the opening up of infrastructure procurement throughout Asia in the 80s using private capital, Leighton gained experience in innovative delivery methods and infrastructure development. In the 90s they expanded into telecommunications, successfully forming joint ventures with telecommunication companies in building the needed networks.

Organizationally Hochtief has transformed from being a traditional general contractor to a multinational services company. Similar to most construction companies in Germany and elsewhere in the world, Hochtief has traditionally been set up geographically, having largely autonomous offices in major urban centers aligning them with the customers in these regions. Organizing the company geographically can result in a serious problem. Autonomy of the offices rises and the cohesiveness of the entire organization suffers. Communication breaks down between offices, thus skills and capabilities aren’t sufficiently leveraged among them, economies of scale cannot be achieved and eventually the whole is less than the sum of the pieces due to corporate overhead’s inherent costs and reduction in flexibility. Hochtief realized the sub optimal structure and set the stage to partly reorganize the units more towards a product grouping where the market permits such action. Essentially they are trying to realize the optimal trade-off between proximity to its customers and collocation of its specialized assets, meaning employee know-how.

Ten years ago, Hochtief had roughly 30 offices throughout Germany. These offices, independent profit centers, all offered the entire continuum of constructed facilities from bridges, ports and roads to office buildings, plants and malls,
thereby duplicating proprietary skills and being unable to efficiently deploy them. Only their international assignments were managed centrally. The idea was to draw on foreign subsidiaries’ client contacts and combining these with Hochtief’s German specialty technical know-how.

Moving into new markets and thus offering new products as well as changing clients and market conditions led to changing organizational structures over the years. The idea is to align businesses where risk profiles and needed functions are similar. Developing buildings, for example, has far less in common with building buildings than often perceived. Whereas technical ingenuity and building process efficiency are the keys to success for a construction company, anticipating property prices and customer preferences as well as marketing skills, make the difference in real estate development.

Upon reviewing its German construction operations a few years ago, Hochtief disentangled civil engineering projects (Hochtief Civil) from other building projects (Hochtief Building). In civil engineering the differentiating factor is the uniqueness of the design, whereas in other commercial buildings process efficiency and close client contact predominate. Therefore it created competence centers for tunneling, marine works and power & water. On the other hand these
competence centers have to draw on other divisions' client contact, making the interface and incentives very difficult to define. Creating an additional organizational layer this summer, Hochtief Construction AG, where both the civil and the building division move closer together again, might express these difficulties.

The same underlying rationale applied for setting up autonomous units for Hochtief Airport, Hochtief Development and Hochtief Services. Creating independent units for Hochtief North America and Hochtief International, though, seems to be a sign of a company growing faster than corporate structures and thus cultures can bear. Consistent with its move to align the business increasingly along products, combining Turner and what used to be Hochtief Building would have made sense. These units have very similar products and clients in their respective markets. On the other hand the execution differs just as much. Turner is the US's largest construction manager at risk\textsuperscript{57}. As opposed to Hochtief Building it excels at outsourcing the majority of the work and at the same time creates stable subcontractor relations in order to deal with the project risk. Assuming that this skill is one of the underlying reasons to acquire Turner, an alignment would have made even more sense.

Apart from the flaws of creating Hochtief Construction just cited, it was the last step to create a pure holding company structure separating operational from group responsibilities. In the past the heads of all divisions were on the executive committee as well. Consequently a classical you-get-what-you-pay-for problem could arise. If you are responsible for both the unit and the group as a whole, but your performance is measured only on the unit level, your action will most likely be biased towards that unit even at the expense of the entire group. Now each manager has a clear-cut job description. The unit manager has to maximize profits and reports to the executive committee. Executive level managers seek and allocate finances, solve legal issues and define the strategy. Above all, it is

\textsuperscript{57} Engineering News Record, USA: http://www.enr.com/dbase/2001cmrisk.asp
their challenge that the very organizational structure put in place to help the business does not prevent the company from sharing skills and capabilities across units. Otherwise a conglomerate can't add value. A shareholder would be better off buying a diversified portfolio of different stocks with the same businesses as the conglomerate. Assuming that intersegment sales be a proxy for sharing skills across organizations boundaries, the following graph shows that Hochtief still has a long way to go.

<table>
<thead>
<tr>
<th>(EUR thousand)</th>
<th>External Sales</th>
<th>Intersegment Sales</th>
<th>% of Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airport</td>
<td>2,151</td>
<td>19,022</td>
<td>784.0%</td>
</tr>
<tr>
<td>Building</td>
<td>1,872,470</td>
<td>117,674</td>
<td>6.3%</td>
</tr>
<tr>
<td>Civil</td>
<td>839,310</td>
<td>16,486</td>
<td>1.9%</td>
</tr>
<tr>
<td>Development</td>
<td>210,024</td>
<td>29,498</td>
<td>13.8%</td>
</tr>
<tr>
<td>International</td>
<td>405,567</td>
<td>2,159</td>
<td>0.5%</td>
</tr>
<tr>
<td>North America</td>
<td>6,228,900</td>
<td>-</td>
<td>0.0%</td>
</tr>
<tr>
<td>Services</td>
<td>41,326</td>
<td>91,489</td>
<td>121.0%</td>
</tr>
<tr>
<td>HQ</td>
<td>-14,020</td>
<td>10,705</td>
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<td><strong>∑ =</strong></td>
<td>9,585,728</td>
<td>287,033</td>
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*Graph 60: Intersegmental Sales*

Past reorganizations were only part of Hochtief's efforts to return its German construction units back into profitability. Capacity has been slashed heavily to cope with sluggish demand. Employees in Germany have come down from 20,000 in 1996 to around 13,000 in 2000. In addition, Hochtief tried to acquire its traditionally main rival, Holzmann AG, in the mid-90s. At the time, Holzmann was even more affected by the downturn due to heavy losses abroad and hence its stock price was depressed. Hochtief's was looking for a better cost structure compared to its competitors. Finally though, the take-over was prohibited on anti-trust grounds.

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58 Intersegment sales state revenues generated between Group companies.
Hochtief's development over the last 5 years primarily reflects coping with worsening market conditions at home and acquiring the leading general contractor in the US, Turner Construction Company, in the summer of 1999. In FY 1999 Turner contributed € 1.2 bn in sales and was fully consolidated in FY 2000, thus accounting for € 6.2 bn. Therefore, excluding Turner's share, sales decreased by € 500 m to € 3.38 bn between 99 and 00. This reduction comes from downsizing the German construction divisions.

On the earnings side Hochtief has reported worsening numbers for the last three years. The strain on its financial situation would have been even worse if one excluded Turner. In 2000 Turner contributed € 100 m into the consolidated income statement. Otherwise the loss from continued operations would have been € -180 m.
Even though showing negative EBIT numbers in 1997 and 2000, Hochtief earned a return on its equity in all of the past five years. The reasons are twofold. First Hochtief made €180 m in 2000 from financial investments and second a number of companies, in which Hochtief only has a minority share, are accounted for after EBIT. In 2000 these equity gains amounted to €104 m. Leighton and Ballast Nedam were primarily responsible for this number.

To degree to which Hochtief eliminates value can be seen from comparing its ROCE to its cost of capital. ROCE calculates operating earnings less taxes over equity plus all interest bearing liabilities. All interest bearing liabilities includes long-term and short-term debt, but excludes accounts payables, which usually don't bear any interest payment. The cost of capital calculates the expected return on its debt, the interest rate, and the expected return on the shareholders' equity, which depends on the riskiness of the cash flows. These two costs are then weighed taking into account the company's capital structure. This means accounting for the indebtedness of the company.

Hochtief states that its WACC (Weighted Average Cost of Capital) was 4.3% in 1999 and 7.1% in 2000. The change is attributed not to a less risky business but rather to a higher leverage ratio. Comparing the cost to their ROCE, Hochtief has lost value over the last five years.
Its market capitalization reflects the decline in value as well. Since 1997 Hochtief has almost cut its value in half. This is even more striking since it tripled its sales during the same time period. It is nonetheless fair to mention that Hochtief has performed similar as all other publicly traded German construction companies. Its stock performance has been very much in line with the DAX Construction Index over the last three years. Currently all top 6 German construction companies report losses at home. Only two of them manage to offset these with profit in international markets.

Finally Hochtief has held its employees stable at around 41,000 since 1996. Again this compares with tripling its sales in the same time period. This reflects the effects of the Turner takeover. Turner is a construction manager at risk. Therefore all projects' funds flow through its books, although over 90% of the work is performed by subcontractors. Hence the revenues per employees have gone up sharply.
7 Research Findings and Conclusions

All three companies show a striking similarity in formulating their respective strategies. AMEC, Dragados and Hochtief all have embarked on a journey to internationalize, specialize and extend their services along the value chain. As much as intentions were congruent, each company’s implementation and thus success has been very different. In this last chapter, a basis for measuring success or firm performance is chosen, applied to each company and then a number of determinants for varying firm performance, such as management, markets and client behavior, are discussed.

Indicators for achieving these three strategic goals should be the following. Being present in and servicing global markets and the move from a vertically integrated construction company towards an engineering/design company ought to lead to a reduction in the company’s cost of capital, whereas specialization leads to higher value-added work and thus higher revenues per employee.

Over the five-year period, which has been looked at, AMEC as well as Hochtief have radically disposed themselves of their execution skills. AMEC’s revenues per employee have increased by 35% and Hochtief even achieved 175%. On the other hand Dragados remained stable. The reason is that the Spanish construction market has been growing tremendously and thus external pressures have been moderate, since barriers to entry ensure a favorable competitive environment. Although on paper, Hochtief’s transformation looks the most impressive, its rise can primarily be attributed to the acquisition of Turner in the US. Turner is a pure construction management company in commercial buildings, sourcing all execution from subcontractors. Although Hochtief will undoubtedly learn and transfer skills how to manage a construction project and at the same time pass on risks downstream to the subcontractors, Turner does not offer Hochtief added skills in its objective to specialize in infrastructure ranging from roads, ports and airports and services. AMEC’s acquisitions, on the other
hand, have achieved both objectives. They specialize in certain industries and offer value-added services.

It has been argued earlier that the available financial models insufficiently grasp the complexities of organizations’ economic environments and thus the impact of strategies on firm performances. Nonetheless, they build the only basis to quantitatively tackle differences between companies. The models are either accounting-based or market-based.

Market-based indicators, such as stock price or price-earnings ratio, reflect a consensus among capital markets’ participants about a company’s future prospects. Differences in supply and demand for a specific stock price result from information asymmetries among these participants. The information can be either irrational, i.e. trends, bubbles, “irrational exuberance” and rumors or rational, i.e. annual reports and profit warnings. Since a price for any good or service, though, is entirely based on a buyer’s perceived value and less so on what the seller thinks is right, both are equally valid.

Yet again, for purposes of comparing different companies’ past actions, accounting-based indicators should be applicable, because they rely on the rational part or “hard” numbers and are based on past action, rather than trying to anticipate future outcome. Hard numbers are annual reports and since these are tightly regulated, a company’s individual discretion in measuring and reporting these is limited and hence they offer a better basis for comparison.

It is worth mentioning that room for manipulation certainly exists. Earnings per share, for example, are a popular ratio. A company’s ability, on the other hand, to influence the bottom line of its income statement is ample. Therefore, it is important to account for the regulatory environment’s incentives when analyzing companies. In general, the underlying reason for annual reports is to give

59 Greenspan, Alan: Senate Finance Committee, USA, 2001
interested third parties an unbiased view of a company's situation. The relative importance of each stakeholder, though, differs between countries. In Anglo-American economies, annual reports are guided by financing purposes and in Continental-Europe reporting is geared towards avoiding taxes. The reason is that in the Anglo-American model capital markets play a much more significant role in funding a companies' projects. In Continental-Europe, on the other hand, long-term relations with a few banks allow companies to effectively communicate conservative reporting practices. The choice, to do so, decreases with the number of investors in one company.  

In addition, construction poses a special problem. Balance sheets measure a point in time and income statements measure a time period. Accounting and reporting practices have typically evolved to use the "Gregorian Calendar" as a reference. A year, though, inaccurately measures the earth revolving around the sun, but much less so business or production cycles. Whereas in most industries these cycles becomes ever smaller and hence quarterly reporting becomes the norm, in construction, projects often take much longer than a single year. Therefore, special problems arise and these are dealt with differently in various countries. Companies have certain discretion in accounting for incomplete work. Therefore an analysis of a construction company's performance has to include more than a single year.

There exist a number of different models to account for value creation. These are Economic Value Added (EVA), Net Present Value (NPV) and the ratio of Return on Invested Capital (ROIC) over the Weighted Average Cost of Capital (WACC). All three, if applied correctly, should deliver the same result and account for the three main variables driving value: operating margins, cost of capital and the competitive advantage period.  

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60 Therefore most US companies have two sets of reports: for Uncle Sam and capital markets  
61 CSFB, EVA Primer, 1996
## Weighted Average Cost of Capital and Value Creation Calculations

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<td>Risk Free Rate (%)</td>
<td>5.5 5.5 5.5</td>
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<td>Risk Premium (%)</td>
<td>3.5 3.5 3.5</td>
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<td>Beta</td>
<td>1.18 0.9 0.77</td>
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<td>1.2 1.15 1.1</td>
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<tr>
<td>Cost of Equity</td>
<td>9.6 8.7 8.2</td>
<td>9.7 9.5 9.4</td>
<td>9.7 9.5 9.4</td>
<td>9.7 9.5 9.4</td>
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<td><strong>Debt</strong></td>
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<tr>
<td>Cost of Pre-Tax Debt (%)</td>
<td>7.3 7 7</td>
<td>6.5 6.4 6.5</td>
<td>6.5 6.4 6.5</td>
<td>6.5 6.4 6.5</td>
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<td>6.5 6.4 6.5</td>
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<tr>
<td>Group Tax Rate (%)</td>
<td>25.1 28.8 29.5</td>
<td>17.9 20.4 20.1</td>
<td>17.9 20.4 20.1</td>
<td>17.9 20.4 20.1</td>
<td>17.9 20.4 20.1</td>
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<td>17.9 20.4 20.1</td>
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<td>Cost of After-Tax Debt (%)</td>
<td>5.4 5 4.9</td>
<td>5.3 5.1 5.1</td>
<td>5.3 5.1 5.1</td>
<td>5.3 5.1 5.1</td>
<td>5.3 5.1 5.1</td>
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<td>5.3 5.1 5.1</td>
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<tr>
<td><strong>Capital Structure</strong></td>
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<tr>
<td>Debt/Equity</td>
<td>66.9% 51.4% 46.1%</td>
<td>22.2% 21.0% 21.4%</td>
<td>22.2% 21.0% 21.4%</td>
<td>22.2% 21.0% 21.4%</td>
<td>22.2% 21.0% 21.4%</td>
<td>22.2% 21.0% 21.4%</td>
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<td>22.2% 21.0% 21.4%</td>
<td>22.2% 21.0% 21.4%</td>
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<tr>
<td><strong>WACC (%)</strong></td>
<td>8.0% 7.4% 7.1%</td>
<td>8.9% 8.8% 8.6%</td>
<td>8.4% 7.2% 8.2%</td>
<td>8.4% 7.2% 8.2%</td>
<td>8.4% 7.2% 8.2%</td>
<td>8.4% 7.2% 8.2%</td>
<td>8.4% 7.2% 8.2%</td>
<td>8.4% 7.2% 8.2%</td>
<td>8.4% 7.2% 8.2%</td>
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<tr>
<td><strong>ROIC</strong></td>
<td>29.2% 23.1% 25.5%</td>
<td>13.8% 21.3% 23.2%</td>
<td>1.2% -1.4% -1.0%</td>
<td>1.2% -1.4% -1.0%</td>
<td>1.2% -1.4% -1.0%</td>
<td>1.2% -1.4% -1.0%</td>
<td>1.2% -1.4% -1.0%</td>
<td>1.2% -1.4% -1.0%</td>
<td>1.2% -1.4% -1.0%</td>
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<tr>
<td><strong>Value Generation</strong></td>
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<td></td>
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<tr>
<td>ROIC / WACC</td>
<td>3.65 3.12 3.59</td>
<td>1.55 2.43 2.69</td>
<td>0.14 -0.19 -0.12</td>
<td>0.14 -0.19 -0.12</td>
<td>0.14 -0.19 -0.12</td>
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<td>0.14 -0.19 -0.12</td>
<td>0.14 -0.19 -0.12</td>
<td>0.14 -0.19 -0.12</td>
</tr>
</tbody>
</table>

The above graph shows two things. First, how the cost of capital has changed over three years for each company and secondly, taking into account ROIC as a measure for profitability, the creation or destruction of value.

Although all three companies have reduced their cost of capital, the result is misleading. In AMEC's case the reduction results from a significantly lower cost of equity, which is the direct result of less cyclical long-term contracts with companies in process industries, such as oil & gas. At the same time, it debt has remained essentially stable, leading to a reduction in leverage due to its rising market capitalization. Dragados, again, has been very constant for the same reasons as cited earlier. Hochtief now, seems to have reduced its cost of capital slightly. On the equity side, the return, investors ask for, has remained
unchanged. The reason is that, although Hochtief has diversified internationally into the US, the US construction market is at its cyclical peak and, again, Turner does not provide long-term contracts in promising markets. Hochtief's lower cost of capital in 2000 results from sharply leveraging its balance sheet. In addition, adding debt coincided with a decreasing share price. As a consequence, Hochtief experiences higher costs of debt in the year 2001 and increasing debt levels have increased the likelihood of financial distress.

As suggested at the beginning of the chapter, reasons for different outcomes could be management, markets and client behaviors. Whereas it is impossible to judge if the respective management teams have been more or less capable in implementing their strategies, the company's performances seems to suggest two fundamental conclusions. First, the public sector plays an enormous factor in shaping an advantageous or adversary construction environment and secondly, global success seems to rely on a firm foundation in the company's home market.

In AMEC's and Dragados' case, the public sector has both been active in shaping strong demand for constructed facilities. It has both assumed its role of alleviating sharp cyclical downturns by sourcing facilities in a recession and it has been a actively promoting alternative delivery methods. Both actions formed the basis for these companies to have success abroad. In addition, the effects of globalization and outsourcing have been strongest in the UK and thus offered AMEC an opportunity to fill these vacant markets and again, from there on, roll out skills and capabilities globally.

To the contrary, Hochtief serves as an example, where a company has progressive ideas, but the inability to gather experience at home prevents the company from radically changing the business model. The government has retreated from investing into needed infrastructure and refuses to open up the home market to innovative solutions.
An interesting analogy can be drawn to Dragados. Relying on close cultural bonds to much of Latin-America and benefiting from experience gained at home due to the government's initiative to open up road, port and airport infrastructure to the private sector, Dragados has been very successful in building a leading position in operating these facilities worldwide. Hochtief, on the other hand, has started to enter the only market of infrastructure privatization in Germany, thus far. Airports have emerged to be the only segment, which the public sector seems to be willing to dispose off. Successful engagements include Düsseldorf, Hamburg and Athens. Moving into airport privatization and thus operations certainly constitutes a bolder strategic paradigm shift for a construction company, when compared to roads and ports. The reasons are threefold. First, construction costs as a percentage of life cycle costs are the smallest, thus highlighting the need to build up or acquire outside skills; second, exogenous risks affecting demand are very high, since a large part of air travel is discretionary, and third the market for airport operations is relatively consolidated, thus leading to high competitive rivalry.
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