

# CHAPTER 4 - CHANGES IN THE EXTERNAL ENVIRONMENT AND THEIR IMPACT ON THE STRATEGIC MANAGEMENT OF CONSULTING ENGINEERING FIRMS IN SOUTH AFRICA: THE TASK AND INDUSTRY ENVIRONMENTS

## 4.1 Introduction

The general components of the macro business environment, which were discussed in the previous chapter, impact on all business enterprises. The macro environment represents environmental factors that are outside an individual company or even an industry's sphere of control. The transitional nature of all aspects of South African society has resulted in an abnormally high incidence of change factors, which are "outside an individual company or even an industry's sphere of control". The macro business environment are therefore more important to South African firms than it is to most of their competitors and counterparts in developed countries.

An enterprise however also functions in task and industry environments as further aspects of the external environment. In this chapter the task and industry aspects of the business environment of South African consulting engineering firms will be discussed to illustrate how changes in these environments can influence the strategic management of such firms.

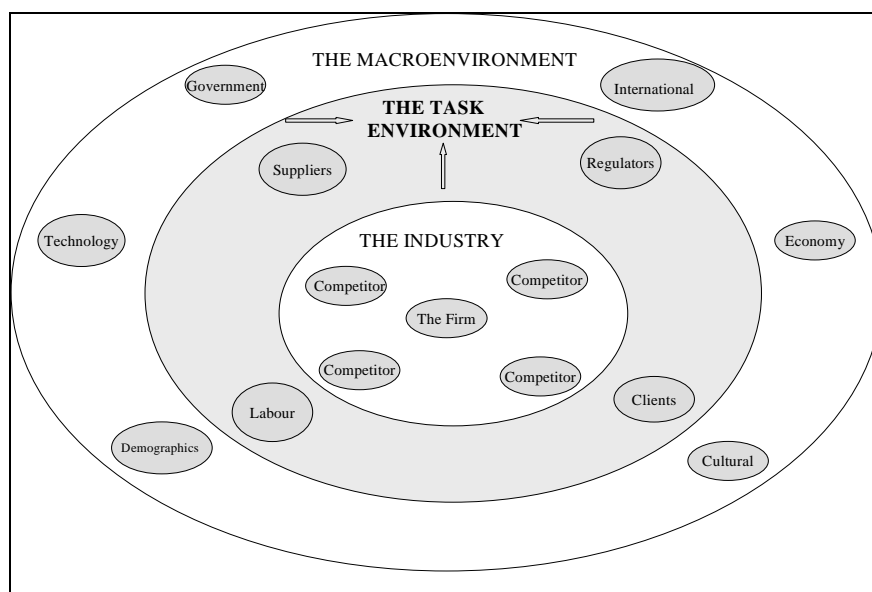
The industry environment of an individual firm is composed of the firm itself and the organisations that compete directly with it. The task environment includes not only competitors, but also clients, suppliers, regulating authorities and other organisations with which the firm interacts directly [13].

## 4.2 The Task Environment

Each enterprise functions in a closer, more immediate task environment, which comprises all the firm's stakeholders. Stakeholders, in the context of the task environment, are the specific organisations with which the firm interacts directly in the course of conducting its business [13].

Figure 4.1 shows how the task environment relates to the global external environment of a firm and that the task environment includes regulating authorities, labour organisations, suppliers and clients. The individual firm's competitors face the same task environment and competitors are also key components of one another's task environment as illustrated.

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**FIGURE 4.1**  
The task environment of an individual firm [13]

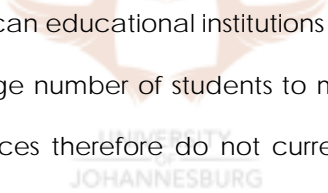


#### 4.2.1 Suppliers

Organisations must acquire resources from their environment and convert those resources into products or services to sell. Suppliers provide these resources [105].

The primary resources of consulting engineering firms are people and capital, with a small component of materials and equipment.

- **People:** The human resource suppliers in this case are primarily the South African universities and technikons. The short supply of graduate professionals, especially in civil engineering, and the loss of young professionals due to emigration and other factors were discussed in Chapter 3.



The South African educational institutions have the capacity to educate a sufficiently large number of students to meet the needs. The suppliers of human resources therefore do not currently have a major influence on the strategic choices of South African consulting engineering firms. Broader market and societal forces, as discussed in the previous chapter, however result in a constrained supply of suitable entrants into tertiary engineering education. This is particularly the case for students in civil engineering [129].

- **Capital:** Traditionally consulting engineering firms were funded from two sources. These are:
  - The owners, who were all involved as full-time employees of the firms, and

- o the banks who provided overdraft facilities secured by either the firm's assets (e.g. debtors book or investments such as buildings) or by the owners in person.

The modern consulting engineering firm has become more capital intensive [48, 65, 85] due to the increasing sophistication and continuous development of information technology, operational trends such as slow payment of fee accounts by both private and public sector clients [185], increasing training and other human resource development costs as well as the costs resulting from the ever-increasing competition for good staff [84].

In addition to the traditional sources, South African consulting engineering firms are currently utilising many alternative sources of funding including local and overseas corporate investors, innovative structured finance schemes, staff equity schemes etc. Some of the larger local consulting engineering firms have even recently expressed their intentions of applying for public listings in keeping with international trends. In the United States of America 287 of the consulting engineering firms were listed on their national stock market in 1998 [56].

Thus, consulting engineering firms now have more alternative sources of capital than ever. Choosing a source of capital is made more complex because new sources continuously emerge and tax laws often change [69]. Financial managers must therefore continuously hunt for better borrowing opportunities and replace old debts with new ones [30]. Making good strategic decisions often means making the right financing decision, that is choosing the right source of capital or capital supplier.

The ability to anticipate changing capital requirements is also a vital component of such a right choice. The earlier management can anticipate the need for additional capital, the more favourable the terms it should be able to negotiate with a potential financier.

- **Equipment and materials:** Such suppliers are largely limited to the suppliers of computer equipment, software, office equipment, printing media etc. Some suppliers, such as those who supply sophisticated computer software for design, modelling and analysis, were often of critical strategic importance during the period of South Africa's economic isolation (sanctions). Equipment and materials are however now readily available and as a result the suppliers thereof are now of lesser strategic significance to consulting engineering firms. The strategic implications of aspects such as software switching cost were addressed in section 4.2.4.

#### 4.2.2 Regulators

It was shown that the government is one of the important general components of a firm's macro business environment. The terms *regulators* or *regulating authorities* however refer to specific governmental organisations in a firm's more immediate task environment. These organisations influence an industry or individual firms by creating uncertainty for enterprises by:

- Publishing new regulations,
- changing existing regulations or
- changing the degree of enforcement of regulations [206].

The following are examples of regulators in the task environment of South African consulting engineers and the typical influence that such regulators can have on the industry or on individual firms.

- **State Tender Board**

This national body [207], which falls under the jurisdiction of the Department of Finance, is the custodian of public sector procurement in South Africa. Many of the published regulations that govern public procurement have implications for consulting engineering practices. Examples of such regulations will be those governing the implementation of the government's targeted procurement policies. The following are examples of such regulations with some of the implications that such regulations have for consulting engineers.

- Regulations governing the procurement of professional services, such as consulting engineering services, by the public sector. The public sector still contributes a substantial proportion (57,4%) of the total income of the consulting engineering industry [185]. New or amended regulations, which govern the methods to be employed in the selection and appointment of consulting engineers, can potentially have serious repercussions for the entire industry.
- New regulations pertaining to the application of the government's targeted procurement policies in respect of public sector construction works require of the consulting engineer to assume additional duties and responsibilities without additional remuneration.

The planning currently is for the State Tender Board to be phased out and for a new so-called common service provider (CSP) to be established within the Department of Finance on 1 April 2002 [22]. It remains to be seen what implications this action will hold for the South African consulting engineering industry.

- **National Home Builders Registration Council (NHBRC)**

This regulator [126] has been instituted to inter alia protect homeowners in cases of poor building workmanship. The mandatory levy on new house construction has however added to construction cost. Consulting engineers who were appointed to do periodic quality inspections had to accept substantial business risk for low fees, which led to the issuing of a SAACE advisory note to members to warn them about the “increased and unacceptable business risk” involved in accepting such appointments from the NHBRC [173].

- **South African Reserve Bank (SARB)**

In its role as exchange control regulator [204], the Reserve Bank’s regulations may influence the ability of South African consulting engineers to expand their overseas operations, e.g. by offshore acquisitions. It may also limit the ability of South African consulting engineers to participate in Public-Private partnership (PPP) projects by imposing new restrictions on offshore-sourced finance.

- **The Competition commission**

The apparent inefficiency of the Competition commission [28] in approving the sale of companies is causing undue delays to many large property transactions as well as to mergers and acquisitions. This regulating authority, which was intended as an anti-monopolistic agency, unfortunately had a negative impact on many businesses, including consulting engineering firms. The author is of the opinion that many of the transactions, which have been delayed by the requirement for Board approval, cannot, by any stretch of the imagination, be construed as being of a monopolistic nature.

- **National Electricity Regulator (NER)**

This regulating authority [125] is proposing a totally new dispensation for the generation and distribution of electricity in South Africa. Many of the details of the new dispensation are still in the process of finalisation. It is however clear that the new dispensation will have a major impact on the businesses of consulting engineers, especially those practicing in the electrical discipline. Examples of possible impacts of the new dispensation are:

- The establishment of new regional electricity distributors (REDS) can potentially create many new business opportunities for consulting engineers. Existing client-consultant relationships of long standing will however be under threat as many of the current smaller distributors, e.g. local authorities, will be absorbed into the new REDS.
- The proposed independent electricity generators, e.g. corporatised or privately-owned and operated power stations, may decide to outsource more of their engineering functions in order to improve their cost-efficiency. This also has potential for creating new business opportunities for consulting engineers.



- **Commission for Conciliation Mediation and Arbitration (CCMA)**

This commission [23] was created to expedite the resolution of any disputes declared in terms of the Labour Relations Act. The regulations place onerous requirements upon the employer when any employee, who may feel aggrieved, lays a complaint at the CCMA. In spite of the good intentions of the Act, the practical situation is that small business owners and professional practitioners can often not afford the time to become involved in such arbitration or mediation processes. Smaller employers, who often cannot afford or justify the appointment of human resource management personnel, are therefore inclined to pay unreasonable settlement amounts to aggrieved employees in order to avoid having to spend time (and thereby lose income) on arbitration or mediation proceedings. It is the opinion of the author that this situation tends to spawn unrealistic and even fabricated grievances against employers on the one side and on the other side a negative attitude of employers towards employing staff.

- **Advisory council for occupational health and safety [8]**

Officials from the commission's inspectorate often interact with consulting engineers. It has been the experience of the author that the extent to which inspectors are directed to have either co-operative or confrontational and /or reasonable or unreasonable attitudes may often be an important determinant of the ability of consulting engineers to achieve project cost and programme targets.

- **National Department of Public Works.**

In a legal sense the Department of public works [39] is the ultimate regulator of the engineering profession. The following are examples of this department's regulatory roles:

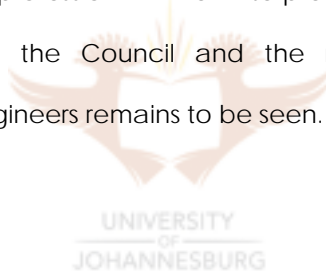
- The Engineering Council of South Africa (ECSA) [43] is the statutory registration and regulatory body for professional engineers, technologists and technicians. This council is appointed by and reports to the Minister of Public Works. ECSA is responsible for the annual submission of proposed fee scales to the Department and the publication thereof upon approval by the Department. These fee scales regulate the income of consulting engineers for the vast majority of public sector appointments and are therefore of critical importance to South African consulting engineers. In the recent past consulting engineers have been hard hit by administrative delays within the department of public works which caused approved fee scales not to be signed and therefore published. The following examples will illustrate the seriousness of the situation:

- The last update of the percentage base fee scales, which are supposed to be negotiated and updated annually, was only published in the Government Gazette (notice 109) of 22 December 2000 to replace the previous notice (number 147) that appeared in the Government Gazette of 18 September 1998 [75].

- The last update of the time-based fee rates was published in the Government Gazette of 23 October 1998 (notice 164), which is more than three years ago at the time of this publication.

These administrative delays in the regulatory process obviously had a negative impact on consulting engineers who are all experiencing inflationary cost pressure in their businesses.

The members of the new Engineering Council of South Africa was appointed by the Minister of Public Works on 26 July [43] in terms of the new Engineering Profession Act [147]. In terms of the Act the members of the new Council include a number of people from outside the engineering profession. The interpretation and application of the legislation by the Council and the resultant regulatory impact on consulting engineers remains to be seen.



- o The Council for the Built Environment (CBE) is about to be appointed by the Minister of Public Works in terms of the Council for the built environment Act (Act no. 43 of 2000) [144]. The Council will inter alia have a co-ordinating role in the regulation of six so-called built environment professions, of which the engineering profession is one. Engineers will obviously only have limited direct representation on the Council. The interpretation and application of the new legislation by the Department and Council and the resultant regulatory impact on consulting engineers remain to be seen.

- o The Construction Industry Development Board (CIDB), which was recently appointed by the Minister in terms of the Construction industry development board Act (Act no. 38 of 2000). The Board is intended to “ensure the growth, development and performance of the construction industry” [122]. The Board will inter alia establish registers of Contractors and Projects and will, in its regulatory capacity, have an impact on the entire South African construction industry, which includes consulting engineering. The interpretation and application of the new legislation by the Department and Board and the resultant regulatory impact on consulting engineers remain to be seen.

- **Department of Public Enterprises**



This department [38] is responsible for restructuring public assets as represented by Public Enterprises such as Transnet, ESCOM etc. The restructuring is aimed at improving the efficiency, viability and competitiveness of Public Enterprises [74]. The ultimate aim, however is to meet the stated governmental policy objective of at least partial privatisation of these assets. The nature of the privatisation and the resultant regulatory impact on consulting engineers remain to be seen. The extent of privatisation will determine the scope of future business opportunities for consulting engineers, both during the restructuring process and during the future operation of the restructured/ privatised entities.

- **Department of Provincial and Local Government**

This department [37] is responsible for the recent and current restructuring of both local authority structures and the delivery of municipal services by local authorities. The new, and greatly reduced number of, local authorities were formalised by the countrywide municipal elections of 5 December 2000. As regulators of municipal service delivery mechanisms, the department will play a leading role in directing developments regarding the countrywide restructuring of municipal service delivery [121]. The nature and extent of such restructuring will determine the scope of future business opportunities for consulting engineers, during both the restructuring process and the future operation of the restructured entities.



- **Department of Trade and Industry (DTI)**

As one of its functions this department [40] considers export incentives and other practical measures to support growth in the value of exports by specific industries. The department's understanding of the significance of the export of professional services is therefore of critical importance in determining the ability of South African consulting engineers to export their services and to compete in a global export market.

The consulting engineering industry is currently discussing the expansion of marketing support incentives and the creation of a dedicated Export Council for the construction industry with the DTI [113] and with other stakeholders in the construction industry. The outcome of these

discussions can have a great impact on strategic decisions within the South African consulting engineering industry.

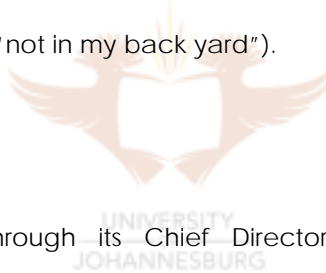
The DTI is also responsible for measures to improve South Africa's attractiveness as an international investment destination. In this regard they have an important regulating role in the consulting engineering industry as their actions will largely determine the extent to which international capital will be available for the development of infrastructure by way of Public-Private Partnerships (PPPs). Their actions will furthermore determine the attitude of foreign investors towards direct investment in South African consulting engineering firms as well as participation in PPP joint ventures or consortia with South African consulting engineering firms [83].



- **Department of Environmental Affairs and Tourism**

This department [36], through their Chief Directorate: Environmental Management is inter alia responsible for “limiting actions having a negative impact on the environment” and “promoting sustainable development”. The practical application of the National Environmental Management Act (Act no. 107 of 1998) [155] does sometimes become a source of concern to consulting engineers and many of their public and private sector clients alike. The primary concern is the unreasonable delays, which are often caused to the implementation of much-needed infrastructure projects with negligible or no negative environmental impact due to:

- o The complex and time-consuming mechanisms provided for in the Act.
- o The indiscriminate application to projects without sufficient provision for discretionary decisions by experienced professionals.
- o The opportunity that the Act presents commercial opponents to a project to delay such a project through an objection and appeal process (e.g. "if I can delay the opposition's project long enough it will negatively affect the economic feasibility thereof or it may give me sufficient opportunity to get my own project completed and to start trading").
- o The opportunity that the Act presents individual opponents to projects to delay these projects through an objection and appeal process (e.g. "not in my back yard").



The department, through its Chief Directorate: Pollution Control [155] is furthermore responsible for:

- Promoting a holistic approach to integrated pollution control and environment quality management.
- Promoting control of air pollution.
- Promoting waste management.

All of these aspects fall within the ambit of many of the projects designed, implemented, operated and maintained by consulting engineers. This implies that the nature of the interface between the department and consulting engineers are of great importance. The Department's uniformity and fairness in the interpretation and application of legislation and the resultant regulatory impact on consulting engineers their clients have to be continuously monitored.

#### 4.2.3 Labour organisations

The role of labour organisations is not a major environmental factor in the South African consulting engineering industry. Unionisation is mostly limited to semi-skilled materials laboratory assistants and clerical administrative staff and this situation is not likely to change in the foreseeable future.

#### 4.2.4 Clients

Maister [106] wrote "power, in all professions, is moving from the professional to the client. The professional firm must increasingly demonstrate a willingness to be cooperative, responsive, and adaptable in order to win the confidence of today's client."

Client expectations have, in keeping with global trends [70, 116, 92], reached a level where clients "expect it all". Competition is intense and clients can now demand and expect prompt service, high quality and value for their money [167]. Judging by the increasing number of professional indemnity insurance claims against consulting engineers [180], these client expectations, together with changes in the legal environment, have caused clients to become more litigious, thereby increasing the business risk of consulting engineering practices.

Transformation of the civil service has resulted in an inability by many central, provincial and local government departments to spend their allocated capital budgets. This under-expenditure is of great concern to both government [108] and consulting engineers as the public sector still contributes a substantial proportion (57,4%) of the total income of the consulting engineering industry [185]. The situation is therefore being monitored closely by the consulting



engineering and construction industries in order to be able to quantify knock-on effects (e.g. employment, growth and development opportunities lost) for effective lobbying with government. The industry has already made several proposals to government on ways in which the private sector could augment institutional capacity in government departments where required in order to remove institutional capacity bottlenecks.

The long period of high real interest rates in South Africa had the effect of limiting investment in infrastructure by both the public and private sectors. The high real interest rates had, over and above the usual operational business impact (cost of operating capital etc.), a further uniquely South African implication. Transitional processes have, in certain government departments, resulted in a situation some inexperienced and inappropriately qualified persons were appointed in key positions, resulting in localized institutional capacity collapses, inefficient administrative processes etc. One of the results of this is that the three tiers of government often default on payment for services rendered by consulting engineers as discussed in section 3.3.1 of Chapter 3. In a time of high real interest rates it can be appreciated that the economic consequences of poor debtor performance by a major client sector can be fatal for many small privately owned consulting engineering enterprises.

The situation with regards to slow payment and non-payment of consulting engineers' fee accounts by the public sector is being monitored on an ongoing basis and is the subject of regular interaction between industry representatives and the Department of Public Works. The Department has to date commissioned a study in this regard and have subsequently instituted various measures as an attempt improve the situation. The provisions made in the Public Finance Management Act and Amendments [160, 161] for enforcing compliance

by officials to contractual payment obligations is furthermore expected to continue improving the regularity of payments to consulting engineers.

#### **4.2.5 Cyclical nature of the industry**

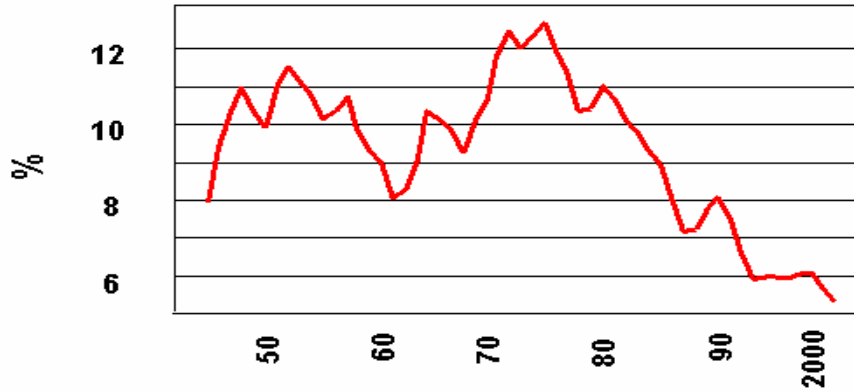
Consulting engineers are involved in the creation, operation and maintenance of physical assets or infrastructure. A substantial proportion of their work therefore falls within the wider construction industry sphere [185]. The relationship between economic growth and investment in construction will therefore always be of particular significance to consulting engineers.

The level of activity of the South African construction industry has always exhibited a cyclical character with a multiplier of 2 to 5 times that of the level of general economic activity. For example, when the GDP grew by 8% in 1964, the construction industry grew by 18% and when the economy declined by 1.2% in 1985, construction activity shrunk by 5.4% [195]. During growth periods the multiplier can be ascribed to capacity constraints that built up in infrastructure which were then met by accelerated investment. Since 1994 investment in infrastructure seems not to have behaved in this way anymore. For example the overall economy expanded by 3.4% in 1995 while the construction industry shrunk by almost 2% [99]. This apparent structural adjustment could possibly be ascribed to a major shift in government policy from fixed investment towards social expenditure, low confidence levels of local and foreign private sector investors, high real interest rates and an imbalance between capital and consumption expenditure in the public sector. Credit was relatively cheap during the 1960's and 1970's, but since the middle 1980's South Africans have lived in a high interest rate regimen and in a free market credit has only one price, no matter how urgent the development needs of the country [195].

Overspending on salaries and wages of a bloated and inefficient civil service was subsidised, in a sense, by reducing capital expenditure i.e. growth generating expenditure. Investment goods, for example socio-economic infrastructure projects, are usually financed by long-term loans and the price of capital or credit is the interest rate. There has long been a well-founded concern amongst the engineering fraternity that if construction investment in the maintenance and rehabilitation of infrastructure is neglected for too long, deteriorating infrastructure itself may become a major constraint to future growth and prosperity of the Southern African region. This view has been supported by a World Bank specialist [93] who recently stated that government is underspending on maintaining transportation infrastructure that plays a significant role in the lives of those living in poverty. Figure 4.2 illustrates just how low the level of construction expenditure has already dropped, compared to internationally acceptable levels of 12 to 15% for a developing country [91]. Government fortunately shares this concern and the Minister of Finance has instituted budgetary measures to start addressing the problem of deteriorating infrastructure and has expressed the intention of increasing the level of fixed investment as a percentage of the Gross Domestic Product [107, 113, 108].

FIGURE 4.2

Construction investment as a percentage of Gross Domestic Product [91]

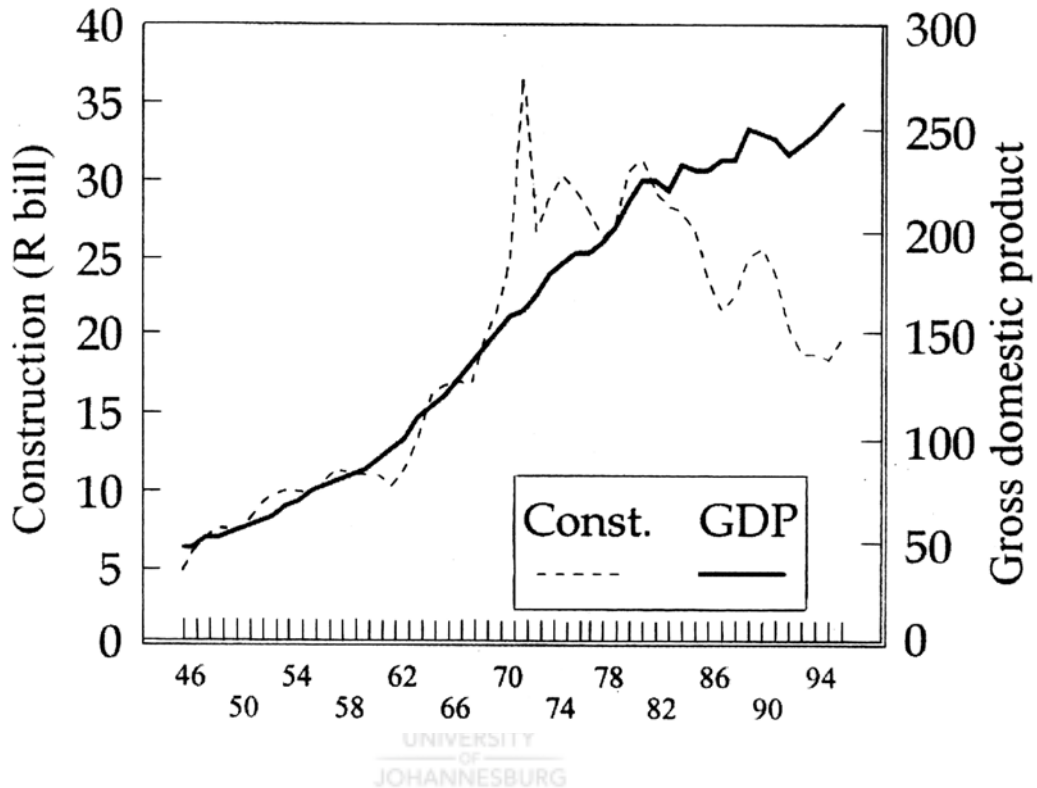


Although the national economy recorded a respectable rate of growth, as represented by the growth in GDP, since 1992, the South African construction industry contracted substantially during the same period as illustrated in Figure 4.3 [195].

The construction industry has always been characterised by the cyclical nature of its business activity levels and over time all successful industry participants had to develop strategies to cope with these cyclical variations in business activity. The recent uncharacteristic cycle [91], as discussed in the second paragraph of section 4.1.5 however seems to indicate a structural change, rather than a traditional cyclical change within the industry and implies that industry participants will have to develop new strategies to cope with the evolving nature of the construction industry [195].

FIGURE 4.3

Construction expenditure and Gross Domestic Product [195]



#### 4.3 The Industry Environment

The South African consulting engineering industry faces the components of the task environment as part of its external business environment. The components of the task environment was discussed in the preceding section 4.1 and graphically illustrated in Figure 4.1. In addition, competitors within the industry must deal with one another as participants within the industry environment. The firms in the industry environment are competing for the same clients and are trying to win market share at each others' expense. Each firm must therefore both anticipate and react to the actions of competing firms and attempt to shape or influence the firm's task environment in its favour.

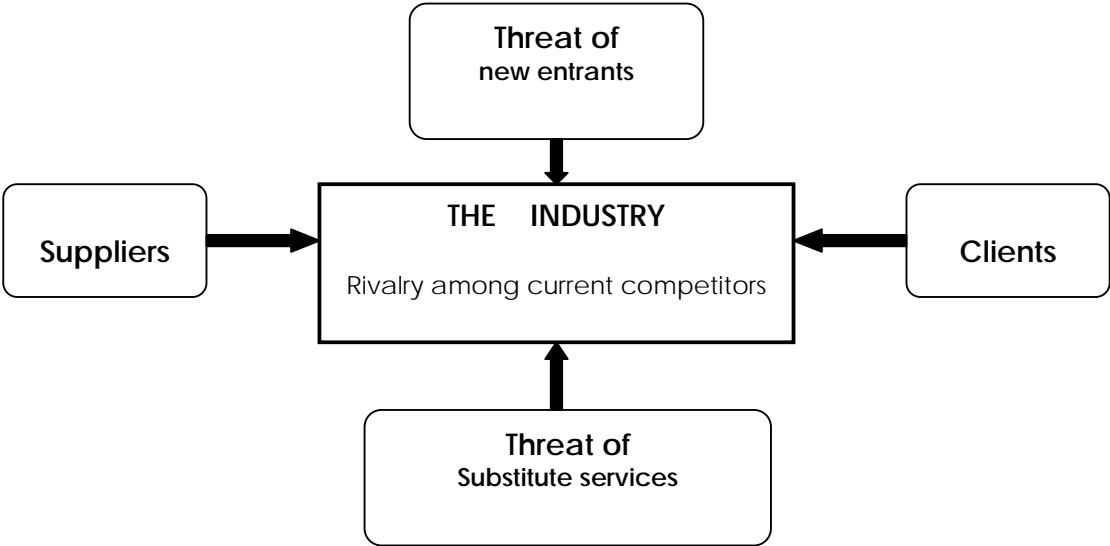
Michael Porter, a professor at Harvard and leading expert on competitive strategy, wrote “a good strategy is concerned with the structural evolution of the industry as well as with the firm’s own position within that industry” [135] and that “the essence of strategy is coping with competition” [134].

Porter furthermore wrote: “competition is at the core of the success or failure of firms. Competition determines the appropriateness of a firm’s activities that can contribute to its performance, such as innovations, a cohesive culture, or good implementation. Competitive strategy is the search for a favourable competitive position in an industry, the fundamental arena in which competition occurs. Competitive strategy aims to establish a profitable and sustainable position against the forces that determine industry competition.” [133]

The concept of competitive analysis was developed for analysing the industry environment and, for the purposes of this study, Porter’s approach to competitive analysis or the so-called Porter model as illustrated in Figure 4.4 [134] will be used.

**FIGURE 4.4**

**The Porter model for competitive analysis [134]**



#### 4.3.1 Current competitors

All South African consulting engineers have rivals that compete with them for market share. Competing firms use conventional business tactics such as price reductions (fee discounts), new service introductions, advertising campaigns, sponsorship, brochures, direct mail, web sites etc. to gain advantages over their rivals. Consulting engineering firms, as professional service businesses, however also employ an increasing portion of their resources on indirect or relationship marketing. Examples of such indirect marketing tactics used to gain competitive advantage are:

- **Listening to clients:** This is typically done through user groups, reverse seminars, attending client industry meetings, market research, senior manager visits, project closure meetings and systematic client feedback.
- **Managing clients' experience:** It is important for consulting engineers to be aware that while goods are consumed, services are *experienced* [209, 105]. Substantial effort is therefore invested in managing the perceptions and expectations of clients.
- **Managing staff attitudes:** Successful consulting engineering firms go to great lengths to instil more responsive and co-operative attitudes in their professional staff.
- **Quality management (QM) systems:** Many South African consulting engineering firms has adopted formal quality management systems and several have obtained ISO 9001 quality management accreditation [71]. Unlike the quality control systems previously used

by firms to improve technical quality, the QM systems are aimed at improving overall management including both service quality and technical quality.


- **Building personal relationships:** This can be by way of social activities, sensitivity towards and attention to personal values and needs etc. This is also an area of controversy as some of the entertainment activities have become expensive and extravagant events and could in certain instances easily be construed as improperly influencing potential or existing clients or in other words corrupt practices.
- **Demonstrating competence:** This is normally done through seminars, speeches or presentations at client-attended meetings, articles in client-orientated (trade) press and doing proprietary research on topics that will be of interest to potential clients [105].
- **Networking:** This will normally include aspects such as civic or community activities, networking with potential referral sources and the publication of newsletters.

Competition between South African consulting engineers is intense due to the reduced volume of work in the depressed local market, the maturity of the industry and the large number of direct competitors [182]. This has led to an increasing emphasis and expenditure on marketing to gain competitive advantage.



#### 4.3.2 Threat of new entrants

Globalisation and the end of South Africa's economic isolation have resulted in a sharp increase in the activity and presence of foreign competitors in the local consulting engineering market. The main barrier to the entry of foreign firms is their high cost structures, which render them uncompetitive in the South African market, except when offering specialised niche services for which clients are willing to pay a premium. Foreign firms are however rapidly overcoming this barrier to entry and are successfully penetrating the South African consulting engineering market by either employing South African staff or purchasing substantial equity in established local firms, e.g. Bergman, HKS, Stewart Scott, Ninham Shand, African consulting engineers, etc.



The trend towards the commoditisation of design services has resulted in a situation in which many, especially private sector, clients select and appoint consulting engineers on the basis of price alone. This has in turn favoured the establishment of small practices who keep their overhead costs low, for example by operating from their places of residence and using technicians on temporary employment contracts who often also provide their own computer hardware and software. This global trend has resulted in a situation where margins of consulting engineering practices are under pressure [58]. Successful consulting engineering firms are however rapidly developing new markets and services, for example by entering the fields of management consulting, sustainability consulting, environmental consulting and maintenance management, in order to maintain or regain profitability levels.

The application of targeted procurement policies as instruments of black economic empowerment has resulted in the preferential treatment of majority

black-owned consulting engineering practices. Such preferential treatment was initially limited to appointments by public sector clients, but has recently been extended to many major private sector client appointments. This has resulted in an exodus of black professionals from established firms to form majority black-owned or so-called emerging practices [123] to gain the maximum advantage from their affirmable professional service provider (APSP) status.

#### **4.3.3 Threat of substitute services**

In the “changing world of consulting engineering” [91] the nature of services offered by consulting engineers is undergoing a metamorphosis to the extent that it is changing the very nature of the business of consulting engineering. Consulting engineers are increasingly becoming involved in activities, which are both upstream and downstream in the total project lifecycle from their traditional role in the design and implementation stages of a project. Examples of such activities are feasibility studies, institutional support, project finance, management consulting, facilities management, infrastructure operation, maintenance and rehabilitation.

Many of the engineering design functions are reserved for professional engineers or technologists by law [147]. The nature of the new services offered by consulting engineers are however often far removed from that of traditional design services and these services are therefore not reserved for engineers by law. This environment has created an opportunity for substitute service providers to compete with consulting engineers. Examples of these new competitors offering substitute services are:

- Management consultants: International management consultants, e.g. Andersen Consulting and McKinsey, who employ many engineers within their worldwide organisations have become very involved in the creation of infrastructure, especially by providing institutional support to government departments and through involvement in PPP-type projects.
- Accounting firms: Large multinational accounting firms, e.g. PWC, Deloitte and Touche and KPMG, who also employ substantial numbers of professional engineers, are often competing directly with consulting engineering firms for appointments as programme managers, restructuring advisors, technical auditors etc.
- Design-Build-Finance (DBF) groups such as Aquazur are competing with consulting engineers by offering a full spectrum DBF service.


#### 4.3.4 Suppliers

Suppliers were historically not significant as a strategic environmental factor in the consulting engineering industry environment. The electronic age has however changed that situation in that consulting engineering practices have become extremely dependent on their computer systems and the peripheral infrastructure. Consulting engineers are now at a disadvantage by being very dependent on powerful computer software suppliers. The power of the software suppliers is mainly in the huge switching cost (e.g. training cost and productivity losses due to psychological factors and the learning curve phenomenon) associated with a change in software supplier. An ever-increasing portion of consulting engineering practices' expenses budgets is being allocated to computer hardware and software [82]. This high input cost item has become

indispensable in the modern consulting engineering practice and the high switching costs associated with changes in supplier are making consulting engineers increasingly vulnerable to the regular mergers and acquisitions taking place in the software industry.

The development of e-commerce intermediaries has also become an area of concern, which will have to be monitored closely. The initial experience in the USA has shown that these e-commerce portals for the construction industry will probably accelerate the commoditisation of professional design services by selling design commissions on an auction website on the basis of competition on price alone [81].

#### 4.3.5 Clients



Clients are important to consulting engineers for more reasons than just the money they provide for services. Clients can demand lower fees, higher quality or more service. They can also play competitors off against each other to drive fees down [104]. South African consulting engineers are currently being subjected to all of these client demands and negotiation tactics and are at a disadvantage when negotiating with clients due to the depressed state of the market and the resultant intense competition [184].

Powerful traditional client bodies sometimes decide to expand their internal capacity and thereby cut, or even eliminate entirely, the use of consulting engineers. In South Africa this has in the past happened at many parastatal organisations and local authorities. In the USA the Californian transport authority (Caltrans) and the department of Public Works of the city of San Francisco has recently announced that, due to labour union pressure, they have commenced

with a process of rebuilding their internal capacity and that they will stop using private consultants [32].

#### **4.3.6 Industry strategy formulation**

It is clear that competition within the South African consulting engineering industry environment has recently intensified significantly [183]. Consulting engineers must therefore spend more time analysing and interpreting the more complex competitive environment in order to formulate winning strategies.

By analysing the five industry environmental factors discussed in sections 4.3.1 to 4.3.5, the management of a consulting engineering firm can identify its competitive strengths and weaknesses. Management can also try to anticipate future changes in these factors and then decide how best to manage their firm in the competitive environment that they have identified. Porter's competitive analysis [134] can guide many types of strategic decisions, as illustrated by the following examples:

- Selection of software suppliers by analysing the power that they may have over the firm (e.g. switching cost, company stability, maintenance cost, price increases etc.).
- Selection of client groups, individual clients, market type or service type focus etc. by analysing the firm's bargaining power in each of these areas.

- Making acquisition or divestment decisions by evaluating the potential of different businesses in terms of an assessment of their competitive environments, i.e. their competitive advantages and disadvantages.
- Positioning a firm so that its capabilities or strengths provide the best possible defence against threats in its competitive environment.

Another approach to effective strategic management is to use environmental management techniques, which means formulating proactive strategies aimed at changing the environmental context in which the firm operates. Environmental management can be by way of strategic manoeuvring, independent strategies or cooperative strategies [13].



#### 4.4 Conclusion and recommendations

Anticipating, interpreting, and managing the impact that changes in the external business environment may have on an enterprise are fundamental components of the strategic management of such an enterprise. All firms operate in a macro-environment as discussed in Chapter 3. Every individual firm also operates in a more immediate and individualised task environment. The task environment comprises the firm's stakeholders, i.e. the organisations, groups, and individuals who directly affect (and are affected by) the firm's strategy and actions. Important stakeholders in the task environment include regulators, labour organisations, suppliers, clients and competitors.

Effective strategic management does more than react to the external environment; it also actively changes or shapes the industry environment in which

a firm operates. Michael Porter's model for competitive analysis and environmental management are two techniques that take this pro-active approach to analysing, adapting to, and shaping the external industry environment.

The management of a consulting engineering firm should make strategic decisions based on its assessment of the firm's external business environment. A firm can adapt to its environment and/or it can shape the environment to meet its needs. Knowledge and understanding of the external environment is therefore central to successful strategic management. The management of consulting engineering firms must have suitable information systems to provide them with accurate information on their external environment so that they can make appropriate and effective strategic decisions for their firms. In the next chapter the application of management information systems in the consulting engineering firm was explored in order to put the desired characteristics of a suitable strategic environmental information system for the South African consulting engineering industry in the right perspective.