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THE UNIVERSITY OF WARWICK
DEPARTMENT OF ENGINEERING

MANUFACTURING GROUP
PORTFOLIO SUBMISSION BY MICHAEL HUMPHRIES

Engineering Doctorate Portfolio
Executive Summary

Management in Engineering Consultancies

With specific reference to the Carl Bro Group and Peter Deer and Associates

EXECUTIVE SUMMARY ONLY AVAILABLE

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Preface

In producing this summary, I have revisited the work undertaken over the last 5 years. Many people have given their time, effort and ideas to help me. Thanks to you all. My special thanks go to Mike James-Moore for stepping in, late in the programme, to act as my tutor. On the administrative side, Anna Campodifiori has once again taken on much of the copy typing and continual re-editing.

My final thanks go as always to my family, Suzan and Grace and my business partner Peter Deer for putting up with me. Suzan acted as editor in chief and Peter, as usual, kept my feet on the ground.

Thanks also go to other students and consulting engineers who I have met during the programme. They have given me an insight into engineering far beyond my own narrow niche in the construction industry.

Michael Humphries, St Albans, March 1998.

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1. Introduction and Market Context

1.1 Introduction

In 1992 I was working in a large engineering consultancy. I had reached a stage in my career where management had overtaken technical work as my principal day to day activity. As suggested in my personal profile, I considered that there were gaps in my experience, especially in the management field. When I started to seek information to assist me, I could find little that was written directly about the process of management in firms of consulting engineers.

Subsequently, when I wanted to start my own consulting firm, I sought information to give me guidance. As with my investigation when part of a large firm, I was able to find little directly related to a small start up businesses in consulting engineering.

This seemed curious, many people have started and managed firms of consulting engineers, some with considerable success. In other professions such as law, management consultancy and medicine, there are many sources of information about the practice of that profession, but this did not seem to be the case in consulting engineering. It is not that consulting engineers do not write. On the contrary there are many works written by consulting engineers, but they tend to be directed towards technical subjects or project management. What I found to be absent was a thorough examination of the management of a consulting engineering firm as a business entity, taking into account the issues of clients, strategy, marketing and people.

In my portfolio I have attempted, through projects and post module work in both a large and a small start up company, to examine consulting engineering firms as businesses. Firstly identifying the key issues then developing a framework of ideas that could be used by others. Because of the lack of literature directly related to the practice of consulting engineering in construction I have looked outside that industry for references to guide me. In this summary I have attempted to consolidate the information gained. This would be useful as a starting point when assessing an existing businesses or as guidance for start-up firms.

1.2 The market for consulting engineers

My early research started with a review of the history and development of consulting engineers together with a review of the general market in construction. Over the last decade the construction industry has seen some remarkable changes¹. The market has been through a complete cycle from the boom of the late 1980's through the bust of the early nineties followed by recovery over the last two years. Civil engineering was given a buffer through the worst of the recession by major Government investment in road and infrastructure works. However, the commercial building market has been

particularly volatile, falling from a peak of over £11bn in 1990 to a low point of £5bn in 1993. Recovery has been erratic and painstakingly slow since then, with a recent return to rapid growth in some sectors.^{1, 2}

Consulting engineers working in the construction industry have also seen profound change. On top of the dramatic market swings, they have had to face up to a revolution caused by the introduction of fee competition, the freedom to advertise and mandatory tendering by governmental departments for all major commissions³. In responding to these market forces, firms of consulting engineers have been changed forever, both in their organisation and culture. Competition is fierce. Deregulation of the profession has caused a polarisation in the size of firms with new, acquisition hungry, "mega-firms" at one end of the market and small niche firms at the other⁴. Both have taken work from the traditional middle sized firms, who for many years were the profitable mainstream, but who now struggle to keep in the black.

Civil engineering is the largest sector in consulting engineering, representing 70% of the volume of work undertaken.⁵ Major UK and international infrastructure projects demand high volumes of staff dealing with the design, detailing and management of complex civil works. Not unnaturally therefore, the culture and management style of most large UK consulting firms is determined by the business processes needed to undertake such large undertakings.

My own field of building services engineering is predominantly based in the building sector of construction. In the building sector, the role of a consulting engineer is different to that in civil engineering. The design process is still predominantly led by firms of architects, even though the largest share of the fee income is earned by engineers.⁶ In contrast to the largest consulting engineers, architectural firms are generally much smaller. The largest purely architectural firm has a total staff of less than 500, with some of the smaller firms in the Architects Journal top 100 having less than 20 qualified staff.⁷ Such firms are small in comparison to the major consulting engineers who undertake the bulk of the UK's consulting activity.

The design of buildings is as much about aesthetics as function. Consequently, engineering performance is often compromised or made more difficult in order to achieve a design that is visually pleasing. Few architects want one building to look much the same as another, creating a desire for uniqueness in every scheme. As consulting engineer Tony Feather wrote, in a litigation report, "*every building is a prototype*". It is this desire for uniqueness, together with the differing requirements for each client user, that is at the heart of the difference between the role of the consulting engineer in building as opposed to civil engineering, where engineering function is the principal driver. Uniqueness means that there is often no precedent to the design solution adopted and each engineering system is a novel assembly of standard

components that have not been previously tested together. A further complication for building services engineers is that the user's opinion of comfort and amenity is subjective.

1.3 Client dissatisfaction and change

The building sector has received strong criticism over the years since the market collapsed in 1989/90. The adversarial approach adopted by all parties and ad-hoc contractual arrangements between consultants, contractors and sub-contractors have been castigated by major clients such as John Egan of BAA⁸. The Latham Report⁹ has described fundamental faults in the culture and processes in construction. Latham suggesting that co-operation by partnering is the way forward and that a fundamental rethinking of roles and relationships is essential¹⁰. The construction and technical press has noted several firms who have adopted a less adversarial approach, but from my research I have noted that change is by no means consistent. Some clients, senior professionals and top level contractors are implementing change programmes. There is a long way to go before the new initiatives will become the norm at project level, replacing the adversarial culture with something that is more profitable for everyone.

In a draft paper¹⁰ (originally prepared in early 1996) I suggested that perhaps the worst thing that could happen to construction was recovery before the much vaunted process of cultural change had become established. My concern was that if boom conditions returned there would be a rapid return to the bad practices of the eighties. There is evidence that the momentum for change has stalled. Client complaints are still a regular feature of the technical press.¹¹ The evidence is that the construction industry may have left things too long and that the much discussed change will be less far reaching than originally intended. The proposed "*Latham Legislation*"¹² seeks to impose on the industry a prescription for fairness and prompt resolution of disputes. The evidence from manufacturing indicates that what is needed is not more rules to create fairness, but a change in culture.^{11,13} In order to defeat the intent of the legislation, contractors are already preparing strategies to avoid its effects with respect to delayed payments and arbitration.¹⁴ So much for a new era of partnering and co-operation.

1.4 Structure of this paper

This paper summarises the work I have undertaken within the EngD programme and some of the key ideas that have resulted from it. The review begins with an examination of the companies I worked for, and a comment on the industrial sector in which they operate. Then follows a brief statement regarding the objective of the portfolio and the projects undertaken. The main review identifies the key areas of study then sets down the business processes that my research shows are important for professional firms. I have hypothesised that consulting engineers, like any professional

service firm, must master these processes if they are to succeed. This hypothesis has been tested during the start up of my own consulting firm Peter Deer and Associates.

Finally, I have summarised the key features of Innovation and Change Management both of which are essential for survival together with a list of tools that have proved helpful in the development of my own consulting firm.

2. Company context - consulting engineers

2.1 Authors perspective

My own technical discipline of building services engineering is principally based in the building sector of construction. It is not a large sector, mechanical and electrical services represent only 6% of the UK workload for consulting engineers. My research into the management of firms of consulting engineers has been based on work in the following companies.

Medium sized company
1989-1994
Turnover around £1.0m

as Managing Director of James R Briggs and Associates (JRBA) a firm of around 30 staff specialising in building services engineering with 3 offices and projects throughout the South of England

Large Domestic company and
International subsidiary
1994-1995
Turnover UK £14.0m UK
£120m overall

as a Director of Carl Bro Group UK Ltd (CBG) a national multidisciplinary firm of around 450 staff. CBG is a subsidiary of Carl Bro Group, a Danish consulting engineer of over 2000 staff.

Small company
1995-date
Turnover around £0.6m

as joint founder of Peter Deer and Associates (PDA) a start-up firm currently with 8 staff specialising in building services engineering, based in London.

This spread of roles has enabled me to evaluate organisational traits and business processes for consulting engineers in:-

- Single and multidisciplinary firms
- Large and small organisations
- Different stages of development
- Domestic and international context

I have supplemented information gained from my own experience with a series of interviews with other consulting engineers and building sector professionals. Information gathered from interviews was used in post module work and in the drafting of Part 1 of my project about starting a small engineering consultancy¹⁵.

2.2 Sector perspective - UK

Consulting engineering is a mature service business. UK activity is dominated by a few firms and in 1995 out of the top 100 firms, 10 carried out 50% of the workload. Over Arup and Partners, for many years the UK's premier firm, grew organically to its present size¹⁶. Organic growth was the norm for many large firms until the late eighties when mergers and the acquisition of smaller specialist firms became more common. The privatisation of local authority and health authority design departments through the late eighties and early nineties, together with the break up and sale of the Property Services Agency (PSA), has brought new large firms into the market. Firms such as TBV (now Tarmac Professional Services), Pell Frishmann and the rapid growth of WS Atkins to over 6000 staff were as a direct result of such acquisitions. Introducing such firms into the private sector increased competition for the more established larger firms. Layoffs and redundancies caused by the recession created a myriad of tiny consultancies that increased competition at the small project end of the market. Fee competition meant that the comfortable fee scales were no longer used, resulting in a drop in fee income by as much as 50% for the same work^{4,17}. Larger consultancies responded by seeking growth to cover their heavy fixed overheads and attacking the international rather than domestic market. Many firms sought to maximise their fee income and standardise their processes to provide the control needed in a very 'tight' market. Early adopters of Quality Assurance (QA), such as Oscar Faber found that a more commodity based approach to service provision was profitable, but the market benefit reduced as QA became an order qualifier for Government work¹⁸. With an influx of new entrants at both ends of the scale, there was excess capacity. Huge firms began to dominate at one end and small niche firms at the other. Increasing competition made things very uncomfortable for middle sized firms with a predominantly UK based workload. Some firms who had grown in the profitable eighties had acquired an unmanageable fixed overhead in expensive property. Substantial debts, exacerbated by failed contracts in the early nineties become unmanageable for some. Firms like YRM and Travers Morgan were not able to adapt to the leaner times on very much reduced fees and were taken over or slowly went broke.

Building services engineers do not have an especially good reputation in either the engineering profession or the construction sector. Prone to over design and seen as less professional than their structural or civil colleagues there is considerable market 'churn' between clients¹⁹. A few well known, long-standing relationships exist between clients and professionals, but my experience in starting my own firm has shown that for new entrants with good design, business and project management skills there is a readily accessible market.

For me the most vexing question for consulting engineers is, what does a client want? The answer seems to be a wide variety of things depending on their business and the market in which they operate. My research indicates that many consulting engineers

have tried to offer the same service, based on strong technical ability, to a wide spectrum of clients. This, in my view, simply does not work and clients react badly to it believing that their project is not receiving any “bespoke” input. In architecture there are different types of firms who undertake work in a particular sector. My research has identified that there are different styles of consulting engineer too.²⁰ Each is suited to a particular type of client base and market segment. For success a consulting engineer should look at their own skills, capabilities and company culture and seek clients who want that mix. From interviews and literature review, I have formed the view that it is only when a firm gets to a considerable size that it should be seeking to provide a cross market capability.

2.3 Company Perspective - Carl Bro Group - UK and Globally

An extended version of this section is given as appendix A for background information.

My early research and post module work was influenced by my role as a director in Carl Bro Group (CBG). Although globally CBG is a large company, (over 2000 staff) its UK operation was not big enough in any sector to compete for the very largest projects. Consequently in the early 90's CBG was very keen to make an acquisition to increase its UK turnover. Growth was needed to support a large fixed cost in property and overheads. It was one of the four final bidders for the PSA Southern Region, a £90 million turnover government privatisation. It was also well placed on bids for Local Authority road departments and Water Company design offices. However none of the acquisition bids made by CBG was successful. In the face of a declining market an alternative course of action was needed.

Restructuring in the UK began in 1993/4. Using a similar approach to that used in Denmark in the previous year. Objectors were sidelined or removed. This created instability and high redundancy costs in a company that was already under financial strain.

Recession, bad project investment and the costs of restructuring put the parent company under further financial strain. In 1994 results for the whole group went into the red for the first time. More fundamental was the effect caused by paying off large shareholding directors ousted in the change process. In early 1995 the share price tumbled from over 2000 DKr to 500 DKr ruining the retirement plans of many senior staff who had bought shares rather than pension rights. Unprofitable joint venture developments in environmental clean up and waste incineration projects caused further losses. The company was in serious financial trouble and sought the support of an external backer. A joint funding exercise from the firms bank and external investors has stabilised the position but the CBG has not made a profit since 1993/4 although a break-even result is expected in 1997/8. The share price in 1998 was still around 600-650 DKr.²¹

CBG were not alone, many consulting engineers suffered in the recession. Others though prospered. There have been some remarkable growth stories through the lean periods. I have already mentioned WS Atkins but other smaller companies were equally successful. Design led firms like Max Fordham, Whitby and Bird and Battle McCarthy have developed strongly by careful segmentation and the maintenance of their own culture and style.

2.4 Change in culture and scale - JRBA to CBG

An extended version of this section is given as appendix A for background information.

JRBA was acquired by CBG in 1989 and almost immediately thereafter the building sector went into a severe decline. After several years of boom, not having enough staff and struggling with too much work, things changed within months. CBG were taken aback by the rapidity of change in the market, which they had not anticipated. Most of the CBG activity in the UK was in civil engineering which left me as one of the most senior people in the firms building division. Despite being from one of the smallest companies, I became involved in the general management of the whole company throughout the UK. This role gave me a valuable insight into the struggle for survival of a previously very profitable group of companies. An evaluation of the issues that CBG were facing are set out in my MSc dissertation.¹

In retrospect, and in the light of the experience of running PDA, it would have been better for the company if I and the other directors (most of whom were skilled engineers and marketers) had concentrated on their clients rather than focusing on internal processes and company structure.

Such comments seem simple in hindsight now that the recession has passed, but at the time survival and cutting costs were priorities. In the face of a severely declining market, CBG and many other consulting engineers had to accept that, unless they changed their businesses and cut fixed costs, they would slide into bankruptcy. This was something that most had never seen before.

In leaving CBG to set up my own firm I re-examined the role of a building services consulting engineer in the building sector to suit the needs of a small niche firm. This work formed basis for the major project undertaken after MSc during the second half of the programme.

3. Objective of the portfolio and projects

My objective in seeking a place on the EngD programme was to develop an understanding of business management in an engineering context relevant to my role in JRBA and CBG. I had initially been looking for an MBA but none of them seemed to

suit my workload and business needs. When I joined the EngD programme I could find very little in the literature with respect to the management and development of engineering consultancies.

Because of CBG's activity throughout Europe and in the third world, my early work focused on:-

- International business
- Consulting and service industries
- Parent company-subsidary relationships
- Change management

In early 1993 when I attended my first module, CBG's UK companies were experiencing mixed fortunes. Firms in the building sector were suffering badly. Those in the water industry were slightly better but desperately waiting for more activity following water privatisation. The saving grace was a buoyant workload in transportation (road design) principally based in Scotland through the Scottish Office. Innovative joint ventures²² and high technical competence had created a strong client base. Even this more profitable sector was not making the returns that would have been typical only a few years before. Transportation was the most profitable sector in CBG's UK activity and served as a flywheel to stabilise the rest of the UK companies.

When I started EngD in 1993 construction was at the bottom of a steep fall in output. It also was the beginning of a very slow recovery leading to a more sustained period of growth from late 1995 to date (early 1998)²³. At the time however, it seemed that a hard market was to be the way of life, at least for the immediate future. The subjects chosen for modules reflected this. The focus being principally business and finance orientated. A review of modules is given in the Personal Profile.

Research projects undertaken in the early part of the programme were:-

- History and background of consulting engineers
- The European and UK construction market
- Review of the development of CBG
- Evaluation of key issues for CBG globally and in the UK

This work was designed as a foundation for subsequent internal projects within CBG. The data from this research formed the basis of an MSc dissertation. In the dissertation I attempted to bring together a number of threads that had emerged from post module work, background reading and the direct experience of change management in CBG. The post module assignments were also used as research vehicles to assess live issues within the UK business.

Areas of interest for me were:-

- Finance and accounting
- Marketing
- Quality
- Human and team issues

My role within CBG and the business challenges that the company was facing gave the project and post module work a particular perspective focusing around the needs of a large company. Throughout 1994 it had become clear that CBG were adopting a development strategy that did not support, therefore in late 1994 I decided to leave CBG to form my own consulting firm. Modules taken through 1995 represent a transition through my departure from CBG and the development of my own consultancy with a friend and colleague Peter Deer. In post module work during this period, I have attempted to contrast and compare the differences between managing a large firm with those needed to run a small start-up consulting organisation. I have found that the marketing, business process and organisational approaches are quite different in a smaller firm. Customer focus and service quality however, remain equally important regardless of a firms size.

Analysis and experiences gained during the latter part of the programme are set out in an interlinked project in three parts exploring the theme of "Starting a small consulting firm". Each of the parts assess different issues as follows:-

Part 1	External factors	This part explored some of the issues that were unresolved in the MSc dissertation. It also evaluated the market for consulting engineers, from a small company perspective and identified different consulting styles. An important underlying theme in the work was a change in emphasis from the internal to the external. Changing the business imperative from a focus on creating repeatable processes to creating satisfied customers.
Part 2	Human issues	Moving from a large to a small company introduced a change in both motivating factors and business drivers. This part explores the underlying personal and team motivations. It then seeks to identify how they would shape a small business and its subsequent development.
Part 3	Strategies, results and competencies	The development of a new firm, Peter Deer and Associates, is assessed over its first thirty months of trading. An evaluation is made of the strategies adopted for getting work, doing it and developing a team that will sustain the firm into the future. Financial and non financial results are presented and suggestions are made for further development

Through 1996 I undertook further modules that explored learning, different methods of undertaking the consulting process, the use of computers in design and the introduction of innovation. The final module was a financial review of the development of my new firm as an investment project.

A summary of the work forming the portfolio is given in Appendix B.

When I joined the EngD programme I could find very little in the literature with respect to the management and development of engineering consultancies. My work has therefore drawn from a wide range of sources outside construction. Because of my links with Warwick Manufacturing Group I have used manufacturing as a principal comparator. My views on the methodologies that construction could use to improve their own culture and processes were set down in a draft paper.¹⁰ This work was drafted to set an industry framework for my work in CBG. After leaving CBG I used it as a lead into the thinking behind establishing a small consultancy.

4. Key areas of study

Through the work I have undertaken, several key themes have emerged. Each in itself is not unique and has been researched by many others outside the construction industry. I have found very little published work researching consulting engineers and none where the themes have been combined holistically and linked to the engineering profession. When assessed together, they represent, in my view, the external and internal factors that should shape management within engineering consultancy firms. They are:-

- Customer focus
- Change in the construction industry
- Identifying and maintaining core competence
- Innovation in service delivery and linking expertise to customer needs
- Human factors and team building
- The link between staff development and a firms success in professional services
- Service quality and the 5 gaps in service provision
- Marketing for professional services firms
- Analysis of mainstream and niche markets in construction
- Relationship marketing in small and large firms
- Corporate competence and personal consulting
- Financial management
- Dealing with change and continual learning

PDA's innovation has been to evaluate these factors and use them to create a professional services firm that is better suited to its niche market. PDA has not yet

fully mastered all of the competencies it needs. However the directors and staff are aware of some of the weaknesses and are actively trying to do something about them.

My experience has been that when I have discussed these factors with colleagues, co-professionals and clients, interest is high. Many seem to feel the need for advice but do not know how to go about getting it. I have noticed from interviews that there is still a general distrust by engineers of management, management consultants and especially accountants. It is as if engineers resent the advice given. I have always found this curious coming from professionals who make their living by giving advice to others.

5. Business processes for professional services firms

5.1 Customer Focus and Service Quality

All businesses need to focus on their customers²⁴. This is true for most firms but especially for professional services firms whose service is largely intangible. The Association of Consulting Engineers prepared a major future study report²⁵ which gave a special plea from clients “...*consulting engineers must make a greater attempt to understand the needs of the client and to bring to the team business knowledge and skills to support the engineering excellence which Members currently show....*”. Emphasis was also given on the need to adopt new forms of appointment in order to improve value and reduce client's risks. The author of the report concluded that consulting engineers should be “*looking at innovations and adding value to projects by innovative methods*”.

With service businesses, a customer's perceptions are the key factor²⁶. It does not matter that a service was actually top rate if the customers' perceptions are different. Evaluating service quality and identifying channels of communication (or breakdown) can be visualised using the 5 gaps model of service quality.²⁷

I have used the 5 gap model to develop an understanding of service businesses, applied the lessons in the development of my own small consultancy. There are key areas of communication and information transfer that if not correctly addressed can lead to a reduction in service quality. The “gaps” in expectation and performance lead to customer dissatisfaction. By concentrating on closing the gaps, customer service can be improved. In PDA I have found that gap analysis is a useful tool in analysing relationships and serves well to illustrate key factors in relationship marketing.

In evaluating service quality and customer focus I have noticed a belief by some consulting engineers, especially those who started in business in the 60's that the most important asset for a firm is technical competence²⁸. They believed that if they were technically sound, clients would naturally use them. Their view seemed to be that being an engineering professional was something that was of value in its own right. This view

is typical of many professionals and to some extent it is true, there is value in the knowledge held by professionals. However from a business view point the holding of knowledge is irrelevant unless it can be used to the benefit of a firms customers. There is a move in many professional roles to decouple expertise and professionalism taking away from professionals simple tasks that can be automated or carried out by non-professionals²⁹. Design and build is an example of this in construction. Contractors do not employ expensive consultants to do design that can be carried out equally well by sub-contractors.

CBG is an excellent company in many respects and has leading edge capability at an international level. In the UK however, too much of its management focus was on internal processes rather than seeking out and satisfying the needs of its clients. This was particularly the case in much of the building sector. In starting PDA I have focused on creating a business that is much more customer orientated. I have attempted to shape PDA's activities around customer needs rather than expecting a customer to accept the PDA's processes regardless of fit.

My observations are that clients are (broadly speaking) disinterested in the technology of building services.³⁰ They expect that their consultant will be an expert. They expect all consultants to be experts. It is not the quality of expertise that is important but the quality of advice. Good advice takes into account both the business and technical aspects of the problem at hand. Quality advice should be that which is best for a customer's business, not the safest for the consultant. Handy³¹ predicts that this change in role towards giving advice is inevitable for professionals of all types, who must loosen their resistance from that of "*guardians of knowledge*" to "*counsellors and interpreters*"

The right business decision may involve a less than optimal engineering solution. Something that is difficult for some engineers to accept. I have seen, from my research in CBG and in PDA, that clients respond favourably to the pragmatic approach. The downside must, of course, be set out; but fairly, not loaded towards the safe bet. The classic professional position is that "consultants advise, clients decide". This still holds true in theory, but in practice, many engineering decisions are so complex that clients have no choice but to ask their consultants what to do and then to act on that advice. When a consultant avoids his responsibility, by passing the buck and expecting his clients to make a decision on what is to them incomprehensible data, they resent it. Taking responsibility for decisions rather than simply offering alternatives is a key business ethic in PDA.

5.2 Internal Processes

As with technical advice, strong and comprehensive internal processes are only of benefit if customers see value in them. In interviews, I have noted a degree of cynicism by private clients about the value of standardised processes, especially QA. This is, I believe, derived from the lack of perceived benefit that a client gets from compliance with complex systems. I have noticed a similar attitude towards the input of planning supervisors. It is not that clients do not believe in QA or are cavalier about safety. It is that so much of the consulting process is invisible to them. Consequently, they struggle to relate the paperwork generated by such systems to their own requirements for a good building built safely. Making the consulting process tangible is therefore a crucial part of demonstrating value and improving a clients perception that the consulting engineer is contributing to the client's business. PDA's *personal consulting*³² approach increases tangibility by placing the most senior staff at the client consultant interface.

Looking back on the changes within CBG and the development of PDA, an understanding about customer focus is one of the most valuable competencies that I have developed. It was missing within parts of CBG that were strongly process driven and those parts struggled to remain profitable. Departments within CBG that looked carefully at the market and their customer's requirements continued to be successful and to secure new work despite the recession³³.

CBG in Denmark had a background in large international infrastructure projects. Projects were secured by CBG because of strong processes and technical excellence rather than personal client relationships. This was especially the case in the Overseas work carried out for aid agencies. The companies CBG acquired in the UK were not organised like CBG. Much of their workload, especially in the building sector, was not secured on the quality of its internal systems but on the individual capabilities of its people and their relationship with clients. It took me sometime to realise this and to be able to articulate my understanding in a structured way. The CBG methodology was not wrong, simply inappropriate for much of its UK business.

When CBG was operated as a federation of individual companies³⁴, internal differences were not so important, as each firm carried out its own activities in its own way. It was only when CBG began its reorganisation and tried to install a common set of processes, QA system and cultural values that the differences became unmanageable. CBG have since realised that their systems were not being equally effective throughout the company. There was no long term fit between the bulk of CBG's European operations and its small UK based building teams. Through 1996/97 it has disposed of most of them by closure or management buy-out. The CBG UK business now centres around, large projects in civil, water and transportation where its systems are valued and successful. CBG has clearly opted for a business based on corporate competence.

5.3 Innovation and Linking Expertise

In my research I have noted that there is a continual process of business and technical development in the construction industry. New techniques be they technical or organisational tend to be localised at first, gradually permeating through the industry until they become common place. In order to maintain their value to clients, engineering consultants need work that is complex or demand leading edge input. In these areas new solutions enable innovation. Once a technique becomes commonplace its value is lessened and clients become unwilling to pay the premium cost for a consultant's involvement. Consulting engineers also need to handle complexity well, as this too attracts a premium.

To maintain their edge, consulting engineers must continually seek out new products, technologies and methodologies that assist clients to get the best value from their building projects or property portfolios. For consulting engineers continuing professional development (CPD) is not a chore but a necessity. To reiterate, gathering knowledge and technical capability is in itself pointless. The expertise is only of benefit if it is used to add value to client's work.

Liedtka et al ³⁵ propose that for professional services firms to prosper they must:-

- Develop competencies over time
- Leverage individual expertise to solve problems
- Generate new ideas
- Provide superior value to clients

In their view professional service firms will only provide superior value to their clients if *"they are able to handle complexity and use a rich depth of technical expertise in one area with an ability to link that expertise to work in other areas"*. Thus the central asset of a firm is not the technical expertise of individuals, rather it is their collective wisdom that sets them apart from their competitors. In generating new ideas a multi-disciplinary approach is essential because such solutions have a greater potential for innovation.

In developing PDA a multi-disciplinary approach has been adopted. Not at team level as practised in JRBA but at an individual level. The objectives have been to bring a multi-disciplinary skills approach both to the client/consultant interface and throughout the design and project management process. Such an approach maximises the interest and personal development of project engineers. It gives them the opportunity to make decisions that influence the design and management of a scheme. I have also found that clients like the opportunity to develop a relationship with an individual for all the technical issues on a project. This is in contrast to the organisation in traditional firms, where each project would have a mechanical, electrical and public health engineer.

There could also be a lighting designer, lift engineer and environmental specialist too. Because PDA's engineers are broadly trained they are better placed to create the linkages across disciplines that add value. The appointment of multidisciplinary engineers is still not common in building services and while there is movement towards the term building services engineer as a title it is rare to find multidisciplinary engineers who operate at the design level.³⁶

5.4 Human Factors And Team Building

Liedtka et al³⁵ have shown that the development of individual consultants in professional service firms is closely linked to the overall success of the firm. They call this process the *generative cycle*. Personal and professional development is therefore essential. For success, individuals in the firm need to have *analytic talent* to handle technology and complexity, *human qualities* to develop client relationships and *entrepreneurial skills* to build businesses. Together with these individual qualities, successful professionals must also be team players. Where individuals do not have all the technical and management skills to undertake the whole of a project, teamwork is essential to minimise gaps.

I have assessed the motivations behind starting a small firm with my business partner Peter Deer to identify the links between personal aspirations and the company structure, culture and strategies that result. I have found that it is only when the personal and business drivers are compatible that a firm is likely to provide financial reward and professional development. PDA has been structured to meet both these drivers and has a culture where responsibility can be taken by all staff commensurate with their experience and confidence. A flat structure enables teams to form for specific projects and then to reform when the workload changes.

The small company structure PDA has adopted served it well for the first few years of operation but will need change as growth continues. The focus has been on building a complete team. In achieving this, PDA has attempted to utilise primary and secondary team preferred team roles developed by Belbin³⁷. Inevitably there has been compromise because of the size of the firm, however for the reasons described in the previous section, the team role is as important to us as technical ability.

5.5 Personal Development And Company Development

In professional businesses there is an inextricable link between a firm's development and that of its staff, including its leaders.³⁸ As stated earlier the generative cycle (see Figure 1) is a representation of how personal development and client development fit together and support each other. For firms like PDA and CBG, learning is not only about gaining technical or academic knowledge. It is also about gaining knowledge

about clients' wants and needs. Then designing internal processes so they can be directed towards creating value for them. Because change is continual the process may need to be adapted after each project to take into account the most current industry and market factors.

A focus on personal development is the reverse of an approach that seeks to turn professional services into a commodity. I would argue that where professional services

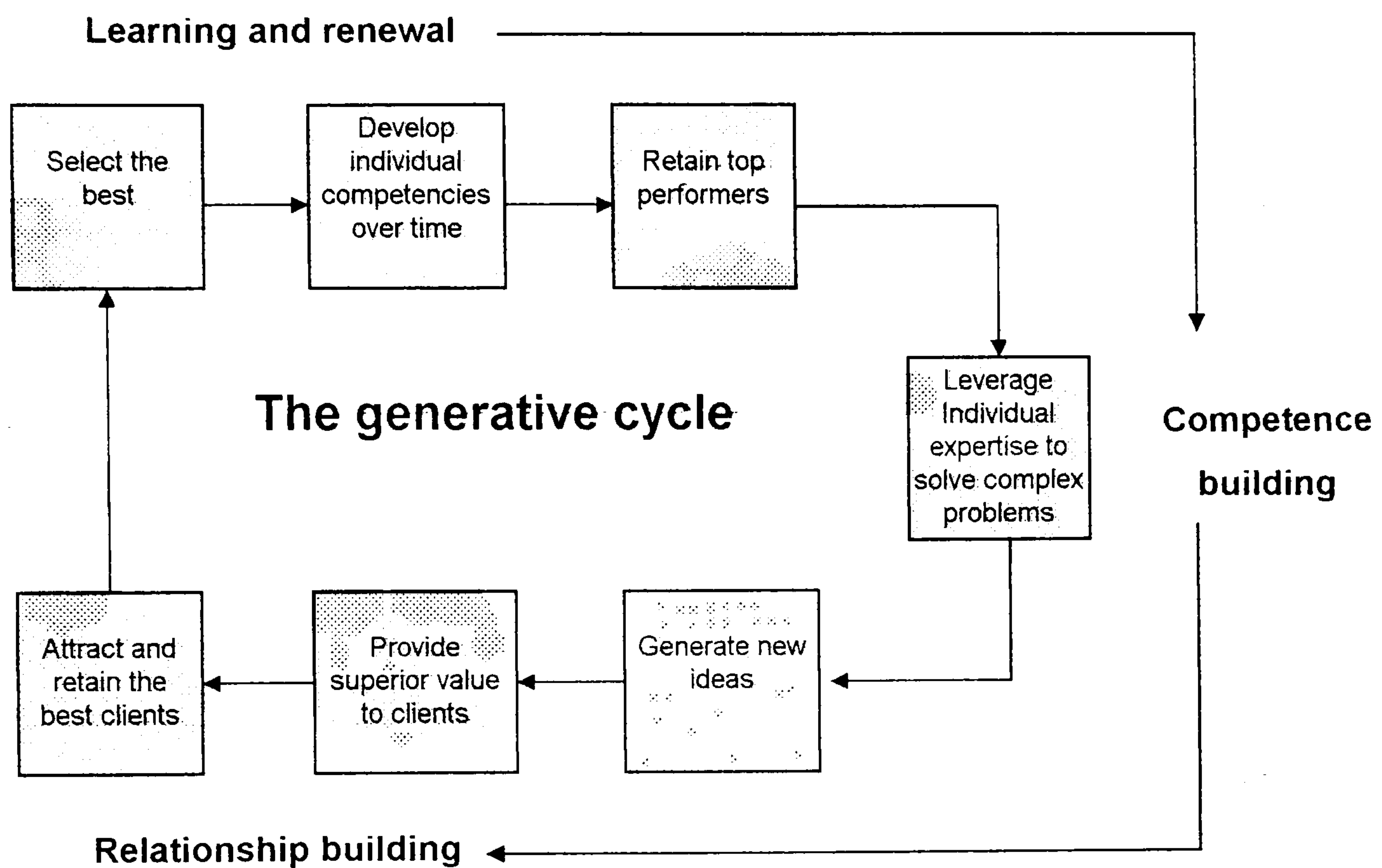


Figure 1 - The generative cycle for professional firms

Adapted from Liedtka et al. 1997

can be simplified then carried out by low cost staff or computers, they should be. There is no premium value in carrying out repetitive work. Clients instinctively know this and resent having to pay over the odds for something that is straightforward.

Engineers will only develop, and be satisfied with their role when they are undertaking interesting and challenging assignments. Without such challenges they are likely to become discontented. As Maister³⁹ points out there is no long term client relationship where the consulting engineer is simply seeking billable hours. If work is straightforward and could be carried out by a contractor or a technician it is essential that the client knows this and can make an informed choice. He may still employ the consultant to undertake the assignment but it is better that he knows the premium he is paying.

Learning and collaboration with clients enables the development of business related capabilities together with personal development of the individuals within a firm^{35,38,39}. A firm cannot create these capabilities in isolation. To do great consulting work a firm

needs great clients who are prepared to fulfil their side of client/consultant value exchange. Where clients demand more it creates "stretch" for the consulting engineer, extending capability but not to the point of overload. But to create stretch, there needs to be feed-back both from the client and within the firm. Internal and external review is essential. It is a mistake to assume that a client will want a service that was the same as last time, even though the broad parameters of the project are similar.

5.6 Marketing For Professional Services

From an initial post module assignment on strategic marketing, my research has explored the marketing mix for service based firms and developing an understanding of the 7P's of services marketing⁴⁰. Selling and marketing strategies have been assessed, in particular the differences between those that suit large or small firms^{40,41}.

From my assessment, large firms need to adopt a strategy to bring to the market a strong internal process supported by in depth technical capability. The literature suggests this approach is best suited to clients who need a consistent service process with a clear quality audit trail and repeatability. The bulk of consulting engineering services in the UK are carried out by large firms offering this type of service. In such a relationship, although there may be a key account manager in the consultant's organisation, service provision is between the client and the consulting firm as a whole. Most of the consulting work is carried out by technical staff who do not interact with the ultimate client. I have called this approach *corporate competence*.³²

At the other end of the spectrum there are clients who seek to develop a relationship with an individual consulting engineer. In this type of relationship the service on offer is limited to the skills of the individual and the team supporting him or her. This is very much a niche market approach. In contrast to firms offering corporate competence, where senior staff are predominantly managing a process, this approach requires that the most senior staff are actively involved in the engineering work. I have called this approach *personal consulting*.³²

Both approaches can be used by large and small firms. However it seems from the firms I have observed, that in general, large firms tend to offer corporate competence whilst small firms tend towards a more personal service. For complete market coverage a firm would need to be able to offer both forms. From my research I consider this could only be undertaken by firms who were carefully segmented internally. Perhaps one example is Arup Associates, a multi-disciplinary design-led subsidiary of Ove Arup and Partners. Arup Associates uses the resources of Ove Arup and Partners to carry out the detailed design but retain its own 'designer' autonomy. Arup is a multi-faceted firm being strongly team based with team leaders giving a service close to personal consulting, but within an environment with a strong corporate

structure. Arup is renowned for being able to handle the largest projects while at the same time retaining design flair.

PDA has developed a marketing mix intended to serve a niche market in the commercial property sector. The elements of the mix are based on the 7P's of services marketing.⁴² The key elements are given in

Figure 2. The mix was determined very early in its development, prior to starting business. It has been refined but its heart has remained unchanged. The mix is designed to suit a small number of clients who want *designer* flair but with the property knowledge traditionally associated with *city* firms.²⁰ The mix adopted by PDA was

<p>Product - Building Services Engineering design, management and maintenance control. 'Designer' capabilities with City Style.</p> <p>Price - Medium to high per unit hour but with lots of extra services included within the standard price.</p> <p>Place - London/SE but UK wide at client request although national work is not sought directly.</p> <p>Promotion - Relationship and niche marketing leading to referral opportunities. "Personal Consulting"</p> <p>People - Highly qualified/experienced. Lower grade outsourced or sub-contracted. Anyone can take executive decisions.</p> <p>Physical Evidence - Standardised documentation and forms. Corporate business cards. City dress code. City office style. Close client contact.</p> <p>Process - Flexible, empowered project managers. Adopt to lead consultant or client systems. Use non standard appointment terms.</p> <p>Figure 2 - Marketing mix for PDA</p> <p>Based on the concept of the 7 P's of services marketing⁴²</p>

chosen to suit the skills of its engineering staff and the needs of clients in a particular sector of the market. The mix adopted by any firm is unique and sets the processes and culture of the firm. The blend of competencies, personal skills and processes makes a firm what it is. Small firms cannot hope to provide all the skills and resources that a large firm can provide. However, a small firm having the close involvement of the principals in day to day engineering may provide superior service to a team from a large firm, but only in a limited area of expertise. The key for success is to clearly identify areas of superior competence and identify clients who want these particular skills.

The benefit of client/consultant fit

Within the EngD programme I have studied the restructuring of CBG as it attempted to provide a consistent product and corporate competence. In CBG the UK managing director attempted to create a focused approach for his UK teams through a total quality programme. The programme failed due to lack of senior management commitment.⁴³ The personal satisfiers and motivators⁴⁴ of the directors were not understood or catered for. There was no fit between the objectives of the Danish management and the recalcitrant directors.

Appropriate fit between consultants and clients is equally important. As a result of my research and an analysis of client requirements, PDA has developed a business based on *personal consulting*. From my review of services marketing techniques the most important factor seems to be the identification of the type of service a client is seeking and then offer a package that fits their needs. This means that the service must be adapted for each client. It may also mean refusing to do a job when there is no fit.

Giving personal consulting to a client who is seeking broad corporate competence in a recipe for failure. The reverse is also true. A short analysis of customer defections in PDA confirms this for small firms.⁵⁵ The benefit that large firms have is that they can, with care, segment internally to enable "designer" departments to sit alongside the more traditional process driven teams. Care has to be taken in the marketing and client management to ensure that the right person is dealing with the right bit of each project.

Fit within a group of companies is as important as the fit between a client and a consultant.⁴⁵ It is now much clearer to me that CBG's Danish management had decided on a target market and that the building teams in the UK did not fit into their vision. The lack of fit did not matter in the old CBG federated structure.³⁴ It became a real problem in a pan-European matrix structure directed towards major civil and infrastructure projects. The people, clients and processes within the building sector had a different mix to CBG's target market. Frustration and deterioration of the business were inevitable in the circumstances. In a different market CBG may have been able to take a more long term view to developing the building sector, rebuilding the organisation to make a better fit. Certainly their timing could not have been worse, buying into the UK at the top of the market in 1988/9 and pulling out of London at the beginning of the property recovery from 1996-8 was very expensive. By the time the market was improving there were not enough experienced building personnel left to exploit the opportunity. CBG had little choice about their course of action. At that time no one at board level in Denmark would support further investment in the UK making consolidation around those core activities the most pragmatic course of action.

Transactional and relationship marketing

Closely connected with the market profile for a professional firm is the business development approach used. There is a continuum of approaches from the sales driven transactional approach to the relationship orientated referral approach⁴⁶. In a sales based environment success in bidding tends to be price driven, whilst in referral business value is a more important criteria than price. There is no unbreakable rule, but I have observed that firms offering corporate competence tend to adopt sales based strategies while those offering personal consulting opt for a relationship and referral strategy.

In PDA, relationship marketing has been found to be a successful method of developing the business. It does however demand a great deal of commitment from senior staff and unless new recruits of the right calibre can be developed to make relationships of their own, it may become a brake on company growth or lead to over-trading.

The factors that shape the marketing strategy for professional engineering firms therefore comprise.

- Careful analysis of marketing mix
- Segmentation of clients to fit available capabilities (this may be broad or narrow)
- Continual review of approach against client base to ensure continuing fit
- Adopting processes that suit the marketing strategy

PDA has studied its engineering and business skills seeking clients from a market niche that puts value on them. This approach is at odds to the staple marketing theory that says find out what the market needs and adapt your firm so that it offers it. Such an approach is only suitable for large firms who are seeking to provide broad coverage. For many years consulting engineers like many professionals, have paid much less attention to marketing (by refining all the elements of the marketing mix) than to developing and defining their technical ability⁴⁷. The result has been that many firms are not properly able to exploit their capabilities and clients become frustrated complaining that engineers must concentrate on providing services that clients want.^{11,25} In such firms marketing becomes confused with selling and there is no clear internal appreciation of the link between quality, internal process and staff development.

5.7 Financial Strategies

Consulting engineers have adapted to change in the market with considerable skill. A reduction in income through fee competition and a rise in design and build contracts has been absorbed.

As Alec Moir the chairman of Oscar Faber noted⁴⁸ :-

“Consultants were used to working for fees that were normally 4% of the project value. Then fees went down to 1.5%..... the thing that surprised everyone was how resistant consultants were and that they managed to survive but the way they did it was to cut staff numbers, salaries and corners”.

The market has recovered and fee levels quoted by PDA are now more like 2-2.5% of the cost of works. Nevertheless there is still a considerable reduction on the traditional fee scales of the past. How then does a consulting engineer undertake his business in an era of reduced fees and increased competition? From my research the financial factors are the same for both large and small firms.

- Minimise non productive overheads
- Outsource low value adding activities
- Manage the business on accurate information
- Increase speed of cash flow through the business
- Train engineers in how they add value to the business of the firm and its clients

It is essential that the financial strategy ties into the broader business strategy, hence the last item in the list above.

When I was a director of JRBA and CBG I observed how the lack of cash constrained the firm and created a significant administrative overhead to manage work in progress, debtors and to control non project expenditure. In interviews with other consulting engineers, cash flow management and speed of payment was repeatedly cited as the most troublesome area of concern. To reduce the impact of these problems PDA adopted a cash positive strategy from its inception. This was achieved by careful selection of work and by the founders taking only the minimum drawings until cash targets were met. Once a cash reserve is established the effects are :-

- There is no pressure to invoice too early - clients do not feel pressured
- The occasional late payer is not a concern - creating goodwill with smaller clients
- Suppliers can be paid quickly - ensuring prompt and preferential service
- New equipment can be purchased when it is needed
- Less time is spent on cash-flow management and bookkeeping - reducing overhead and wasted time by directors.

For a firm like CBG such an approach is probably not achievable in the short to medium term. A lack of cash (because of high fixed charges and a commitment to completing large projects secured at low profit margins) has been the root of their problem. CBG did operate on a cash positive basis for most of its existence up to 1990, it was a surplus of cash in its share foundations that enabled its European expansion programme. However the availability of cash cannot buffer the effects of bad acquisitions and poor management for an indefinite period. This is a lesson for PDA. Simply having cash in the bank is not a protection against giving poor engineering advice or a failure to maintain client relationships.

Outsourcing may at first seem to be in direct contradiction to the growth aspirations of the very largest "Mega-firms". This is not necessarily the case. A firm may seek total market coverage of all disciplines and sectors without being completely vertically integrated. Manufacturers discovered this some time ago. The methods adopted by PDA such as outsourcing, personal consulting and customer focus are equally applicable to large businesses. The objective of the business should be to create *flexibility* to cope with market change and *scalability* to respond to market demand. Many of the firms that failed in the eighties were both technically competent and flexible but had overheads that demanded a high turnover. When the market reduced they were unable to adapt to lower levels of income.

All firms need management information to operate effectively. In large firms this maybe provided by a central accounting function although this is not necessarily the

case. In small firms the business is usually simpler although this does not always mean that information is accurate or available.

In putting together a business plan for PDA, I assessed the financial difficulties that CBG faced and adopted a strategy to minimise them. In practice, the objectives were similar to those of CBG, but in a small start up firm implementation was much simpler.

The key business and financial differences I have identified and set out in tabular form as Figure 3 below.

Business need	PDA Approach	CBG Approach
Increase cash flow and availability	Cash reserve, regular billing	Programme to reduce WIP & debtors. Maximise -ve WIP. Sale of unproductive assets
Accurate business information	Simple billing, pay debts quickly Accurate billing against stage Cash position = business position	Europe wide on-line project Costing system. On-line budgets. Team accountants.
Increased volume	Relationship - long term	Sales - short term
Increased capability	Multi-skilling, staff development	IT Systems, acquisitions, Recruitment of sector specialists
Minimise overheads	Outsourcing, single location, minimise non productive by multi-skilling.	Head count reduction, consolidation to fewer offices. IT system for communications.

Figure 3 - Different business and financial approaches adopted by CBG and PDA

There are examples of both large and small companies being financially successful. However one should never lose sight of the point that financial systems are not the business, they are simply one way of knowing how the business is doing. They are important - but they do not earn anything for the business. Being a top quality engineering advisor and providing services that clients want earns the fees that keeps a company in business.

Overhead and non-productive costs in PDA are approximately 13% of turnover.⁴⁹ In 1995 for JRBA these costs were 36% and in CBG overall they were 38%. Yet in the building sector there were few projects that CBG could undertake that PDA could not. The CBG building sector teams simply did not get sufficient marketing or technical benefit from the overhead charge it had to sustain, consequently they were both unprofitable and uncompetitive. This is a valuable lesson for PDA as it grows. Non productive costs will increase, it is important that they do not become out of control.

Perhaps the most significant overhead costs that PDA will have to sustain in the future are the salaries and bonuses of its shareholding directors, Deer and Humphries. At present they are the predominant marketers and contribute to the technical production

process. This role must continue. A firm the size of PDA could not support two semi-productive senior partners.

The construction market is volatile and the business strategy adopted by any firm must be able to accept the turndowns that have occurred on a regular basis over the last 30 years. A clear lesson from my research is that the financial model of the business should be continually assessed to determine the firm's ability to respond to changes in demand. Managing demand is one of the key management tasks in a service business.⁵⁰ Firms that are technically competent and flexible, but with high fixed costs are vulnerable. Those firms that do not have access to cash are equally at risk. In downturns credit becomes more difficult to obtain, placing a financial strain on the company. PDA can accept a substantial reduction (around 40%) in turnover before it becomes unprofitable.²⁸

In PDA I have introduced a long term policy to developing financial strength and a cash reserve. A persistent theme in my research is that organisations which take a longer term view of growth and profit, are more likely to develop successfully and survive market fluctuation. To further improve changes in demand, support services are outsourced to give flexibility and aid adaptation to market changes. To support this, "multi-skilling" ensures that staff are able to adapt to changes in the type of work that clients require.

I have found from my research that most consulting engineers, even small ones, operate a job costing system. PDA has not introduced a job costing system. From my research in CBG and my previous experience at JRBA, I consider job costing systems to be divisive and to distort the time allocation to projects. The optimum time input to a project should be made on the basis of the needs at the time, not to suit an arbitrary budget conceived before work started. Financial control is needed, but not at a micro level. This approach has been the subject of much debate amongst my professional colleagues (outside PDA) who are sceptical as to whether it is sustainable. They take the view that cost control is essential. My proposition is not that accurate information is not valuable, simply that job costs should not be the principal project management tool. This point was confirmed by course tutor Roger Gemmell in his review of the CBG project management system.⁵¹ He pointed out that a purely financial view of project success, as used by CBG, was too simplistic.

PDA does not ignore project costs, it always records time chargeable hours so that they can be reclaimed. However, the need to record rechargeable hours should not automatically mean the introduction detailed time sheet system. Overall profitability is important, but if one project make a little more or less than another is not critical. What is important is the future work load and overall profitability that is generated by a clients overall portfolio. Clients do not like to think that their consultant is only interested in the

amount of billable hours that can be charged.^{11,38,39,35} PDA has adopted the approach of quoting a fixed fee and then sticking to the agreed sum, this may mean absorbing minor changes and redesign. Consultants must have a genuine concern for a clients business interests if they want to achieve success, long term profitability does not come from trying to recover every extra hour on every project.

5.8 Non Financial Measures

In assessing their success companies tend to focus on financial results, whilst they are necessary they can be misleading. I have noted that in big and small companies that there is a considerable volatility in financial results when assessed over short time spans.^{49, 52} Further, in CBG for example, the entire management process was based on the output of the job costing system which itself was manipulated by project managers to mask loss making jobs. The system also did not reflect accurately the free overtime and off book working (both marketing and technical) carried out. I have demonstrated statistically, that in some CBG companies the cost information was flawed.⁵² Managing the business on misleading data was the cause of the huge annual write-downs at the year end that became a feature of the CBG business.⁵³

From my work in CBG and PDA I have formed the hypothesis that where businesses produce intangible products, they should predominantly assess their performance and client satisfaction using non financial measures. The principal measures being repeat business, client satisfaction and development of relationships. These should be supplemented using financial information. Financial measure should be simple and reflect the current business position and the teams performance. The requirement for simplicity ties in well with the cash based strategy adopted by PDA.

Where firms are sales driven they need well defined and analysed sales performance figures. They need to evaluate conversion rates and to monitor what in financial services is called the "pipeline" i.e. the number of opportunities, bids, and pre-qualifications that are available together with their chances of success. Once a project is won, feedback is needed to ensure that the project is progressing through the process on track. On completion, performance measures and client satisfaction are important but only to ensure that further sales opportunities are secured.

Where firms are adopting a relationship approach to marketing, quality and value is a key factor and it is vital that they are measured, however care must be taken. In an effort to secure useful knowledge clients should not feel they are being pressured.⁵⁴ If a firm is small enough, with only a few clients, feedback can be assessed in person. As growth takes place a client response system may be needed. Because the referral opportunities that result from relationships are essential for growth, the value stream flowing from key relationships should also be monitored. I have used a simple

graphical method of tracking the value from key people and clients so that a firm's vulnerability can be assessed. See part 3 of Project on starting a consulting firm.⁵⁵

5.9 Summary

Maister^{38, 39} suggests that the management of professional firms is about balancing the effort given to billable and non billable time. Bartlett and Ghoshal⁵⁶ identify three processes that all firms should master. Maister then identifies 12 key skills that are needed for success. Sub-processes are linked through relationships with staff and clients in the generative cycle, see Figure 1. These processes and sub-processes are interrelated, I have linked them and presented them here in Figure 4. My research has shown very clearly that technical competence alone is not enough to create a successful business. Each of the processes and sub-processes must be considered, their requirements addressed with a focus on how they add value to the clients business.

Split	Basic Process	Sub-Process
Billable	Work Doing (And Competence Building)	Developing innovative approaches to solving clients problems Finding new ways to lower the cost of professional services Turning individual assignments into long term relationships Disseminating and sharing skills and knowledge to increase effectiveness
Non Billable	Work Getting (Entrepreneurship)	Earning unprompted referrals from your work Generating an awareness of capabilities in important markets Turning enquiries into assignments
	Continuous Renewal	Developing new services Attracting high potential new recruits Transferring skills to juniors Developing new partners

BUSINESS PROCESSES FOR PROFESSIONAL FIRMS

Adapted from Maister - True professionalism Fig 5.1 1997 and Bartlett and Ghoshal
"Changing the role of top management - beyond structure to Process HBR Jan/Feb 1995"

Figure 4 - Comparison of business processes

Development and marketing activity is traditionally non-billable. For CBG, like most firms that are organised around a sales based approach to work getting, sales and marketing activity was a significant cost. Texts on sales and marketing in professional firms generally describe work getting within the "sales paradigm", i.e. there is a process beginning with lead finding, through initial contact bid etc. ending up with a project.⁵⁷ Once that project is secured the sales team then goes on to try and find more work by re-applying the sales process elsewhere. One of the advantages of the relationship approach to marketing is that the marketing process generally takes place during the consulting process. Thus simultaneously maintaining close client contact and reducing non productive marketing time. Developing this approach is one of the key innovations that PDA have adopted to develop their business. Relationship marketing however, is not a passive process. All staff in a firm must work to improve the service given to increase the referral rate.

The way that a firm decides to assemble its marketing mix and internal processes will to a large extent shape its culture, structure and target client base. This applies to start up businesses and those seeking to introduce change programmes. There is no right way but there are many wrong ways.⁵⁸ What is needed is a fit between the target markets and the strategies and processes used. Just where a particular firm decides to pitch its business should reflect its business and marketing strategy. It is the mix of processes and competencies that distinguish one company from another and prevent simple copying by competitors.⁷⁰ As Bhidé noted *"It is easy to knock off an innovative product, but an innovative business system is much harder to replicate"*.⁷⁰ Companies fail, not because they make the wrong choice, but because they fail to realise a choice exists. The former can be corrected by feedback, the latter is just bad management. Crego and Schiffrin²⁴ have reviewed the application of management tools and have found that it is not so much which of the many approaches is adopted. What counts is being consistent and not giving up too early if a new system does not produce immediate results. This is especially the case with relationship marketing. Relationships take time to develop and effective referral work does not happen overnight, relationships are about long term exchange of value between consultant and customer.⁵⁹

When PDA started trading they needed turnover to develop the business. Projects not in the intended marketing mix were undertaken but in a controlled way. As workload in the target market began to develop the other non-target workload was dropped.

6. Innovation

6.1 Processes and business systems

As I have studied business processes as part of the EngD programme I have seen business fads come and go. Some have reached a peak and then disappeared completely, others remain core business ideas. When I joined EngD in 1993 "Re-engineering"⁶⁰ was in its ascendance "Learning"⁶¹ was being proposed as a key to internal development whilst the jingoistic "Excellence"⁶² was coming to an end. Underlying these were the older philosophies of "Quality"⁶³, "Core Competence"⁶⁴ and "Just in Time"⁶⁵ with its newer relative "Leanness"⁶⁶.

Some of the fads seemed to be more closely tied in to the current state of the market than to be fundamental and valuable techniques. Whilst others seemed to be useful in parts but not wholly applicable to my business needs. My business was a service profession in construction, not manufacturing, therefore the material I was given required adaptation. This was a fascinating process, but even this translation did not seem to bring my own work in to one of the clearly defined philosophies. At first I found this frustrating, continually trying to fit what I was doing into a neat package. Were we in CBG downsizing or re-engineering? Was our business to be based on quality or core competencies? Nothing seemed to fit precisely. Seeking innovation became a pre-occupation and innovation seemed to need a big idea. In my own work I did not seem

to be using one of the current "hot" techniques. Instead I was taking a bit from here, adapting a model from there and trying to fit them together into a process that worked.

When together with my business partner, Peter Deer, we started PDA the same applied. Mixing different business techniques, marketing strategies into a business propositions was successful. We were developing and clients liked what we were doing, but still no big ideas. It is only in the last 12 months of reflection (and after attending the innovation strategy module) that I have begun to understand that we have been innovative. None of the business approaches used in PDA are new in themselves, it is

their unique combination which is in contrast to other consulting engineers and therefore innovative.

For example, taking a business view that focuses on the customer is not new in manufacturing but it is rarer in construction (although it is becoming more common now). Outsourcing non-core activities is against a general movement for big consultancies to become vertically integrated and offer a one stop shop⁴. However, some are now structuring their business using outsourcing as a risk avoidance measure. Data transfer by Internet is a common process in many industries, but some small professional firms still do not have a modem. Many consulting engineers use relationship marketing, but instinctively rather than

<p>SWOT (with brainstorming) Strengths weaknesses opportunity and threats. Invaluable in brainstorming the firms competitive position and the issues that have to be addressed.</p> <p>7 P's of services marketing Marketing mix for professional firms. Enables the evaluation of the fit between the firms actual and desired marketing strategy and position.</p> <p>Consulting style assessment Enables a comparison of the firms operating style with archetypal patterns used with 7P's to refine marketing mix.</p> <p>Relationship tracking Used with portfolio analysis shows the vulnerability of a firm to customer defections.</p> <p>Belbin's Team roles inventory Gives to each team member an understanding of how they like to work and how to use their strengths and understand their weaknesses.</p> <p>5 Gap analysis Enables the client and market relationships to be understood. Identifies potential breakdowns in process and reinforces the key issue that in services, it is perception not reality that counts.</p> <p>Hertzberg's two factor theory of motivation Enables an understanding of the motivating factors that create satisfaction. Combine with force field analysis to assess drivers.</p> <p>Systems thinking - Mind maps Useful for understanding the interconnectedness of business factors and the limit of ones own control.</p> <p>Figure 5 - Evaluation and management tools.</p> <p>For references and examples in the portfolio see (68) at rear of this report</p>

is a planned way. In CBG, like many companies, there was confusion between marketing and selling.⁶⁷ Each of the above issues have been assessed by PDA and solutions developed that create a business and operating culture geared to its customers. For a detailed review see Parts 1-3 of "Starting a small engineering consultancy"^{15,20,2}

Creating customer value has been identified by the Association of Consulting Engineers, as a key issue that its members need to address. A report addressing the issue was published in 1995²⁵ but only a few consulting engineers have created what my research indicates are truly customer driven firms. Complaints by clients about a lack of awareness by consulting engineers of client needs persist.¹¹ PDA has tried to adopt tools, processes and methodologies into its business culture so that it is better

suited to fulfilling its customers' needs. PDA is not perfect, and could do better in many areas. Certainly there are areas where it is weak, even vulnerable, especially with respect size and dependence on

a few clients. Nevertheless for the most part the directors and staff know where they need to improve and hopefully why.

PDA's innovation has been to look at its market from a perspective outside the construction industry norm, then try to modify what it does to make a better fit with client requirements. It has not tried to become technically superior for its own sake, it has tried to

match technical competence with a focus on what a client is trying to achieve when they employ a consulting engineer.

- Reference to business methods outside construction with a particular emphasis on the customer rather than the process.
- Process is important. Refine it to make it appropriate to the customers' needs on each project, rather than trying to fit a customers requirements into a set process.
- Put the senior staff into the customer interface. This was called "personal consulting".
- A marketing approach based on relationships and differentiation. It was important that the firm offered personal contact but with the feel of a large firm.
- Long term approach to growth and rewards.
- Financial strategy based on cash. Simplification of the financial processes and abandonment of the traditional job costing system approach.
- A structured rather than opportunistic approach to planning and development.
- Involvement of staff in the cultural and technical development of the firm.
- Sharing profits and risks with staff to develop commitment and maintain involvement.

Figure 6 - Innovations by PDA to create company culture and style

In order to develop a language to enable me to discuss PDA's business methodologies, I have introduced new ideas and descriptions, however they are describing elements of consulting engineering business that were known but not consciously articulated.⁶⁹ It is rarely the single big idea that gives a firm its market position. Rather it is its portfolio of competencies, relationships and culture that set it apart and make it difficult to imitate.⁷⁰ In my research I have looked at "best practice" but have often opted for "appropriate practice" in establishing internal processes and strategies within PDA. What has not been compromised is the understanding that customers wouldn't use PDA if they didn't have to. To stay in business consulting engineers have to be more than technical specialists, they need to be trusted advisors.³⁵ Being technically competent is a given requirement. No client would knowingly employ a consulting engineer that didn't know anything about their own field of engineering. There are probably many other consulting engineers with superior technical skills to PDA who don't give such good advice because their focus is directed principally towards engineering and not the business needs of the client.

6.2 Lessons for consulting businesses

I undertook the EngD because I felt insecure in my knowledge about management in engineering consultancies. I had previously sought advice from colleagues and other professional but they did not seem to have any clearer view than I did. Whilst researching for my projects and post module work, I found little that was directly based

on work in consulting engineers and even less that was centred on building services engineers in UK construction. To some extent I have had to create my own framework from the work of others, drawing on research in the fields of marketing, manufacturing plus professional services and general business management. I have found that many traditional business management tenets have to be used with care, as they are often based on work in large companies, can be product (not service) orientated and often from a USA perspective. Within the literature there are models that can assist in framing the problems and aid understanding. I have found the 7 tools described in Figure 5 to be very useful and I recommend them to anyone wishing to assess their business, their market sector and to fit different elements into a broad framework. Some are easier than others to master and use immediately. I have found the use of brainstorming to be the most easily adopted. Even when used in a simple form it gets key issues quickly into the frame for discussion.

In Part 3 of my project I set out some of the lessons that I had learned in PDA which would be of value to others starting a small consulting firm, these are set out Figure 6. In preparing a business plan for PDA, I re-evaluated the processes used at CBG by asking clients what they liked and did not. These findings were combined with the business methods described earlier that are client focused but also suited to my (and my business partner's) own individual aspirations for ownership, control and personal satisfaction. The latter point should not be ignored. Understanding ones motivations for introducing change or starting a new venture are important and will shape the eventual organisation that results. In professional services of all sizes (like any business that relies on knowledge workers), most of the best people in an organisation are effectively volunteers, because they could get a job elsewhere if they wanted to.⁷¹ They stay for their own reasons, but will only be *committed and effective* if their objectives and the company's are in alignment.

6.3 Managing Change

Throughout my research I have observed a market for consulting engineers that is unpredictable and continually changing. I have examined product life cycles⁷², company life cycles and assessed phases in growth of businesses⁷³. On top of this there has been continual variation in market requirements. Being aware of and adapting to this change is essential when providing professional services in the construction industry. Current trends indicate that further market and process change is inevitable. In the short to medium term information technology (IT) is set to change communication, responsibilities and methods of working. Within a few years there will almost certainly be a market slowdown if not a recession, in the construction industry. Preparation for these adverse changes is vital.

In 1988 JRBA found that staff were becoming scarce due to the boom. A strategy was adopted that brought contract staff into the firm to increase capability. All major project

design decisions and client contact was maintained by permanent staff. When the market turned JRBA was able to reduce staff without the immediate trauma of redundancies, although these regrettably came later. Outsourcing in PDA is a similar demand management strategy. These strategies were initially reactive, in the event of a further downturn. A more proactive strategy is now needed because as the marketing analysis shows, PDA's business is too narrowly based and would be vulnerable to a change in its key client base⁷⁴. It needs to create a more diversified client base. Options for specialisms were discussed in Part 3 of my project. Since that was drafted, a specialist in telecom, fire and security systems has joined the team. In line with PDA's multi-skilling he is also training in general building services and is assisting the author with a multi-disciplined project in Oxford Street. This is only the beginning of a process of developing flexibility and broadening market coverage.

Growth for PDA should concentrate on developing a small number of new clients, but for success this must be done without compromising the existing relationships. The research shows that maintaining existing relationships is the essence of growth in service business.

Change is not only external. Firms change internally as they grow. Storey identifies how entrepreneurs change their roles during small business growth⁷⁵, Maister identifies the life cycle of the professional firm⁷⁶ and services products have a life cycle similar to those for tangible products. I have observed in the firms I have managed and noted in interviews with other consulting engineers, the disruption caused by the retirement of the founders and subsequent generation shift. PDA has attempted to plan for the growth stages and has not forgotten that the way that Deer and Humphries intend to withdraw from the business will influence its growth and the retention of key individuals. Staff need to feel they have a future to remain loyal and committed.

Views differ on how to deal with the continual shifts in market, personal and development. I have seen in my research, that in most cases, firms will adapt provided that they are aware that change is inevitable and do not continuously attempt to maintain the status-quo. Renewal, is the effective response to external change. Firms either regenerate themselves or they will decline. This can be seen in the demise of formerly very successful firms and has been an ongoing issue for CBG.⁷⁷ Managing the change need not be a traumatic process, provided each project and milestone in a firms development acts as a learning event and enables a gradual adaptation of process or an increase in knowledge.

7. Summary

If there has been one major theme in this....., it is that the key to ensuring any professional firm's future is wise management of its two key assets:-

- *Its inventory of skills, talents, knowledge, and ability*
- *The strength of its clients relations and reputation*

Achieving a good income statement result is a necessary condition for professional firms success, but it is far from a sufficient criterion. To have been judged a good year, a firm must not only achieve its volume and profit goals, but do so in a way that builds new skills and strengthens client relationships

David Maister - True professionalism 1993

Liedtka et al have suggested that professional firms are amongst the most difficult to manage. They point to staff contentiousness, self interest, fiefdoms, insensitivity to clients and exploitation of staff. Together with slow and inefficient decision making, firms in professional services can be reactionary and inwardly focused.³⁵ At the same time the best professional firms can give intensive satisfaction to its employees and provide extraordinary value to its clients.

Consulting engineers are in an enviable position in the construction industry. They receive the largest proportion of professional fees, can opt for a wide range of disciplines and there is a marketplace for both large and small organisations. There is a role in the consulting world for those who enjoy engineering design, management or research. Life can be tough at times but there are personal, professional and financial rewards for those who are prepared to put their client first, treat colleagues with respect and work hard at developing their skills.

One often reads in the technical press, especially in the letters pages of professional journals, that engineers lack status, are undervalued or are doomed to fail in the management arena.⁷⁸ My research shows that this is not the case in consulting engineering. In consulting engineering there are multi-million pound businesses, handling billions of pounds of construction work annually. They are generally owned and run by engineers and despite the ever pressing need for financial competence, few are run entirely by accountants.

Whilst consulting engineers are amongst the most successful businesses in construction, they also receive strong criticism from their clients. Research by the Association of Consulting Engineers found in a client survey that:-

".....there was universal criticism that consulting engineers fail to put themselves in the place of the client to understand their needs.....For example it was said that consulting engineers see themselves as technical boffins whereas in addition to their engineering expertise they should bring market and financial skills to the client's team."

ACE future study report p32

This perception by clients is an extraordinary indictment of the ability of a large group of consulting engineers to assess and deal with their clients requirements. At the same time it identifies a market opportunity for firms who are prepared to change the way they think and act. In establishing and developing PDA I have observed that clients in its niche market have reacted favourably to an approach that takes into account their business objectives. To date this has resulted in a profitable business and growth for PDA.

Through managing change in CBG and starting my own firm I have learned a great deal about professional practice, service industries and the construction industry. I have also learned a great deal about people including myself. My next challenge is, together with my partner Peter Deer, to further develop PDA whilst maintaining it as a successful and continually innovative firm. We have got some things right to date but we still have a lot to do and a great deal more to learn.

In my research I found very little published work on the management of consulting engineers in the UK. In putting together my portfolio I have begun the process of defining the strategies, key issues and competencies that consulting engineers must master to achieve success. Much more work is needed. However I consider the work in my portfolio would be a useful starting point for someone who is managing change in an existing business or starting a new firm.

Appendix A

Background information regarding CBG and JRBA

This is an expanded version of sections 2.3 and 2.4 presented for information.

Company Perspective - UK and Globally

My early research and post module work was influenced by my role as a director in Carl Bro Group. Although globally CBG is a large company, (over 2000 staff) its UK operation was not big enough in any sector to compete for the very largest projects. Consequently in the early 90's it was very keen to make an acquisition to increase its UK turnover. It was placed in the final four bidders for the PSA southern region, a £90 million turnover business with project workload that included all the building for the Trident programme. CBG were well placed on bids for Local Authority road departments and Water Company design offices. However none of the acquisition bids made by CBG was successful.

CBG suffered like other consultants in the recession. Without an increase in turnover, in order to support their fixed overheads, CBG had to resort to hard financial management, staff reductions and smaller acquisitions to maintain its position. These small but often ailing firms, had technical expertise that complimented CBG's existing businesses but they required a large management input. The European recession hit Denmark later than the UK. For the first two years of the UK recession the CBG in UK was able to rely on support from its Danish parent. CBG had, since 1988, tried to use its Danish and international income to develop volume businesses in Europe. Their intention was to have a consulting organisation in every European country. CBG was a major player in the international consulting market with major links into ODA (Overseas development agency) and Danida (Danish overseas aid agency). Because of funding controls CBG had reached the limits of workload allocated to Danish firms. It wanted a pan-European network to tap into domestic work, but more importantly to gain increased access to European country funded aid to the third world.

During the 70's and 80's CBG acquired businesses in line with a strict operational policy in which each subsidiary retained cultural and financial independence. This was not only a belief of the firms founder Carl Bro, but essential if multi country aid funded work was to be acquired. However their timing was unfortunate in the UK. Following some early profitability but before their UK acquisitions had begun to provide a substantial income stream the UK construction market collapsed. CBG had experienced continuous growth and profitability for over 20 years. Each of its acquisitions had added value and profitability to the company. However the company was getting sloppy. Return on capital invested (ROCE) began to decline in 1985, the newer acquisitions were not as profitable as the founding parent firms.

Initially the attitude of the Danish parent to the difficult market in the UK was "pull your socks up and invest in management, like we do". It was at this time that direct management from Denmark began and set the seeds for the reorganisation that came later. As the recession spread through Europe the Danish operations began to suffer too and had to introduce layoffs and cuts in benefits - something they had never previously had to do.

CBG is an unusual company in that it is owned by its employees. Until 1996 most senior directors in Denmark were significant shareholders. Major shareholders were generally responsible for managing sizeable teams in the parent company or for the control of a large subsidiary. Most of the senior staff had been with the company from its early period of growth in the seventies. Carl Bro the company founder and most influential character retired in 1991 leading to a period of instability as senior shareholders vied for overall control. The largest and most dominant firm in the group was Carl Bro a/s (CBA) a large Danish based multidisciplinary firm. Most of the senior shareholders expected that one of the directors from that firm would take over as MD. Surprisingly, Carl Bro and Helge Sorensen the outgoing and incoming chairmen supported a younger director from one of the smaller companies - Jesper Rasmussen, who was appointed MD in 1992. Rasmussen has a family history in consulting engineering, his father being the chairman of Denmark's largest domestic firm.

Rasmussen did not believe that the confederated structure in CBG was efficient and set about restructuring the Danish firm. He was not supported by many of the CBA directors and systematically set about removing them from positions of influence. With beneficial terms of appointment and large share holdings, removing the opposition was expensive. A foundation controlled the sale and purchase of shares which were redeemable on demand. The cash within the foundation was the basis of the companies strengths, it quickly became unstable causing financial worries.

Restructuring in the UK began in 1993/4. Using a similar approach, objectors were sidelined or removed. This created instability and high redundancy costs in a company that was already under financial strain.

Recession, bad project investment and the costs of restructuring put the company under severe financial strain. In 1994 results went into the red for the first time. More fundamental was the effect caused by paying out large shareholding directors. In early 1995 the share price tumbled from over 2000 DKr to 500 DKr ruining the retirement plans of many senior staff who had bought shares rather than pension rights. Unwise joint venture developments in environmental clean up and waste incineration projects caused further losses. The company was in serious financial trouble and sought the support of an external backer. A joint funding exercise from the firms bank and external

investors has stabilised the position but the CBG has not made a profit since 1993/4 although a break-even result is expected in 1997/8. The share price is still around 500.

CBG are not unusual, many consulting engineers suffered in the recession. Others though did not. There were some remarkable growth stories through the lean periods. I have already mentioned WS Atkins but other smaller companies were equally successful. Design led firms like Max Fordham, Whitby and Bird and battle McCarthy have developed by careful segmentation and the development of their own culture and style.

Change in culture and scale - JRBA to CBG

JRBA joined CBG in 1989 and almost immediately thereafter the building sector went into a severe decline. After several years of boom, not having enough staff and too much work, things changed within months. CBG were taken aback by the rapidity of change in the market, which they had not anticipated. As a new company director within CBG(UK) I was faced with the effects of the recession and in managing the integration of JRBA into its new parent company. My then partner James Briggs was due to retire in 1991. Most of the CBG activity in the UK was in civil engineering which left me as one of the most senior people in the building sector. Despite being from one of the smallest companies, I became involved in the general management of the company throughout the UK. My role brought me into contact with the senior Danish and UK management and I began to experience the growing internal friction that was becoming a significant factor in the group's business life. In less than 18 months I had moved from being a small company director with around 75% of my time spent on managing projects to a role where 50% of my time was in dealing with general management, reorganisation and reporting. Within a further 18 months I was almost 100% committed to sorting out management problems and assisting the UK managing director with implementing a change in company structure.

Between 1989 to 1994 I had gone from technical management at an operational level in a £1 million pound business to being part of a team restructuring a £15 million business. CBG were one of the principal bidders for the largest part of the Property Services Agency, the government's design and building maintenance division. I was also told that if one of the PSA bids came off I was to be on the management team of the new firm during its integration into the group, potentially a £90 million business. I found the whole process fascinating but felt that I was completely out of my depth. I could not see a coherent strategy in the change being undertaken and believed that I needed to gain a much better understanding of general management principles, the way in which large organisations worked and basic marketing.

The size, operational methods and cultures of the other UK and Danish companies were completely different to those of JRBA. The founder of JRBA, James Briggs was a benevolent autocrat⁷⁹ who ran the business to suit his own interests. Technical development was readily supported, the firm prided itself on solving difficult problems. Everyone was encouraged to become involved with their engineering institutions and to work on BSI committees and the like. James had been reasonably successful in his career but despite technical successes the firm had never grown much beyond 35 staff. JRBA were known as designers and as such secured interesting technical projects with well known architects. James liked to run the business in his own way and was something of a pioneer in the development of the use of PC's for building services calculations. He readily admits that he was not a 'people person' and was unwilling to delegate power. It is this factor that probably limited the size of the firm.

When James and I were partners we were at different ends of our careers. I was 37 and James was 58. He wanted to retire at 60 and wanted me to take over the business. He was relaxed about the agreement and the repayment schedule making only one proviso, that I had to buy or arrange the sale of his office building as part of the deal. The building was owned by James' pension fund and was its principal asset. Our bank (Nat West) were happy to lend the money but I was unwilling to borrow £1.5 million to finance the purchase of the goodwill, assets and the office block. The returns were out of proportion to the risk. To make the loan repayments the business would have to have stayed at 1988/9 levels for the foreseeable future. I felt that this was unlikely to be the case. Although I believed the current growth could not continue, I had no premonition at all about the impending collapse in the market. I was simply expecting a minor turndown like that of 1981.

We wanted JRBA to invest in computers, improve our training and competence. We also wanted to gain access to the large European market for our specialism of museum design. We could not do this and finance James' retirement. It seemed that an external buyer would be the best option. Quite by chance we were introduced to David Keegan an accountant from CBG. He explained that CBG were looking for an M&E firm to join the Carl Bro Group in the UK. When we were introduced to CBG, the size, capability and geographical spread of operations seemed everything we were seeking. CBG wanted to buy the business of JRBA for cash and to operate it as an independent firm. JRBA would acknowledge its membership of CBG but remain as a separate entity. We were both taken by the people we met, they had real commitment to engineering and their enlightened attitude to employee terms and conditions. Research with UK engineers who knew the firm was all positive. The deal was done in early 1989 after a little bargaining and with relative speed. CBG bought the assets for cash and paid for goodwill. The office was also bought at an independently evaluated market price.

Within 3 months of JRBA joining CBG the UK market collapsed. The Danish market deteriorated around 18 months later. In 1991 Carl Bro retired and CBG experienced a bitter internal struggle for control, the effect of which are still being felt by the firm today.

For further information regarding development and change in CBG see MSc Dissertation.

Appendix B Contents of the portfolio

Post module work

Module	Subject	Submitted
Financial analysis and control systems	Examination of published accounts of JRBA Development of a financial model for JRBA	Apr 1993
Applied statistical methods	The statistical nature of company reporting in the Carl Bro Group of companies in the UK	Jun 1993
Strategic Marketing	Marketing strategy of Carl Bro Group Building Division in the South East of England	Oct 1993
Research Management	Research management in the Carl Bro Group	Nov 1993
Human factors in industry	Managing change with particular reference to restructuring in the UK. Selection and assessment procedures in the Carl Bro Group	Mar 1994
Quality management techniques	The application of quality system in the Carl Bro Group Introducing continuous improvement Assessment of failure of Quality Improvement Teams	Apr 1994
Business environment and economics	Assessment for the search by large firm for the monopoly position in a market.	May 1994
Project planning management and control	Evaluation of the project planning methods on CBG-UK Comment on project cost control system in CBG - UK Integration of project and costing systems.	Jul 1994
Collaboration and Contract Management	Case Study: The IBI/CBG joint venture to exploit the road traffic informatics market in the UK	Oct 1994
Information systems strategy	Information and business strategies of large and small consultancies. The value of databases and communication networks	Mar 1995
Manufacturing strategy	Decision making framework for use in a small consultancy. Location as tool for change	Jun 1995
Management of change	Management of change in PDA. Structure and culture in small consultancies	Nov 1995
Improving personal performance	Learning and vision as a tool for development. Paradigms for growth	Apr 1996
CAD-CAM	The future use of CAD/CAM in construction Using a common data base	Jul 1996
innovation strategy	Innovation in Peter Deer and Associates. Using tools and concepts to manage innovation	Nov 1996
Financial Decision Making	Financial decision making at Peter Deer and Associates. PDA as an investment project	Nov 1996

MSc Dissertation 1993 - 1995.

Submitted June 1995

The management of a consulting engineering company through a restructuring process

Project 1995-1998

Starting a small consulting firm:-

Part 1 - External factors

Submitted Aug 1997

Part 2 - Human Issues

Submitted Dec 1997

Part 3 - Strategies, Results and Competencies

Submitted Feb 1998

Draft paper 1996 - 1997

Transferring business methodologies from the manufacturing sector into the construction industry

Submitted Apr 1997

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- ²¹ Results for CBG are as follows (DKK^r - millions) From annual report 1995/6 published 21 Oct 96
- | Year | 92 | 93 | 94 | 95 | 96 |
|----------|------|-----|-------|------|-------|
| Turnover | 788 | 858 | 1045 | 1058 | 1063 |
| Result | 21.9 | 7.1 | -26.9 | -5.9 | -28.9 |
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- ⁵⁰ Lovelock C H "Services Marketing" - Managing demand Ch 6, Prentice Hall 1984. See also Zeithaml and Bitner, Ibid. p387-413 and Kotler - "Marketing Management" - Prentice Hall seventh ed. 1991.
- ⁵¹ Humphries M R - Post module assignment "Project Planning Management and Control" Jul/Aug 94. Course tutor Roger Gemmell suggested that the focus on production as cash due from clients to be overly simplistic. In a follow up review he also suggested that despite its comprehensive data the system did not take any account of client satisfaction. This is a regular complaint from clients about consulting engineers that they see their relationship simply as the revenue earned not on value exchanged. See reference 11 above.

⁵² Humphries M R "Report on the statistical nature of company reporting in the Carl Bro Group of companies in the UK". Post Module report - Applied statistical methods. WMG Sept 1993.

⁵³ Managing the costing system in CBG became a very difficult task. The difficulty in job costing system is that the current position affects the sensitivity of the final result. Achieving P/L factors of a set value became a management goal. If a project manager says he is going to achieve a factor of say 1.9 and reports this throughout the year, then realises that he is only going to make 1.8 at the last minute, the impact is large because the whole write down has to be taken into the results in one month with no opportunity for adjustment. Some project managers would report their results on budget then write them down at the year end because they only received "one month of pain" instead of management nagging for the whole year.

⁵⁴ Fournier, Dobscha and Mick, "Preventing the premature death of relationship marketing", Harvard Business Review Jan-Feb 98 p42-51. The authors postulate that whilst information is necessary for the creation of relationships overdoing it can create bad will. Their research is predominantly related to products but is relevant to service.

⁵⁵ See Humphries M R "Starting a small consulting firm - part 3 - Strategies, Results and Competencies" Section 4.5 and Appendix 4.

⁵⁶ Bartlett and Ghoshal "Changing the role of top management - Beyond structure to process" Harvard Business Review, Jan-Feb 1995, p86-96.

⁵⁷ See for example Coxe W "Marketing architectural and engineering services" Van Nostrand Reinhold 1983. (reference in MSc dissertation p 162 fig 7.10)

⁵⁸ Many books are published on the marketing and management of professional firms, most give guidance on marketing and business development. The following are texts that the author has found to be useful:-

- Lambert T "High Income Consulting" Nicholas Brearley 1994.
- Markham C "The Top Consultant" Kogan Page 1993.
- Shenson H L "Shenson on consulting" John Wiley 1990

⁵⁹ Clark, Peck, Payne and Christopher "Relationship marketing - a new perspective" Paper presented "Rethinking Marketing Symposium" Warwick Business School, July 1993. Represented in Advances in relationship marketing, *ibid.* Ch 14 p264.

⁶⁰ Hammer M, Champy J, Reengineering the Corporation, Nicholas Brearley Publishing, London, 1993

⁶¹ Senge P "The fifth discipline - The art and practice of the learning organisation" Century Business 1990, (UK1992).

⁶² Peters T "In search of excellence"

⁶³ Deming WE, "Out of Crisis: quality, productivity & competitive position", Cambridge University Press, 1986

⁶⁴ Prahalad C.K. and Hamel G., "Competence of the Corporation", Harvard Business Review, 1990, May-June

⁶⁵ Hall RW, "Zero Inventory", Dow-Jones Irwin, 1983

⁶⁶ Womack and Jones "Lean thinking - Banish waste and create wealth in your corporation" Simon and Schuster 1996

⁶⁷ Moore J "Marketing services businesses" IEE Management and design division - Inaugural Address 1991. Published Engineering Management Journal. Feb 1992 p 11-22.

⁶⁸ References from Figure 5

- SWOT (with brainstorming)
Introduced through out the programme. See Mullins "Management and organisational behaviour" -Pitman 1985, reprinted 1993. For examples see project Part 3 p 68.

- 7 P's of services marketing
See post module report "Strategic Marketing". See Zeithaml and Bitner above.

- Consulting style assessment
See project Part 1 p 26.

- Relationship tracking
See project part 3 Appendix 4.

- Belbin's Team roles inventory
See project part 3, Post module report " See Belbin above.

- 5 Gap analysis
See Zeithaml and Bitner. See Project part 1. See post module report "Strategic Marketing"

- Herzberg's two factor theory of motivation
See project part 2.

- Systems thinking - Mind maps
See post module work Innovation strategy. Project part 3 p-73.

⁶⁹ Terms such as Personal consulting, Corporate competence, Relationship value stream and the development of generic consulting styles (see External factors p26-28) are believed by the author to be new.

⁷⁰ Bhide A "The questions every entrepreneur must answer" Harvard Business Review Nov-Dec 1996, p120 et seq.

⁷¹ Ulrich D "Intellectual capital = Competence x Commitment", Sloan Management Review Winter 1998 p15-26

⁷² Cowell D "The marketing of services" Butterworth Heinemann Ch7 p115-121.

⁷³ Deakins D "Entrepreneurship and small firms" McGraw Hill 1996. Ch 10 p194 et seq.

⁷⁴ Humphries M R "Starting a small consulting firm - part 3 - Strategies, Results and Competencies" Ch9 p74 et seq.

⁷⁵ Storey D J "Understanding the small business sector" International Thompson Business Press, 1994. P121 et seq.

⁷⁶ Maister D H "Managing the professional service firm" Free press paperbacks 1997. (Original edition 1993). Ch2.

⁷⁷ For an evaluation of the professional firm life cycle see Maister - ibid. Ch2. Maister suggests that firms naturally progress from brains driven through experience driven to procedure driven styles. This is a parallel to a transition from personal consulting towards corporate competence. In order to remain in the same market segment with increasing maturity firms must assess their marketing mix and people to ensure they are compatible.

⁷⁸ Dunn D "Tipped for failure at the top - Why engineers are poor bosses" Professional Engineering Nov 1995 p22.

⁷⁹ Clark Jon "Human resource management and technical change" Sage, p190 fig 9.1