

UNIVERSITY OF KWAZULU-NATAL

Management Strategies Employed by Consulting Engineering Firms

By

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DECLARATION

I, Muziwandile Donald Hlubi, declare that:

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Abstract

There will always be a need for consulting engineering services in industry. In the engineering consulting fraternity, employees are the key valuable assets and this study addresses how the professional employees' skills can be managed and structured in such a manner that they contribute efficiently to the daily operation of the consulting engineering firms. The core business of the consulting engineering firms is to sell or offer engineering or technical solutions to their clients and this can be successfully recognised by integrating the firm's different engineering disciplines into projects teams that are able to implement specific projects allocated to them. Leaders in these teams are expected to have proficiency to identify individuals' skills and talents that can be incorporated into a specific project team. At a strategic level, firms' managers should consider developing skills development plans that takes into consideration a combination of academic training, professional training and practical employee training. As soon as a skills development plan is in place, it is easier for it to be implemented at the operational level under the supervision of team leaders who are responsible for the continuing professional development of individual team members. The aim of this study was to determine the various business and technological strategies applied by consulting engineering firms while tendering and competing for project work in the country. The consulting engineering industry is highly competitive; managers of these firms must be properly equipped with both technical and management skills in order that they may survive in this industry. A probability sample of 44 engineering consultants was drawn from consulting engineers in two areas of South Africa, namely, North West Province and Eastern Cape Province, which have a total of 140 consultants. 22% of the respondents offered electrical engineering services, followed by the civil engineering services that form 16.7% of the respondents. The structural and mechanical engineering followed at 13.9% and 11.1% respectively. Chemical engineering and architecture were both at 5.6%. Some of the findings of this study were that managers of the consulting engineering firms must be equipped with communication competencies as well as emotional intelligence and self-management competencies, because, although consultants are highly technically skilled, they lack business and human skills. Part of the recommendations are that there is a need for the consulting engineering firm to upload a succinct synopsis of their services on their company websites, which will help promote the value of their services to their clients.

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CHAPTER ONE

INTRODUCTION TO THE RESEARCH

1.1 Introduction

The South African government is investing billions of rand on infrastructure projects for the next decade. This large capital expenditure commenced in the year 2010, in preparation for the Soccer World Cup. Government is investing in major infrastructural projects ranging from electrification, water reticulation, roads, telecommunication and housing, amongst other similar projects. This has created business opportunities for the consulting engineering firms to offer their services to the public sector in ensuring that the governments' projects are delivered adequately and implemented professionally as anticipated.

The government acknowledges that the public sector's capacity to implement infrastructure projects is presently restricted by its limited engineering professional expertise and it is therefore from this background that the need for the consulting engineering firms' services becomes a vital necessity. In line with government capacity building, government must include experienced consulting engineers, project managers and other delivery experts to assist in ensuring better planning and implementation of infrastructural projects.

In the global economy, the state of the nation's physical infrastructure provides an indication of its likely prosperity. Societies need infrastructure to survive. The profitable of any economic activity requires efficient and functional systems of transport, energy and waste management as well as social infrastructural services.

The Engineering Council of South Africa (ECSA) launched a national initiative to tackle the chronic shortage of engineering skills, in line with government's plan to develop 30,000 engineers by 2014. ECSA said that currently one engineer services over 3,000 people in South Africa compared with 227 in Brazil and 543 in Malaysia.

1.2 Problem Statement

In the marketplace there is an observation that the majority of professional workers are moving away from full-time employment to consultancy. According to (Miller, 2012) there is a rise of temporary contract workers termed ‘supertemps’. The rise of the supertemps is likely to change the way business is currently being conducted (Greenstone, 2012). The term ‘super-temp’ is defined as “top managers and professionals from lawyers to CFOs to engineers to consultants who have been trained at top schools and companies and who choose to pursue project-based careers independently of any major firms”(Greenstone, 2012).

There are many reasons for professional people’s moving to consultancy; these are either voluntary or involuntary reasons. Certain factors such as an economic recession lead people to this shift (Sloman, 2012). Once you have shifted into consultancy, the question that needs to be answered is,” What is it that you do as a consulting firm that will keep you in business for the next five to ten years?”

Independent consulting firms come in many forms; some receiving paid work either directly or in association with others, (Sloman, 2012). These strategies employed by consulting engineering firms in accepting paid work, should give them an edge over their competitors, especially when bidding for competitive tenders (Greenstone, 2012). The question is, “What strategies are employed by consulting engineering firms in order for them to survive in their business?”

1.3 Motivation for the Study

The motivation for this study was to enrich potential consulting engineering firms as well as experienced existing consulting engineering firms with the business management strategies that will support them in growing their businesses on sound business principles. Since engineering consulting is not implemented in isolation, prospective clients and existing clients that rely on the services of consulting engineering firms are also likely to benefit from this study.

1.4 Objectives of the Study

- 1.4.1 One of the objectives of this study was to determine the strategies employed by consulting engineering firms in retaining skilled staff.
- 1.4.2 The second objective of this study was to ascertain techniques or systems used by consulting engineering firms to manage workloads without working overtime.
- 1.4.3 The third objective of this study was to ascertain how the consulting engineering firms would cope with contracts that exceed their resource capabilities.
- 1.4.4 The fourth objective was to determining various forms of marketing conducted by the consulting engineering firms.
- 1.4.5 The last objective was to discover and measure the cause and effect association among variables relevant to the objectives.

1.5 Focus of the Study

The focus of this study was on the talent management strategies employed in consulting engineering firms. These firms have always been better positioned to handle certain kinds of work that cannot be easily executed in-house (Greenstone, 2012). Consulting engineering firms must manage and preserve the indispensable talent of their experienced professional employees; companies must be creative in retaining their high performers. The focus of the study was also based on the advertising approaches used by consulting engineering firms in promoting and selling their professional services. Jaafar (2008a) stated that the fundamentals of marketing services are completely different from the notion of marketing products.

1.6 Limitations of the Study

The major limitation of the study was in obtaining ethical clearance from the local Consulting Engineering South Africa (CESA) branch. This was the reason that North West and Eastern Cape CESA branches were used as the two populations for the study. The CESA local committee members showed an interest in the study but were reluctant to formalise ethical clearance. The study being based on CESA regions out of KwaZulu-Natal, led to the use of “Survey Monkey” as a data-collection and “Excel” was used as a data-analysis tool. The administration of the questionnaire was not difficult, but response was very slow. The sampling technique used also contributed to the delay in answering of the questionnaires. The limited research time to collect all the responses was a limitation in the study; there were

questionnaires received after the full data analysis had been completed and therefore were not used in the study.

1.7 Research Questions

- What are the technical and business elements that are critical in the success and sustainability of an Engineering Consulting Firm?
- What strategies have consulting engineering firms employed to retain skilled staff?
- How may consulting firms comprehend ways in which to find engineering prospects and turn them into clients?
- How does one get busy (business contracts) and remain busy (continue getting work)?

1.8 Research Methodology

The Consulting Engineers of South Africa's (CESA) branches in North West and Port Elizabeth formed the two populations used in the study. A total of 140 members of the CESA formed the sample for this study. The target population was the 60 consulting engineering firms that were located in two provinces. These were sufficient samples from which the research process could draw conclusions on management strategies employed by consulting engineering firms in the country (Sekaran, 2010).

The regional CESA membership database represented sufficient representation of all elements for each population from which the sample was drawn. The chairman of the CESA Port Elizabeth region and chairperson of the CESA North West Branch were to ensure that the sampling frame matched the population coverage (Coldwell, 2004). The sampling method ensured that each sector of the population had an equal chance of being chosen as a subject in the sample; this is known as simple random sampling (Sekaran, 2010).

The data was collected through administered questionnaires and the regional chairpersons of the CESA branches or regions played a vital role as facilitators of the data-collection process (Punch, 2009). CESA members were made aware of the importance of their participation in this study; the reason for this was to ensure that data was collected properly and accurately, ensuring that the quality of data remained of a high standard (Punch, 2009).

1.9 Chapter Outline

- Chapter One: presents an overview of the study and indicates the way in which the study was to be conducted. It outlines the problem statement, the research questions, the objectives and beneficiaries of the study.
- Chapter Two: provides the literature review which details theoretical background of the study. The literature review explains the business sustainability strategies that may be employed by consulting engineering firms.
- Chapter Three: contains the research methodology that identified who participated in this study. It summarises the techniques employed in conducting this research.
- Chapter Five: provides the recommendations and conclusion of the research. This chapter confirms that the research questions have been answered, and also gives evidence of the way in which the research questions were answered.

1.10 Chapter Summary

The consulting engineering field is a very competitive industry. Leaders in these firms must equip themselves with relevant management strategies, as a means of ensuring that they remain competitive in their business. Engineering consulting business is not only governed by meeting the clients' satisfaction through merely delivering technical reports and engineering specification produced by consultants, however there is also human side of business that must be taken into consideration.

Consulting firms must take into consideration many factors that are central to their sustainability and survival, to mention a few: the competitiveness of their services should be defined by the firms' competitiveness of consulting fees, their track record in similar projects, as well as the goodwill of the company.

The firms' timeliness of service may be expressed by their promptness to respond to queries and complaints, and their ability to meet clients' deadlines.

CHAPTER TWO

THE LITERATURE REVIEW

2.1 Introduction

The consulting engineering services' sector is based on the premise that the individual's knowledge is what is bought and sold by clients. People in consulting firms are scarce, highly qualified resources that are vital to the success of consulting engineering firms (Macmillan, 2004).

Consulting engineering firms are entities owned by entrepreneurs with the intention of providing services to the private sector, government enterprises, as well as to non-profit organizations. Consulting engineering firms are systems with interconnected elements that function together in order to achieve a common goal. The study addresses the productivity and performance of the consulting firms as independent organisations. This study sought to ascertain relevant strategies employed by consulting firms in order to maximise profits through effective utilisation of the organisation's human and technological resources to produce quality services at minimum cost.

In this study the notion of productivity is defined as the ratio of output to input. In order to remain competitive, consulting firms must always endeavour to minimise the input for a given level of output as part of the process aimed at achieving efficiency and effectiveness. A productive engineering consulting firm is defined as one that achieves its goals through effective utilisation of its own resources (Pellicer, 2005).

Because there is problem of intangibility when selling or marketing engineering services, it becomes the duty of the advertiser to create the company's image in the mind of its prospective clients. The other responsibility of the firm's marketing division is to influence the firm's personnel in the manner with which they should present themselves when dealing with their clients.

2.2 Management Strategies Employed by Consulting Engineering Firms

The following headings cover the four key research questions.

2.2.1 Technical and Business Strategies – (First Research Question)

This section addresses technical and business elements of successful and sustainable consulting engineering firm.

- **Business Management and Technical Strategies**

The question that must be answered by engineering consultants is: what strategic resources do we have or need to have in order to excel in the industry in which we are participating? It must be understood, however, that strategic resources may be human, financial or other resources that will assist the firm in emerging as victors in their industry (Brennan, 2006). Consulting engineering firms have a tendency to rely more on their technical expertise and less on business acumen. Leaders of consulting engineering firms have to adapt to business tactical planning strategies (Tucker, 2006).

Tactical planning is about applying the firm's strategic plans. It is the responsibility of the managers in the consulting firms tactically to plan and predict the actions of their clients and their competitors, as well as to coordinate with other departments in executing strategic plans of their firm (Hellriegel, 2009). The point of departure for the engineering consulting firm in implementing a tactical plan is firstly ensuring that the firm's strategies are achieved at budget or below. This is a case where a firm distributes resources; it assigns capital, human resources, and it facilitates a variety of functions. Strategic planning involves the capital allocation through budgets for various firms' activities (Hellriegel, 2009).

Managers in the consulting firm must ensure that the company's goals and targets are implemented by or before the cut-off date. In order to be competitive the engineering should strive to meet or exceed the stated goals (Ling, 2009). Consulting engineering firms should consider utilising flexible engineering principles for their firms without compromising their engineering standards. There is a need for them to challenge conventional knowledge by suggesting the use of operational management principles associated with flexible engineering principles to address the issues of resource allocation in their firms (Brennan, 2006).

Consulting engineers persistently try to do too much in too little time; the pressure often becomes intolerable, and they need time out to reflect (Crainer, 2007). There is a lack of fresh thinking because consultants simply do not have time to reflect on what might be the correct response to the situation in which they find themselves. These individuals try to apply a technical solution to an adaptive challenge, and the most adaptive challenge is around behaviour and creativity; we need always to address these topics with renewed thinking.”

- **Business Leadership Strategies**

Another critical business strategy necessary for consulting engineering firms to adopt is the shift to facilitative leadership. This means that it is very important for project leaders in the consulting engineering firms to facilitate the performance of their team members as well as of the individuals within the teams (Gunavathy, 2010).

The leadership of the consulting engineering firm must communicate the firm’s vision and strategy clearly to every staff member; if this is implemented correctly, it should allow employees to reflect creatively on the strategic direction of the business. Gunavathy (2010) suggested that the business-forecast process is likely to introduce control for long-term thinking within the firm. In this strategy, project managers must distribute the work to project leaders in charge of smaller project teams (Brennan, 2006). This strategy is said to increase the throughput by empowering the professional or skilled staff.

As part of business strategy to motivate engineering companies should consider implementing flexible working schemes that would allow employees to be more in control of their time and place of work (Europe, 2003). Flexible working schemes are said to benefit both employers and employees, with employees likely to come to their place of work with fewer problems or concerns and therefore more highly motivated to discharge their duties to the best of their ability.

What is of interest is the fact that this flexible scheme is attractive to both male and female employees, however, the working from home and part-time work are more attractive to women (Europe, 2003). It is important for both employer and employee to realise that there must be a balance of organisational needs against the personal needs of employees.

In the engineering sector it is claimed that one in five engineering managers works an extra 14 hours a week more than they are paid for; this can equate to a seven-day working week for them (Macmillan, 2004). Engineering managers are willing to work longer hours as long as they are supported by their companies (Brennan, 2006).

MacMillan (2004), managing director of Adeco, suggested that employees in the engineering sector are motivated by a sense of purpose, and are not afraid to work hard as long as their ideas are valued, they are empowered, and allowed to work flexibly.

- **Workload Balancing Strategies**

The other test in consulting engineering firms is the management of professional resources under fluctuating workload conditions (Bayer, 2006). The question is, what are the dynamics dictating the workload? Bayer (2006) suggested that the firm's internal processes affect the workload fluctuations. The approaches and strategies used by the engineering firm in acquiring work may negatively affect their future, should these not be properly implemented.

In applying workload balancing strategy, the consulting engineering firms may take into consideration the firm's processes and procedures of allocating project leaders to specific projects. The criteria used in such assignments should not only be influenced by factors such as staff availability, individual preference as well as staff experience. This strategy is said to limit the scope of the project leader; certain employees or project leaders may have to execute similar projects that will restrict them from applying wide knowledge of their technical expertise (Brennan, 2006).

The successful workload balancing in an organisation is dependent on the engineering firm's ability to attain appropriate work and to execute it smoothly, assigning engineering resources accordingly (Bayer, 2006). It is important to note that the essence of workload management is more about the way in which engineering professionals conduct their work, the way in which these professionals are managed, and also the way in which learning takes place across projects.

Restricting employees to carrying out projects of a different nature tends to limit them in serving and discharging their responsibilities as valuable project managers. In the final analysis, by allocating the correct resource to the correct task, company cost, work quality and

the project delivery period will be positively influenced. There is a huge negative cost implication should the firm fail to predict workload (Bayer, 2006).

In balancing the workload, managers in the engineering firms ought to consider the performance of one particular project that could influence others in the portfolio, resulting in missed deadlines and excessive staffing resources for other projects, perhaps being harmful to their performances (Chang, 2005). It is the responsibility of project leaders to monitor and control competition between projects for resources such as engineers.

Consulting engineering companies are project driven, and it is therefore in their interest to explore various project models in order to find the one best suited to their requirements. If a project model is properly implemented it is possible for project leaders to realise that not all tasks will be done correctly; some may need redoing (Bayer, 2006).

The emphasis on project modelling is more about having appropriate project plans from the beginning of a project, with emphasis on quality and quality assurance, in order to avoid unidentified rework as much as possible; and to offer alternative corrective measures.

- **Mergers and Acquisitions Strategies**

In order for consulting engineering firms to remain in business they should continually look for prospects that may be transformed into business opportunities. Consulting engineering firms should consider adopting mergers or acquisition strategies as an option of corporate development. The driving motive for a merger or acquisition should be the firm's intention to diversify into new services or rather into new client markets, and the firm's penetration into new geographical markets (Kreitl, 2004).

The concept of merger in the engineering sector is motivated by the difficult economic conditions faced by engineering firms; these firms must either shut down their operations or find a business partner with which they can merge (Morrissy, 2011). This is a strategy for growth in smaller consulting engineering firms, where the owners of the firms have realised that the possibility of coming out of the economic downturn is very slim.

The adopting of the merger or acquisition strategy by engineering consulting can help position the firm to gain access to large-scale projects, in particular those entities that are project-

oriented firms (Kreitl, 2004). This strategy will indirectly eliminate or reduce the competition posed by other consulting engineering firms, while at the same time the firm stands to benefit by enhancing its market share (Kreitl, 2004).

It is critical, however, to consider that in professional services such as engineering consulting, the merger with or acquisition of another firm carries its own disadvantages; the obtained firm's personnel and their expertise are not owned by the acquiring firm (Culp, 2009). Consulting engineering firms often have low tangible assets, as also well-educated and highly mobile professionals. This background can spell high risk in the merger with or acquisition of another consulting engineering firms (Kreitl, 2004).

The trend of consolidation is not always good for industry. People who may have built up their careers at a particular firm may decide to leave soon after a merger, feeling that they do not fit in with the new environment (Morrissy, 2011). Also, the new owners may not value them and may decide to lay them off.

The client and the project sponsor may differ in their view of consolidation. The project sponsor always seeks reliability and competency from an engineering consulting firm. He also expects the engineering firm to meet all needs throughout the project phases (Morrissy, 2011). Larger, stronger firms are better positioned to meet clients' needs. It was argued by Morrissy (2011), that larger engineering firms have the capacity to invest in training and development and is able to invest in building their own pool of talented and skilled staff.

- **Business Operational Models Strategies**

The difficulty of managing professionals is not unique to consulting engineering firms. However, by applying basic and sound business principles, it is possible for a small or medium-sized consulting company to realise accelerated company growth. In consulting engineering firms it is possible to achieve company growth through implementation of correct business operational improvements, especially the implementation of proper resource allocation strategy (Brennan, 2006).

Consulting engineering firms may be able to optimise their resource allocation methods owing to many ways in which engineers and technicians are used throughout individual consulting engineering firms (Brennan, 2006). In this strategy, exploration of various

resources-allocation schemes should have a positive effect on organisational performance and on the firm's growth. In the implementation of operational models as an option, the top performers or skilled workers in consulting engineering firms should be retaining much of the project work. This strategy is likely to empower these employees by increasing their influence and impact with the replacement of junior staff; by doing so, it is possible for the throughput of the firm to be increased.

The resource allocation scheme where senior and more experienced staff is assigned to strategic projects has the potential of drawing more business for the firm, especially when they are spending more time being able to be seen by their prospective clients. In delegating more work to the talented and senior staff members, it is also possible to have productivity increase of the junior staff; this will enable the firm to execute more work more quickly (Brennan, 2006).

Gunavathy (2010) suggested that the organisational business processes such as resource allocation, projects-tendering routines and engineering-resource management are likely to have consequences on project processes namely: procurement, implementation and project scheduling. Strategies used in Turning Engineering Prospects into Opportunities

In order to solicit business and ensure that they are always occupied with project work, consulting engineering firms must conduct an assessment of their firm's strengths and strategies on how they can leverage these strengths in order to realize potential business opportunities (Ling, 2009). In order for the consulting firms to remain in business consulting firms must strive for the continuity of the projects' work as soon as the business opportunities have been realized. This is achievable through the firms' undergoing weakness assessment, which could uncover what would exacerbate threats; these firms must find ways of overcoming the threats (Ling, 2009).

2.3 Strategies Employed to Retain Skilled Staff – (Second Research Question)

This section discusses strategies that can be employed by consulting engineering firms to retain their skilled staff.

2.3.1 Retention of Skilled Staff

The survival of consulting engineering firms is dependent on individual engineers working for them; it is from this background that firms must acknowledge that these individuals bring considerable value to the firms (Gambardella, 2009). There are three motivations for a skilled employee leaving employment: dismissal, retirement and intentional resignation. The last motivation is dependent on the employee's personal discretion (Winterton, 2004) whereas the first two are influenced by company management.

Consulting engineering firms should manage and devise means of retaining their skilled staff. As part of retention strategy to be used by consulting firms, the firm's model of employment contract should be formulated such that they have built-in incentive components for skilled employees. Gambardella (2009) stated that the model is based on the premise that brilliant employees often have striking options that tempt them away from the company; it is therefore critical for employers to provide ad hoc stimuli with which to preserve their skilled staff.

However, it is imperative that, before the firm can concentrate on the scheme of employee retention they first comprehend their employee population (Bettinger, 2009). The questions that ought to be asked are: what are the employees' demographics; why did they choose to work for our firm; why do they want to leave and join our competitor; and what could persuade them to stay? There is always a perception that salary is the primary motive for the employee leaving the organisation. Salary may indeed a significant factor, but not necessarily a primary motive for leaving work. Employers in the engineering consulting sector must consider other retention strategies rather than simply offering more money (Bettinger, 2009).

There is a notion of typical features of the job market for skilled employees; the first feature being asymmetric information (Gambardella, 2009). This states that an employee is more informed than his employer about his ability. Chai (2007) stated that "the general productivity of an individual may be commonly known, but his productivity for a given task is more likely to be private. The responses to environmental conditions are known and common across

different individuals.” This statement also implies that, even when an employer may know about the capability, aptitude and knowledge of an employee, it is highly likely that the employer is less informed about his eagerness to resign from the employer’s firm to pursue outside options, or to make a commitment to a rival employer firm. The employee is the only one who knows how much he gains by leaving the company.

The second feature of a talented or skilled employee is that his output is difficult to describe as also to quantify (Gambardella, 2009). Under these circumstances it is difficult for the employer to propose a contract with standard pay for a performance-based scheme. Gambardella (2009) stated that, when a specific task is assigned to a productive employee, it is expected that he will generate more or better output than an unproductive employee, the unobserved productivity can be retrieved from his observed results. Consulting engineering firms must consider various ways of retaining their employees; as such, they should take employee development and employee engagement into consideration (Bettinger, 2009). Sicker (2003) stated that as an employee starts on a new project or a new assignment, the employee job satisfaction increases.

2.3.2 Management Incentive Schemes for Skilled Staff

Retaining talented and skilled workers in an engineering firm can be a serious challenge, because individual skills and talents are the core resources of the business. The question is: what issues should consulting engineering firms identify as key to the mutual obligation of the psychological contract, that are likely to enable the engineering consulting firm to retain their best talent?

There is a notion of psychological contract that is based on the premise of personal goals being incorporated with those of the engineering firm if the worker’s expectations of the consulting firm and the consulting firm’s expectation of the worker are plainly spelt out during the negotiation phase of the employee recruitment process (Carrell, 2006). The schemes used by the consulting firm in retaining their skilled and talented workers cannot be done in isolation if it is to be effective. An effective retention scheme is one that is valued by the employees such as one offering attractive rewards and benefits. These may include performance bonuses, share options and guaranteed-base salaries, to name a few.

The organisational environment also contributes to the retaining of human resources. Employees should always be able to rely on organisational support and commitment in order

to see value in staying and committing to a specific consulting firm. The firm's reputation is of value to employees associated with it. The work-development environment is also of great value to skilled and talented staff. It is a fact that employees of consulting firms look for advancement opportunities as well as autonomy and independence.

An emergency plan may be required in the event of a negative occurrence, for example, in response to an exodus of experienced and skilled staff, owing to lack of capital projects. Consulting firms should have a plan to deal with these situations. As part of strategic planning for the firm, leadership should also prepare for a positive event, such as an increase in demand for their services. It is important for consulting firms to be prepared for engineering prospects, and to be able to turn them into opportunities, rather than responding in panic mode when dealing with unforeseen events or situations (Hellriegel, 2009).

2.4 Engineering Prospects turned into Clients – (Third Research Question)

This section discusses how consulting engineering firms understand ways to find engineering prospects and turn them into opportunities.

2.4.1 Strategies used in Searching for Engineering Opportunities

It is important for consulting engineering firms to start by identifying the customer group they wish to target. Once this has been done, the rest of the strategy will flow. These decisions should be in line with the firm's goals and should be the vehicle of the firm's final destination (Brennan, 2006). The question here is; how does the engineering consulting firm respond to an engineering prospect that has the potential to be converted to an opportunity? An existing engineering consulting firm may decide on a market-penetration strategy, where their current clients' services are a target. However, another engineering consulting firm may consider a market development strategy to be relevant in addressing their needs; this is where a firm targets clients that were initially targeted by its firm but were never persuaded, or clients that had not been targeted by the firm or even by its competitors (Apaydin, 2011).

The market-penetration strategy aimed at current clients should be regarded as a high priority for the engineering firm (Winer, 2007). In the marketplace, where the firm's services are being utilised, there is always potential among current and prospective clients who are likely to be persuaded to utilize more services. Suppose an engineering consulting firm's services are

being marketed in a company that is operating nationally, it is possible for these services to be adopted more widely throughout the organisation. In South Africa there are numerous foreign consulting engineering firms engaged in infrastructural projects. South African consulting firms are now facing harsh competition (Ling, 2009). In order to succeed, South African consulting engineering firms must have an effective competitive position in the industry so as to achieve a competitive advantage, defined as having superiority over your competition (Wei-Ming, 2007).

2.4.2 Strategies Used to Identify Engineering Prospects

The question that needs primary clarity from consulting firms is whether they are engaging in sustainable business opportunities or whether they are merely surviving from project to project? Consulting firms should consider a dual-strategy approach to their business that encourages the use of the firm's existing resources and potential to enhance performance in the present while also aiming to meet the requirements of the future. The identification of engineering prospects is a strategy that can be employed by the firm for its long-term survival and future prospects. In order to survive and prosper, consulting firms must revisit their corporate and business strategies; this may be defined as a key winning ingredient for a successful company (Hellriegel, 2009).

The corporate strategy should help consulting engineering firms define their capacity in terms of industry and markets in which they participate (Grant, 2010). It is important for a firm to find a balance between corporate strategy and business strategy. The business strategy is helpful in defining the way in which a consulting firm can compete within a specific market. If the consulting firm is to succeed in a particular industry it must develop an edge over its competitors (Grant, 2010). The consulting firm should define the way in which it is competing in the market, and also should clearly define the basis of its competitive advantage. Management strategies employed by consulting engineering firms are more about business planning, which focuses on developing strategies effectively to deal with the environmental prospects and intimidation in relation to a firm's strengths and weaknesses (Hellriegel, 2009). In a well-managed firm, strategic development is set to include the preparation for the unforeseen. It is not always easy to balance the technical and business competencies when managing professionals, especially in consulting engineering firms. In order to remain

competitive in their business, managers need to master the operations management techniques in engineering management firms (Brennan, 2006).

The major focus should be on the resource allocation strategy in operations where there is a wide range of engineers and technologists that may be used throughout the firm. Gunavathy (2010) is of the opinion that management of the professionals is a challenging task, and the distinctiveness of activities performed by these professionals averts the use of typical or standard processes. It is therefore imperative for consulting engineering firms to use custom-made activities, because the management of information used by these professionals cannot be made routine (Brennan, 2006).

2.4.3 Advertising and Marketing Strategies of Engineering Services

Kotler and Armstrong (2005) defined marketing as “a social and managerial process by which individuals and groups obtain what they need and want through creating and exchanging value with others.” There is also another definition of marketing by American Marketing Association(AMA): “the process of planning and executing the conception, pricing, promoting and distributing of ideas, goods, and services to create exchanges that satisfy individual and organizational objectives” (Jaafar, 2008b).The advertising and marketing of professional services plays a major role in searching for prospects that may be converted to opportunities by consulting engineering firms, that must identify correct advertising consultants and the correct advertising media to be used in achieving their marketing communication with their current and their prospective clients (Jaafar, 2008a).

It is necessary for consulting engineering firms to establish the needs of their clients and to compare them with their engineer’s perception of what those requirements are. These advertising and marketing strategies are relevant in unexpected situations such as the economic recession. During this period times the firm’s most skilled workers are laid off; they are not easily replaced by new recruits (Apaydin, 2011).

This is a time when higher-paid workers are dismissed to save money. It is critical for consulting engineering firms to respond by turning the economic recession into opportunity. They should revisit their marketing strategies during the recession period, to considering increasing their skilled resources as a way of taking advantage of various opportunities that

present themselves during recessions; for example, consulting firms may acquire talented resources when the cost of acquiring them is low (Apaydin, 2011). The South African business is now open to international investors and players; as a result, consultancy in the country is facing challenges and competition brought about by globalization. This factor, together with the evolving of the country's economy, has brought external demands to bear on consulting firms in the country (Jaafar, 2008b). There is a trend in engineering consultancy for firms not to have a full comprehension of marketing strategies and knowledge of implementing marketing techniques. (Jaafar, 2008a) suggested that consulting firms are only inclined to undertake basic marketing when the projects they have at hand are almost completed.

While it is good for a firm to strategise around the concepts of advertising and marketing, it is, however, a fact that service advertising is difficult. What makes it more so, is that engineering services offer no tangible rewards, and there is no immediate feedback to the advertiser of the engineering services (Jaafar, 2008a). In this industry consultants may use various mediums such as professional brochures, professional magazines, company websites, and trade magazines, in advertising to inform their clients that the firm is capable of satisfying their requirements. Clients, however, may obtain information about the consulting firm from other parties in the engineering consulting industry.

During a recession those engineering firms with financial muscle may exploit the situation to their advantage and may want to pursue an increase in market share. Competitors are likely to cut costs by laying off their talented employees; adding new, talented employees for a well-positioned engineering consulting firm will help to increase the firm's technical capacity and is likely to enhance its relationships with its clients (Apaydin, 2011).

Lastly, competitors are said to provide poor service, therefore it becomes even easier for a well-positioned engineering consulting firm to attract more customers during the recession than during normal times. The main reason for implementing marketing strategies is that engineering firms may successfully compete by enhancing their competitiveness; and also by acquiring sufficient projects in order to sustain their business, and at the same time remain profitable (Jaafar, 2008b).

2.5 Strategies Used to Secure Contracts and Remain Busy (Fourth Research Question)

This section discusses how the consulting engineering firms get engineering contracts and continually remain busy.

2.5.1 Strategy used in Maintaining Client Satisfaction

Maintaining client satisfaction is a strategy that is important for the consulting engineering firm to build up a progressive client-driven project management scheme, because this may be influential in guaranteeing greater client service (Bordoloi, 2006). The most crucial business strategy that consulting engineering firms must adopt in order to successfully compete in the future is to be able to recognise and satisfy the needs of clients (Bordoloi, 2006). This strategy will allow consulting engineering firms to retain their existing clients and also allow them to satisfy their clients' needs.

Managers of consulting engineering firms must not restrict their project management methods only to technical issues, such as the development of a project financial plan and schedules. They must accept the importance of incorporating humanistic project management matters such as client communication skills as components of a project management system. In this study, client satisfaction is described as a function of superior service, excellence of product and quality of approach to clients (Tang, 2003).

In order for an engineering firm to maintain a successful consultant/client relationship, it is crucial for engineering consulting firm to understand fully the main attributes that matter in client relations, namely, integrity, communication, and clients' objectives (Tucker, 2006). When it comes to integrity, consultants must protect the intellectual property of their clients. In situations where a consulting firm has a number of clients, it is important that the consultant be mindful of each client's intellectual property and not convey any of it to others unless permitted to do so.

When the non-disclosure period has lapsed, meaning that the consultant is officially free to disclose, it is good practice for the consultant not to do so until after the customer has published the information to the public domain (Tucker, 2006).

In line with the integrity aspect of client/customer relationship, Tucker (2006) suggested that there are obvious ethics that cannot be overemphasised; these are detailed below:-

- the consultant must not mislead the client on the extent of the consultant's understanding of the matter at hand;
- it is not proper for the consultant to charge the client for development of information that the client assumes already exists; and
- the consultant must not mislead the client regarding his qualification as a professional engineer.

Another important attribute of a successful consultant/client relationship is communication. Tucker (2006) was of the opinion that open communication between the client and the consultant is conducive to efficiency and effectiveness of the relationship and projects undertaken. On the issue of time, a consultant should at all times be frank about his availability and the estimating of time required to complete a project (Tucker, 2006). In the interests of good future relationships, the consultant should not take on a contract if he is unsure that he can meet the time requirements of the client.

2.5.2 Strategy employed in building Professional Engineering Skills

The management strategies employed by consulting engineering firms defines the tactical approaches that the firm must implement today that will help them realise a competitive advantage in the future (Gunavathy, 2010). It is a fact that some of the services provided by engineering consultants are new or advanced technologies, as well as the provision of professional knowledge. Intellectual capital is the lifeblood of consulting engineering firms; it is therefore critical to protect such an asset (Huang, 2007). There is also a need for engineering development resources, precisely because of staff layoffs in times of economic downturn (Chang, 2009). Instead of a consulting engineering firm's focusing on one big client they can serve the needs of various clients through a system of subcontracting development engineering work.

In the engineering consulting business, quality client service is fully dependent on the skills, attitudes as well as abilities of the employees. Consulting engineering firms should build up and apply strategies that inspire employees, because it is the firm's human assets that will enable it to realise future success (Gunavathy, 2010). The appropriate management of the intellectual capital of the firm is likely to have a positive effect on the management and operations of the firm (Huang, 2007). Engineering consultants have the responsibility to

master abundant know-how and information technology, so as to ensure that they deliver quality and safe projects. Huang (2007) suggested that in the future, the consulting engineering industry will encounter not only changes in the industrial environment, but also a scarcity of qualified engineers.

The consulting engineering firms should uphold the view of a broad spectrum of technical skills and knowledge bases as a minimum necessity. In applying this technique, an engineering consulting firm will team together skills for much of the work taken on; the firms are thus likely to achieve better flexibility and superior efficiencies (Brennan, 2006). Because our country is a player in the global economy, there is an initiation of knowledge economy which has resulted in a shift towards intellectual capital (Huang, 2007). Engineering consulting work is very much knowledge-intensive by nature, engineering solutions being dependent upon knowledge.

There is a need for smaller consulting engineering firms to remain at the cutting edge of technology, but this does not come easily to them. In such circumstances, the engineering consulting firm may consider working with academic institutions such as universities, in order to find team-work opportunities (Chang, 2009).

2.5.3 Strategy for Pricing Engineering Services

The intention of corporate strategy is to identify key issues within the firm that are likely to influence the long-term prospects for an engineering consulting firm; pricing of engineering services is one such issue (Yee, 2006). When an engineering consulting firm has managed to turn prospects into opportunities it is then important to ensure that these opportunities are sustainable and profitable to the firm. In order for firms to remain in business they must price their services appropriately.

Unlike other professions, the engineering and designing consultants selection is in most cases based on criteria such as quality, availability, reputation, references and résumé, and these factors may or may not include pricing. (Sturts, 2005a). Sturts (2005b) suggested that many engineers tend to commoditise engineering services; these engineers have difficulty in qualifying the value of their service, especially to their prospective clients.

In today's business of engineering consulting, the labour hours spent on a particular project can no longer be used as a measure for the services rendered. There is a need for consulting engineering firms to review and offer new pricing strategies (Sturts, 2005b). Not only must the older engineering services' pricing method be revisited; there is also a method of engineering design fee calculated as a percentage of the project construction fee. The difficulty in quantifying the consulting design engineer's services has encouraged the use of quantifiable construction costs as a base for estimating the engineering pricing (Petroni, 2008). (Sturts, 2005a) argued that there is no common way of measuring the engineering expertise and creativity in terms of labour hours.

The labour hourly rate method is said to undermine the engineering firm's profitability. The new design technology speeds up the engineering design processes. This hourly-based pricing method is such that the faster the engineering processes are completed, the less the consulting engineers are paid. Also, the issue with the lump-sum contract fee structure is that the design fee is estimated between 7% and 12% of the total construction fee of the project. This system does not cater for or reflect the value of the engineering consulting services (Petroni, 2008). The new trend in the pricing of engineering services is value pricing, where the pricing is based on the market value of the service.

There is no doubt that the new engineering technologies and productivity improvement methods are making the hourly-based labour rate obsolete (Sturts, 2005b). The difficulty with the traditional pricing method is that it does not permit the engineering consulting design engineers to base their pricing on the value of their services. There is a need for a new structure that will ensure that engineering firms are encouraged to improve and optimise their designs in such a manner that they remain profitable and sustainable.

In order to minimise the marketplace constraints when it comes to bidding for projects, consulting engineering firms must apply the value-bidding model in situations where bidders are chosen based on quality of the services offered, and not only on the price they charge (Sturts, 2005a). Key fundamentals of the value-bidding model are to support decision-making when the options are limited and unclear; perhaps conveying some information with respect to competitive advantages and disadvantages.

The value-bidding methodology is likely to assist engineering firms to assess the value of their services as perceived by their clients; then compare their competitive position with that of their competitors. Sturts (2005a) stated that the value-bidding model is anticipated to assist engineering consultants to manage the technological advances that have affected the industry, and to sustain pricing decisions for new engineering design processes.

2.5.4 Cost Control Strategies in Consulting Engineering Firms

In order for a firm to gain a competitive advantage, a consulting firm must provide comparable client value while ensuring that it performs projects more efficiently than its competitors, or perhaps performs projects in a unique way such that it creates better value for the clients, and dictates a premium fee (Wei-Ming, 2007). When a consulting engineering firm has set its pricing structure and agreed on it with prospective and existing clients, the firm is left with the huge responsibility of controlling costs in order to ensure that costs stay in line with the intended company cost-effective targets (Pellicer, 2005). The primary reason for the existence of engineering consulting businesses is to offer services or products to industry in order to realise economic profits.

The business of engineering consultants is dependent on individual contracts or projects as requested by their clientele. Pellicer (2005) suggests that cost and price are the most critical variables that drive firms in order to realise the firm's profits. The engineering design fee may be calculated as a percentage of the total project construction fee: this is a case of a lump-sum contract. If a firm is able to minimise costs, the firm should be in a position to obtain more profits (Pellicer, 2005). In the majority of engineering and construction projects the contract price is fixed before the project commences; the firm's profit is dependent on how well the company controls the cost.

There are three methods of calculating costs that are popularly used by consulting engineering firms, namely, job order orientation to contracts; full absorption of costs; and time orientation (Pellicer, 2005). In the context of this study, absorption costing is described as a costing system that takes into consideration the production costs that are made up of direct costs and a proportion of indirect costs. The job's order costing is a costing system that accumulates

labour, material and overhead costs by contracts. The last costing method is the time orientation, and this cost may be predetermined.

In consulting firms, engineers work on various projects at the same time, as a way of minimising inactive time. (Pellicer, 2005) suggested that personal costs are the key to the cost-control schemes in firms offering professional services. In other words, productivity of the engineering consulting firm is dependent on time instead of on monetary units.

2.6 Chapter Summary

The labour turnover is not always dysfunctional as in the case where less-performing employees are replaced by talented and better performing employees. Bordoloi (2006) stated that in any business labour turnover is not inevitable. Bettinger (2009) argued that, whether the economy is booming or busting, employers must find efficient strategies to keep their quality talent employed within their organisations. Engineering consultants must comprehend that client satisfaction is not only about technical output, it is not determined only by engineering reports produced by the consultants.

There are measures of client satisfaction based on clients' perception and expectations (Tang, 2003). In the final analysis, clients have their own ways of assessing the quality of services provided by their employees (Yee, 2006). The advertising by engineering consultants is more important for the firm as a strategic way of ensuring that its services and its operation are properly communicated to its clients. The market needs a constant reminder about the existence of service-providers. The enhancement of the firm's image may be accomplished through proper advertising of the firm's operations and services. Marketers must find an effective way of advertising consulting engineering services.

Consulting engineering firms must acknowledge that they are in business to make a living, as with any other business. It is therefore necessary for engineers to be incentivized and rewarded for improving design in the industry as whole. In order to survive in business, engineers must market and charge for their services, bearing in mind characteristics such as downstream cost saving, as well as market-value systems. There are, however, other options such as profit sharing and alternative pricing strategies that may be exercised by consulting engineering firms (Sturts, 2005b).

The cost system that is time orientated is predetermined, documented and used as a reference for controlling costs of the targeted firm's profits. In order to improve the cost control in the consulting firm (Pellicer, 2005) recommended that the total absorption of costs billable time of productive personal be used as a general principle; and also be spread over accounted cost between contracts. In working with the universities, engineering firms may benefit by achieving some validation and some commercial possibilities.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

As illustrated in the objectives of this study, this is a descriptive form of research aimed at answering formal research questions. This study was designed to discover and measure the cause and effect association among variables relevant to the objectives. The study was aimed at addressing technical and business elements of successful and sustainable consulting engineering firms. A properly implemented skilled staff retention strategy will translate into a less staff turnover and possibly increase employee efficiency which will benefit engineering firms at large.

3.2 Aim of the Study

The aim of the study was to identify the management strategies employed by consulting engineering firms in order to give them an edge over their competitors, especially when bidding for competitive tenders (Greenstone, 2012). The question was, “Which strategies are employed by consulting engineering firms in order for them to be leaders in the engineering consulting business?” The findings of this study should help parties interested in the area of engineering consulting to make comparisons to similar issues related to engineering consulting and be able to draw valid conclusions about the issues impacting on their businesses. The information gathered in the two populations should be sufficient to give valid conclusions about management strategies employed by consulting engineering firms.

3.3 Respondents and Location of the Study

The target respondents for this study were the national CESA members located in nine provinces. However due to geographical limitations in accessing CESA members in the seven other branches, only two (North West and Port Elizabeth) branches of the Consulting Engineers of South Africa (CESA) formed the population for this research. Collectively, they have in excess of 100 members. These two geographically spread branches should yield useful results. The intention of the study was to canvass the views of consulting engineers from other areas as well, nevertheless, consent to conduct research was only received from the above two branches.

3.4 Research Approach

The purpose of this study was to answer the following question, “Which management strategies have consulting engineering firms employed to retain skilled staff?”, using the quantitative research methodology approach (Saunders, 2009). This study is likely to contribute in developing new knowledge concerning techniques that consulting engineering firms can use to manage retention of their skilled staff. This research was designed to discover the attitudes and feelings of management at individual engineering firms towards survival strategies in the consulting industry.

The target population of consulting engineering firms located in the two provinces was sufficient to generate a statistically sound sample, allowing this research to be undertaken and conclusions to be drawn about management strategies employed by consulting engineering firms in the country. The results of the study can be generalised to the wider consulting population, because a sample in excess of 30 was used (Sekaran, 2010). In spite of this, those who implement the recommendations should do so with care; they should monitor the process, as this was a small-scale study. The chairmen of the CESA Port Elizabeth region and of the CESA North West Branch offered to request responses from their members.

3.5 Population and Sampling

The targeted populations were the two regions, namely, CESA Port Elizabeth region and CESA North West region. The membership of these two regions is in the excess of one hundred. It was decided to sample these two groups. In this study, sampling was used to obtain data and to reach conclusions on the consulting engineering firms’ management strategies.

The sampling method that was followed in this study was such that each element of the population had an equal chance of being chosen as a subject in the target sample. Ideally, 30 respondents from each branch were aimed for, which would result in a minimum of 60 members of the CESA to form a sample for this study, although this would ultimately be determined by response rates. This random sampling technique is free from bias and is always likely to yield credible conclusions (Wilson, 2010).

The regional CESA databases for the Port Elizabeth and North West branches formed the population of the study. In consultation with the chairpersons of the two regions, confirmation

was made that the regional CESA membership database sampling frame is truly representative of the populations. A total of thirty-one engineers responded, which makes the sample sound and capable of generalisation, (Sekaran, 2010). Given the small sample size, people implementing the recommendations would be wise to do so with care. Whilst data was being analysed a number of responses were received, unfortunately they were not included in the analysis due to late arrival.

3.6 Data Collection

The data was collected through the use of computer-assisted interview software known as Survey Monkey. The regional chairpersons of the CESA branches or regions played a vital role as facilitators of the data-collection process. As part of the research strategy it was critical to collect evidence that would assist the researcher's empirical generalisation to be accepted (Remenyi, 2010). The data collected in this study using questionnaires was used for descriptive purposes. The sample was as representative and accurate as possible, since it was to be used to generalise about the total population (Saunders, 2009).

Data used in this study is in numerical form; and this is to be used as a source of inferences (Collis, 2009). A questionnaire was the preferred method of data collection in this study; these were self-completed questionnaires. The questionnaires were emailed to the two regions, ensuring a cost-effective and speedy data-collection method.

The distribution of these questionnaires may be described as more of a group distribution; the target CESA constituencies were to be assembled in the same room at the same time (Collis, 2009). Through implementation of this data-collecting technique, it was expected that the number of usable responses would be high.

3.7 Development of the Instrument

The questionnaire used in the study was designed in such a manner that it enabled the acquisition of information that cannot be simply observed or that is not readily available (Remenyi, 2010). The only questions used were closed ended; these were coded so as to comply with computer analysis. The four measurement levels that have been applied in the design of questionnaires were: nominal, ordinal, interval and ratio scales. Individual consulting engineering firms were classified according to the respective industries in which they operate (Remenyi, 2010).

Ordinal scales were also used where the respondents were asked to rank order of their preference and in the case of consulting engineering firms are asked, for example, to rank their advertising medium in terms of effectiveness in generating business for their firms (Remenyi, 2010).

3.8 Pretesting and Validation

The preliminary questionnaire was tested on a sample of five engineers from Mechanical, Chemical, Electrical, Civil, and Instrumentation engineering backgrounds. These five questionnaires were analysed in the light of the objectives, in order to identify any potential limitations of the preliminary questionnaire (Hair, 2011). The participants in the pretesting were all engineers from different consulting engineering firms. Respondents were e-mailed an internet link directing the participants to the survey that was designed using Survey Monkey. This pretesting was conducted over a period of two days and on completion some of the questions were redesigned to eliminate ambiguity and to ensure that none of the questions were double barrelled.

Yin (2003) proposed that internal validity is critical in quantitative research. He described it as “establishing correct operational measures for the concepts being studied”. In order to ensure that the research design remain unambiguous it integrated a wide variety of views; ensuring that the viewpoint of one region never dominated the results; the findings representing the full truth about the situation (Wilson, 2010).

3.9 Analysis of Data

The data collected was prepared for completeness and validity before it was analysed. This was the phase where, for example, missing data in the questionnaires was addressed (Hair, 2011). The Survey Monkey software conducted the analysis. The Survey monkey generated the suitable figures to illustrate the findings. This helped to verify whether the respondents had understood the questions correctly.

The data was coded such that it could be entered into a computer. This was done by assigning 1 for male and 2 for female as an example, where there were only two categories from which the respondent must choose (Hair, 2011). The Excel spread-sheet programme was used in analysing data. The sample of 10 per cent of the coded questionnaires was checked for possible coding errors.

3.10 Validity/Reliability

In order to enhance the reliability of this study, multiple sources of evidence were used. The evidence used was collected from the North West as well as the Port Elizabeth branches of CESA. This technique contributed in addressing the broader range of attitudinal and behavioural issues. The technique used is likely to give credibility to the findings and conclusions on this study, because it was based on various sources of information. Reliability was established by the receiving of stable and consistent results.

The validation of the research questionnaire was executed when it was assessed for face validity and when it was sent to research coordinators, who both reviewed the final version of the questionnaire. The whole purpose of this exercise was to ensure that the research measure would accurately reflect the concepts that it was proposed to measure (Wilson, 2010).

The research was conducted in the field of consulting engineering; at the time leading to the evidence collection there was no major activity in the engineering fraternity likely to affect the findings of the research. The research was impartial and not affected by any sector's history (Wilson, 2010). In order to minimise research dropout rate, longitudinal research design was eliminated.

3.11 Chapter Summary

The data collected in this study contributed to drawing conclusions and making recommendations. The data was analysed, synthesised and interpreted as suggested by Remenyi (2010).

The reason for sampling instead of collecting data from the entire population was that it was not practically possible to examine each member of CESA. (Sekaran, 2010). The assertion that could acceptably be made from the sample data was more dependent on the relationship between the population and the sample (Smith, 2012).

In testing the existing theories on management strategies, obtaining experimental research evidence was critical. An open minded approach was maintained whilst analysing the data. The data to be gathered had characteristics that were represented numerically; this evidence was presented using statistical techniques. Chapter four which follows contains the findings of this research.

CHAPTER FOUR

PRESENTATION OF RESULTS

4.1 Introduction

The primary data presented and analysed in this chapter was collected using the Survey Monkey. The chairmen of the CESA Port Elizabeth and CESA North West region facilitated by urging their members to respond to the survey. In collecting data, bias and loaded questions were avoided in order to receive impartial answers from the respondents.

4.2 Presentation of Results

The data presented in this study is based on a total of 36 questionnaires that were successfully completed and returned on time out of the targeted 140 CESA members. The North West and Port Elizabeth were the two CESA region populations used in this study, however, there were a few outliers from CESA members in Gauteng and KwaZulu-Natal. Ideally a greater response would have been preferable, however due to time constraints it was not possible to obtain a greater response.

Consulting engineering firms have seldom been researched; the focus of this study **was** therefore on the evaluation of the strategic position of an engineering consulting firm. The data presented in this research is to contribute to shared knowledge of strategic management within consulting engineering firms.

Managers in consulting engineering firms will find the recommendations that flow from the analysis useful in their particular firms. Managers of various consulting firms may also follow the general findings of this study to advance the most appropriate strategies for their particular circumstances.

4.3 CESA Regional Membership

Figure 4.1 below gives details of the CESA members who participated in this study. They are categorised by their regional membership association. The respondents were from the four CESA regions.

Table 4.1 Member Association

		I am a CESA member and affiliated to the following region	
		Response Per cent	Response Count
CESA Membership	Gauteng	6%	2
	Eastern Cape	39%	14
	North West	47%	17
	KwaZulu-Natal	8%	3
Total		100%	36

It is evident from Figure 4.1 that the majority (47%) of the respondents were from the North West CESA branch, followed by (39%) of the Eastern Cape CESA branch. The KwaZulu-Natal region had a total of 8% respondents and Gauteng had a total of 6% responses. The respondents from the last two regions are assumed to be members who were previously residing either in North West Province or in the Eastern Cape and have since moved to different provinces but not updated their CESA membership details. This makes a total of 31 respondents in the sample.

4.4 Consulting Engineering Firm Sizes

Figure 4.1 details the various sizes of the firms at which the respondents were working, based on the number of consulting engineers hired by individual firms. Although there are many consulting engineering firms within the two regions that were used as populations of the study: North West region and Eastern Cape region; the data presented was collected from those firms registered with CESA. There are many consulting engineering firms operating who are not registered with CESA.

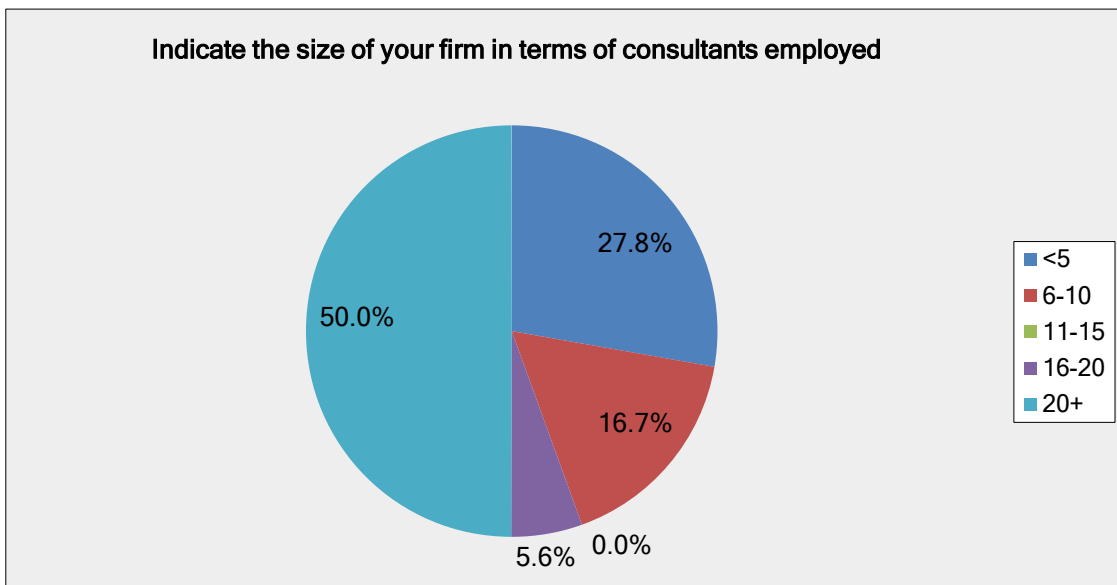


Figure 4.1 Consulting Firm Size

About 50% of the respondents were from firms that employed more than 20 consultants. As detailed in figure 4.1, firms with fewer than five consultants totalled 27% of the respondents. The next-largest of the firms that responded fell in the range of 6 to 10 consultants; and these formed 16% of the respondents; lastly, firms of between 16 to 20 consultants formed 5% of the respondents. There were no responses from firms having between 11 to 15 consultants.

This observation shows that in the consulting engineering sector, firms are either small or large; there are not many medium-sized companies. The strategic question that each firm should answer is, "What is my competitive landscape at the moment? What are the competitors of similar size doing today and what could they be doing in the future? Is there potential new competition developing?" These firms should spend time ensuring that their business plans are workable.

4.5 Consulting Engineering Services

Figure 4.2 indicates that various consulting firms offer multi-engineering services, however, it is also important to take into account that some of the firms specialise in only one type of engineering service. It was observed that the multidisciplinary firms were the large firms.

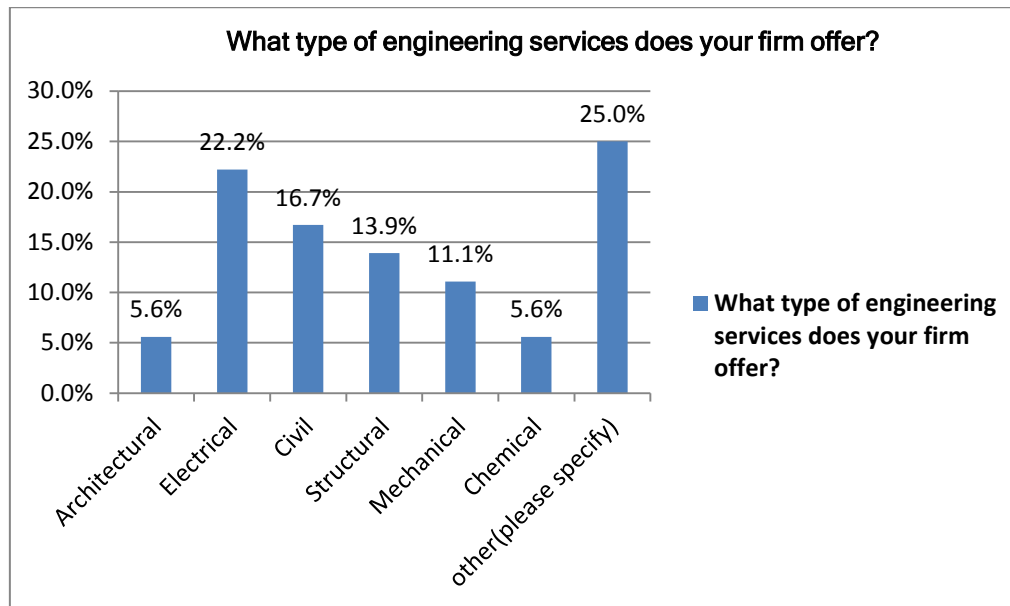


Figure 4.2 Engineering Services Offered

A total of 22% of the respondents offered electrical engineering services. They were followed by civil engineering services that form 16.7% of the respondents. Structural and mechanical engineering followed at 13.9% and 11.1% respectively. Chemical engineering and architectural were both at 5.6% as shown on the above figure 4.1. As mentioned before, some consulting firms offer more than one engineering services. A total of 25% of the respondents offered different types of services other than the ones listed on the questionnaires.

These ranged from Safety Integral-Level Determination services and Renewable Energy services to Engineering & Topographical Surveying services. The consulting engineers vary from entry level to those with 30–40 years of experience in consulting engineering. They usually work with more than one client; must understand the needs of each, and must facilitate and obtain client buy-in to their project decisions.

4.6 Skilled Staff Participation in Decision-Making

Skilled staff in consulting engineering firms participates in decision-making at various levels. Figure 4.3 below illustrates the extent to which they participate in decision-making in their respective firms. The data presented in this section refers to decision-making that is over and above the normal operational decision-making of the consultants. This is about consultants having an effective say in the management dealings of the firms.

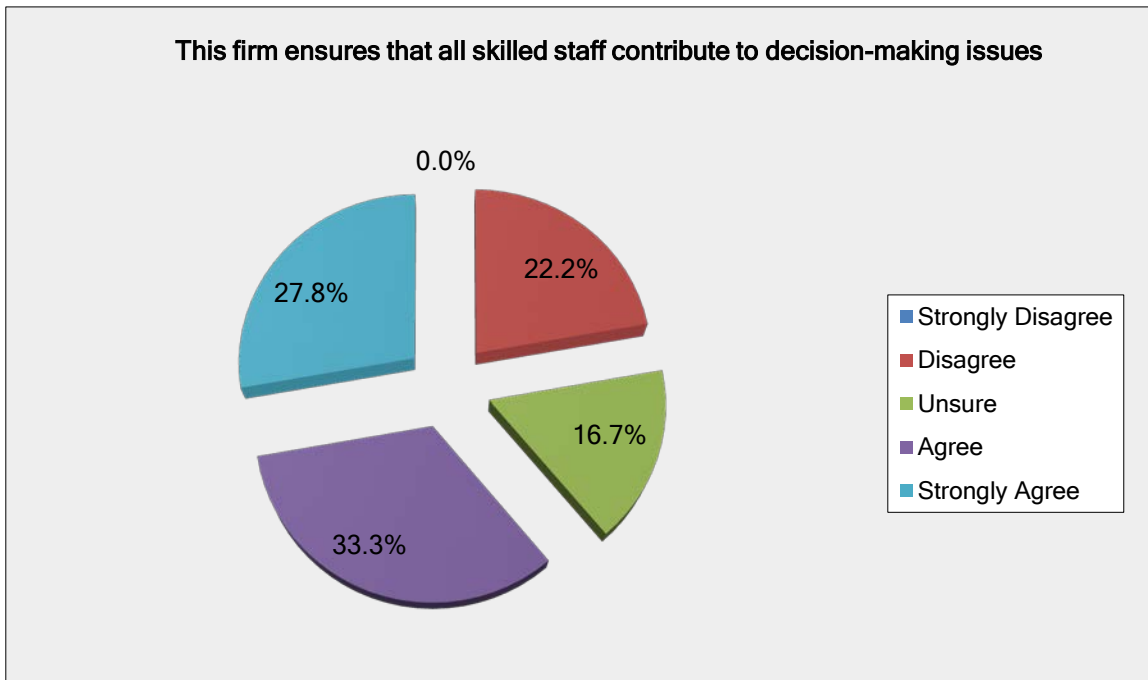


Figure 4.3 Staff Decision-Making

Even though there were diverse views about skilled staff participation in the firm's decision-making, many of the respondents (33%) agreed on their contributing to decision-making; 28% of the respondents strongly agreed that they effectively contributed to the decision-making of their firms. Some 22% of the respondents disagreed with this statement; and these are respondents who believe that they are not involved in the decision-making of their firms; while 16% were not really sure of their contribution to decision-making of their firms. When 38% of respondents were unable to agree, this indicates an area on which management must focus attention. It is important for team leaders to share information with employees through daily team meetings and weekly staff meetings; these should not be long meetings.

4.7 Rewarding Skilled Staff

In retaining their skilled staff, consulting firms are rewarding their employees accordingly. It is evident from Figure 4.4 that most (61%) of the respondents were of the opinion that their firms were offering attractive reward packages. Almost 67% agreed, while 17% disagreed, and almost 17% were unsure. To have almost 34% of respondents unable to agree indicates a problem. It is also possible that many of the respondents that expressed themselves unsure (16.7%) may have done so because they feared being identified.

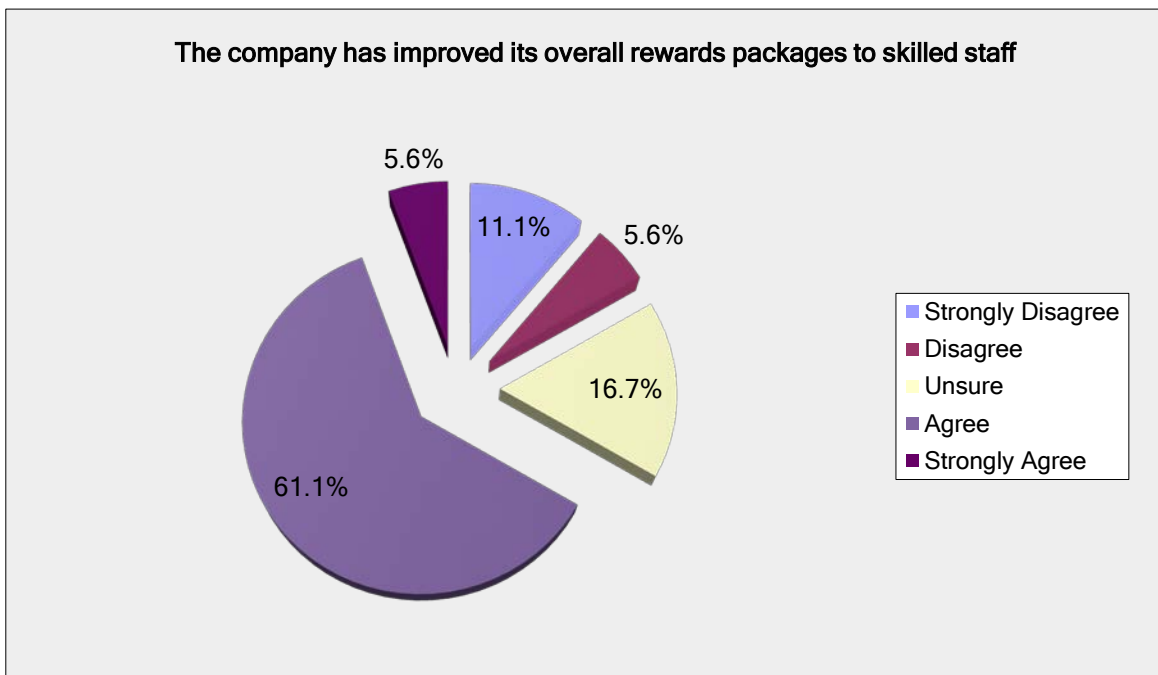


Figure 4.4 Staff Reward Packages

The figure 4.4 above shows that the majority (61%) of respondents believed that their reward packages had improved; about 6% of the respondents strongly agreed with the opinion that their overall reward packages had improved. It is also noted that there were about 11% of the respondents who strongly disagreed that the reward packages of their firms had improved or were attractive.

Taking into account the other 5% of respondents who also disagreed that reward packages had been improved by their firms, a total of 16% of respondents disagreed that the reward packages of their firms had improved; while about 17% of respondents were not really sure about the improvement to their firm's reward packages.

4.8 Staff High-Level Training

Figure 4.5 indicates that most (72%) of the respondents were positive about their company's spending on them with regards to their high-level training. There were another 5% of respondents who also strongly agreed that their firms were paying for training of interest to the skilled staff.

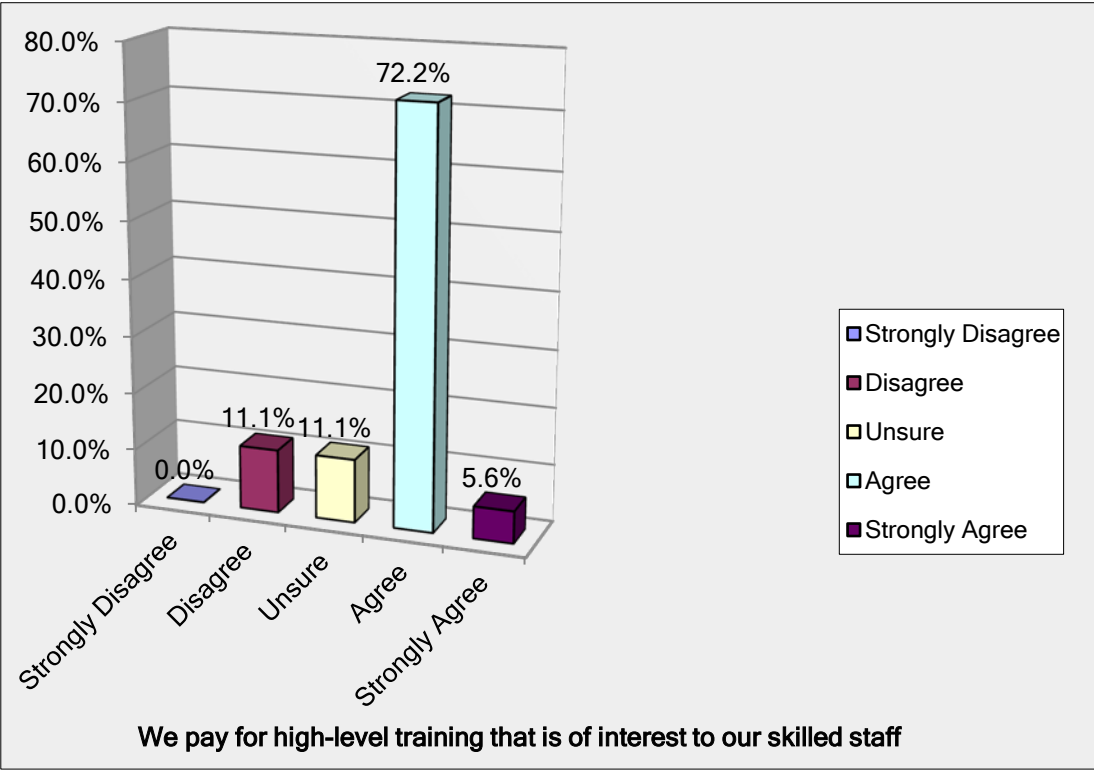


Figure 4.5 Training Skilled Staff

There were only 11% of respondents who were not convinced (disagreed) of their firm's spending on skilled staff high-level training programmes. In addition, 11% of respondents were unsure of their firm's spending or paying for high-level training of their skilled staff. An interesting observation to note was that consultants are being continuously trained by their firms; there is a valuable benefit to both the staff and the firm.

While consultants are gaining more knowledge on an on-going basis, firms may be taking advantage of the skills levy benefits. In every firm people matter, whether a consulting engineering company is small, or large, it is always the individual consultants within the firm who make or break relationships with clients.

4.9 Working Flexible Time

As shown in Figure 4.6 some 56% of respondents agreed that their firms made adjustments to working hours such that they were more flexible to their staff members. 16.7% of respondents were in agreement with this view; they strongly believe that flexible working hours are of benefit to the staff.

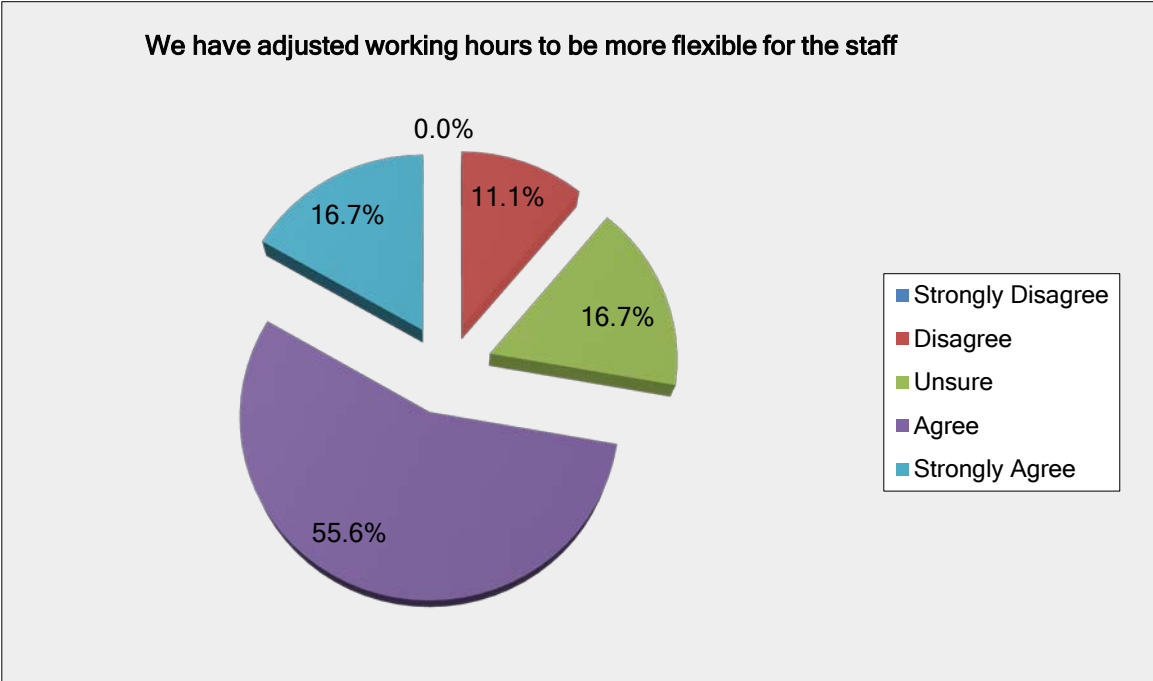


Figure 4.6 Flexible Working Hours

As observed in the figure 4.6 none of the respondents disagreed with working hours being adjusted to be more flexible to staff, however, there were about 16% of the respondents who were not sure of the benefits realized by working flexible hours. The benefits of the flexible working hours are dependent more on individual needs and lifestyles.

The flexible working time is a strategy that benefits employees, because it can be viewed as a tool for supplementing knowledge that is necessary for most of the employees. The benefits may be different ways for increasing knowledge – life-long education courses financed by the employers, or courses financed by the employee. Employers said to benefit from the flexible working hour system because it may not be necessary to provide staff free time for addressing personal problems during working time, for instance, visits to doctors or dentists.

4.10 Project Management Software

In Figure 4.7 as shown below it is of interest to observe that 50% of respondents believe that their firms have upgraded their project management software. An additional 5% of the respondents strongly agreed with these views.

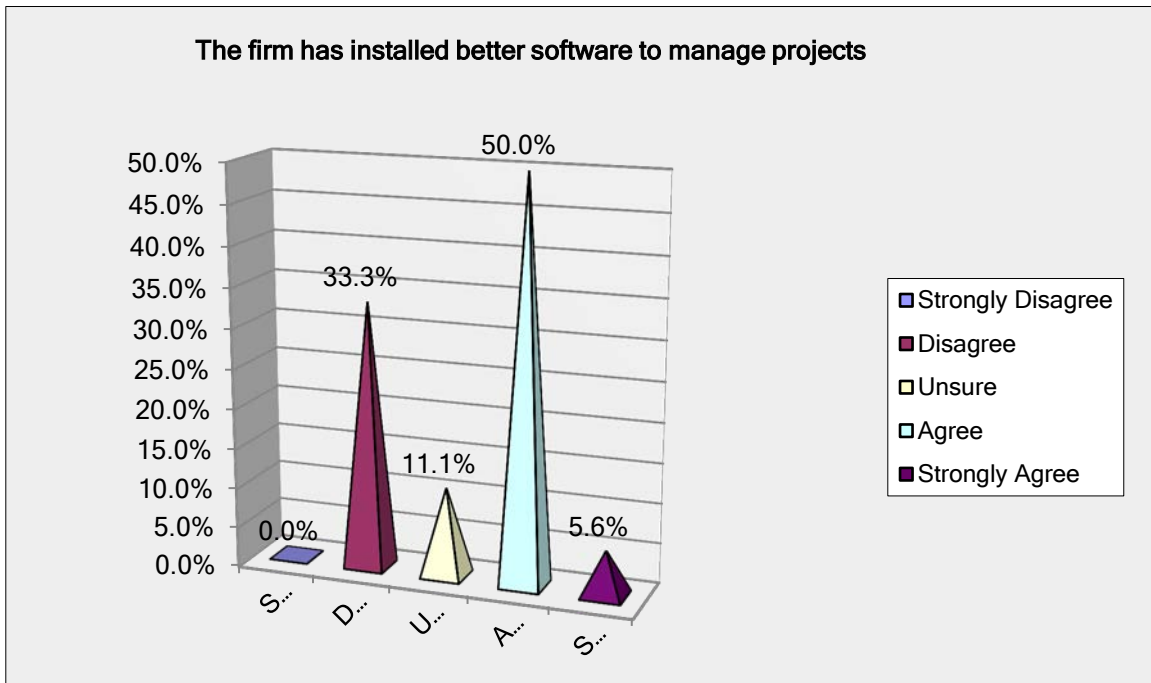


Figure 4.7 Project Management Tools

A large number (33%) of respondents disagree that their firms have installed or upgraded to new project management software. These are likely to be people who are using the same project management tools but have not yet upgraded to the newer versions. Some 11% of the respondents were not sure whether their companies had installed better software to manage projects. The possibility may be that these are consultants who only pay attention to their area of interest and do not necessarily look at projects as a whole; they are not concerned about the way in which the overall project is managed.

There are various commercial project management methodologies used by consulting engineering firms. The following are common methodologies aligned with the international standards for project management, PMBOK (Project Management Body of Knowledge) and PRINCE2 (Projects in Controlled Environments).

4.11 Project Management Techniques

The figure 4.8 below shows that 56% of the respondents have realised the need to enhance their project management techniques in order to improve firm's efficiencies. Respondents neither strongly agreed that their firms were not intensifying their project management techniques nor strongly disagreed with that opinion.

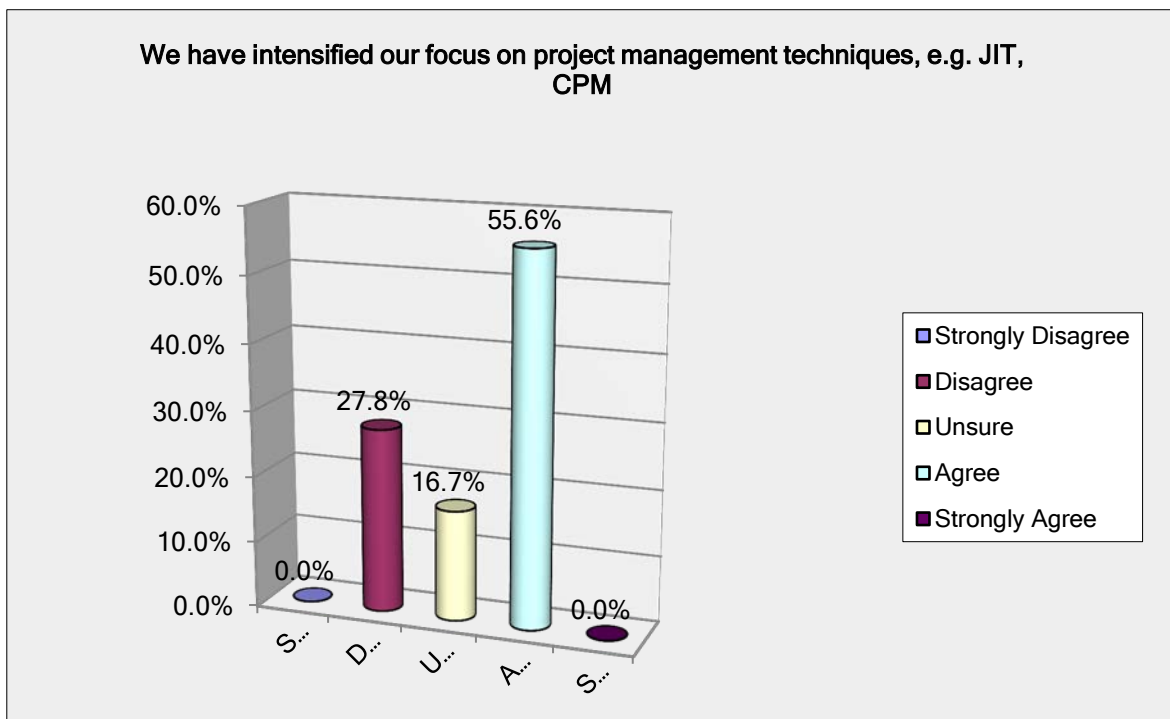


Figure 4.8 Project Management Techniques

A total of 28% of respondents were in disagreement that their firms were intensifying their project management technique; while 17% of respondents were unsure of the enhancements of their firms' project management techniques.

This is an area that needs the attention of consulting firms. Consultants may be putting a great deal of effort into ensuring that their designs and engineering are of a high standard, but may feel that the implementation does not reflect their quality of work, owing to lack of good project management. There is a need to explain and execute a project management methodology that specifies the steps and tasks required to manage consultation-type projects in a consistent manner. A good projects management model ensures that good project management practices are identified and implemented throughout all projects in a typical consultation engineering firm.

4.12 Association with other Consultants

The figure 4.9 below shows that in the consulting engineering services the association of the consultants or consulting firms is a common practice. As detailed below, there were about 50% of respondents who agreed that their firms formed an association with other consultants, while the other 44% agreed strongly that their firms were in association with other consultants in order to broaden their expert knowledge.

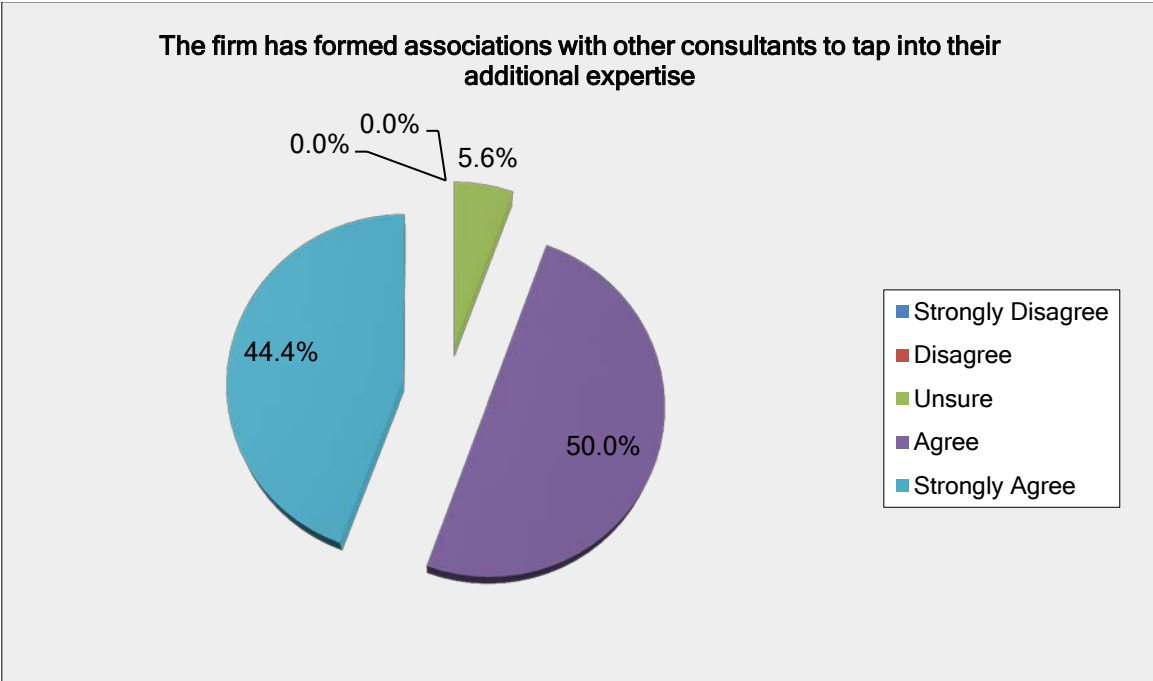


Figure 4.9 Additional Expertise

The minimum of 6% of the respondents were not aware of their firm’s association with other consultants. It is common practice in consulting engineering that some firms tend to specialise in certain fields and as such they are unable to execute projects on their own. These specialist firms are there to support large multinational firms who lack specialised engineering services.

It is vital for consulting firms to realize that, based on the requirements of a project; it may need to mobilize a broad range of engineering resources from international consulting engineering firms. In order to satisfy clients’ requirements, consulting firms may have to consider collaboration with other firms for tighter strategic alignment and integration.

4.13 Management Concepts

In Figure 4.10 a total of 65% of respondents agreed that their firms have increased their focus on management concepts. 6% of respondents also strongly agreed with that belief. It is possible that there has been a lack of business management techniques within the majority of consulting firms.

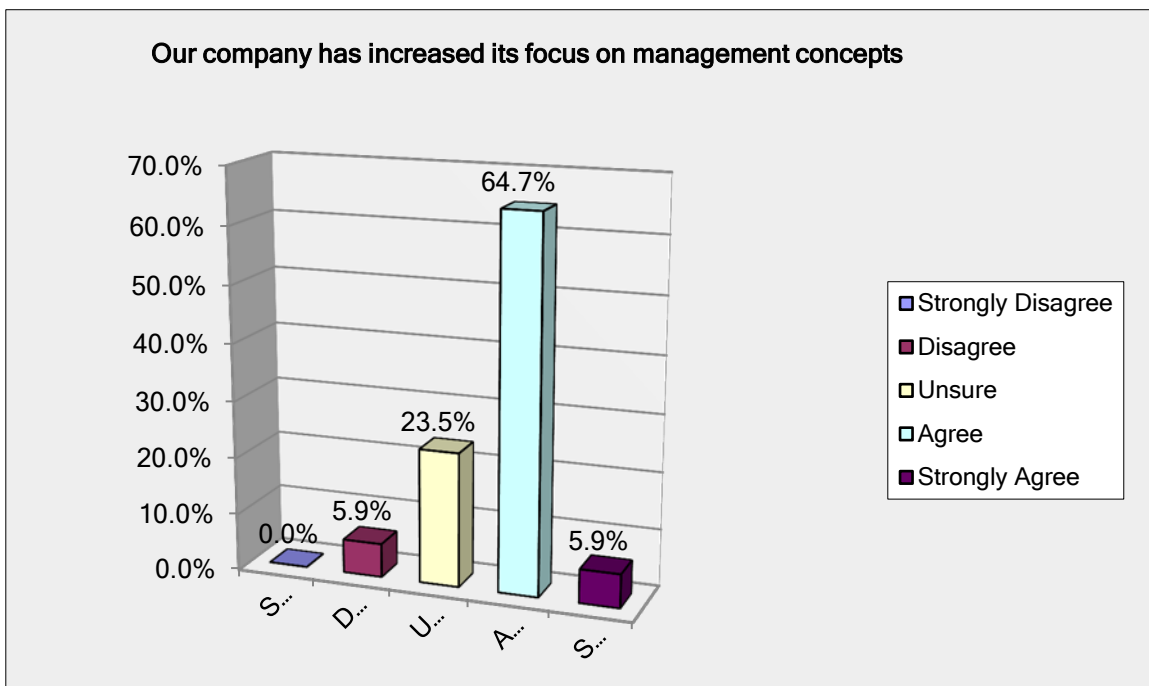


Figure 4.10 Management Models

This is evidence from the above graph that only 6 % of respondents were in disagreement with the opinion that their companies had increased their management concepts. Some 24% of the respondents were not really sure whether their companies had enhanced their management techniques. None of the respondents strongly disagreed with the notion of enhancement of the firm's management concepts.

In order to enhance operational effectiveness, it is recommended that leaders in consulting engineering firms remove safety time from every task during the early stages and get rid of unreported early finishes; inserting a project cushion at the final stage to protect the project. It is recommended that managers of consulting firms improve their project management abilities and improve their reputation as a company.

4.14 Partnership Approach

In execution of large projects, consulting engineering firms should consider a joint-venture approach. This is evident in Figure 4.11, where 50% of respondents were in strong agreement with this approach. Another 44% of the respondents also agreed that their companies would consider joint-venture options when tackling larger projects.

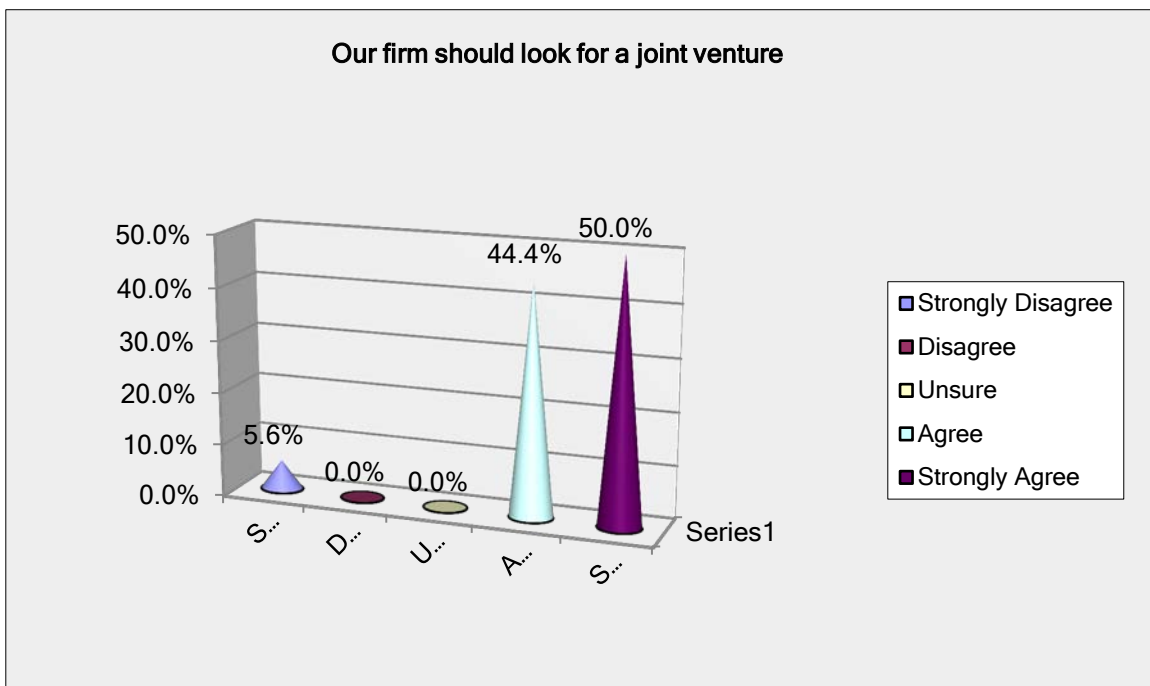


Figure 4.11 Joint-Venture Option

The above graph that shows that a total of 94% of the respondents believe in the joint-venture approach when executing larger projects. The 6% of the respondents that were in disagreement with the joint-venture approach are likely to be consultants who never execute larger projects. The joint-venture structures are usually formed on a project basis; they are not permanently kept structures. They are tailor-made to suit the projects' specific requirements, and dissolved thereafter. As observed in the above figure the joint-venture approach is always to the benefit of all parties involved in projects, if properly management and controlled.

Consulting engineering firms could cut their overhead costs by a substantial amount should they implement joint-venture options when tackling larger projects. The overheads and infrastructure set-up costs are cut to a minimum when firms are engaged in a joint venture arrangement. In this strategy the risk is shared amongst all the stakeholders.

4.15 Additional Skills on Contract Basis

Figure 4.12 below indicates that 70% of respondents agree that their firms would consider hiring additional resources on a contract basis. Another 24% of respondents strongly agreed with this proposal.

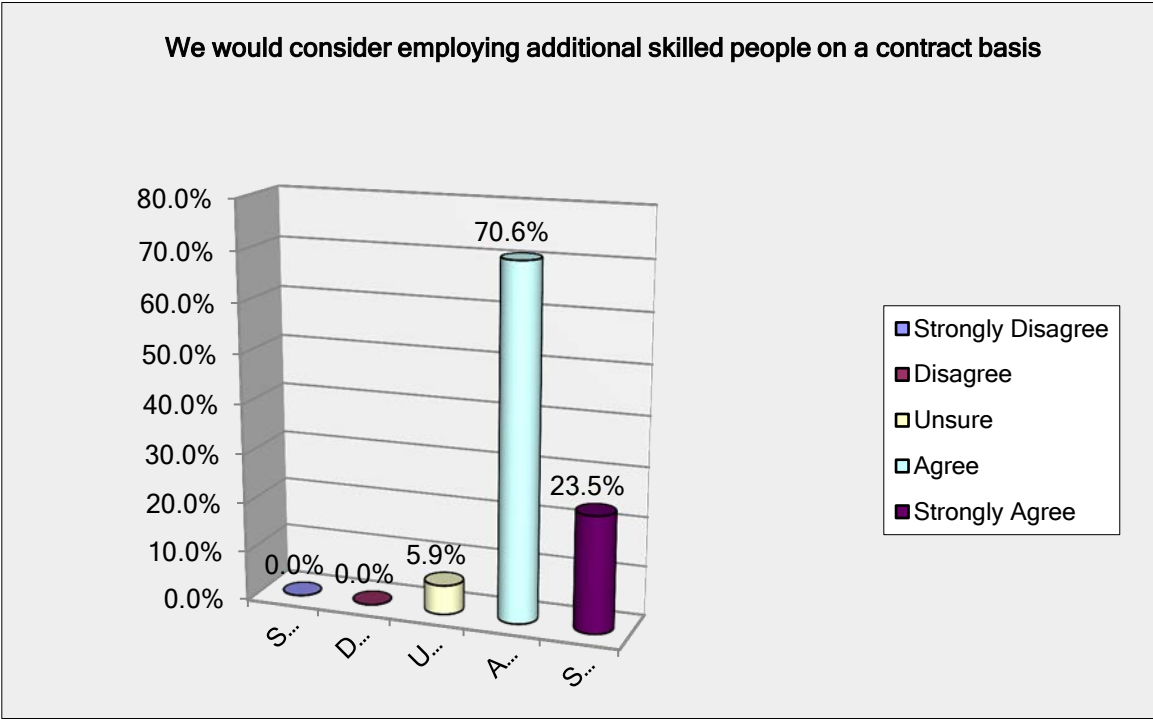


Figure 4.12 Contracting Skilled Resources

As observed in Figure 4.12 above, none of the respondents were in disagreement with the idea of hiring additional consultants on a short-term basis. The 6% of consultants who were not sure that their firms would consider temporary staffs on a short-term basis were probably not in senior positions or perhaps did not have full understanding of the management strategies of the firm. A total of 94% of consultants were in agreement with the idea of hiring temporary consultants; this confirms that the consulting work is seasonal; hence provision for temporary staff must always be made.

A challenge faced by smaller consulting engineering firms has always been the permanently hiring of high calibre of engineers and to be able to offer their staff competitive packages. The greater challenge lies in absorbing the cost of skilled workers during the slack period; this poses a substantial problem for smaller firms.

4.16 Allocation of Work

In order to share work amongst consultants, the consulting firm must base its decisions on the availability of their skilled resources. As shown in Figure 4.13 it is evident that 72% of respondents believe that their firms would consider outsourcing some of the work. In addition to this, there were also 11% of respondents who strongly agreed that it was important for firms to outsource some of the work. A total of 83% agreed with the suggestion of outsourcing some of the work.

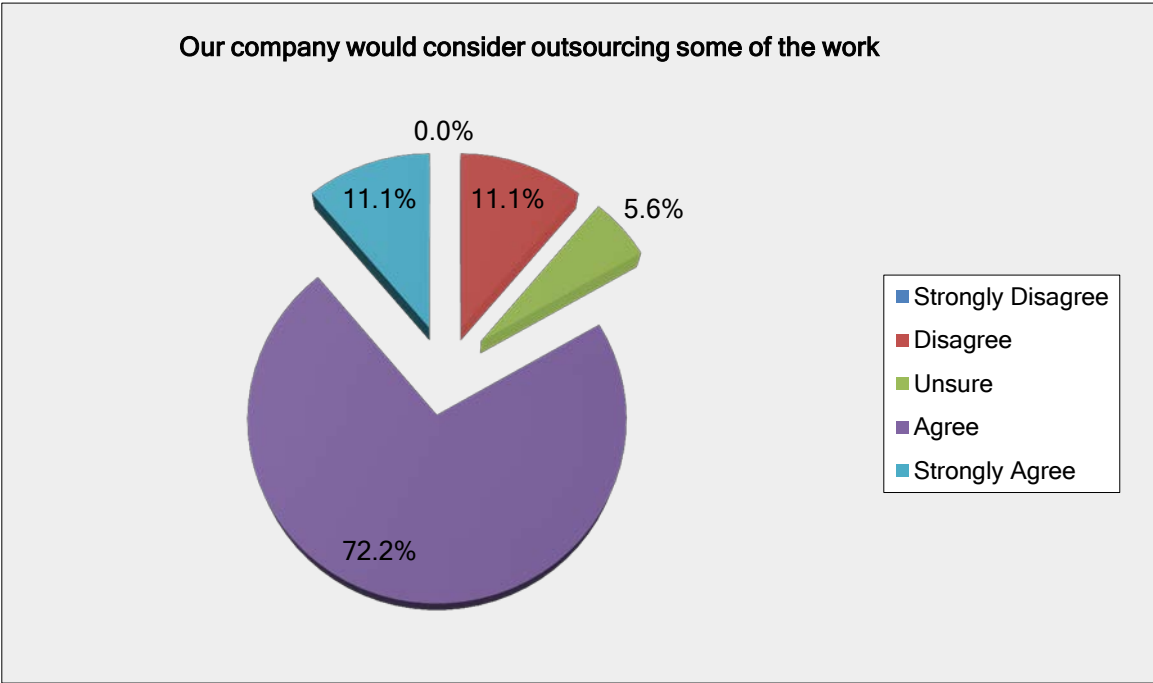


Figure 4.13 Outsourcing some of the work

Some 11% of respondents were not in agreement with the idea of outsourcing some of the work. The question that may have occurred to them could have been, “Why take on work that one is not able to execute?” The other 6% of respondents were not decisive about the idea of outsourcing some of the work.

It is vital that before consulting firms go ahead with outsourcing some of their work, they assess the total cost savings resulting from outsourcing the consultancy work; this should present more favourable financial rewards. An optimal degree of outsourcing must be identified. Management must also ensure that the outsourcing policy is clearly communicated to the employees.

4.17 Partnerships in Consulting Engineering

As a strategy for retaining valued customers, consulting engineering firms may consider forming project alliances with other engineering firms. Figure 4.14 illustrates that 83% of the respondents were in agreement with the idea of project alliances, where each company would execute a portion of the work.

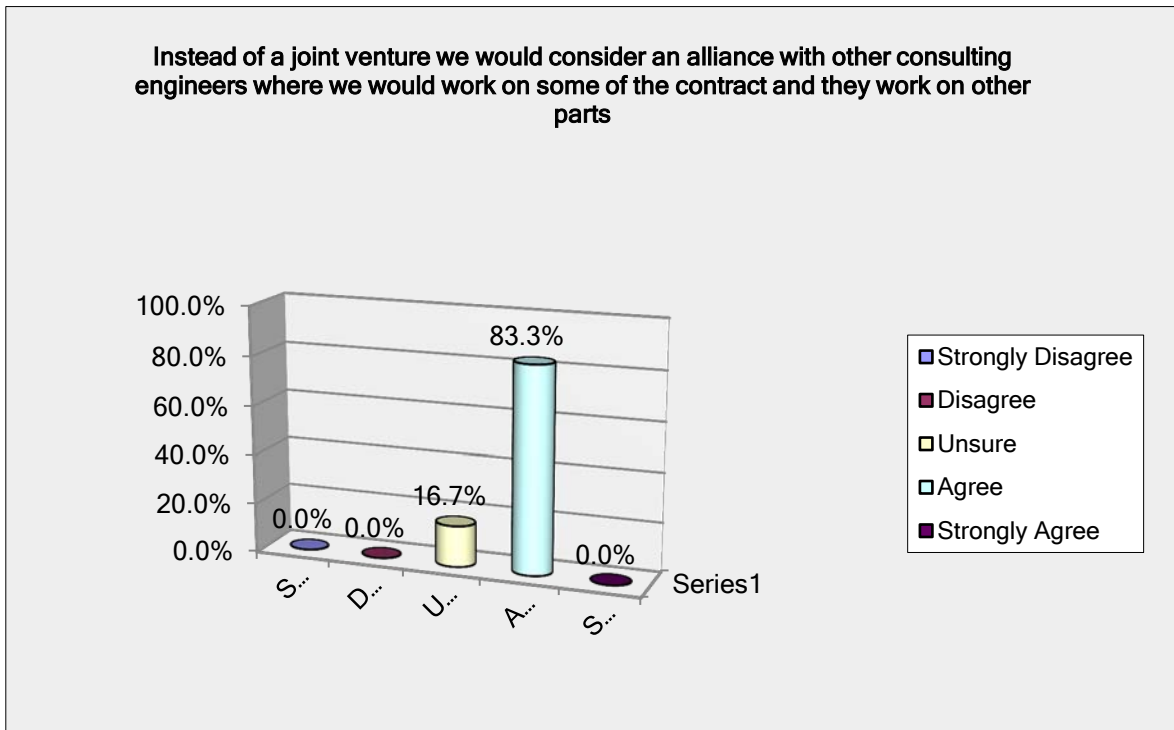


Figure 4.14 Alliances of Engineering Firms

There were no respondents that disagreed with the idea of forming project alliances when implementing larger projects. The 17% of the respondents who were not sure of this approach may have been influenced by the size of their firms or by the projects that their firms take on.

Consulting firms must be aware that their alliances with other engineering firms may lead to a number of paybacks, including enhanced communication, closer relationships between suppliers and customers, and sharing some of the practices (co-design and co-engineering). These benefits are of great significance in a situation in which businesses cannot respond effectively to the needs of the market, because they lack specialised technical expertise.

4.18 Advertising Company Services

Advertising of consulting engineering may be implemented in various ways. In Figure 4.15 there were about 33% of respondents who agreed that their companies were using trade journals as a medium for promoting services. There were an additional 6% of respondents who strongly agreed that trade journals were used to advertise their firms' services.

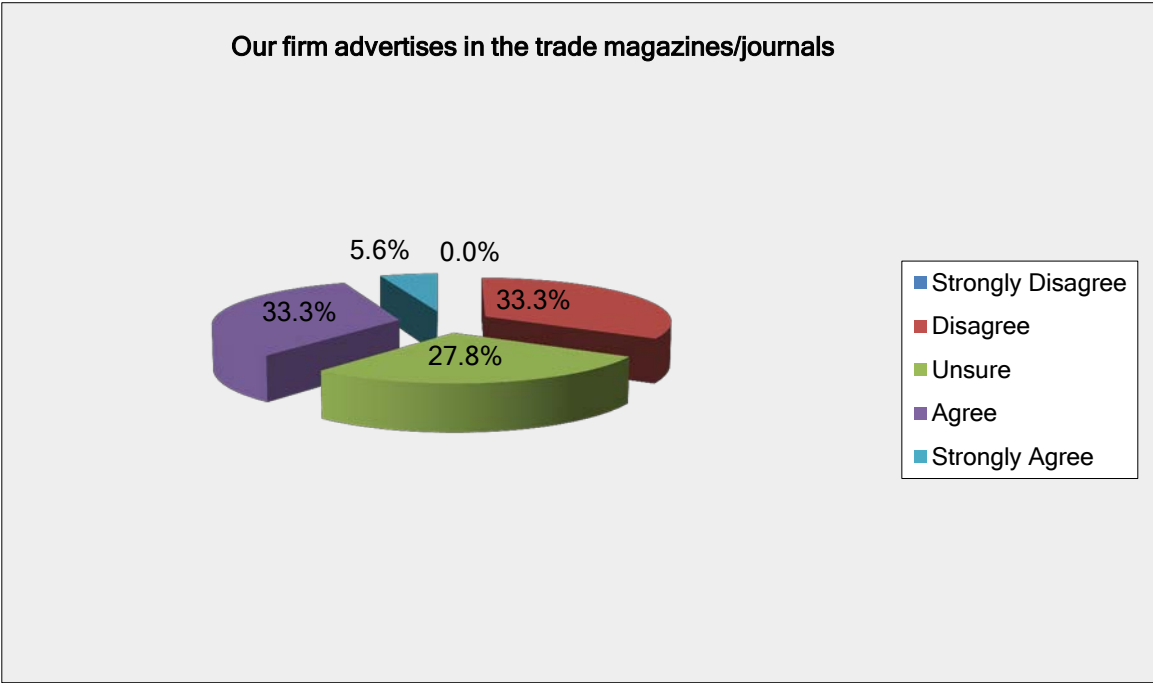


Figure 4.15 Trade Journals Advertising

It is of significance to note that there was a total of 33% of respondents who disagreed with this method of advertising, saying that their firms were not using trade magazines or journals for advertising. The remaining 28% of respondents were not aware that their companies were advertising in trade journals. It is of importance to the consulting engineering firms to note that from a business perspective, there are higher costs associated with advertising in trade magazines.

The challenge in this form of advertising is to keep up with the increasing advertising costs on an ongoing basis. Without the support of our advertisers, we would never have been able to consider or sustain the conversion to a magazine. The key driver here is to have a growing number of consulting firms advertising in the same trade journals such that it helps to drive a larger circulation of these publications.

4.19 Advertising on Company Websites

It was indicated in the previous section there are many different mediums used to promote engineering services. In the figure 4.16 below, the option of advertising on company websites was examined. A majority (61%) of the respondents strongly agreed that their firms were using a company website to promote their services.

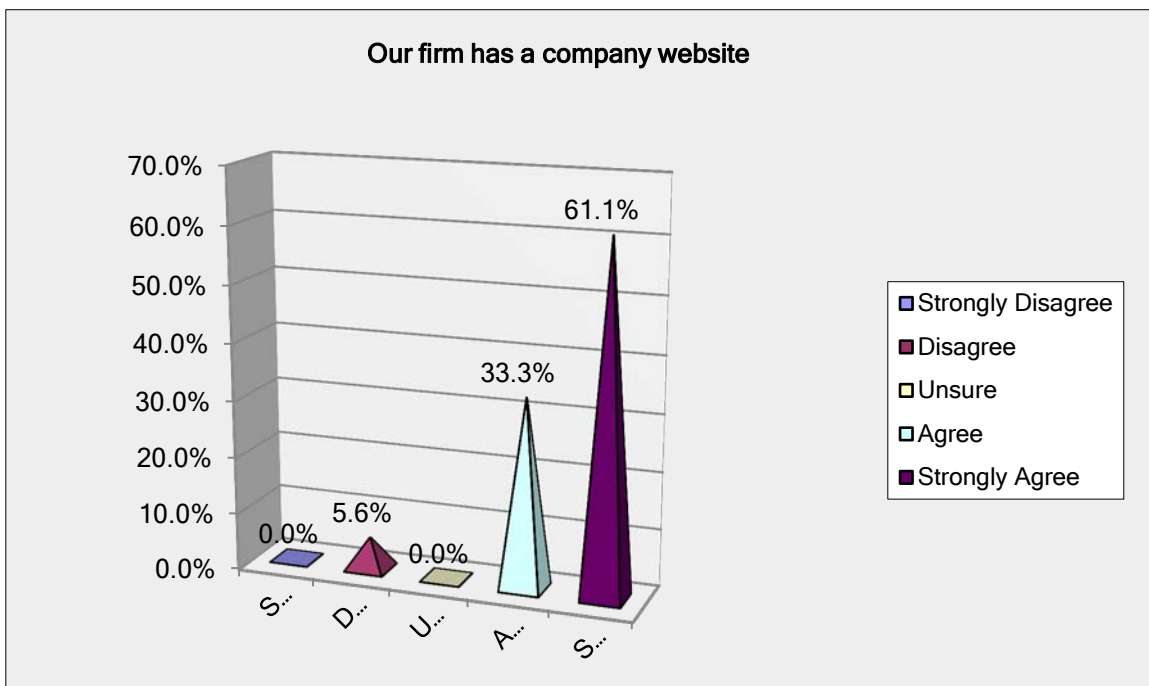


Figure 4.16 Use of Company Website

A total of 33% of the respondents also agreed that their companies have a company website that is used for marketing the firms' services. A small (6%) number of respondents disagreed that their firm has a website on which they promote their services. This method of advertising makes it easier for the prospective clients to interact directly with their future service providers. They can even post requests for their specific requirements via the company websites.

Consulting firms are able to respond promptly to concerns or requests posted on their websites. Marketing of engineering services comes by way of the engineering firms endeavouring to discover what the client really wants and to position their firms to satisfy those needs. The consulting firms frequently rely on their professional reputation, the use of improved technology, and by offering high-quality services.

4.20 Alerting Prospective Clients to Our Services

Another channel that may be used to promote the company services is that of hosting seminars. It appears from Figure 4.17 that this was not a popular means of promoting consulting engineering services, about 44% of the respondents disagreeing with the idea of hosting seminars as a way of promoting company services.

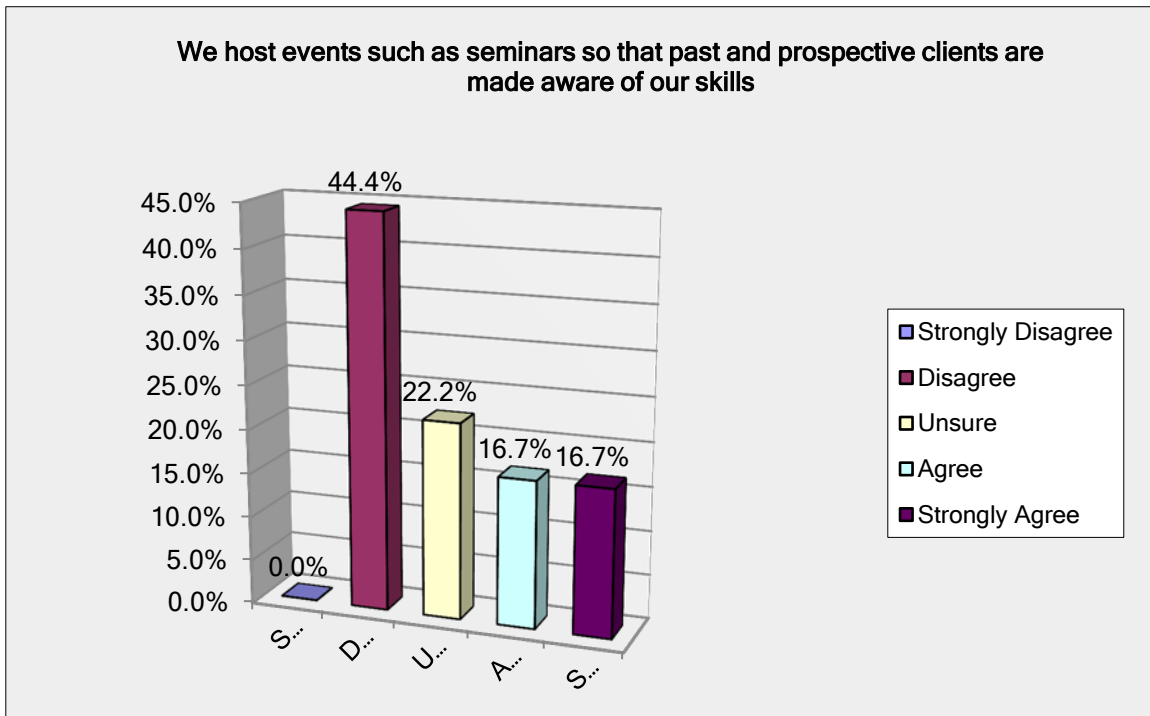


Figure 4.17 Hosting Engineering Seminars

22% of respondents were not sure whether their firms were hosting seminars in order to attract prospective clients and retain existing ones, while 34% of respondents agreed that their firms do use seminars as a strategy for promoting the firm's services. This method may not be popular; however, some companies do make full use of it.

The main advantage of holding engineering seminars is that industry experts have an opportunity to address the new engineering development requirements and to assess the changes to the standards and statutory requirements. Consulting engineering firms become knowledgeable about specifications and engineering systems that have become obsolete. In addition, these seminars are held once or twice a year and enrolment is usually limited.

4.21 Calling on Prospective Clients

Another way of promoting business services was for a consulting engineering firm to call on prospective clients. Figure 4.18 confirms that 78% of respondents agreed that they call on prospective clients to look for new opportunities.

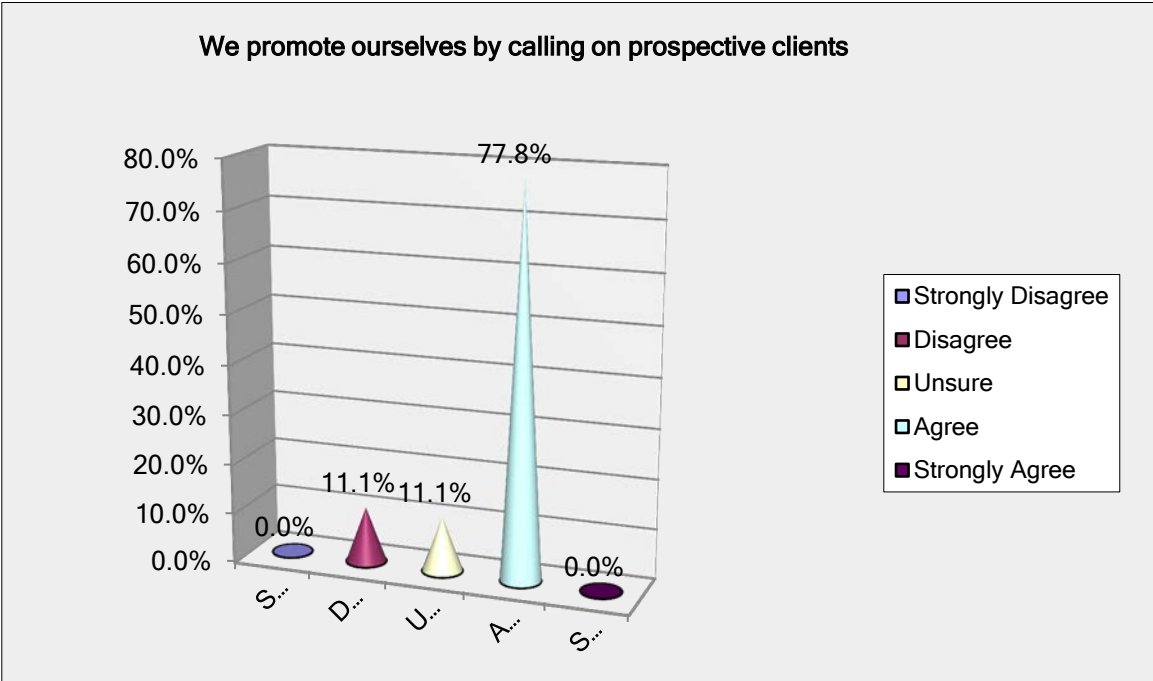


Figure 4.18 Marketing of Engineering Services

A total of 11% did not agree that their companies would call on prospective clients to market their services. Another 11% of respondents were not decisive about calling on prospective clients to market their services. This is a cumbersome way of marketing company services, because it requires consultant marketing personnel to visit the prospective clients’ sites and is therefore time-consuming.

In consulting engineering firms, very occasionally firms have their own marketing divisions responsible for marketing. The most important task of the individual responsible for marketing is marketing communication, which includes advertising, undertaking advertising events and public relations. In most consulting firms, marketing activities are conducted by senior members, usually partners. However, these individuals seldom conduct marketing research; they rely mainly on, in-house information.

4.22 Direct Relationship with Clients

It may be easier to enhance business prospects when one has formed direct relationships and contacts with potential clients. Figure 4.19 shows that a large (61%) number of respondents agreed that they built direct contacts with the prospective clients as a way of marketing their business.

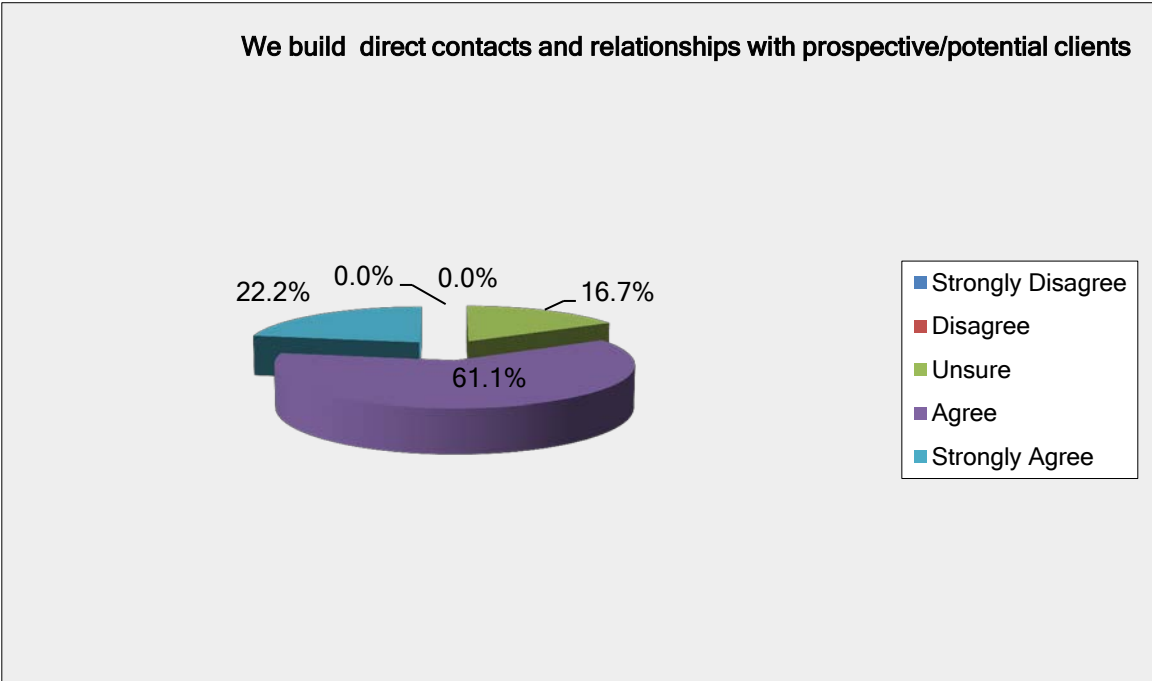


Figure 4.19 Customer Relationships

In this strategy 22% of respondents strongly agreed with the system of forming direct relationships with potential clients. The last 17% of respondents are not used to forming direct relationships with potential clients. The basis of this strategy is integrity and what the consulting engineering firms must realise is the fact that clients are devoted to those consultants who are loyal to them by keeping their undertakings, delivering on what was promised, finishing projects by the time agreed on, and charging the price promised.

Consulting engineering firms should also be aware that winning projects from new clients is more difficult than securing follow-on work or a next assignment from your loyal existing clients. It is vital to know that opportunities are missed by not leveraging a relationship. It is critical not to take clients for granted, as this may undermine loyalty and may even place the work at hand in jeopardy.

4.23 Informing Professional Colleagues

A less expensive method of acquiring business is to promote one’s firm by calling on professional colleagues to inform them of one’s capabilities. In this strategy it is always possible that professional colleagues are already aware of one’s capabilities as a consultant. Figure 4.20 as shown below indicates that 61% of respondents were in agreement with the strategy of calling on professional colleagues to seek business prospects.

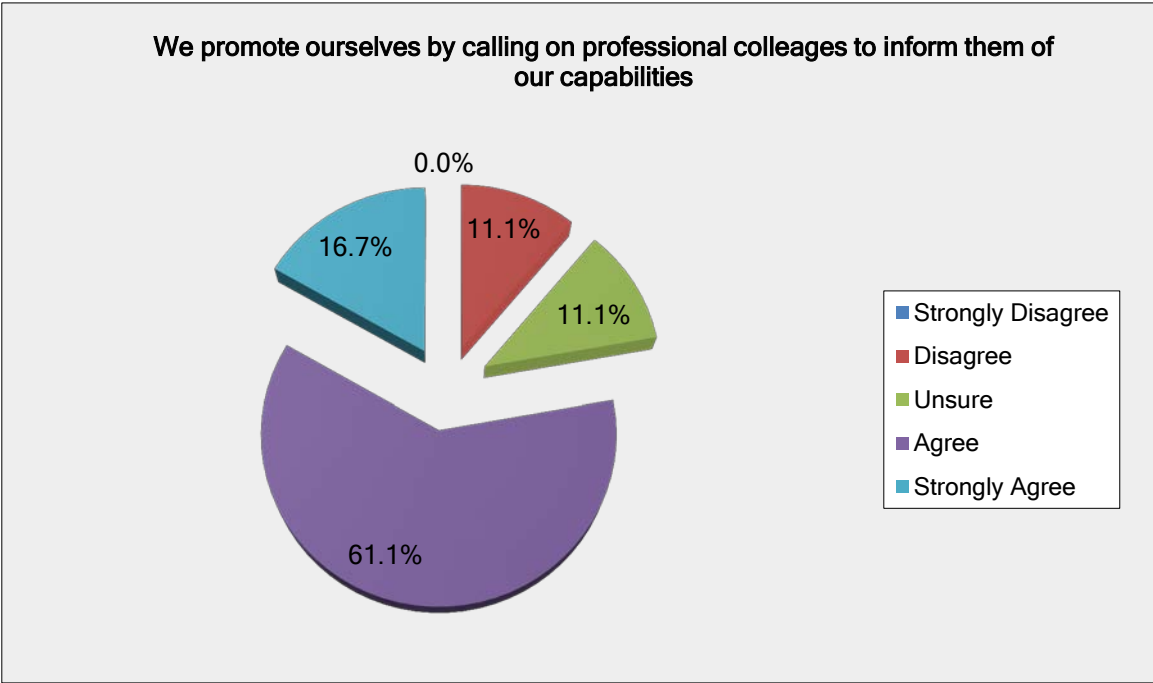


Figure 4.20 Canvassing Professional Colleagues

A total of 17% of respondents also strongly agree with this tactic of calling on professional colleagues to canvass for business prospects. However, about 22% of respondents disagreed with the strategy of approaching professional colleagues when seeking work prospects. This strategy is more suitable for experienced and well-developed consultants who have been practising for a long time and have created a good reputation for their firms. New entrants to the industry would find it difficult to adopt this strategy.

4.24 Trade Shows /Marketing

Trade shows marketing may be one of the most expensive marketing tools, however, the potential economic returns to be realized are said to be concomitantly high. In this marketing option potential clients and existing clients have direct interaction with the service-provider at a neutral venue, and are made aware of the consultant’s new developments.

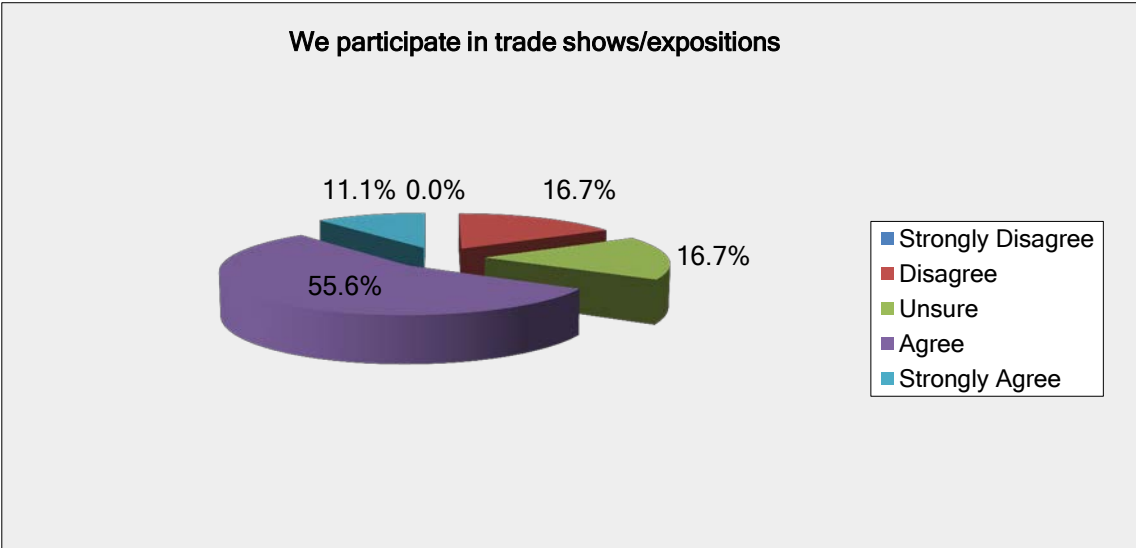


Figure 4.21 Exhibition Participation

It is apparent from the above figure 4.21 that the majority (56%) of respondents agreed that their firms participate in exhibitions. There were also about 11% of respondents who strongly agreed that their companies do take part in exhibitions as a way of marketing their services. The other 17% of respondents disagreed that their companies participated in exhibitions, while the balance of 17% were not aware of their firm’s participation in exhibitions.

The engineering exhibitions are usually held over a period of two days. Participants tend to benefit by the practical seminar sessions that are held during these exposition at no cost. During these two-day events engineering experts and peers share technical and line-management topics surrounding good engineering practices. The consulting engineers benefit by participating in practical, hands-on demonstrations where they achieve CPD-seminar points. These practical sessions provide a better understanding of engineering standards and best engineering practices.

4.25 Strategies used to Generate Business Prospects

The seven marketing and advertising strategies discussed in this study were ranked in order of their effect on the generation of business prospects for their firms. Figure 4.22 shows the effectiveness of these strategies in their ranked order as indicated by all respondents.

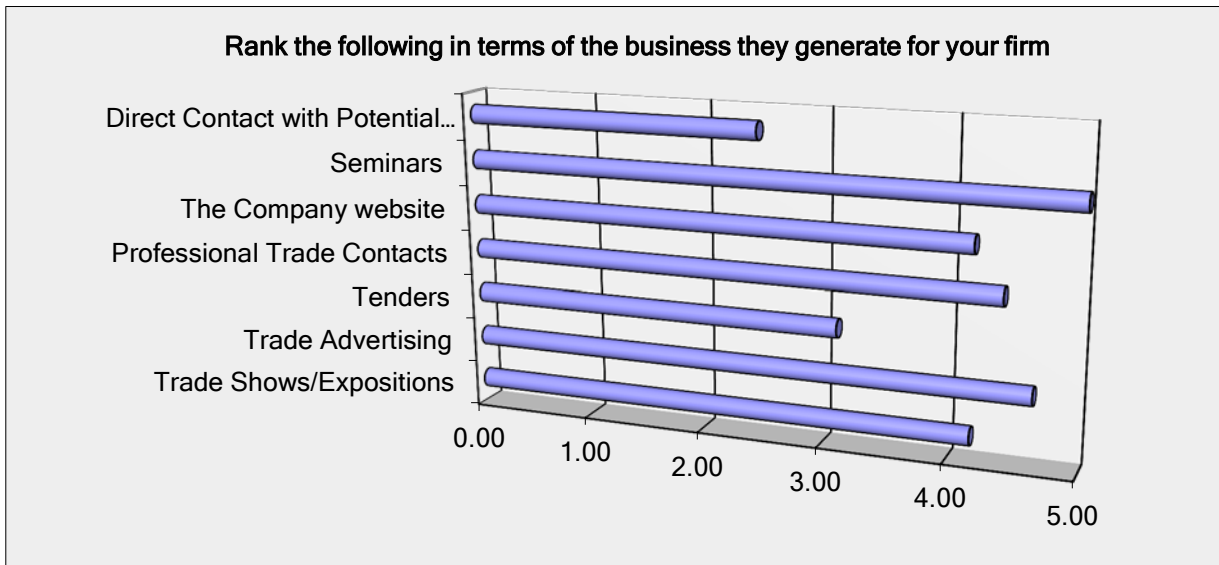


Figure 4.22 Ranking Strategies by Business Gained

Seminars were ranked as the most effective marketing tool for generating business prospects for most consulting engineering firms. This is usually an event held once or twice annually but it has a great impact on generating business as indicated above. Advertising in the trade journals was ranked as the second most effective way of marketing consulting engineering services. The third most effective advertising method was the use of professional contacts in achieving business prospects. This strategy is less time-consuming because their professional contacts already know the consultants' capabilities, there being therefore less effort required to market services.

The fourth most effective advertising technique as ranked by the respondents was trade-journals advertising and company-website advertising. These two strategies were ranked equally as shown in figure 4.22. The major difference between the two is that the company website is maintained and controlled by the consulting engineering firm. It is therefore easier to monitor and control the company advertisement, while advertising in trade journals is externally controlled; consultants have no control over where and how the advert is placed in

the journal. The use of the tender method as a way of advertising was ranked the fifth most effective way of generating business prospects. This is one of the popular methods of soliciting business in the consulting world; however this method is less effective since being a very competitive method of acquiring business. It is important to note that, depending on the size of the tender, it may be a very time-consuming and expensive exercise.

The strategy ranked the sixth most effective way of generating business prospects was direct contact with potential clients. This is a time-consuming method of sourcing business prospects that can generate work for the consultants. It may be suited to new business entrants and also to smaller entities.

4.26 Participants in the Survey

The respondents in this study were from four different CESA regions; however, the target population of the study was the Eastern Cape and North West provinces. There was a sample of responses from Gauteng Province as well as a small percentage of respondents from KwaZulu-Natal. The outliers may be attributed to individual consulting firms having operations in various parts of the country. This makes it possible for some consultants to be working in different provinces for the same company.

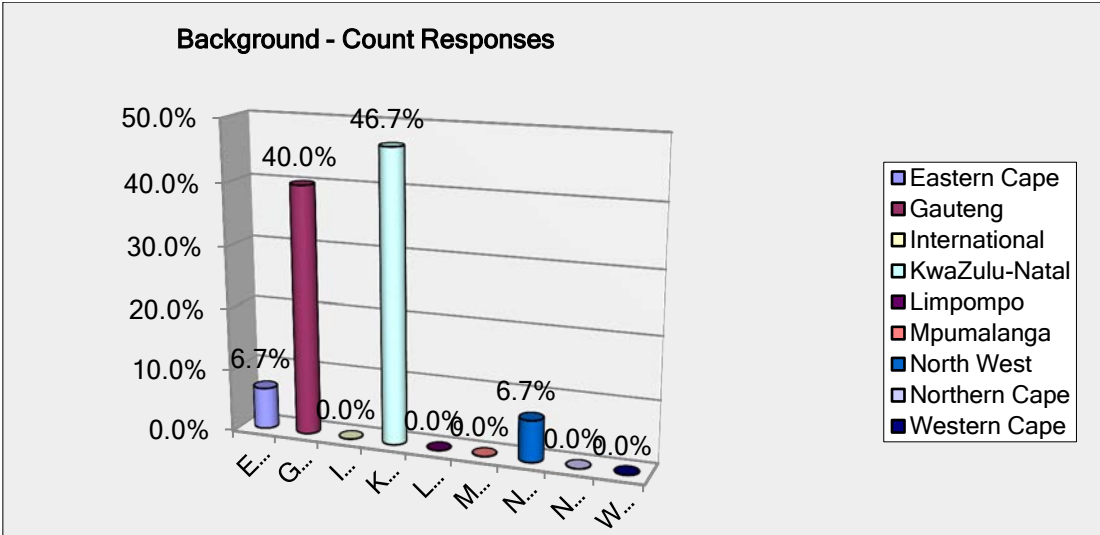


Figure 4.23 Responses from Consultants

Figure 4.23 shows that the majority of respondents were from North West Province followed by the Eastern Cape Province. This was in line with the targeted population as per the study’s objectives.

4.27 Consulting Engineering Services

Although this study targeted eight different types of engineering services as offered by consulting engineering firms, shown in Figure 4.24 below, there were also responses from consulting engineers.

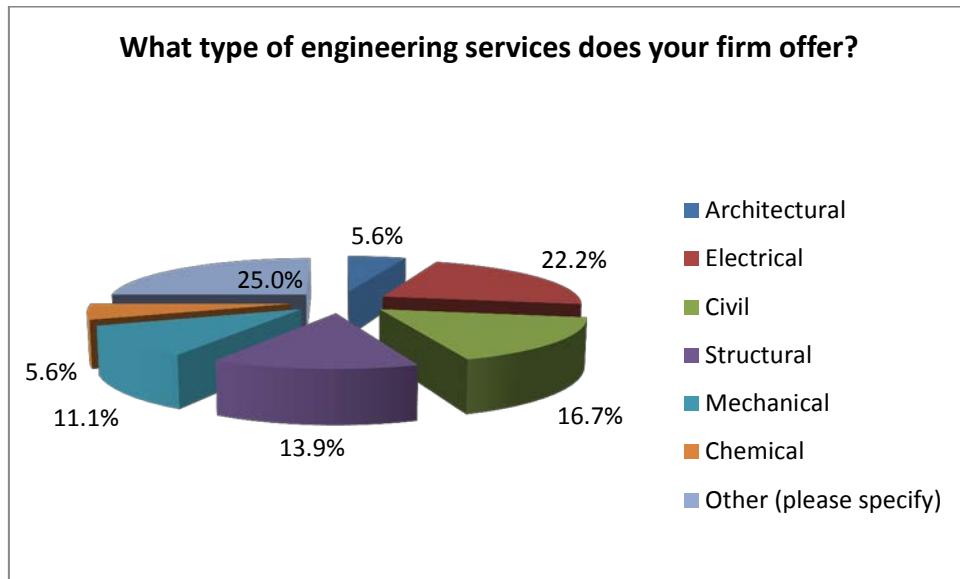


Figure 4.24 Engineering Services Offered

These consultants specialize in consulting engineering services in areas such as safety, integral-level determination services, renewable-energy services, and lastly the engineering and topographical surveying services. Respondents from some of the firms, especially the larger consulting engineering firms offered services that covered all eight engineering services as listed above.

Based on Figure 4.24 it is evident that the majority of the respondents who took part in this study were consultants from an electrical engineering background. They were followed by civil engineering consultants. Structural and mechanical engineering consultants followed as third and fourth. Architectural and chemical engineering consultants comprised the least number of respondents. This is likely to indicate CESA's demographics of their registered consulting engineers.

4.28 Retention of Skilled Staff

Figure 4.25 below indicates that most consultants in engineering firms were satisfied with their jobs, which indicates that this is a competitive industry; most firms are employing aggressive retention strategies.

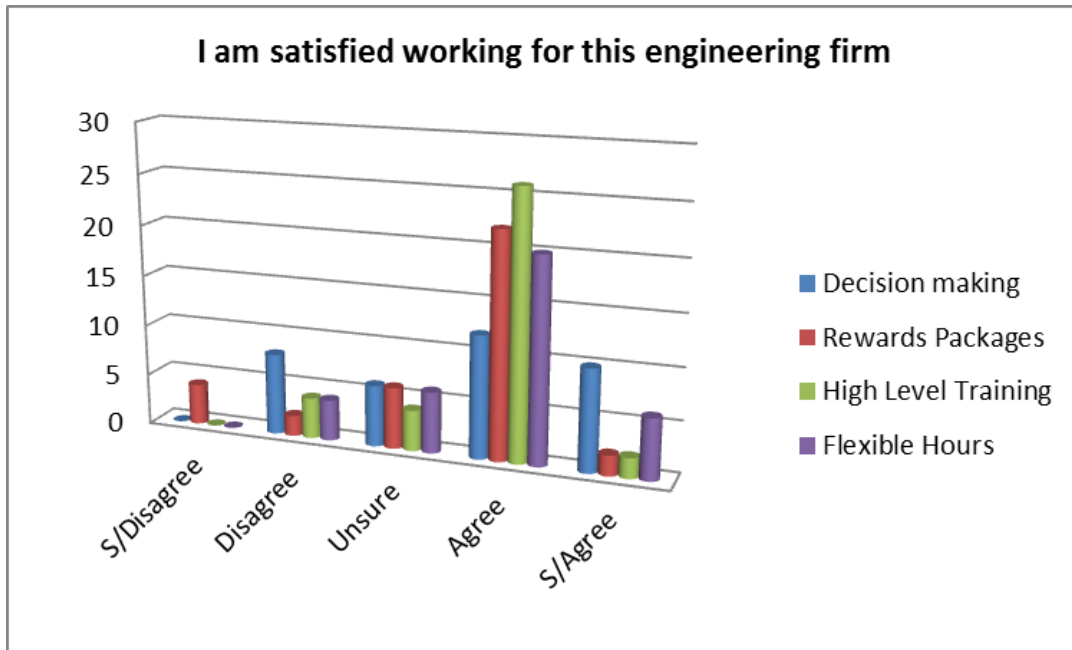


Figure 4.25 Employee Satisfaction

The flexible working hours of consulting engineering firms was viewed as one of the most attractive benefits; this was common to the industry at large. The flexible working hours' strategy is not only beneficial to employees, but also to the firm, minimising employee turnover as well as employee absenteeism. This practice allows consultants to choose their own starting and finishing times at work, provided that they meet all their daily targets and obligations.

It is obvious that the majority of consulting firms are implementing strategic training aligned to the firm's objectives and its business strategies. It is important for consulting engineering firms to train essential workers and to propagate new knowledge throughout the organisation. The respondents were satisfied with the way in which their companies rewarded them.

4.29 Business Techniques used in Engineering Operations

There is a need for enhanced business and managerial principles in the consulting engineering environment. This is evident in figure 4.26 below, where a majority of the respondents agreed that their firms have increased their focus on managerial concepts. In the consulting engineering world firms are drawing on knowledge from additional expertise that happens live all over the country as well as from all over the world.

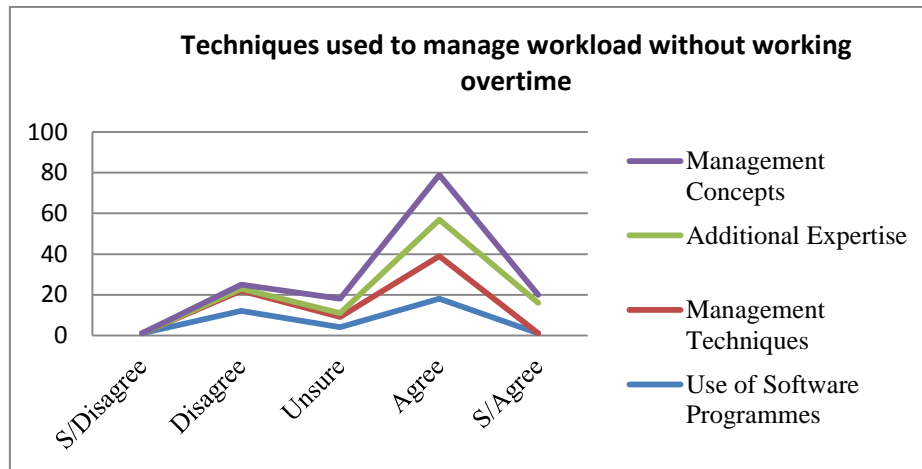


Figure 4.26 Business Operational Model

There was a growing need to seek additional expertise globally; such expertise was geographically dispersed but readily available in forming of teams that would function together for the duration of specific projects. These teams have the ability to work effectively if they are managed properly, and given specific guidelines to be followed, regardless of the work or project duration. In discharging managerial techniques administrators of the consulting engineering firms should consider creating effective controls formulated on the costs and benefits principle.

Management techniques examine the benefits and costs of utilising certain controls in order to obtain desired results for the firms. In supporting the firm's business operational models, consulting engineering firms make it a habit to continually upgrade technologies that support their operations. It is evident from the above figure 4.26 that most companies were using old technologies in supporting their operations. Engineering firms should realise that technological forces have a key role in creating and uplifting the organisation's projects environment.

4.30 Limited Engineering Resource Capabilities

The administrators of consulting engineering firms must develop a sound managerial competencies model for their firms. Figure 4.26 clearly indicates that most respondents believed that their companies should engage in alliances with other firms when executing larger or more complex projects. The managers of consulting firms must be equipped to manage team dynamics.

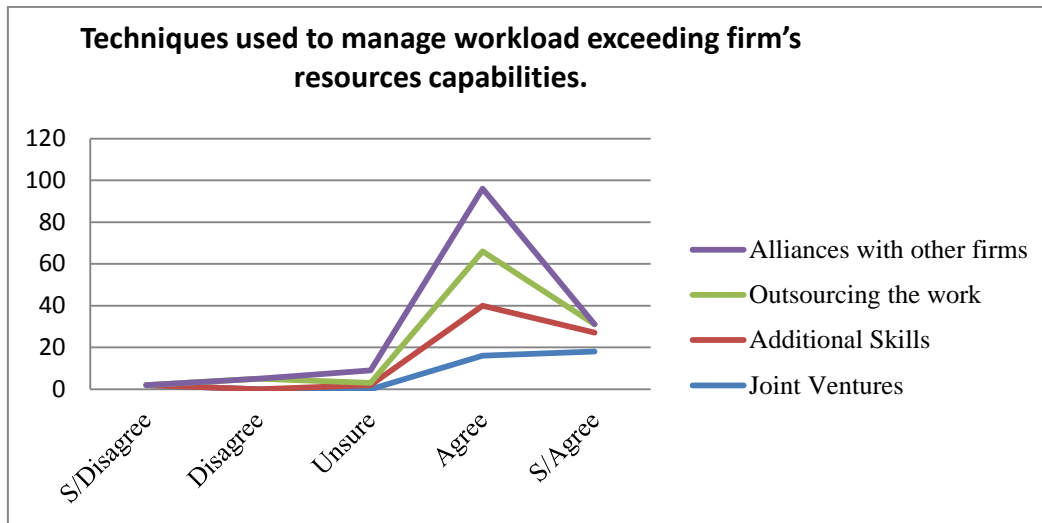


Figure 4.27 Workload Management Strategies

One of the fundamental elements of the managerial competencies model is the strategic action competency principle. In referring to the above figure 4.27, it is evident that most engineering consultants believe that there is a need to outsource some of the work if and when required. The techniques used in consulting engineering to manage workloads may be discharged in such a manner that there is no unproductive overtime worked by consultants.

The strategic action competency principle suggests that consulting firms must have a clear understanding of the industry in which they participate; if fully comprehended, it is easier for them to identify partners who may complement their competencies in the formation of joint ventures. This competency principle allows the firm to take strategic business action. There is a model of teamwork competency, as illustrated in Figure 4.26. Respondents were of the opinion that there are situations in which additional resources are required on a short-term basis. Administrators of consulting firms must create a supportive and conducive environment within which consultants may discharge their duties effectively.

4.31 Marketing Engineering Services

There were seven different marketing strategies explored in this study; these were ranked in order of priority based on the business prospects that they represent. Of great importance in marketing the engineering services was the value proposition. Consulting engineering firms should take into consideration that they are competing in a very aggressive environment. This means that they must be very clear as to why their clients should acquire their services rather than those of their competitors.

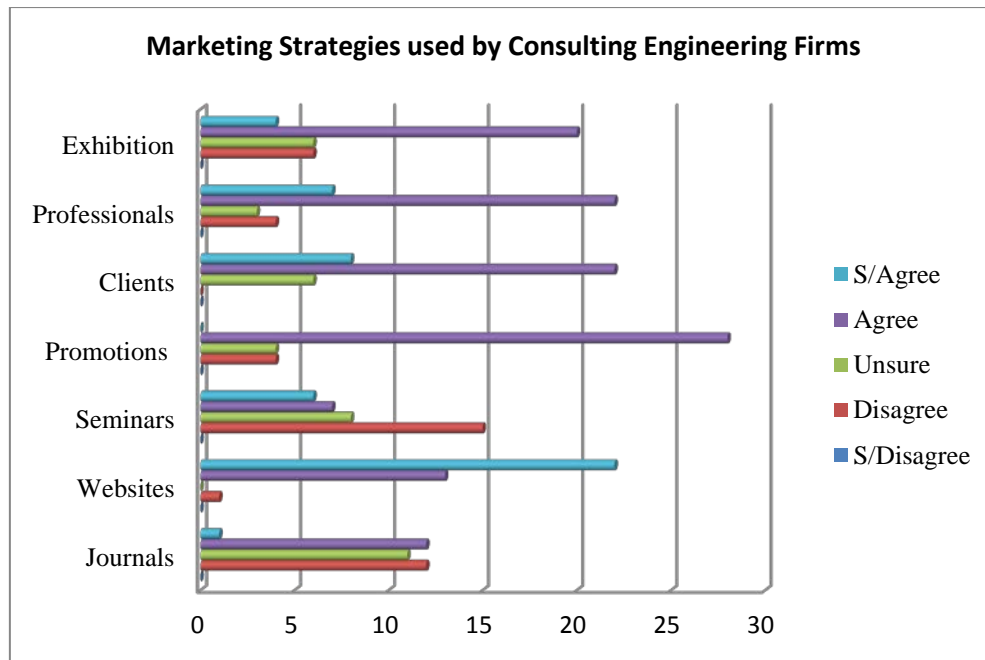


Figure 4.28 Marketing Strategy Model

In the figure it was evident that the majority of respondents strongly agreed with the use of a company website as a marketing tool for the firm's engineering services. A large number of respondents who agreed with the use of the company website in advertising and promoting the consulting engineering services.

Were the two responses superimposed, the use of the company website would be by far the most-preferred tool of marketing engineering services. The hosting of seminars was the least-preferred marketing tool in advertising engineering services. The use of professional colleagues was another preferred method of promoting services; clients would then already know what to expect from consultants.

4.32 Chapter Summary

Technology has a major role to play in business strategy. If incorrectly applied, it may hinder strategic options for the service industry. It is therefore important to define technology as the knowledge, tools, techniques and actions used to transform information and ideas into finished services. Technological forces contribute a great deal in creating and changing an organization's consulting environment.

The success of consultants' training and development is measured by the ability to produce a stream of competent consulting engineers; motivated consultants, who are able to meet current and future organizational goals. The training and development of activities of the consulting engineers must be based not only on the current but also on future needs of engineers and skills required to fulfil future working responsibilities. It is therefore necessary to cater for potential changes in technology, and perhaps government legislation to prevent consultants' obsolescence in the future.

Project management in the 21st century is anticipated to transform from 'getting the job done to strategic project leadership, with the conception of 'creating a competitive advantage and winning in the marketplace' applying; project management is used as a competitive tool (Labuschagne, 2010). According to Labuschagne (2010), a benchmarking study confirmed that consulting engineering firms that are effective in project management practice a simple, well-defined project-management structure.

A good model of managerial competency is vital in ensuring that consulting engineering firms have a strong balance of technical and business principles, because engineering firms are formed on the basis of technical competencies. Consulting engineering firms must realise that a focus on customers is the foundation of successful business-level plans and strategies. In order to achieve business-strategy goals, a functional-level strategy is required to implement business plans and strategies. Chapter Five which follows contains a discussion of these findings and a conclusion to this research.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The study was conducted successfully in spite of a lower than expected response rate. The conclusions as detailed below are limited to this study, based on the findings of this research. In this study a concerted effort was made to ensure that the research was objective. The conclusions arrived at are discussed in this chapter. As presented in the data collected for this study, a differentiation strategy is recommended to offset competitors. Leaders in the consulting engineering sector must realise that it is easier to market their services if they have a favourable business standing, as their services being intangible.

5.2 Findings from Literature

5.2.1. Objective One

The first objective of the study was to determine the strategies employed by consulting engineering firms to retain their skilled staff. The flexible working hours' strategy is not only beneficial to employees but also to the firm, because it minimises employee turnover as well as employee absenteeism (Carrell, 2006). This practice gives options for consultants to choose their starting and finishing time at work, provided that they meet all their daily targets and obligations.

In order for consulting engineering firms to execute and implement the strategic training programme productively, they need to develop a comprehensive strategic training plan. The plan should promote on-going training and development in the organisation and should always be aligned to the company's objectives (Hellriegel, 2009). There are many reasons for employees leaving an organisation and joining another firm, but the fundamental reason is usually inappropriate employee compensation.

5.2.2. Objective Two

The second objective of the study was to ascertain the technical and business elements of successful and sustainable consulting engineering firms. In the consulting engineering world

firms are drawing on knowledge from additional expertise that happens live countrywide as well as globally.

Technology has a major role to play in business strategy; in consulting engineering firms entities must keep ahead with technological development if one is to compete in this environment (Hellriegel, 2009). There is a growing need to gain additional expertise globally; this expertise is geographically dispersed, but readily available to those who wish to form teams that will function together for the duration of specific projects. These teams have the ability to work effectively if they are managed properly and given specific guidelines to be followed regardless of the work or project duration (Macmillan, 2004).

5.2.3. Objective Three

The third objective of this study was to establish the way in which consulting engineers secure contracts and remain busy. One of the fundamental elements of the managerial competencies model is the strategic action competency principle. The managers of consulting firms must be equipped to manage team dynamics. Administrators in consulting engineering firms must develop sound managerial competencies models for their firms (Hellriegel, 2009).

Managers in consulting engineering firms must revisit marketing of their services through trade shows. During the expositions engagements and discussions with the exhibitors on their services are always useful; however, most companies are cutting back on open spending such as sending people to exhibitions and offsite seminars (Milo, 2012). The consulting engineering services were procured for quality reasons; their fixed tariff was the basis for payment. Now, however, with the introduction of the Preferential Procurement Policy Framework of 2000, consulting engineering is being procured through competitive tender processes where price is the major factor (Pirie, 2012). CESA is engaged with National Treasury and the Construction Industry Development Board to combine price and quality under one process (Raman, 2012). This CESA initiative gives leverage to CESA-registered firms in securing contract work and remaining busy.

The strategic action competency principle suggests that consulting firms must have a clear understanding of the industry in which they participate, and if fully comprehended this makes it easier for them to identify partners who may complement their competencies in the

formation of joint ventures (Grant, 2010). This competency principle helps the firm take strategic business action.

5.2.4. Objective Four

The fourth objective of this study was to investigate and understand how consulting engineering firms find engineering prospects and turn them into clients. What is of great importance in marketing of engineering services is the value proposition (Winer, 2007). Consulting engineering firms should take into consideration that they are competing in a very aggressive environment. This means that they must be very clear as to why their clients should acquire their services rather than those of their competitors (Winer, 2007).

5.3 Findings from the Fieldwork

5.3.1 Objective One

The first objective of the study was to determine the strategies employed by consulting engineering firms to retain their skilled staff.

5.3.1.1 Findings

The flexible working hours of consulting engineering firms was viewed as one of the most attractive benefits; this was common to the industry at large. This practice allows consultants to choose their own starting and finishing time at work, provided that they meet all their daily targets and obligations. The majority of respondents also agreed that their firms are spending a great deal on high-level training. The respondents were satisfied with the way in which their companies rewarded them.

The observation made was that the majority of consulting firms are implementing strategic training aligned to the firm's objectives and its business strategies. It is important for consulting engineering firms to train essential workers and to propagate new knowledge throughout the organisation. The respondents were satisfied with the way in which their companies rewarded them.

5.3.1.2 Conclusion

The common incentive scheme in consulting firms is profit sharing; this is an annual payment that an employee receives in addition to his regular salary. The findings showed that most

consultants in the engineering firms are satisfied with their jobs, which indicates that this is a competitive industry; most firms are employing aggressive retention strategies.

5.3.1.3 Recommendation

The firm should always be clear about the basis of this strategy, which is to increase the consultants' incentive to work. The general consensus of the respondents was that consultants from various consulting engineering firms are generally satisfied with working for their respective firms. This means that the rewards systems and incentives schemes employed by consulting firms were good retention schemes used to retain skilled employees. The benefit offered by these firms such as flexible working hours and high-level training of skilled staff contributed to the retention strategy of the skilled staff.

5.3.2 Objective Two

The second objective of the study was to ascertain the technical and business elements of successful and sustainable consulting engineering firms. The business management techniques examine the benefits and costs of utilising certain controls in order to obtain desired results for the firms.

5.3.2.1 Findings

There is a need to enhance business and managerial principles in the consulting engineering environment. This is evident in the findings, where a majority of the respondents agreed that their firms have increased their focus on managerial concepts. As an example, technological tools such as computer-aided design can give a company a competitive edge if implemented correctly.

5.3.2.2 Conclusion

The findings proved that most companies were using old technologies in supporting their operations. Engineering firms should realise that technological forces play a key role in creating and uplifting the organisation's projects environment.

5.3.2.3 Recommendation

In supporting the firm's business operational models, consulting engineering firms make it a habit continually to upgrade technologies that support their operations. In discharging

managerial techniques, administrators of consulting engineering firms should consider creating effective controls that are formulated on the costs and benefits principles.

5.3.3 Objective Three

The third objective of this study was to establish the way in which consulting engineers secure contracts and remain busy. Techniques used in consulting engineering to manage workloads were such that there was no need for consultants to work unproductive overtime.

5.3.3.1 Findings

The findings confirmed that most respondents believed that their companies have a need to engage in alliances with other firm when executing larger or more complex projects. It is evident from the study that the most engineering consultants believe that there is a need to outsource some of the work if and when required.

5.3.3.2 Conclusion

The teamwork competency principle, as determined in the findings, confirmed that respondents were of the opinion that there are situations when additional resources are required on a short-term basis. A good model of managerial competencies is key in ensuring that the consulting engineering firm has a strong balance of business and business principles. Engineering firms are to a large extent reliant on technical competencies. Workload management strategies such formation of joint ventures and outsourcing some of the engineering work were identified as one of the key competency strategy principles.

5.3.3.3 Recommendation

Administrators of consulting firms must create a supportive and conducive environment for consultants to discharge their duties effectively. There is no reason why the consulting firm should not charge higher fees, when the basis of the client's choosing one's engineering services over one's competitors is clearly defined.

5.3.4 Objective Four

The fourth objective of this study was to investigate and understand how consulting engineering firms find engineering prospects and turn them into clients.

5.3.4.1 Findings

There were different marketing tools explored in this study; these were ranked in order of priority based on the business prospects that they represented. From the findings it was evident that the majority of the respondents strongly agreed with the use of a company website as a marketing tool of the firm's engineering services. There were also a large number of respondents who agreed with the use of company websites in advertising and promoting consulting engineering services. Were the two responses superimposed, the use of company website is by far the most-preferred tool of marketing engineering services.

5.3.4.2 Conclusion

The hosting of seminars was the least-preferred marketing tool of advertising engineering services. The use of professional colleagues was another method used in promoting engineering services; clients would already know what to expect from consultants. The consulting engineering environment is a competitive environment; however, with good marketing and advertising strategies it is possible for the firm to acquire more project work and to keep themselves busy.

5.3.4.3 Recommendation

The research findings illustrated that the matter of marketing engineering consulting work strategically to ensure the sustainability of the firm was effectively addressed. As indicated in the research findings, the use of a company website was one of the key tools that can benefit the organization in marketing its engineering services. Trade shows and advertising in trade magazines were amongst the preferred tools of selling the company services to prospective clients.

5.4 Benefits of this Research

The management strategies employed by consulting engineering firms are not only limited to consulting engineering firms; they are tools that are based on sound business principles and may be applied to many different business formations. The consulting engineering firms are likely to be the major beneficiaries of this research; these entities usually being formed on the basis of technical competencies, but that lack business expertise.

Stakeholders that will benefit from this study vary from engineering students to engineering firms that are one-man operations, and all the way up to large, multidisciplinary engineering entities. Individual consultants and engineers within multinational corporations can benefit by this study because there are no common business guidelines that cover strategies in the consulting world. This study contributes to and benefits the engineering fraternity as a whole.

In referring to retention of skilled staff as discussed in the findings of this study, it is evident that matters such as reward packages, incentives, and flexible working conditions, are applicable in many working environments. The business operational models as discussed in this study are applicable to various business formations and are beneficial to business administrators in discharging their responsibilities. The influence of technological forces is proof that this study can benefit a large society of stakeholders living as we are in the era of technology.

The last major contribution of this study may be viewed from the marketing point of view. Whether a firm is in the retail, public or private sector, there is always a need to market company services. The marketing strategy models as discussed in this research highlight the various marketing platforms beneficial to many business entities.

5.5 Recommendations for solving the Business Problem

Managers of these firms must be equipped with communication competencies, emotional intelligence, and self-management competencies; consultants are highly technically skilled individuals, yet lacking business and human skills. It is recommended that consulting engineering firms recognize that technology creates many options for engineering solutions where they are not viable with the older technologies.

In order for consulting engineering firms to execute and implement their strategic training programmes productively, they must develop a comprehensive strategic training plan. The recommendation is that, as part of an employee-retention strategy, the employer should involve employees in decision-making, as well as in discussing matters of employee reward or compensation. In order to add value in marketing engineering services for consulting engineering firms must upload a concise synopsis of their services on the company website, which will help inform their prospective clients of services they can perform.

5.6 Recommendations for Other Research that May be Conducted

- There is an opportunity to research how CESA-registered firms can collaborate with other local and international firms in order to develop new products and services and to reinforce their power to innovate.
- There is a need to research strategies that CESA may employ to attract more membership. This may be in a form of a training programme for newly-qualified engineers, to prepare them for the industry.
- It is recommended that future research be conducted on how to solicit retired engineers from different professional bodies to assist current CESA members in ensuring that they comply with their professional charter of ethics.

5.7 Concluding Comments

In this study the skilled staff retention strategies in the field of consulting engineering were researched and suitable recommendations and conclusions were provided. If this strategy's recommendations are implemented and carefully monitored, there should be an increase in consultants' enticement to work. The second objective that was researched in this study was based on business management techniques that also provided recommendations; if these recommendations are properly implemented and supervised, monetary incentives of the consulting engineering firms may be increased.

Securing engineering contracts and remaining busy was the third objective that was researched; again, suitable recommendations and conclusions were reached. This objective was researched on the basis of the key competency strategy principle. If the recommendations are taken into consideration and carefully implemented the consulting engineering firm may be able to identify additional resources that may be required on a short-term basis that would help ease the project workload as and when necessary.

The last objective that was researched in this study was the marketing of the consulting engineering services. Under this objective seven key strategies were researched; conclusions and recommendations were also provided. The consulting engineering firm can acquire more project work if marketing strategy recommendations are properly implemented. A wider and more in-depth study may yield findings that will be of greater value to the engineering

industry. However this limited study has identified areas of strength and weakness in the strategies that may be used in managing consulting engineering firms. The study is thus useful due to having highlighted such problems.

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Appendix 1 Questionnaire

SECTION A: Background and Overview

1. I am a CESA member and affiliated to the following region:

- | | | |
|-----|---------------------------|--------------------------|
| (a) | Eastern Cape | <input type="checkbox"/> |
| (b) | Gauteng | <input type="checkbox"/> |
| (c) | International | <input type="checkbox"/> |
| (d) | KwaZulu-Natal | <input type="checkbox"/> |
| (e) | Limpopo | <input type="checkbox"/> |
| (f) | Mpumalanga | <input type="checkbox"/> |
| (g) | North West | <input type="checkbox"/> |
| (h) | Northern Cape | <input type="checkbox"/> |
| (i) | Western Cape | <input type="checkbox"/> |
| (j) | If Other – please specify | <input type="checkbox"/> |

2. Indicate the size of your firm in terms of consultants employed

<5	6-10	11-15	16-20	20+
----	------	-------	-------	-----

3. What type of engineering services does the firm offer? (Mark all applicable boxes)

- | | | |
|-----|---------------------------|--------------------------|
| (a) | Architectural | <input type="checkbox"/> |
| (b) | Electrical Engineering | <input type="checkbox"/> |
| (c) | Civil Engineering | <input type="checkbox"/> |
| (d) | Structural Engineering | <input type="checkbox"/> |
| (e) | Mechanical Engineering | <input type="checkbox"/> |
| (f) | Chemical Engineering | <input type="checkbox"/> |
| (g) | If Other – please specify | <input type="checkbox"/> |

SECTION B: To consider the strategies that the consulting engineering firms employ to retain skilled staff.

4. This firm ensures that all skilled staff have input on decision making issues

Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
-------------------	----------	--------	-------	----------------

5. The company has improved its overall rewards packages to skilled staff.

Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
-------------------	----------	--------	-------	----------------

6. We pay for high level training that is of interest to our skilled staff.

Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
----------------------	----------	--------	-------	----------------

7. We have adjusted working hours to be more flexible for the staff.

Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
----------------------	----------	--------	-------	----------------

SECTION C: To determine which techniques/systems consulting engineering firms use to manage the workload without working overtime.

8. The firm has installed better software to manage projects.

Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
----------------------	----------	--------	-------	----------------

9. We have intensified our focus on project management techniques e.g. JIT, CPM

Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
----------------------	----------	--------	-------	----------------

10. The firm has formed associations other consultants to tap into additional expertise.

Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
----------------------	----------	--------	-------	----------------

11. Our company has increased its focus on management concepts.

Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
----------------------	----------	--------	-------	----------------

SECTION D: To ascertain how the consulting engineering firms would cope with a contract that exceeds their resource capabilities.

12. Our firm would look at a joint venture.

Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
----------------------	----------	--------	-------	----------------

13. We would consider employing additional skilled people on a contract basis.

Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
----------------------	----------	--------	-------	----------------

14. Our company would consider outsourcing some of the work.

Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
----------------------	----------	--------	-------	----------------

15. Instead of a joint venture we would consider an alliance with other consulting engineers where we would work some of the contract and they on other parts.

Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
----------------------	----------	--------	-------	----------------

SECTION E: To determine the forms of marketing done by the consulting engineering firms.

16. Our firm advertises in the trade magazines/journals.

Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
----------------------	----------	--------	-------	----------------

17. Our firm has a company website.

Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
----------------------	----------	--------	-------	----------------

18. We host events such as seminars so that past and prospective clients are made aware of our skills.

Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
-------------------	----------	--------	-------	----------------

19. We promote ourselves by calling on prospective clients.

Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
-------------------	----------	--------	-------	----------------

20. We build up direct contact and relationships with prospective/potential clients.

Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
-------------------	----------	--------	-------	----------------

21. We promote ourselves by calling on professional colleagues to inform them of our capabilities.

Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
-------------------	----------	--------	-------	----------------

22. We participate in trade shows/expositions

Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
-------------------	----------	--------	-------	----------------

23. Rank the following in terms of the business they generate for your firm;

1 = Best, 2 = Very Good, 3 = Good, 4 = Satisfactory, 5 = Poor, 6 = Very Poor, 7 = Least Business/No Business.

Trade Shows/Expositions	Trade Advertising	Tenders	Professional Trade Contacts	The Company Website	Seminars	Direct Contact With Potential Clients
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Thank you.

Appendix 2 TURNITIN Similarity Page

Donald Hlubi_Final Dissertation _30 November 2012

ORIGINALITY REPORT

8 %

SIMILARITY INDEX

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Appendix 3 Ethical Clearance



7 August 2012

Mr Muziwandile Donald Hlubi 210540220
Graduate School of Business and Leadership

Dear Mr Hlubi

Protocol reference number: HSS/0679/012M
Project Title: Management Strategies Employed by Consulting Engineering Firms

EXPEDITED APPROVAL

I wish to inform you that your application has been granted Full Approval through an expedited review process.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number. PLEASE NOTE: Research data should be securely stored in the school/department for a period of 5 years.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

.....
Professor Steven Collings (Chair)

/pm

cc Supervisor: Mr Alec Bozas
cc Academic leader: Dr S Bodhanya
cc School Admin: Mrs Wendy Clarke

Professor S Collings (Chair)
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Founding Campuses: Edgewood Howard College Medical School Pietermaritzburg Westville

