ON THE THREAT OF SUPPLIERS FOR THE ENGINEERING CONSULTING AND DESIGN SERVICES FIRMS

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In the case of companies from engineering consulting and design services industry the classic models of analysis (e.g. Porter’s five forces for structural analysis) exhibit interesting aspects in comparison with the situation when applied to traditional services or industrial production firms, due to the distinctive characteristics of the industry. The purpose of this paper is to present a general overview of the engineering consulting and design industry also analyze different facets of the suppliers concept and their force and threat for the engineering services firms. The paper aims at analyzing the dual strategic role of a special type of suppliers for the engineering companies.

Keywords: professional services firms (PSFs), engineering consulting and design services firms (ECDSFs), industry, suppliers, professionals, knowledge, strength, threat.

JEL Code: L84

1. Introduction

Strategic management models and concepts have been evolving in the manufacturing or traditional services field on a continuous basis since the late nineteenth century but the overwhelming majority of works in this field gives the impression that all the models and concepts are generally, fully, and identically applicable to all industries, in particular to professional services industry the engineering consulting and design services belong to, despite it's distinctive characteristics (Scott, 1998; Sheehan, 2005; Malhotra & Morris, 2009; von Nordenflycht, 2010; Gand, 2010). But, although classic models may provide some strategic insights, managers of engineering services firms run the risk of applying misleading advice.

Within the professional services firms sector, Engineering Consulting and Design Services Firms (ECDSFs) are among the least studied entities (Rimmer, 1991; Boxall & Steeneveld, 1999; Kreitl et al., 2002; Ou & Chai, 2007; Kaiser & Ringlstetter, 2011) as far as their management is concerned. Moreover, the strategic researchers have paid little attention to the competitive environment of these firms and their behaviour determined by the actions of the competitive forces.

The ECDSFs, among others of the same knowledge-based and professional type, are worthy of attention since they played and are still playing an important role in the economic growth of countries in the world today (Kaiser & Ringlstetter, 2011), and it is assumed they will be playing a major role in the new „knowledge economy”. That they have been unnoticed so far, is probably because they are so obscure, small and hidden in statistics as services or, in the best case, as Professional Services Firms (PSFs) in general. Another likely reason for the shortage of studies on engineering consulting and design services firms is that these private firms have little incentive to reveal their financial status and, as a result, it is difficult to get them responding to surveys that inquire about explicit data about their performance (Boxall & Steeneveld, 1999).

The analysis in this paper is supported by the literature from Professional Services Firms (PSFs) field and a combination of the two major approaches in strategic management – Market-Based View and Resource-Based View –, by the extant literature on strategic analysis, also draws from author’s own practicing experience of more than 20 years in the consulting and engineering design industry, both as a design engineer also as a general manager of an engineering company.

While we have many tools to analyze and improve the performance of industrial firms, we have few tools for professional services firms. Some scholars argue that the use of old tools, such as Porter’s model of 5 forces or value supply chain, will not work in the case of knowledge-intensive professional services (Sheehan, 2005). On the contrary, we argue that the application of the classic models is possible but it is not an easy task because it requires different interpretations, adaptations, and redefinitions of the concepts because of the distinctive characteristics of the firms and industry under analysis. If one wants
valid, trustworthy insights from e.g. Porter's model of 5 forces or value chain, there is a need to have a new optics and adapt the models for use in professional engineering services firms.

The present paper is qualitative and descriptive in nature, starting with a general overview on the engineering consulting and design services industry, on the specific characteristics of professional engineering consulting and design services firms, then analyzing different facets of the suppliers concept and their force and threat for the engineering services firms. The paper ends up with a set of conclusions and managerial implications, also with a set of proposed directions for further research on the industry. The paper aims at analyzing the dual strategic role of suppliers for the engineering consulting and design companies, also at contributing to collective knowledge of strategic management in such firms.

2. Engineering consulting and design services industry – a general overview

Engineering consulting and design services, as highly specialized activities, represent a key knowledge-intensive professional services sector that emerged during a later phase of global industrial development when a need for innovative solutions and improved design for construction projects, plants layout and technologies became evident. It has been seen as the key factor in the generation and definition of new technologies in advanced industrial economies, also as a key, risk-reduction factor in undertaking technology transfer from developed to developing economies.

Engineering consulting and design services include a wide range of activities, essentially intellectual, which are combined to optimize investment decisions in terms of choice, design and project management and implementation. The markets for engineering consulting and design services are therefore primarily related to the growth of industries (metals, mining, power, oil & gas, heavy machinery, cement, pulp and paper, chemical, etc.) and construction sector, and businesses in this industry tend to fluctuate with the cycles of growth and stagnation in manufacturing and production in major markets. Demand of consulting and engineering design services is regularly characterized by uncertainty, unpredictibility, severe fluctuations, stagnation, or even discontinuity over time, depending on the economic cycles and investment policies of the potential customers.

Engineering consulting and design services are generally defined as highly specialized activities of intellectual nature, which identify, select, organize and apply technical/technological engineering knowledge and even create knowledge for purposes of investments and production of client firms. The outputs of these services do not feed the final consumption in an economy but represent inputs for other activities and processes of their client firms. Since these services are inputs in the value creation processes of other firms, they also have an indirect effect on the quality and efficiency of these firms’ outputs (Løwendahl, 2005). They are characterized by certain methods/methodologies of work and often by a multidisciplinary approach (engineering, architecture, economics, finance, project management, ecology). The activities of engineering companies are intangible and “intellectual” to the extent that they involve skilled labour in terms of consulting, design and evaluation. The ECDSFs may provide any or all of a number of services, from consultancy to engineering, and these services can be categorized according to the stage of a project for which the services are provided. As such, there are services related to formulation of the project, research operations which explore various technologies available for a specific operation resulting in the choice of product design and technology to be used, project evaluation, basic and detailed engineering and design, procurement of plant components, preparation of bid and contract documents, supervision of fabrication and construction, commissioning, testing and start-up of a new plant, training of personnel, services related to the operation and maintenance of an industrial facility.

The ECDSFs are normally active and operate in the following sectors (Stroe, 2013):

- **Civil** (roads, bridges, railways, tunnels, airports, dams, harbours, docks, social utility buildings, water supply & treatment plants, sewerage systems, irrigation systems, land planning and architecture, commercial buildings, communication systems, hydrology, geology, etc.)
- **Industrial** (metals, mining, power, heavy machinery, ship building, aircraft, oil & gas, cement, glass, chemical, pulp & paper, nuclear, manufacturing facilities, power transmission & distribution plants, etc.)
- **Military** (guns, ammunition, defence systems, special machines and communication systems, etc.)
- **Environmental** (environment protection systems and plants, waste disposal and recycling, management and use of natural resources, etc.)

Engineering consulting services are particularly defined as activities involved in the identification and organization of technological knowledge, relating its possibilities and uses to the context of physical, technological, economic, social, and environmental requirements. Depending on the stage of a project for which the services are provided, consulting services can be grouped into three categories:

- **Pre-investment consulting services**, rendered before the materialization of an investment, in order to identify, prepare and evaluate projects and select the appropriate technologies. These services are
provided (typically for industrial projects) before the actual start of engineering design and fabrication and comprise techno-economic, pre-feasibility, project feasibility and evaluation studies (including market, location, technological, economic, commercial, financial and environmental aspects), preparation of terms of reference and invitations for tender;

- Project implementation consulting services, rendered during the execution of the project. These services comprise project engineering (choice of appropriate technology and equipment, engineering surveys, drawings, plans, diagrams, bills of materials, specifications, tendering, bids evaluation and contracting, negotiation of financial, commercial, know-how agreements, information systems), supervision of project execution (procurement, fabrication, construction, erection, installation), and commissioning and start-up (including personnel training);

- Consulting services for management and production, rendered during the operation stage of an investment which has already been materialized. These services comprise technical assistance and troubleshooting during operation/production, production planning and control, cost control and optimization, product design and development, process improvement, quality control and maintenance systems, sales and inventory systems, expansion programmes, personnel training, management information and control systems, etc.

Engineering design services, rendered mainly during the project implementation stage (project engineering), are particularly defined as activities involved in the application of knowledge in order to develop data, diagrams, drawings, models, simulation and calculation reports, product specifications, materials and fabrication specifications, wear and tear parts specifications, painting, packing, labeling, and transport specifications, procurement specifications for special plant components and equipment, risk analysis reports, instructions for assembly, erection, installation, commissioning, start-up, operation, maintenance, with the purpose of implementing physical facilities for economic activities, and of optimizing and maintaining the existing facilities.

As ECDSFs belong to the PSFs category which on it’s turn is a sub-group of the Knowledge-Intensive Firms (KIFs) or Know-How Companies group, the mutual characteristics of these types of companies relevant for the present analysis are (Løwendahl, 2005; Alvesson, 1995, 2004; Scott, 1998; Kaiser & Ringlstetter, 2011):

- Their services are highly knowledge-intensive, delivered by people with higher education, and frequently closely linked to scientific knowledge development within the relevant area of expertise.
- Their services generally involve a high degree of customization in order to comply with the clients’ unique problems, although some solutions can be standardized and used to different clients.
- Their services involve a high degree of discretionary effort and personal judgment by the experts delivering the services.
- Their services require substantial interaction with the client firm’s staff. For the ECDSFs, the interaction with the client is most intense in the early definition stages, whereas after the project proposal has been accepted, the design process takes place largely within the ECDSFs.
- Their services are delivered within the constraints of professional norms of conduct.
- Selling professional services to potential clients is very different from the mass-marketing of consumer goods or services, as it involves both interaction with the client and a high degree of uncertainty in terms of what is actually going to be delivered.

The business of ECDSFs consists in creative, complex, and customized problem-solving activities for their customers. If the industrial production companies create value within a „value supply chain“, the ECDSFs create value by solving their clients’ problems through the application of knowledge within a „value shop“. A value shop is an organization that creates value by solving the unique problems of its customers and not by producing physical outputs starting from physical inputs (Thompson, 1967; Stabell & Fjeldstad, 1998). A value shop sells its own competences and the customers buy solutions to their unique problems (Fjeldstad & Haanaes, 2001). The five generic categories of primary value shop activities are problem finding & acquisition, problem solving, choice, execution, and control and evaluation (Stabell & Fjeldstad, 1998). Rather than being embodied in the process or product, knowledge resides in experts and it’s application is customized based on clients’ needs (Sheehan, 2005). The activities in these firms are performed by highly qualified professionals and the outcomes are provided by the mental efforts of the professional employees. Whereas nowadays knowledge plays a role in all firms, it’s role is distinctive in engineering consulting and design services firms. For ECDSFs both their inputs and outputs are intangible. For professional workers (engineers, designers, experts) knowledge is simultaneously an input, medium and output of their work (Newell et al., 2002) and is characterized by a high degree of intangibility. Even though for ECDSFs the outputs are in form of written studies, drawings, plans, specifications, calculation reports, instructions, which are tangible, storable and reusable, the intangibility of outputs refers in this case to the lack of customers’ capability to physically feel and assess the outputs because of the lack of
specialized knowledge and information. ECDSFs primarily create value through processes that require them to know more than their clients, either in terms of expertise or in terms of experience in similar problem-solving situations.

As stated previously, both the inputs and outputs of PSFs in general and ECDSFs in particular consist in knowledge. In case of ECDSFs the output knowledge is delivered to customers embedded in form of feasibility studies, planning studies, technological solutions, technical specifications, conceptual/preliminary/detail designs, workshop drawings, plans, calculations reports, diagrams, erection and installation drawings and instructions, operation and maintenance instructions, etc. The knowledge-intensity and general nature of ECDSFs mean that the only real and significant inputs for the value creation in ECDSFs are the education, knowledge, qualifications, experience, expertise, skills, and capabilities of the professional engineers and designers that perform the engineering services by identifying, selecting, organizing, applying, and delivering the knowledge to the customers.

The key strategic resource of ECDSFs, or critical asset, is the human capital who holds and owns knowledge, competences, know-how, capabilities, skills, expertise and experience. The ECDSFs build their strengths through their highly qualified engineers and designers. The number of highly qualified professional employees (professional engineers, designers, technical experts) doing knowledge-based engineering work out of the total number of employees usually amounts to 80 – 85% for large-sized firms and 95 – 97% for medium and small-sized firms. Personnel costs represent about 65 – 70% of all costs of the company due to professionals hiring. The human beings in ECDSFs are the equivalent of machines and equipment in the production companies and recruitment of highly qualified and experienced engineers and designers is the counterpart of investment in new machines and equipment in a manufacturing company (Sveiby & Lloyd, 1987). The difference is in the availability of highly qualified workforce in the labour market as compared to availability of machines and equipment in the product market. Moreover, it is not enough to be available on the labour market, they have to be suitable for specific jobs, and then the company has to be able to attract them. Once the professional engineers have been employed, they are not like machines and cannot be allocated to a project unless they themselves see that project as the most interesting option available to them at that moment and appropriate for their expertise. Education and motivation of the professional engineers in ECDSFs is, simply said, the equivalent of what maintenance is for the existing machines and equipment in the manufacturing companies. Know-how on their “invisible” balance sheet is the equivalent of fixed assets are on the traditional balance sheet of industrial production firms (Sveiby & Lloyd, 1987).

In current times the services that the ECDSFs aim to deliver are increasingly coming under pressure because of a continually changing environment. Because of the technological developments, globalization and changing roles of competitors, blurred identity of the industry, commoditisation of design, loss of specialism, scarcity of professional workforce and the “war” for staffing with engineering knowledgeable people, and shifting patterns of customers’ demand, the ECDSFs need to take notice of these changes and seek out viable strategies through which they are able to continue their endeavours to drive innovation and economic growth thus fulfilling their mission and the critical role that they play within the national context.

3. The concept and strategic duality of “suppliers” in case of ECDSFs

As Porter posits for traditional industrial production firms, the stronger the power of suppliers in an industry, the more difficult it is for firms within that industry to make a profit because suppliers can determine the terms and conditions on which business is conducted. Increasing prices and reducing the quality of their products are potential means which can be used by suppliers to exert power over firms competing within an industry. If a firm is unable to recover cost increases by its suppliers through its pricing structure, its profitability is reduced by its suppliers’ actions.

When it comes to the suppliers an ECDSF may have, one can immediately and directly think of those who regularly supply different raw materials required for production (inputs). Obviously, ECDSFs need some elements of physical nature such as computers to run the specialized software for modelling, designing, performing calculations; they need paper, ink cartridges, printers, and plotters; they need also comfortable offices and excellent work conditions. However, all these are not inputs or raw material in their production processes, but only tools and facilities that support the production processes. They are procured whenever are required as a result of their moral or physical obsolescence and not every time when a new production process (project) starts. In this case, from our point of view, in terms of strategy these may be called quasi-suppliers for the ECDSFs. From the bargaining power and threat standpoint, the suppliers of software, paper and ink cartridges, printers and plotters, offices and furniture are not powerful and have a relatively low bargaining power in relationship with an ECDSF because there are many suppliers of the same or similar products on the market.
Another category of quasi-suppliers for ECDSFs may be considered the universities and engineering schools. Many ECDSFs are located in areas close to large universities or engineering schools, which facilitates the recruitment of good and highly qualified engineers. Thus, universities can be considered as knowledge quasi-suppliers for ECDSFs, and their strength is based on the strength and quality of higher education they provide. As one can see they are not direct suppliers and do not have bargaining power against ECDSFs from this standpoint. They can be considered as direct suppliers of knowledge by the results of their own research which generates new knowledge, also as indirect suppliers of knowledge by their graduates which are highly qualified personnel entering the labour market. The pool of fresh but unexperienced engineers from which the ECDSFs recruit can be considered another type of supplier that is normally not powerful. This is particularly true in the mature engineering disciplines where the number of fresh and unexperienced engineers has more than saturated the labour market. In this situation ECDSFs usually recruit fresh and unexperienced engineers, offer them minimum compensation packages, and enroll them in extensive on-the-job in-house training programs. Their bargaining power for superior salaries within the firm is low and, therefore, they cannot be a threat for the financial stance of the firm.

Another group of suppliers (occasional suppliers) for large-sized ECDSFs are the small-sized, strictly specialized, subcontracting engineering offices (e.g. geotechnical engineering, fire engineering, topographical surveyors, mapping offices, technical tests laboratories) that supply missing or narrowly specialized knowledge, or small-sized general engineering design offices that supply work for overloaded large ECDSFs and that, in general, are considered as not being powerful suppliers due to four reasons.

The first reason is that none of these occasional suppliers is big enough to get a significant market share and form a monopoly on the services offered to the ECDSFs in a specific region. Many of them are actively competing to offer their services to the engineering consulting and design market. The second reason is the fact that although these suppliers do supply services to other markets, their volume of work with the engineering consulting industry is substantial and occasional, and therefore they cannot afford to risk losing work by being difficult, high demanding or over-charging bargainers. But, sometimes, when a big ECDSF is overloaded, projects deadlines are very tight, and there are few competitors of the same size, then the small-sized general engineering design offices might have a little bit higher bargaining power as suppliers. The Porter’s five forces model recognizes that suppliers can become firm’s competitors (by integrating forward), as can buyers (by integrating backward). Thus, the third reason because of which the small suppliers of narrowly specialized engineering services are not powerful is the ability of a good number of ECDSFs to integrate backward into the supplier’s own industry. This is a measure that sometimes seems inviting for an ECDSF when realizes that the suppliers try to overcharge the ECDSF for their services. But, this action should be *ex-ante* carefully considered by estimating if it is possible to maintain a relatively constant workload in a long run. The fourth reason is the relative inability of most suppliers to integrate forward into the engineering consulting and design industry. Even if some of them try and actually do, it is usually a short-life and costly experience which may seriously jeopardize the existence and survival of the firm.

The most important issue challenging the engineering consulting and design services firms is the supply of knowledge and know-how required for their production processes, also the use of expertise, experience, and capabilities. The core of the resource base of the ECDSFs resides in the professional engineers employed and their ability to solve whatever problems the clients may want them to solve. The professionals bring to the firm their expertise, their experience, their skills in relationship building and maintenance, their professional reputation, their network of professional peer contacts, also their established relationships with past, present, and potential clients. These strategic resources are critical to the survival and success of the firm, thus being a „strength” of the firm, but they are to a very large extent owned and controlled by the individuals rather than by the firm itself, thus becoming a potential „threat” for the firm. In this case, the professional workers may be considered both a „strength” and a „threat” for the firm that employs them. Therefore, they have a dual attribute, namely „strength-threat” simultaneously, even though they are parts of the firm not of firm’s external environment (Figure 1).
In the case of ECDSFs one cannot speak of suppliers per se, as ECDSFs cannot purchase on a regular basis the essential inputs required for the production of their services. They mostly require highly qualified and experienced engineers and access to knowledge.

According to Porter, "... if strategy is stretched to include employees and organisational arrangements, it becomes virtually everything a company does or consist of. Not only does this complicate matters, but it obscures the chain of causality that runs from competitive environment to position to activates to employee skills and organisation." (Porter, 1997:162-163).

As "the most important resource of any organization is its human capital" (Totolici et al., 2013:286), the major and most valuable asset of any ECDSF is the highly trained and qualified professional workers (engineers, designers, technical experts) in the fields of engineering in which the company is active. Such companies have all their value creation materialized through the mental efforts of their professionals during the process of organizing, applying, and delivering the knowledge to the customers.

It is argued that perhaps more than anything else, professional services firms in general and consulting and engineering design services firms in particular stand out from most other companies because of the extreme significance they place on the quality and motivation of their personnel (Alvesson, 1995; 2004). As Boxall and Steeneveld posit, "unless one thinks that neutron bombing will make no difference to business activity, the proposition that the quality of human resource management critically affects firm performance is self-evident truth." (Boxall & Steeneveld, 1999).

As Maister argues, PSFs in general – and ECDSFs in particular as a subgroup of PSFs – compete in two markets simultaneously: the "output market" for its services and the "input market" for attracting, motivating, and keeping its productive resources - the professional workforce (Maister, 1982; 1993). These two markets are closely related: loss in the latter may seriously affect the former. That is why it is of paramount importance for an ECDSF to optimally position itself both on the "output market" and "input market" between which there is a close relationship. The two primary processes in ECDSFs are recruiting and keeping the best professionals and winning the most interesting clients and projects. The two processes are not independent. If an ECDSF has the best experts in the world, it has a very strong position vis à vis competitors and is likely to win challenging projects. On the other hand, if an ECDSF is able to win the most interesting, challenging and rewarding contracts, it is then easy to attract the best professionals and if the probability of winning new interesting projects seems high, the professionals will remain with the firm. In case of ECDSFs the inflow and retention of qualified personnel is crucial (Figure 2).
Drucker (cited in Kreiner & Mouritsen, 2003:233) emphasizes the dependence of organizations on personnel, and the strong bargaining position of large groups of knowledge workers and says that: “In knowledge work, the means of production is now owned by the knowledge workers. They are mobile and can work anywhere. They keep their résumés in their bottom drawer. Consequently, they must be managed as volunteers, not as employees. Only the unskilled need the employer more than the employer needs them”.

The highly qualified and skilled engineers and designers are the ones who enjoy the privilege of being the most powerful suppliers (of knowledge, expertise, experience, capabilities) to ECDSFs when the economy is booming or there is a high demand for expertise in a certain engineering field the ECDSFs do not have in-house. On the other hand, during economic slowdown, the bargaining power of employees and potential employees is very low. This is because the demand for their services reduces as the ECDSFs are facing difficulties in obtaining projects or are having few projects to handle with, thus not being able to fill the entire working capacity.

Thus, looking at what Porter refers to as the bargaining power of suppliers becomes a matter of the distribution of power between the ECDSF and the professional engineers they aim to attract, motivate and retain (Lorsch & Tierney, 2002). Mintzberg (1983) argues that in PSFs, the traditional top-down management approach is difficult to implement. Professionals’ striving for autonomy and the power they hold, as being the most valuable asset of the firm (Løwendahl, 2005), make it difficult for management to expect these professionals to do projects against their will. As indicated previously, the bargaining power of employees (engineers, designers) is significant as they essentially constitute the major asset base of the company, possessing a high degree of knowledge and informational power, also enjoying a high mobility. They can exert a high bargaining power, and thus a high financial risk for the firm, by demanding for better compensations and rewards which, if not granted, essentially determines the engineers to quit the company, with almost no loss of capabilities, and join a competitor ECDSF. This is because the biggest portion of costs is with professional staff’s salaries and compensations. Or, some of the actual engineers and designers may leave the company and start their own business which will become a significant competitor for the “quitted company” because the employees leave together with their knowledge, expertise, reputation, and sometimes with a significant part of clients portfolio.

Although management is critical to ECDSFs success, the paradoxical fact is that professionals generally exhibit a high degree of autonomy. The fundamental reason for this lies in the reversed power structure of professional services firms, as the control over the most critical resources for value creation resides with the professionals rather than with owners of firm equity (Løwendahl, 2005).

This challenge might in fact be the most serious one an ECDSF may face with, as the attraction, motivation and retention of highly qualified, skilled, and experienced engineers determines the reputation of the company and quality of services that the company can provide. Therefore, an ECDSF must provide very good working conditions, attractive compensation packages and also challenging projects in order to
attract and keep outstanding engineers because the „engineers are typically loyal to projects rather than to firms” (Løwendahl, 2005), and they primarily seek interesting and challenging projects.

One of the most fundamental strategic management challenges involves the management of competences and other intangible resources which are only partially controlled by the firm (Løwendahl, 2005). To the extent that the firm is highly dependent on competence and knowledge resources that are controlled by the professionals, the organization is highly vulnerable to the exit of these professionals. This is in line with the concern of Henry Michel, former CEO of Parsons Brinckerhoff engineering company, that “many people say that all our resources go down the lift in the evening after a day of work, and that the firm is then empty. That is why I see it as my primary concern to make sure that they want to come back tomorrow.” (Løwendahl, 2005:26). There is a strong reliance of engineering firms on their human resources, often on named individuals who are part of a built reputation of the respective firms (Fenton & Pettigrew, 2000). Departure of their key professional workers is the same as disinvestment in a manufacturing company (Sveiby & Lloyd, 1987). The most important threats are the groups of experienced employees leaving the company and establishing their own engineering services business. In this situation the managerial challenge to be addressed is to successfully motivate and retain the highly qualified and experienced engineers thus preventing them from leaving the company and becoming competitors. This requires carefully developed and successfully implemented human resources strategies within the company.

As to the generic strategies the ECDSFs can adopt, the general position is that they cannot follow cost leadership strategy because this is not a viable one. Since the greatest portion of an ECDSF’s costs are personnel costs (compensation packages), if an ECDSF tries to reduce its staff or its wage bill, its quality of services will immediately fall and with it, clients will start defecting. Regarding the differentiation strategy, one can say that it is difficult for an ECDSF to sustain a differentiation strategy in a segment which is slipping in a cost-based competition, unless it is a local niche or specialist player. Differentiation in the world of ECDSFs does not simply mean having unique products. The products or methods and frameworks of ECDSFs are not particularly defensible. After a while, if they are successful, they will quickly be copied. Instead, differentiation means the quality of the intellectual capital, of the professional engineers of the firm embodied in its brand reputation. Another point of view for differentiation refers to the quality of relationships with the clients.

To conclude with, it is stated that the most important suppliers for an engineering consulting and design company are the existing professional employees or the highly specialized professional engineers and designers available or potentially available on the labour market. The bargaining power of engineers and designers in relationship with an ECDSF depends on the economic and business conditions at a particular time.

4. Discussions and managerial implications

The managers of engineering consulting and design services firms rarely imagine the challenges that await them. Of course, projects schedules are tighter, products are getting more complex, quality and performance requirements are becoming higher, and budgets are shrinking. But these are all simply constraints and engineers are used to dealing with constraints. Strangely enough, the biggest challenges for the managers of ECDSFs today are not of technical but non-technical nature, which are often the stickiest. They need to take actions and pursue initiatives that will keep the engineering companies productive and competitive on the market.

It is concluded that the most important issue today for an engineering consulting and design firm is the suppliers of knowledge which are the highly specialized professional engineers and designers employed by the company or the professional engineers available or potentially available on the labour market. The most fundamental strategic management challenge involves the management of competences and other intangible resources, which are only partially controlled by the firm. The ECDSFs have to pay as much attention to maintaining and renewing its professional workforce as it does to winning new clients.

On the other hand, the professionals of the firm are simultaneously both „strengths” of the firm generated by the quality of professionals, and „threats” for the firm generated by the bargaining power, autonomy and mobility of professionals.

5. Conclusions and directions for further research

The conducted theoretical analysis of suppliers in engineering consulting and design industry shows that ECDSFs in general are being faced with a number of challenges with strategical and managerial implications generated by the suppliers’ power and threat. The most critical seem to be the challenges arising from the input dependency the ECDSFs face with, i.e. the fact that the quality of the services rendered is directly affected by the professional engineers and designers working at the firm and how
well the company manages to motivate and retain them while the “war” for staffing with engineering talents has already started.

As one can notice the conducted analysis referred to the engineering consulting and design firms in general (regardless the country, economic or industrial sector they operate in, firm’s history, firm’s culture, etc.) and revealed only the common features, challenges, and managerial implications resulting from the action of this competitive force. Therefore, detailed studies can be conducted at a global level by discussing the specificity of engineering consulting and design industry varying from country to country or, within a country, the firm’s specificity, history and culture.

These discussions and their conclusions may depend on a large set of variables and parameters to be taken into account, such as: the industrial development status of the country (highly industrialized, developing, low-developed, or under-developed country), the development perspectives of the country and influence of government policies, the historical evolution of the engineering consulting and design industry in the country, the market sector within the ECDSFs operate, the engineering disciplines in which they are specialized, the international linkage and technology transfer, the strategic approach and concentration on the development factors of the ECDSFs, the availability of professional workforce on the labour market and the actual “war” for staffing with engineering talents, globalization, deregulation, relaxation.

The discussions from the actual paper will be further developed and detailed by the author focusing on the Romanian industrial engineering consulting and design services companies providing professional engineering services for various industrial sectors (e.g. metals, mining, oil & gas, power, heavy machinery and ship building), both old companies established before 1990 and new companies established after 1990.

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