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THE GRADUATE SCHOOL OF SOCIAL SCIENCES  
ECONOMICS AND ADMINISTRATIVE SCIENCES**



**MASTER THESIS**

**ANALYSIS OF OUTSOURCING CRITERIA OF A LARGE-SCALE  
DEFENSE COMPANY WITH AHP**

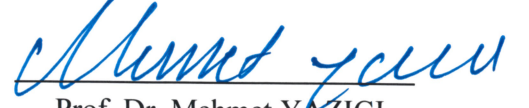
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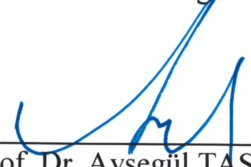
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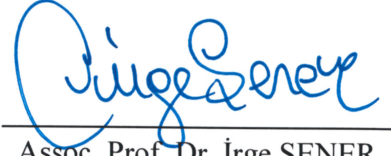
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## STATEMENT OF NON-PLAGIARISM

I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

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## **ABSTRACT**

### **ANALYSIS OF OUTSOURCING CRITERIA OF A LARGE-SCALE DEFENSE COMPANY WITH AHP**

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M.B.A, Master of Business Administration

Supervisor: Assoc. Prof. Dr. İrge ŞENER

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Outsourcing is preferred by companies for several reasons and as in many sectors it is an important strategic decision for defense industry companies. Defense industry is a critical sector for all countries and decisions on the completion of the produced goods within the company or purchase of them, have strategic importance. In this context, the aim of this study is to analyze the criteria related to outsourcing of a large-scale defense industry company and rank the criteria according to the degree of importance for the company. In accordance to the purpose, interviews were conducted with 7 senior managers of the company selected for the study, and the criteria which were evaluated as important for outsourcing of the company, Gaining New Skills, Reducing Cost, Quality Improvement, Focus on Strategy, Handling Overflow Situation, Performance and Capacity Improvement, Maintaining Old Functions, Avoiding Major Investments were determined within the frame of the literature. In addition to these eight criteria, another criterion called Defense Industry Presidency (SSB) strategies was determined, which is important for the defense industry and is shaped in line with

state policies, plays an active role in defense industry firms' outsourcing decisions. The importance of the nine criteria was determined in accordance to interviewees with six managers. The determined criteria were compared with each other using the AHP method and a ranking was obtained. The results of comparisons have been confirmed using the ExpertChoice program. As a result of these analyses, it was determined that SSB strategies is the first priority criteria for outsourcing of selected Defense Industry Company. In addition, the criteria of cost reduction, which is an important criterion for outsourcing for the companies operating in other sectors, was found to have the lowest importance among the criteria for the selected firm. This is thought to be caused by demand (Turkish Armed Forces) and supply (defense industry firms affiliated with Turkish Armed Forces) that result from the same authority.

**Keywords:** Outsourcing, Defense Industry, AHP (Analytic Hierarchy Process), SSB (PDI) Strategies

## ÖZ

### **BÜYÜK ÖLÇEKLİ BİR SAVUNMA SANAYİ FİRMASININ DIŞ KAYNAK KULLANIMI KRİTERLERİNİN AHP İLE ANALİZİ**

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Dış kaynak kullanımı, firmalar tarafından çeşitli nedenlerden dolayı tercih edilmektedir ve birçok sektörde olduğu gibi savunma sanayi firmaları için de önemli bir stratejik karardır. Savunma sanayi tüm ülkeler için kritik bir sektördür ve bu sektörde üretilen ürünlerin firma bünyesinde tamamlanması veya başka bir firmadan satın alınması ile ilgili kararlar stratejik öneme sahiptir. Bu çerçevede, bu çalışmanın amacı, büyük ölçekli bir savunma sanayii firmasının dış kaynak kullanımı ile ilgili kriterlerinin analiz edilmesi ve belirlenen kriterlerin firma için önem derecesine göre sıralanmasıdır. Bu amaç doğrultusunda, çalışma için seçilen firmanın 7 üst-düzey yöneticisi ile mülakatlar yapılarak, firmanın dış kaynak kullanımında önemli olduğu değerlendirilen kriterler, Yeni Kabiliyetler Kazanma, Mâliyet Düşürme, Kalite İyileştirmesi, Ana Faaliyetlere Odaklanma, Büyük Yatırımlardan Kaçınma, Ani Talebi Karşılama, Eski Fonksiyonların Devamının Sağlanması, Performans ve Kapasite

İyileştirmesi olmak üzere literatür kapsamında belirlenmiştir. Bu sekiz kriterin yanı sıra, savunma sanayi için önem arz eden ve devlet politikaları doğrultusunda şekillenen, savunma sanayii firmalarının dış kaynak kullanımı kararlarında etkin rol oynayan, Savunma Sanayii Başkanlığı (SSB) stratejileri olarak adlandırılan bir diğer kriter belirlenmiştir. Mülakatlar doğrultusunda belirlenen dokuz kriterin önem derecesine göre sıralanması için AHP yönteminden yararlanılarak 6 yönetici ile belirlenen kriterlerin birbiri ile kıyaslaması yapılmıştır. Elde edilen karşılaştırmalar, ExpertChoice programı kullanılarak teyit edilmiştir. Yapılan bu analizlerin neticesinde, seçilen savunma sanayi firmasının dış kaynak kullanımında birinci öncelikli kriterin SSB stratejileri olduğu belirlenmiştir. Bunun yanı sıra, diğer sektörlerde faaliyet gösteren firmaların dış kaynak kullanımı için önemli olan maliyetlerin düşürülmesi kriterinin, firma için kriterler arasında en düşük öneme sahip olduğu tespit edilmiştir. Bunun nedeninin, talep (Türk Silahlı Kuvvetleri) ve arzın (Türk Silahlı Kuvvetlerine bağlı savunma sanayii firmaları) aynı otoriteden kaynaklanması olduğu düşünülmektedir.

**Anahtar Kelimeler:** Dış Kaynak Kullanımı, Savunma Sanayii, AH (Analitik Hiyerarşi Süreci), SSB stratejileri

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Finally I would like to express my deepest love, respect and greatest thanks to my family whom I owe my performance, to sister and brother, to the parents I had after I got married and to my beloved wife Gözde GÜNGÖR AÇANAL who gives support and happiness throughout the study, to Bitir AÇANAL who always energized me with its presence.



## DEDICATION

*I dedicate this thesis to my grandfather **Dr. Mustafa Hâzım AÇANAL**, the first Doctor of Medicine of Şanlıurfa city, who is my idol and role model and whom I am honored to carry his name.*



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## **CHAPTER I**

### **INTRODUCTION**

The competitive environment in which businesses compete has become more complex compared to the past; change in economic, social and technological fields has altered the way of competition (Besler, 2002:35). Businesses should adapt to these competitive conditions undoubtedly in order to survive. For this, they should find ways to use their current resources in the most rational and efficient way.

Outsourcing is one of the ways for this. The concept of outsourcing was first mentioned in the history records in the 4th century when the Roman Empire hired the soldiers to defend the country (Özcan, 2015: 59). This concept continues to be used for the same purpose in the modern world. Outsourcing may be preferred by the companies to gain new capabilities, reduce cost, gain prestige, achieve targeted quality standards or improve performance and capacity. There are many different criteria for the use of this strategy in the literature.

Outsourcing process is shaped parallel to the needs of the company. The use of outsourcing which has become a subject that has been frequently studied in the literature, has been examined for many sectors. Recently, a new sector has emerged, whose field of activity is battlefields. Civil contractors support the armed forces in the military fields with logistical support. As a result of the change created by the end of the Cold War (1947-1991), outsourcing has been preferred in many different military fields (Yalçınkaya, 2006: 248).

The phenomenon of globalization has caused some changes in the concept of sovereignty in parallel with the changes in the field of economy and technology. Considering that the public sector does not work effectively and efficiently, it has been

tried to reduce the interventions of the government to the market mechanism by transferring these institutions to the private sector. As a result of this process, the tasks that the state has an active role in, such as education, health and defense, are no longer monopolized by the state (Castells, 2005: 9-16; Ku and Yoo, 2013). In this age, when the concept of security became complex; efficiency, security needs and defense planning are no longer only a state-owned issue. In addition to systems based on military capabilities, civilian elements and capabilities have to be utilized. Outsourcing is considered as a solution for such issues that do not constitute a core for the security function (Singer, 2011: 53; Gauthier, 2013: 1-6). The use of US private military companies in Iraq and Afghanistan has been one of the first important examples of outsourcing for defense industry. After the Cold War, Turkish Armed Forces preferred this strategy especially for the modernization programs and outsourcing has gained more importance in recent years in order to strengthen the defense industry (Yalçinkaya, 2006: 261).

Defense industry has different priorities compared to other sectors. The defense industry, which has critical importance for every country, acts with some country-specific missions. Therefore, the criteria that are important for other sectors may lose their importance in the defense industry sector. Within this scope, the aim of this study is to determine the criteria which are important for outsourcing for the defense industry and to evaluate the priority ranking of these criteria. It is analyzed which of the determined criteria directs the company to outsource and which criteria directs the company to perform within its own structure. Among the 'make' and 'buy' alternatives which are considered within the scope of the research, 'make' is defined as producing the product in-house and 'buy' means procuring the product from external sources, so that 'buy' decision represents outsourcing.

Although outsourcing has many advantages for the companies, there also exists some disadvantages. Therefore, outsourcing decisions became especially important for companies. With this study, the outsourcing criteria of the selected defence company, is analyzed with Analytical Hierarchy Process (AHP), which is a Multi Criteria Decision Making method that progresses to the result with binary comparison method.

It has been observed that AHP method is frequently used in the supplier selection of defense industry firms. Nowadays, countries need to reach suitable suppliers in order to compete at global level. The purpose of supplier selection is to reach the required good or services at the desired time with acceptable cost and quality. Businesses make a performance measurement according to many criteria such as quality, cost and delivery. In this context, Multi Criteria Decision Making methods are used in order to determine the criteria and select the best alternative (Ersöz and Kabak, 2010: 98-100; Aydın and Eren, 2018: 130-132). In line with the decision given by expert opinions, the findings of this study has been evaluated with AHP method.

Within this frame, after this introductory first chapter, the second part of the study includes, conceptual definitions of outsourcing and defense industry. First, the historical development of this concept has been mentioned. The literature review of the concept of outsourcing and definition of its types has been indicated. The definition of the criteria in the literature has been made and the criteria related to the research has been determined.

In the fourth part, expert opinions were consulted for the selection of criteria and interviews has been conducted. The interviews were conducted with seven participants and the people who served as senior managers and who have experience in the industry were interviewed. During the interviews participants were not guided about the criteria existing in the literature, they explained their own views and in accordance with the evaluations of the participants, eight criteria in the literature was identified and in addition one sector-specific criterion was included in the study for the analysis. AHP technique was applied to the criteria determined by expert opinions. This analysis was carried out with six participants who are all experienced program leaders in the sector. After obtaining the result of the analysis, the solution has been repeated with "Expert Choice" software. The same results were obtained with the solution of the two methods and the results were verified. The importance of the criteria evaluated within the scope of the research has been obtained with these solutions.

Finally, the criteria determined as a result of the research has been discussed at the conclusion part which is the fifth part of the study. The findings of the research is compared with the findings of the studies related to research about outsourcing in the



literature. With this study, a sector-specific criterion has been determined according to the interviews and industry related documents. Therefore, the findings of this study which determine the criteria and ranking of these criteria for the selected defense industry company, represents example for other companies operating in defense industry.



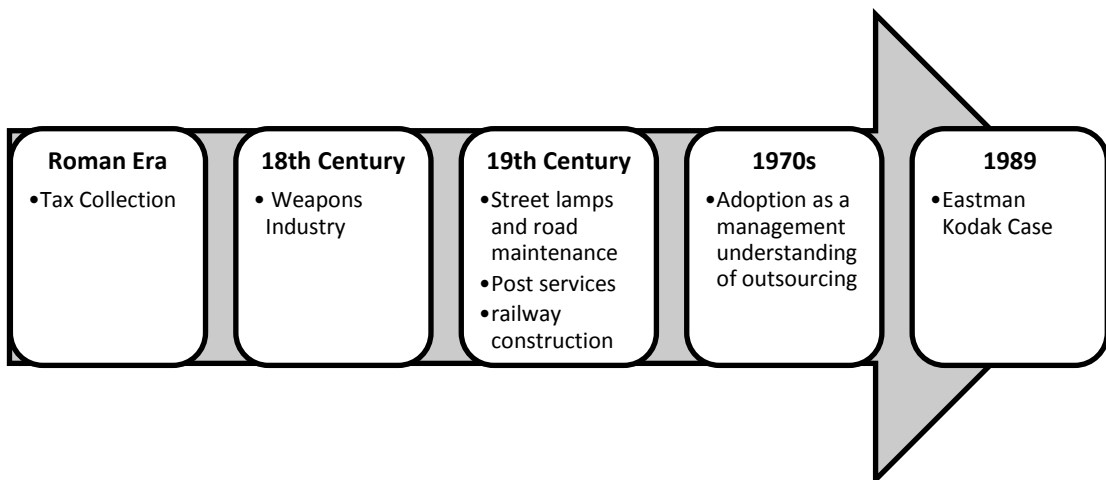
## CHAPTER II

### LITERATURE REVIEW

#### 2.1. Outsourcing

##### 2.1.1. Historical Development of Outsourcing

It is known that the outsourcing started to be used in the old dates, while there is no exact date when the outsourcing management strategy began to be implemented in business organizations (Corbett, 2004: 14). It is thought that the first outsourcing strategy is used by Romans for tax collection, for efficiency as it is shown in Figure 1 (Kakabadse and Kakabadse, 2002:189). It is accepted that the first outsourcing strategy used in modern businesses dates back to 1989. In those years, Eastman Kodak Company transferred all its information management activities to IBM (Businessland and Digital Equipment Corporation). Many authors (i.e. Bryce and Useem 1998: 635; Klein 2002: 25; Sparrow 2003: 3) considered this to be the first example of outsourcing strategy used today (As cited by Özdoğan, 2006: 9).



**Figure 1:** Historical Development of Outsourcing (Özdoğan, 2006: 9)

After the industrial revolution, outsourcing spread rapidly to many different sectors. Early metal component productions for weapons industry is considered as an important example of program for freelancing in market. The first sector where outsourcing was implemented as a national policy was the maintenance of street lamps and state-owned roads and transportation of convicts. All of these processes were adapted from United Kingdom and transferred to the private sector. The United States and Australia were the first to become practitioners after the United Kingdom. The postal services in the United States and Australia have been transferred to the private sector. The transfer of railway maintenance and water storage to the private sector in France is among the most important examples. These are the first and most efficient examples of outsourcing process (Kakabadse and Kakabadse, 2002:189; Edick, 2003: 12).

Since 1990s, organizations have started to outsourcing to accelerate competitiveness. Thus, a new management technique has emerged in the field of management and organization (Gilley and Rasheed, 2000:763). Nowadays, it is not possible for businesses to achieve success in every field. If any company can not fulfill a job or service at the desired level and conditions, this can be made by another company that can do it better (Keskin, 2006: 71). Since 1990s, the concept of outsourcing has been applied intensively by public and private sector institutions. Outsourcing is undertaken not only in production activities, but also in administrative and management functions. These include data processing and information processing operations, human resources management services, accounting functions and internal audit and marketing (Smith and Smith, 2003: 282). There have been many changes in the management and organizational structure of companies since the 1990s. Especially in the 2000s, outsourcing has played an important role in the competitiveness and survival of enterprises (Koçel, 2003: 315).

The technological development of the companies is important in the competitive environment in the global market. Organizations have been forced to turn to cheap labor, make production in different countries and sell in international markets because of global conditions (Browne and Allen, 2001). Nowadays, the competitive environment in which businesses are competing is more economical and complicated compared to the nineteenth century. The developments in the economic, social and

technological fields in the present century have caused the change in international competition (Besler, 2002:35). The management of the goods from raw material until the purchase of last consumer has caused the organizations to become cumbersome and led to an increase in the costs. This situation caused the operational disruptions of the organizations. Difficulties in tracking the flow of money and goods and rapid developments in the field of informatics have forced organizations to find new solutions. The strategy of outsourcing, which is the result of these, has spread all over the world (Browne and Allen, 2001:256).

Competition in Turkey is increasing day by day due to globalization and developments in information technology. The concern of competitiveness increases the importance of outsourcing. The increasing importance of this strategy leads to the spread of this strategy and nowadays it is much more preferred (Koçel, 2003). Outsourcing was initially considered to be used in the construction sector in Turkey. This process started with the transfer of jobs to subcontractors. After that, it has become a preferred strategy by large-scale companies such as Turkcell, Koç Holding and Sabancı Holding especially due to its cost advantage. Koç Holding has transferred some of goods and services to specialized suppliers in order to gain strength and to compete in international markets (Efil, 1999: 267).

### 2.1.2. Definition of Outsourcing

There is not a consensus for the definition of outsourcing (Bradley and Hamel, 1992: 7-22). Some definitions of outsourcing in the international literature are as mentioned below in Table 1.

**Table 1:** Some of the Definitions of Outsourcing

Author	Definition
Lacity and Hirschheim, (1993:74)	Outsourcing is the transferring of a product or service which is previously produced in-house.
Lei and Hitt (1995: 835)	Outsourcing is the reliance on external sources for manufacturing components and other value-adding activities.

**Table 1:** Some of the Definitions of Outsourcing (Continued)

Cook and others (1997: 51)	Outsourcing is defined as a strategy that organization purchasing goods or services from a supplier.
Van Mieghem (1999: 954)	Outsourcing is defined as the provision of goods or services for another enterprise.
Lankford and Parsa (1999: 310)	Outsourcing is an organization providing products or services from other organizations.
Gilley and Rasheed, (2000: 764)	The procurement of goods and services from suppliers is called outsourcing.
Quelin and Duhamel, (2001: 648)	Outsourcing can be defined as the transfer of a business/work to a supplier with a long-term contract.
Dalay and others, (2002: 198)	Outsourcing is the transfer of non-expertise jobs to specialized firms in the sector and this is a modern strategy that offers competitive advantage.
Linder (2004: 52)	The purchase of a company's goods or services by another company is defined as outsourcing.

The commonality of these definitions of outsourcing is that a function made by the company is transferred to a supplier or a subcontractor. Therefore, a product or service will be supplied with external sources as a result of this strategic decision.

On the other hand, some of the definitions of outsourcing in the national literature are as follows. According to Koçel (2003), outsourcing is the utilization of external resources for the transfer of the works to the suppliers except that the organization performs its planning, coordination and control functions. In other words, it is the transfer of various functions to suppliers (Koçel, 2003). Özutku (2002:117) mentions that changes in competitive conditions cause enterprises to concentrate on their basic capabilities in order to make more efficient production for their consumers; this importance given to the core capabilities causes the organizations to decide on the non-core functions to be obtained from the supplier. Türksoy and Türksoy (2017 : 83) indicate that reducing costs by working with subcontractors, increase customer satisfaction by increasing efficiency, establishing a new relationship and connections

with new firms, using the resources of the business more efficiently, to achieve maximum efficiency with minimum labor and cost are the most important issues for outsourcing.

Nowadays, failure is inevitable for an organization that operates simultaneously in many sectors, trying to make all of its functions within its own structure. For this reason, organizations have begun to limit their field of activity with their core capabilities. The outsourcing strategy can be defined as allowing the organization to focus on its core capabilities, enabling the organization to compete and allowing the organizations procure good or services which is related to their core capabilities. In summary, focusing on core functions and transferring of non-core operations to suppliers is called outsourcing (Quinn and Others, 1990: 60).

Each organization operate for achieving competitive advantage, which is defined as the company's distinctive approach to competing and the competitive advantages on which it will be based (Porter, 1980). As Pietersen (2010: 37) states, "*Many businesses make the mistake of defining themselves purely by the products they make. Defining those benefits with clarity not only makes them more competitive, it clarifies to everyone inside the organization what they need to concentrate on, each and every day*". One of the most important tools used by enterprises to achieve competitive advantage is outsourcing (Kroes and Ghosh, 2009: 125). Since businesses want to do jobs that can provide competitive advantage, they purchase services from other businesses in areas where they can not use their basic skills. Outsourcing is very important to be able to adapt to change, to be less influenced by fluctuations, to be able to benefit from current information and the latest technologies (Keskin, 2006: 71). The most important advantages of outsourcing are listed as cost savings, quality, flexibility and specialization (Köse, 2005: 19-21).

### **2.1.3. Types of Outsourcing Strategy**

Different outsourcing strategies are defined in this section. Basically, these strategies accommodate for the same objective; however, the details of these strategies differ.

**Tactical Outsourcing** strategy is used by organizations struggling with constantly same and ongoing problems. This is a kind of traditional strategy (Krstić and Kahrović, 2015: 32). This strategy is realized with heuristic methods and cost-oriented decisions. Other benefits and risks that may occur are ignored in studies within this strategy. Another important feature of the tactical outsourcing strategy is having the shorter period agreements compared to the others. The best aspect of this strategy is that, it is easy and quick to implement (Sparrow 2003: 8; Rodriguez and Robaina, 2004: 289; Özdoğan, 2006: 12).

**Strategic Outsourcing** is a more comprehensive strategy than tactical outsourcing. The decision process is more detailed and the factors such as quality, skills, evolution and flexibility are considered in this strategy. It can be defined as a strategy that takes into account long-term business objectives (Rodriguez and Robaina, 2004: 290; Özdoğan, 2006: 12). It is generally seen as a model in which mutual benefits and jobs are determined. The use of strategic outsourcing ensures a close cooperation because of the sharing of earnings and losses by the parties (Sparrow 2003: 9). Especially Japanese enterprises successfully implement this type of outsourcing. This type of strategy provides great benefits for small and medium-scale organizations (Çoğan, 2006: 40).

**Total Outsourcing** is defined as the transfer of at least 80% of a function to one or more suppliers (Lacity and others, 1996: 14; Sparrow, 2003: 261; Özdoğan, 2006: 12). Another type of outsourcing strategy is **selective outsourcing**. Within the scope of selective outsourcing strategy, some of the functions are transferred to the external source but the part of the function continues to be carried out parallel within the organization. The aim here is to minimize the risk, and this is the main difference from the total outsourcing strategy (Özdoğan, 2006: 12). In the literature, it is accepted that at least 20% of the total activity should be externally carried out in order to define it as a selective outsourcing strategy (Sparrow, 2003: 259; Lacity and others, 1996: 14).

**Transitional Outsourcing:** According to Sparrow (2003) and Özdoğan (2006), there are three stages of this strategy. These are respectively;

- Management of remaining legacy systems

- Switching to new technology
- Installation and management of the new platform

This strategy is intensively preferred in the information technology sector. Businesses use transitional outsourcing strategy as they transfer from one technology to another. The strategy can be defined as transitional outsourcing, if the organization prefers to transfer at least one or more of these steps as an outsourcing. Due to the loss of actualness of the old system and the decrease in efficiency, the companies may face problems during transition process. The aim of this process is to adapt the new technology system without any problems with the support of third party (Sparrow, 2003: 10; Özdoğan, 2006: 13).

**Business Process Outsourcing** is not limited to certain functions only. According to the Sparrow (2003: 11), the scope of the strategy is as follows;

- Operation Process
- Administration Services
- Receivables Management
- Human resources
- Compliance of Finance and Outsourcing

This strategy includes full transfer of the responsibilities of all functions in the mentioned subjects.

In other words, the suppliers are determined by considering the processes and functions that constitute the business. The restructuring and outsourcing of these suppliers are continued in parallel (Özdoğan, 2006: 13). Most of the usage areas of this strategy are customer consultancy services, emergency consultation lines, document processing and storage, salary control system and internal audits (Sparrow, 2003: 11).

**Offshore Outsourcing:** The main purpose of the enterprise in implementing this strategy is the procurement of the goods and services from international suppliers and subcontractors. The aim is to provide cost advantage by choosing companies from cheaper countries (Apte and others, 1997: 291).



#### **2.1.4. Reasons and Advantages of Outsourcing**

There are many different factors that cause changes in the world, on the other side these factors can make outsourcing attractive. Globalization and competitive pressures force organizations to find a better way to develop and better use of technology. The development of organizations is becoming increasingly expensive. This requires more skilled, highly trained, professional and competent employees (Troacă and Bodislav, 2012: 54), so that outsourcing becomes a necessity for the organizations. Many different benefits of outsourcing have been mentioned in the literature. The most discussed benefits are gathered around financial impacts; companies often achieve cost advantages through these outsourcing practices (Bradley and Hamel, 1992: 7-22). There are many reasons why an organization chooses outsourcing for a good or service. The purpose here might be to reduce costs and reducing assets by transferring production or services to the supplier (Bragg, 2006: 1-2). Companies make less investments in production facilities and a reduction in production costs may be realized with outsourcing strategies (Bradley and Hamel, 1992: 7-22).

In order to overcome the high competition, it is necessary to enter the market at the right time by offering an economic product. The requirements and preferences in this process are constantly changing. In response to these changes and challenges, companies try to transfer their responsibilities, goods or services to a third party organizations with similar expertise in developing countries. For the organizations, it is preferable to outsource their operations in a developing country, with labor potential and low cost in the selection of suppliers or countries (Troacă and Bodislav, 2012: 54).

It is well known that businesses can provide competitive advantage in terms of cost through outsourcing. Thus businesses can achieve their goal of making the best production at the lowest cost (Embleton ve Wright, 1998: 94-106). Organizations have the opportunity to benefit from their knowledge and experience by working with different suppliers or subcontractors. Taking services from these organizations and increasing their relations with them, as well as benefiting from their experience, leads to a reduction in education and technology costs. In this way, businesses can grow by increasing their performance and can be a successful business (Özbay, 2004: 14). If

the enterprise provides a service with outsourcing instead of doing it within its own structure, it performs the same service at a lower cost and increases its profitability. On the other hand, outsourcing provides a more efficient organization with fewer resources (Kremic and others, 2006: 468-469).

Outsourcing is mainly used in information technology sector. Because, it is a very challenging and costly process to follow developments for new companies and to make new infrastructural investments. Therefore, outsourcing of technological infrastructures is very important (Özbay, 2004: 18). Since companies that use outsourcing strategy in technological infrastructure systems will not need to invest in infrastructure in this area, the resources to be allocated for this investment can be shifted to other areas (Ataman, 2002: 340).

Investment and risk are concepts that must be considered together. Businesses take risks as they invest. Instead, the organization may choose to focus on its core skills and all other works can be transferred to suppliers and subcontractors. Thus, the organization will focus on its core skills and risk will be minimized. In other words, by transferring some of their activities to external sources, the enterprises will minimize the risk against the threats and dangers and potential negative changes caused by the environmental conditions (Karacaoğlu, 2001: 24).

There are many different factors that cause an organization to decide on outsourcing. According to some authors (i.e. Savaş, 1987: 182; Kavrakoğlu, 1993: 105; Arslantaş, 1999: 104; Juma'h and Wood, 2000: 266–267; Karacaoğlu, 2001: 15-16; Vassard, 2002: 1; Çoroğlu, 2002: 22; Quelin and Duhamel, 2003: 654; Fernandez and Neuenschwander, 2003; Koçel, 2003: 387; Genç, 2004: 215-216; Rodriguez and Robania, 2004: 287-306; Lacey and Blumberg, 2005:15; Bragg, 2006: 2-5; Pindyck, 2017: 26-27) the advantages of outsourcing are defined under the following main topics which will be further explained;

- Gaining New Skills
- Reducing Costs
- Achieving Better Management
- Quality Improvement

- Focus on Strategy
- Focus on Core Functions
- Avoiding Major Investment
- Downsizing Organizational Structure and Assisting a Fast-Growth
- Handling Overflow Situation
- Improving Flexibility
- Enhancing Credibility
- Maintaining old functions
- Performance Improvement and Capacity
- License Strategy

### **Gaining New Skills:**

An organization may think that a function is insufficient and in this case the function may not be promising in the future. These goods or services can be transferred to a supplier who is technically competent, has experienced staff, well managed and authorized (Bragg, 2006: 2). In this case, outsourcing allows resources to be used to discover and improve new capabilities (Genç, 2004: 215-216).

### **Reducing Costs:**

Although the idea of reducing costs which is one of the main reasons for outsourcing has lost its characteristic of being the only reason in time, it is still very important for the enterprises (Lacey and Blumberg, 2005:15). Due to the varying conditions, various demands in the markets, organizations try to avoid costly investments and minimize fixed costs (Mersin, 2003: 33).

Organizations want that their suppliers perform investment instead of themselves to reduce costs (Lacity, 1993:127). Organizations aim to reduce costs with the goal of increasing profits. It is quite reasonable to reduce costs by outsourcing. However, this is not always valid. If the functions of more than one organization are made by a single supplier, this shows that the cost of the supplier will be lower than the organizations. Another method is to buy the goods or services in high quantities or volume. This method is also applicable in order to reduce costs. The other method is to increase the

activities in countries applying tax allowance (Bragg, 2006: 5; Rodriguez and Robania, 2004: 287-306). According to Bragg (2006: 5), the reasons for the lower costs of suppliers are implementing strict controls on efficiency; having a lean company structure; high communication with many organizations doing business at low cost.

The long-term effects of outsourcing strategies are more evident than the short-term effects. Short-term and long-term effects as a result of outsourcing are; the decrease in labor costs, the decrease in investment in assets and the amount of expenditure made for research and development activities and similar type of cost reductions. This cost reductions will of course also trigger a decrease in different kind of costs in the organizations (Juma'h and Wood, 2000: 266–267).

#### **Achieving Better Management:**

A company may experience a performance degradation that is not directly related to the performance of employees and this problem may be directly related to managerial mistakes. Companies must have a management understanding that can provide flexibility according to the conditions of the sector. Because this is a factor that directly affects the competitive advantage. Turnover problems, employee absenteeism, bad end product and missed delivery dates are the most common symptoms of management problems. In this case, it is very difficult to obtain management quality. To solve such problems, outsourcing may be preferred and consultancy services may be used. This type of consulting is often preferred in the field of engineering that requires expertise (Bragg, 2006: 2; Çoroğlu, 2002: 22). This strategy will provide additional time to managers so they can focus on management issues (Genç, 2004: 215-216).

#### **Quality Improvement and Development of Audits:**

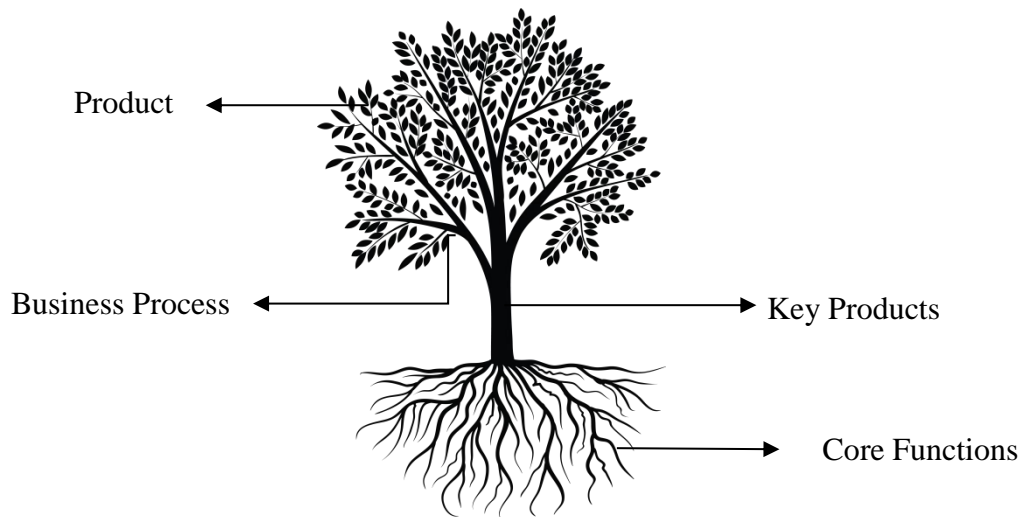
Quality is an important competitive tool for businesses. In order to adapt to the rapid change and development in the world, companies are seeking to gain competitive power by raising the quality. In this sense, documentation of goods or services may be shifted to a quality provider and thus concerns about product quality can be reduced (Kavrakoğlu, 1993: 105; Bragg, 2006: 2).

**Focus on Strategy:**

Businesses want to focus on what they do best. Due to the limited resources of the enterprises, the distribution of these scarce and limited resources to the whole organizational activities causes waste of resources and extra costs. This is important for the company to focus on strategies. Because generally, managers spend a lot of time with taking care of details. These details can be transferred to suppliers, so managers can concentrate on new products or similar strategic issues. The firm's decision to produce or purchase a product is based on strategic decisions. If the decision is to purchase these products, it is decided to close the facilities where these products are produced. In this case, it is important to work with a reliable supplier or subcontractor (Karacaoğlu, 2001: 15-16; Koçel, 2003: 387; Bragg, 2006: 2; Phelps and Fleischer, 2002).

**Focus on Core Functions:**

Core functions refers to the factor that separates a business from another businesses. These are the vision, basic roles, knowledge and skills that cannot be imitated by competitors. Because the goods or services that can be easily found in every enterprise are not sufficient for the competition of the enterprise. The business must have a unique goods or services since the competitiveness of a company depends on it. All direct work related to this product must be carried out within the company. External resources may be used for functions other than this (Koçel, 2003: 387; Ülgen and Mirze, 2006: 120). The relationship between core-functions, key products, business process and product is explained according to Morder (1996: 364) in Figure 2.



**Figure 2:** Core Functions (Morden, 1996: 364)

The main reason for the use of outsourcing is the development of basic skills (Greaver, 1999: 3). There are few key functions that make a company survive. Qualified personnel in the organization can concentrate on these key functions and transfer of other jobs to sufficient suppliers. An important good or service which will lose its' importance in future may be transferred to a supplier. This is all about the future plans of the organization. Thus, the cost advantage can be achieved by transferring the works that are outside the main activity (non-core or supporting works) to the suppliers. This strategy also allows the organization to focus on the core functions (Bragg, 2006: 3; Rodriguez and Robania, 2004: 287-306; Dinçer, 2004: 217).

### **Avoiding Major Investments:**

An organization may not have enough investment for a job, in this case the organization may not be able to obtain sufficient efficiency from the goods or services. Investments related to non-mandatory functions can be transferred to suppliers. It is widely preferred as a very convenient method to reduce investment costs. Thus, the resources to be used as supporting functions (non-core functions) can be directed to the core functions. If the company insists on doing this on its own, it will eventually have to invest to modernize it. In order to avoid this, the function can be transferred to a more technological company. This strategy will allow the company to integrate more easily into technology. In this way, enterprises gain competitive advantage by

benefiting from the cost advantages of the external support which is called outsourcing strategies (Gençyılmaz and Zaim, 2000: 130; Bragg, 2006: 3; Vassard, 2002: 1).

### **Downsizing Organizational Structure and Assisting a Fast-Growth:**

The management team needs professional support in the operation of the company which has a rapid growth. Such a business can receive consultancy services to focus on its core activities, or the functions except core businesses can be outsourced. Enterprises aim to downsize with this method, but it should be noted that the downsizing is merely an organizational downsizing. Deciding quickly and accurately provides the advantage of outsourcing and enables faster growth. It is much easier to take decisions in the management of companies with simple organizational structure. It can be changed easily when the wrong policy or strategy is noticed in the companies having simple organizational structure. These decisions will be much more difficult, as bureaucratic jobs are more complex in companies with large organizational structures (Savaş, 1987: 182; Bragg, 2006: 3; İltter, 2002: 52).

### **Handling Overflow Situations and Capacity:**

The organization can detect that a function is overloaded. In such cases, outsourcing is preferred to complete the goods or services. Using outsourcing for that kind of sudden and high volume demands instead of using current sources, provides sources which can be used for core business. It is a popular option for help desk services and customer support (Bragg, 2006: 4).

### **Improving Flexibility:**

Outsourcing is a good method of eliminating unnecessary costs of full time workers when a business volume shows high variability. This method provides continuous costs to be converted into variable costs (Bragg, 2006: 4; Rodriguez and Robania, 2004: 287-306). Research shows that the development of flexibility is an important factor for outsourcing (Quelin and Duhamel, 2003: 654).

**Enhancing Credibility:**

Outsourcing can be preferred as a marketing management by organizations. Names of suppliers can be shared with companies which are expected to work together in the future; and quality, cost and similar advantages brought by these goods and services can be mentioned. In these cases, the company would like to work with the most recognized suppliers because of their prestige. Working with well-known suppliers will provide confidence for potential customers (Bragg, 2006: 5).

**Maintaining Old Functions:**

The company may not be able to maintain existing functions due to change of location or technological changes. The company can transfer existing functions to a supplier when making these changes for new targets. Thus, the old functions can be maintained during the preparations for new functions (Bragg, 2006: 5).

**Performance Improvement and Capacity:**

Some companies use outsourcing as a method of improvement, taking into account their performance. The profit ratio on assets will increase if a company prefers to transfer its assets to outsourcing. Functions that are most likely to improve this ratio are; maintenance, manufacturing and computer services. Another improvement rate is the rate of earnings per person. In order to achieve this, a function which is done by a large number of employees, such as manufacturing and sales should transfer to the external source (Bragg, 2006: 4).

An organization can detect that it has high cost and low performance functions. In this case, the organization can analyze the cost and advantages of outsourcing. The organization's own staff can perform this analysis with a supplier. This analysis enables interrogation and improvement of internal functions. If the completed analysis proves the profitability of the internal execution of the function, outsourcing is not required, otherwise outsourcing can be applied. This competitive approach is applicable for every sector (Bragg, 2006: 6; Rodriguez and Robania, 2004: 287-306).



### **Licensing Strategy:**

Licensing is a strategic tool to enlarge a business. It is used by both large-scale and small-scale companies. A business arrangement is in which one organization gives another organization permission to use its technology for a specified contract and payment. Before deciding on the licensing, attention should be paid to the license required to use and qualifications of the company. Depending on the features of the license, there may be risks for the licensee and the licensed company. However, an effective strategy minimizes the risk for both parties (Fernandez and Neuenschwander, 2003).

Licensing a product or service is a good strategy in keeping competitors under control. Licensing is also another way of limiting competition or setting a standard. The best example of standard creation is which Sony and Philips agree on a compact disc and share it with all other companies. Thus, a great competitive war was avoided, because the international standard was created as Beta and VHS discs (Pindyck, 2017: 26-27).

### **Presidency of Defence Industry Strategies (PDI)**

The authority was established in 1985 under the name of Undersecretariat of Defense Industry (Turkish abbreviation: SSM) and today, it continues its activities under the name of PDI (Turkish Abbreviation: SSB). The strategies of this authority are based on the decisions of the Council of Ministers in 1998. The purpose of the SSB is described as follows (SSB Strategic Plan, 2017; SSSSD<sup>1</sup>, 2018: 1).

- Meeting the needs of the armed forces to ensure the security of the country
- Domestic production of high technology weapons and vehicles
- Establishment of production facilities with the required technology
- Encouraging and supporting existing national defense industry firms

There are many state strategies for defense industry which is coordinated by SSB. The most important of these are Offset industry participation (Turkish Abbreviation: SK/O

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<sup>1</sup> SSSSD: Defense Industry Sectoral Strategy Document (in Turkish: Savunma Sanayii Sektörel Strateji Dokümanı)

- Industry participation offset) agreements. Within the scope of the purpose of these agreements, the use of the capabilities and skills of domestic industrial companies is the main objective. In addition, it is aimed to increase the competitiveness of small-scale companies by promoting them to export, providing them to carry out research and development (R&D) activities, enabling them to make technological collaborations and directing them to invest (SSMFR<sup>2</sup>, 2015: 31). Thus, the contribution of the domestic defense industry companies in the ongoing projects is increased (SSMSP<sup>3</sup>, 2017: 68).

Another important objective of this strategy is to enable small and medium-scale companies to acquire high value-added capabilities. Regular visits and information meetings are held to ensure that local defense industry companies benefit from these opportunities. SSB provides various support and loans to enable small-scale companies to produce qualified products under this strategy. All of these advantages are provided on condition that they perform production in the subcontractor position for defense industry projects (SSSSD, 2018: 8-9).

According to 2015 data, the current situation regarding this strategy is summarized in the following Tables. Ongoing and completed contracts and the balance of these agreements as of the end of 2015 are as stated in Table 2 (SSMFR, 2015: 31–32).

**Table 2:** Ongoing and Completed SK/O Agreements (SSMFR, 2015: 32)

<b>Types of Agreements</b>	<b>Number</b>
Offset industry participation (SK/O) Agreements	94
Completed Agreements	10
<b>Balance of Agreements</b>	<b>Amount in TL</b>
Industry participation	3.527.071.831
Exportation	5.286.038.513

<sup>2</sup> SSMFR: Undersecretariat of Defense Industry Annual Report (in Turkish: Savunma Sanayii Müsteşarlığı Faaliyet Raporu)

<sup>3</sup> SSMSP: Undersecretariat of Defense Industry Strategic Plan (in Turkish: Savunma Sanayii Müsteşarlığı Stratejik Plan)

**Table 2:** Ongoing and Completed SK/O Agreements (SSMFR, 2015: 32) (Cont.)

Technology Cooperation	574.464.399
<b>TOTAL</b>	<b>9.387.574.744</b>

### **2.1.5. Disadvantages and Risks of Outsourcing**

There are very important benefits of outsourcing for the organizations which use outsourcing strategy. However, there are many risks that may arise as a result of misapplication (Genç, 2004: 215). Outsourcing can provide a competitive advantage to businesses, but on the other hand it may also cause disadvantages (Koçel, 2003). Businesses aim to prevent unnecessary usage of resources by outsourcing. In this process, the dependency of companies on their suppliers and thus organizational loss of power may occur (Taşkıran and others, 2006: 322).

After a while the desired quality may not be reached in the business. After that the organization may prefer to do the outsourced activity again within the structure of the business but it will be forced to catch the quality, and the organization may have lost its competences (Quinn and Hilmer, 1994: 53). Organizations share a lot of information and know-how with the supplier during outsourcing process. After a while the supplier may choose not to continue to work with the organization. This supplier can choose to enter the market with the knowledge that it obtained during outsourcing. A firm which is a supplier at the beginning can become a competitor of the organization (Coşkun, 2002: 67).

So that, although there are many reasons for outsourcing a function, there are many risks involved. The organization should be aware of these risks before deciding on outsourcing. Some of these risks are indicated as follows according to the Bragg (2006: 8-10).

#### **Changing Supplier Conditions in Time:**

There may be problems with the supplier due to financial difficulties, the acquisition of the supplier by another company or change in supplier's strategy in the future. In

addition, due to technological changes, the supplier may not be able to meet the demand. Outsourcing is a cost-effective strategy. However, unpredictable international costs often pose a threat. These risks can be minimized by contracts to be prepared carefully and in detail. If a risky situation is encountered, the contract may be terminated (Bragg, 2006: 8; Somjai, 2017: 159).

### **Dependence on Outsourcing:**

One of the biggest risks of outsourcing is to become dependent on the supplier. The company can lose its flexibility over time, thus losing control over the supplier. In this case, the firm cannot determine the price and quality factors. Thus, the organization will have to accept the price, quality and other factors to be offered by the supplier. In this case, this strategy which is thought to provide a competitive advantage will lose its advantage rapidly for the organization (Koçel, 2003: 392; Taşkıran and others, 2006: 322).

### **Recognizing That Risk is Higher than Actual:**

Another risk is usually the transformation of existing outsourcing stories into successful stories. This common situation affects the decision of outsourcing which it should be questioned at beginning of the process. The academic studies are favorite success stories tool of the free advertising methods of the public relations departments of suppliers. These suppliers prefer not to focus on the parts related to failure situations or risks. In this case, the decision of incorrect outsourcing will negatively affect the organization in terms of financial and managerial aspects (Martinsons, 1993: 19; Bragg, 2006: 8-9; Jiang, 2004: 27-28).

### **Supplier Failure:**

The supplier or subcontractor who works with an organization may fail after start of outsourcing process. Inadequate goods or service by the supplier will cause the failure of the organization, especially if this function is critical for the organization. This risk is the highest for organizations whose main function is computer services, engineering and manufacturing. Choosing the right supplier, checking supplier functions, controlling post-supplier activities are highly important to minimize such kind of risks

(Bragg, 2006: 9; Martinsons, 1993: 19; Jiang, 2004: 27-28). Choosing a wrong supplier will lead to high delivery times and quality problems. Suppliers serve multiple companies at the same time. In this sense, the possibility of not providing timely service should always be considered. It is essential to make the right decision to transfer the functions to the supplier. Because sometimes it is more reasonable to try to solve problems internally (Somjai, 2017: 159; Wongleedee, 2016: 41-44).

### **Loss of Confidential Information:**

It is natural for an organization to share information with its supplier. However, some of this information is private and confidential for the company. Stealing or disappearance of this information after being transferred to the supplier is a high risk. This kind of confidential information with high financial value may encourage the supplier to share it. So one of the biggest risks of this strategy is the possibility of information leakage and this may result in the loss of competitive advantage. In other words, the sharing of confidential company information of an organization brings about some risks such as the emergence of counterfeit products. Many Asian companies are indicated as examples of this situation. These companies established relations with US companies and then entered the US market. In this way many Asian companies have dominated the US companies in the market (Bragg, 2006: 9; Martinsons, 1993: 19; Jiang, 2004: 27; Gilley and Rasheed, 2000: 767; Somjai, 2017: 159).

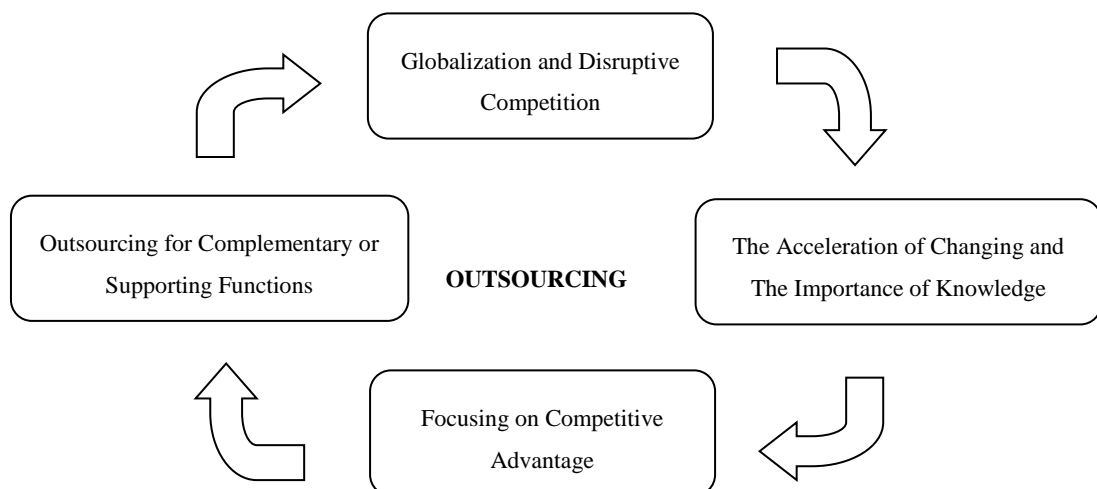
### **Job Loss:**

Outsourcing means transferring important goods or services to suppliers in big projects. Thus, the supplier will learn the strategic business of the organization. If the outsourcing strategy does not work, it will lead to inquiries about the management and this could lead to radical changes of management staff. In other words, an incorrect decision affects the company in terms of cost but also negatively affects the management (Bragg, 2006: 10; Martinsons, 1993: 19; Jiang, 2004: 28).

### 2.1.6. Outsourcing Process

Outsourcing cannot be evaluated independently of other applications. On the contrary, as enterprises concentrate on their own capabilities, the rate of outsourcing increases. As the use of outsourcing increases, partnerships and network organizations are developing and enterprises are downsizing. Thus, businesses become more flexible and can decide more quickly. It is important that organizations make strategic decisions for outsourcing. Goals and objectives should be determined well by organizations that will decide on outsourcing. The success of the organizations depends on making decisions for functions which can be transferred to subcontractors. The cornerstone of outsourcing is to determine what is required from the supplier. First of all, enterprises should have defined their vision and missions correctly. Consequently, they must be concentrated on some key functions and core business. In this way the functions which will need to be transferred to external sources will be revealed in order to ensure long-term business relations, the parties must clearly state their aims and expectations. All details should be negotiated with precision and should be evaluated in the contract preparation stage. A contract where details are not specified may not meet with the expectations of the parties. The preparation of the contract may also be outsourced if required (Ataman, 2004: 16; Ecerkale and Kovanci, 2005: 72; Krell, 2006: 23).

The importance of competition, information, and focus on strategy that lead to outsourcing is as indicated in Figure 3.



**Figure 3:** Outsourcing Process (Corbett, 2004: 4)

### **2.1.6.1. Decision Making in Outsourcing Strategy**

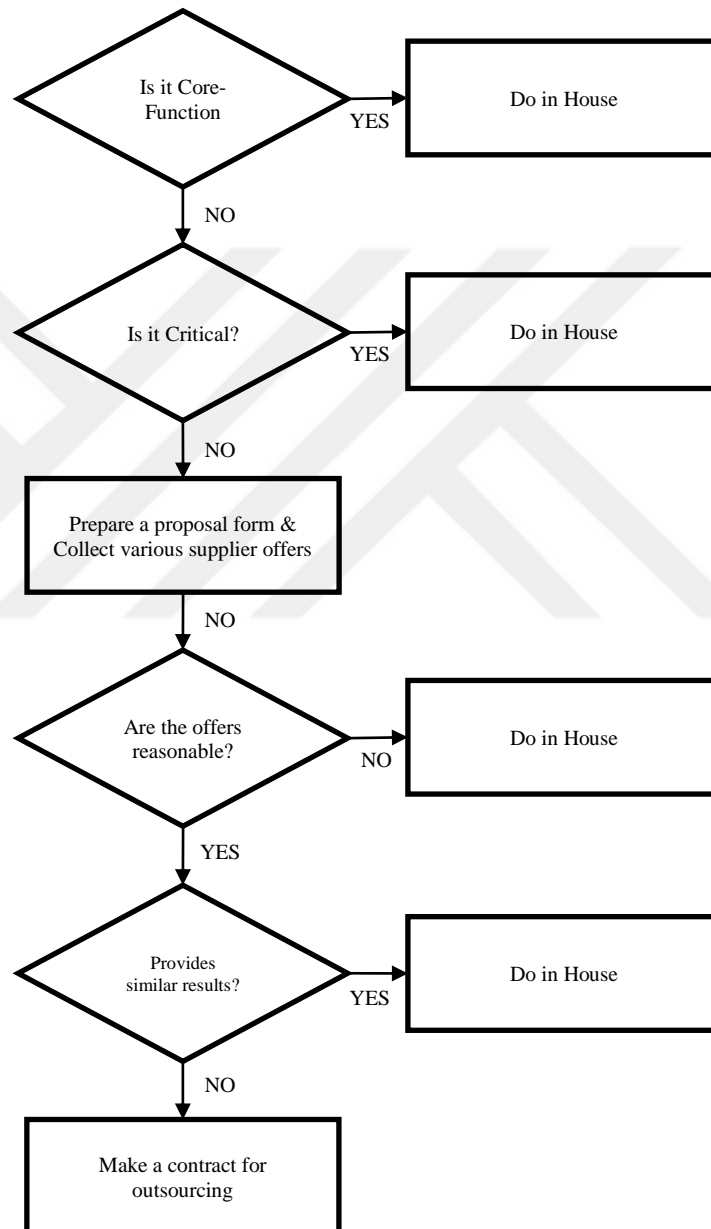
Organizations should work with external subcontractors or suppliers for supporting activities other than core functions. The outsourcing process for enterprises begins when they make decision about make or buy strategy. The strategy of outsourcing brings along many risks. The analysis and evaluation of these risks is important, especially at the beginning of the process. Organizations need to determine the reasons why they prefer outsourcing. Before the outsourcing strategy decision, the business will probably try to solve the problem internally. An improvement may not be observed, although changes have been made to resolve the problem. It will be decided to use outsourcing strategy after it is understood that there is no internal solution. At this stage, the most important thing is to find the right subcontractors and suppliers. In this phase, it should be explained to the senior management about details why the works could not be done internally. It is necessary to prove to senior management that these jobs need to be transferred to suppliers. It should be well researched whether suppliers can meet the demands of senior management of organizations. The supplier to be selected should be analyzed in detail to achieve the objectives. Firstly, the following questions should be answered. Then, strategic planning should be reviewed. Knowing what you want from a service provider is the cornerstone of outsourcing (Greaver, 1999: 62-63; Bailey and others, 2002: 185; Ecerkale and Kovancı, 2005; Arslantaş, 2005: 41).

After the following questions are answered, a decision can be reached. This decision is important to the extent that it affects the future of the company in many respects including cost. The following questions should be answered (Ivor, 2000: 22):

- What are the primary objectives for outsourcing?
- Why these goals are determined?
- Which functions should be transferred to external resources?
- Are there priorities among the specified functions?
- Should all of the specified functions be transferred to the external source, or should it be partially transferred?
- What is the goal to achieve after the transfer?

- How will efficiency be measured?
- What type of cooperation is planned with suppliers?

Determination of the core functions of a business, contacting with the suppliers, evaluation of bids and the evaluation of the process until the contract stage is described as in the Figure 4 according to the Leenders and Harold (As cited by, Zorlu, 2008: 20).



**Figure 4:** Outsourcing Scheme (Zorlu, 2008: 20)



The assessment should be reviewed and decided to be appropriate for the future vision, future core-functions, future costs, future performance and future advantages (Fowler, 1998: 4-5). After this stage, the speed and success of the decision process depends on the efforts of senior management, if the senior management believes in the benefit of outsourcing (Yazıcı, 2003: 22).

#### **2.1.6.2. Determination of Core Functions**

Outsourcing enables organizations to develop their core competencies and focus on the determined capabilities. However, it is a very important and difficult decision to determine which activities are core-functions and which are not core activities. It is quite complicated to distinguish between core-functions and non-core activities and this process requires great attention in order to provide strategic evaluations and real benefits (Arslantaş, 1999: 104; Jenster and Pedersen, 2000: 150; Jennings, 1997: 90; McIvor, 2000: 29-30).

Another important aspect is determining the basic capabilities of the enterprise and determining what differentiates the enterprise from its competitors and what makes them different. It is necessary to determine the ability of the company employees to perform the functions (Arslantaş, 1999: 104; Info-Tech Research Group (ITRG), 2003: 4). This is an important fact that non-core functions should not be considered as an insignificant activity of the organizations. A non-core function may become a fundamental skill in the future as a result of changes in the business environment (Heikkila and Cordon, 2002: 184).

#### **2.1.6.3. Determination of Strategy**

After it is decided to outsource, enterprises should identify the strategies to be followed during outsourcing process. The following points are important with this regard (Embleton and Wright, 1998: 100; Arslantaş, 1999: 32):

- Determination of Core Functions
- Compliance of vision and mission of the company with its outsourcing strategy

- The effect of outsourcing on organizational structure
- Determining whether to benefit from long-term outsourcing or short-term outsourcing
- Determining that outsourced companies can provide the desired quality and cost

#### **2.1.6.4. Cost Evaluation**

Reducing costs is a key motivation tool for outsourcing strategies. All enterprises aim at the lowest cost level among the competition strategies. As a result, these strategies can make significant contributions to reducing costs for enterprises. Cost assessments require careful consideration of the different components and service levels that make up the costs. The procurement costs of a given good or service are a long process that includes direct and indirect costs (Jennings, 1997: 89; McIvor, 2000: 30).

Firstly, the cost between the production of the product within the company and the purchase of the product must be compared. These costs include all costs that must be incurred in the process of production of the product until delivery to the final consumer (Jennings, 1997: 89; Özbay, 2004: 25). The second significant cost occurs during and the end of the outsourcing process. At this stage, the costs for monitoring and control of the supplier, or the costs arising from ceasing the job as a result of the dispute should be considered. All possible costs should be foreseen by this assessment (Vining and Globerman, 1999: 646).

After the agreement, one of the parties may act in a malicious manner, acting inappropriate according to the agreement, taking care of its own interests. In the process, the supplier may demand price increases, arguing for unexpected costs. It is difficult and important for the organization to analyze whether these prices are realistic or not (Vining and Globerman, 1999: 647).

### **2.1.6.5. Evaluating and Selecting Vendors**

This process starts with the response of suppliers to the demand of the enterprise. If many suppliers for this demand are bidding, the process requires an evaluation. The most important point here is that the supplier can provide the company with the desired quality and cost. However, the choice of the best supplier is becoming quite difficult because of the large number of firms that can meet the needs of the business in the market. At the same time, it is important to note that the suppliers may give misleading or incomplete information in order to be able to get the job, and tend to show themselves better than it is. This can be seen as a long process but can be made short and easy with good planning. At first, it should be preferred to spend the time and money for choosing the right supplier. At this stage it is very important to determine that suppliers have adequate service possibilities and resources. Technological opportunities, having expert knowledge, knowing the market dynamics are important considerations. In addition to all these considerations, the organizations applying to the external source should clearly state what needs to be provided from the supplier. After determining the most appropriate outsourcing provider, the tender conditions are prepared and this step is important for a successful process. The reasons of outsourcing, scope, characteristics of the provider, pricing model and performance measurements are determined at this stage. The companies that have an agreement on the terms of the tender sign the contract and start the process. With the signing of the contract, the responsibilities of management are ended (Grupe, 1997: 2-10; Fowler, 1998: 1-14; Embleton and Wright, 1998: 101; Blumberg, 1998: 14-15; May, 1998: 138; Solak, 2002: 90).

### **2.1.6.6. Contract Process**

The basis of the outsourcing strategy is based on the logic of transferring the functions determined by the management to the suppliers. At this point, the form and the basis of the relations should be in the legal nature and with the contracts that containing various sanctions (Krell, 2006: 19). First of all, the business must try to select the correct supplier and sign an effective contract with it. Afterwards, it should discuss the

activities of outsourcing process in detail. Finally, the stage of the success should be compared with the specified objectives. The supplier should be continuously controlled and supported in this process and an effective system should be established in parallel (Freytag and Kirk, 2003: 140-141).

The success of the outsourcing process will depend on an effective communication network between the organization and the supplier (Arslantaş, 1999: 103).

#### **2.1.6.7. Maintaining Relations**

The supplier selection process will be completed with the selection of the supplier profile, by obtaining information about the supplier, with the bid received from the supplier and with the evaluation of the counter benefits and signing the contract. It is important to have periodic meetings in the following process and to develop close communication between the supplier and the company (Embleton and Wright, 1998: 101; Greco, 1997: 52).

At this stage, if the parties continue to be in communication in solving the problems, it is possible that the cooperation is successful. In the success of the relationship, satisfaction of the parties, realization of expectations and goals and elimination of long-term risks are important (Arslantaş, 1999: 47; Kern and Willicocks, 2000: 329).

#### **2.1.7. Research Findings about Outsourcing Practices in Some of the Countries**

Outsourcing has become the key to success in developed economies such as the USA, UK, Japan and Italy. In the UK, banks, manufacturing industry, press, media, telecommunications companies, retail and insurance companies prefer to use outsourcing. In addition, it is highly preferred in the public sector, where outsourcing has reached 43%. The outsourcing preferences of these companies are listed as equipment, infrastructure, applications and business processes. In Japan, outsourcing is mostly preferred in the manufacturing industry. Japanese firms are in close cooperation with their suppliers and subcontractors. These companies are closely interested in the problems of their suppliers and support quality improvement, cost

reduction, and staff training activities of them. Another example is the projects being carried out by National Aeronautics and Space Administration (NASA) of USA. A lot of projects related to sending satellite and carrying astronauts into space are being carried out by this institution. These important projects are supported by thousands of companies specialized in the field and using the most advanced technology. General Motors, Ford Motor Company, BMW and Boeing are among the most important companies that use similar strategies (Çoban and Tutkun, 2004: 37; Türkoğlu, 2006; İlater, 2002: 52-53).

Outsourcing is also used in defense industry in many countries. Some of the research findings related with outsourcing in defense industry in some of the countries are as mentioned in Table 3.

**Table 3:** Some of the Findings of Research related to Outsourcing in Defense Industry in Some Countries

Subject	Findings
Outsourcing in Economics of Military (UK)  <i>(MacDonald, Peter, 2010: 19-135)</i>	It is very important how the requirements of the defense industry are supplied. The decision of make or buy must be made by the National Defense Government. <ul style="list-style-type: none"> <li>• In the military production function, the elasticity of substitution between military labor and capital was examined. This elasticity is very close to zero.</li> <li>• It has been determined that the increase in the use of outsourcing in the defense industry is associated with low cost.</li> <li>• The difficulties encountered have been identified as confirmation that the demand has been met correctly. It has been determined that there is an additional item for military expenditures.</li> </ul>
US Government Outsourcing, The Private Military Industry <i>(Halpin, 2011: 109-111)</i>	United States Government outsourcing during Operation of Iraqi Freedom (OIF) is researched and the following issues were identified: <ul style="list-style-type: none"> <li>• Outsourcing can provide better service and new benefits at lower costs.</li> <li>• Adequate contract management and supervision is essential to ensure that it is useful.</li> <li>• The use of contractors to increase military and state civilian personnel can be both beneficial and harmful to combat operations and targets.</li> <li>• Outsourcing can provide employment and promote economic growth and recovery.</li> </ul>

**Table 3:** Some of the Findings of Research related to Outsourcing in Defense Industry in Some Countries (Continued)

	<ul style="list-style-type: none"> <li>Contractors can achieve new skills. However, these skills bring additional responsibilities to the state.</li> </ul>
U.S. Department of Defense (DoD) (Marquis, 2011: 17-18)	<p>The reason for the failure of a major IT program such as The Defense Integrated Military Human Resource System was largely due to personnel problems.</p> <ul style="list-style-type: none"> <li>The importance of having a staff, skills, leaderships and experience working in all aspects towards the IT process is emphasized.</li> <li>It was stated that the selection of the Department of Defense personnel should be chosen in such a way that it can best support all military personnel defending the country.</li> <li>Accurate analyzes should be made and the process should be transferred to the external source in a controlled manner.</li> </ul>
Outsourcing in Europe (Özcan, 2015: 66-67)	<p>It has been observed to increase labor productivity according to research conducted in UK between 1980 and 1992. In Ireland, it was implemented in the electronic industry between 1990 and 1995 and it has been found to increase efficiency (Girma ve Gorg, 2003). According to the survey conducted by Ernst and Young Company in 8 European countries with 3.700 participants in 2019, the sectoral distribution of outsourcing has been determined, as follows:</p> <ul style="list-style-type: none"> <li>Government and public sector (41%), Service sector (20%), Production and industry (18%), Trade and distribution (7%), Other (14%)</li> </ul>
The Politics of Outsourcing Military Support Services (Erbel, 2016: 1-14)	<p>USA especially in Iraq and Afghanistan wars concentrated on armed security contractors.</p> <ul style="list-style-type: none"> <li>It has been observed that the countries that can manage these resources are more effective in solving the problems at their location.</li> <li>When it comes to the political agenda, it has been recognized that outsourcing is an application that governments want to improve.</li> </ul>

### 2.1.8. Research Findings about Outsourcing Practices of Some Companies in Turkey

The present century has witnessed some changes in the economic, social and technological fields. These developments have led to the globalization of markets and

the change of form and dimension of international competition by eliminating the boundaries between countries. The globalization of competition forces businesses to adapt their business processes to provide customers with more effective, efficient, high-quality, fast, easy, comfortable and inexpensive services. As a result of global competition, organizational change has become a necessity rather than an option. Therefore, global competition emerges as an important change requirement. Outsourcing in Turkey is developing as a concept that is becoming more and more widespread in different sectors. Automotive, white appliances, food, retailing, apparel, construction, pharmaceutical sector has a very high rate of utilization of external sources. The utilization of external resources by the enterprises producing goods and services can be applied in almost every sector (Tekin and others, 2000: 151; Ataman, 2002; Çağlar and others, 2005: 77).

The concept of outsourcing has emerged in the early 1990s in Turkey. However, this concept dates back to the early years of the Republic. In the first period of the republic, labor laws were regulated, especially in the unstable and insecure sectors of businesses. Thus, the first relations between organizations and outsourcing companies were established and developed (Ekin, 2003: 38).

Nowadays, call centers are the sector where outsourcing is most widely used in Turkey. Companies such as Turkcell use this strategy to be closer to their customers by following the customer profile change trend. Suppliers provide advantages such as increasing customer loyalty, controlling marketing and operational costs, benefit from high technology, controlled growth and increasing profitability by providing high quality service with CRM (Customer Relationship Management) experience (Köksal and Böke, 2002: 40-42).

Some examples of outsourcing in Turkey are as mentioned in below Table 4.

**Table 4:** Some of the Research Findings about Outsourcing in Turkey

Company	Findings
Alarko Holding (Budak and Budak, 2004)	<p>Cost effectiveness is stated as one of the important reasons for outsourcing.</p> <ul style="list-style-type: none"><li>• Alarko Holding does not purchase cars for any of its own companies. The Company meets this need through its strategy of renting.</li><li>• The company was doing postal work and paperwork distribution by itself. The company now works with courier companies for this need.</li></ul>
Sunel Ticaret Türk A.Ş (Çoğan, 2006: 126)	<p>As a result of the business analysis within the enterprise, it was decided to transfer the functions other than the core activity to external sources. The transfer of the non-core functions to the external source is preferred to focus on the core-function and main strategy.</p> <p>The functions transferred to external source are as follows;</p> <ul style="list-style-type: none"><li>• Cleaning</li><li>• Transportation</li><li>• Catering</li><li>• Security</li><li>• Maintenance Service</li></ul> <p>Financial consultancy, legal consultancy, customs consultancy and shipping services have been provided from external sources for a long time.</p>
Manufacturing Companies (Oktay, 2006 : 140 - 146)	<p>The results of the study on the effect of outsourcing of enterprises on competition and performance are as follows. The study has been conducted for Turkey's largest 500 companies (According to Istanbul Chamber of Commerce 2006 data):</p> <ul style="list-style-type: none"><li>• Reducing Cost</li><li>• Performance</li><li>• Core Function / Focus on strategy</li><li>• Quality Improvement</li><li>• Gaining new skills</li></ul>
5 white appliances, 6 automotive, 15 food industry companies (Özcan, 2015 : 67 - 68)	<p>It is mainly stated that there is a strategy applied in the financial sector. Outsourcing ratio was determined according to the results of the survey conducted with the companies. These are the results obtained from 26 companies which are among the largest 500 companies in Turkey:</p> <ul style="list-style-type: none"><li>• Human resources (76.2%)</li><li>• Finance (67.6%)</li><li>• Manufacturing (63%)</li></ul>



**Table 4:** Some of the Research Findings about Outsourcing in Turkey (Continued)

	<ul style="list-style-type: none"><li>• Customer service (59.2%)</li><li>• Management consultancy (58.4%)</li><li>• Sales and marketing (57.6%)</li><li>• Information systems (53%)</li></ul>
Manufacturing Companies (Özyer and Döven, 2018 : 2 - 18)	<p>The following advantages were obtained as a result of outsourcing in the manufacturing industry in Erzurum:</p> <ul style="list-style-type: none"><li>• Reducing Cost</li><li>• Performance</li><li>• Focus on Strategy</li><li>• Flexibility</li><li>• Development of business skills</li><li>• Effective warehouse management</li><li>• Prestige</li></ul>

## **CHAPTER III**

### **DEFENSE INDUSTRY**

Abraham Maslow's second hierarchy of needs is the need for security. The need for security and defense are social requirements and are accepted as public service, thereby the state should protect society against threats and dangers (Baran, 2018: 58). An article by the American historian Bernard Lewis indicates that the Turks thought of learning something from Europeans after the failure of the second siege of Vienna in 1683. Also he states that they decided to start the modernization of the army and the development of the defense industry. According to this, it can be deduced that Turks have been trying to develop national defense industries for 318 years (Ziylan, 2001: 1).

Today, the characteristics of the Turkish Defense Industry are defined by the following items according to the document "Principles of Defense Industry Policy and Strategy" adopted by Council of Ministers on 25 May 1998 (Demirel, 2012: 9-10; SSB Strategic Plan, 2017: 40-41; SSSD, 2018: 1):

- Requires precise manufacturing techniques based on high technology
- Requires special quality standards
- Requires skilled manpower
- Requires continuous use of the best technologies and therefore requires substantial R & D activities
- Requires high investment
- Obligation to produce based on one buyer

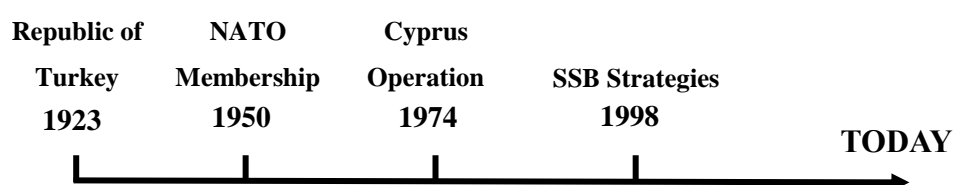
- Requires opening to foreign markets to ensure continuity
- Having special conditions such as security and privacy

### 3.1. History of Turkish Defense Industry

It can be stated that the cannons casted in Istanbul during the rise of the Ottoman Empire, which is the foundation of the Turkish defense industry, constitute the most advanced combat power of the age. This power has been used in land battles, especially in large sieges (Sallar, 2015: 48). In the pre-republic period, the production of the defense sector was carried out in small workshops in İstanbul and these workshops were moved to Ankara during the War of Independence. Efforts have been made to develop the national industry in the Republic period. In this way, a large number of small and medium-sized factories were established in the defense and aerospace industries. Thereby, progress has been made in this sector (Eceral, 2017: 91).

The defense and security mechanism of Turkey has integrated fully into Alliance after being a full member of the North Atlantic Treaty organization (NATO) in 1952. In the following years, a NATO-based security strategy has been built against the Soviet Union and the Warsaw Pact, which was the primary national security threat. As a natural consequence of the operation of defining, planning and building processes of national defense needs under NATO and United States (US) management and control, the US has become almost the only source in the planning and provision of the Turkish Armed Forces' needs (Mevlütöğlü, 2016: 9).

The development of Turkish defense industry can be addressed in four periods as shown in Figure 5. The first period was between 1923 and 1950, the second period between 1950 and 1974, the third period between 1974 and 1998 and the fourth period 1998 afterwards until today (Ziylan, 2001: 1-5; Yavuzylmaz, 2014: 5-9; Özgen, 2016: 193).



**Figure 5:** Periods of Turkish Defence Industry

### 3.1.1. 1923 – 1950 Period

First period includes the years when the state was first established and also this period includes the Second World War. In the first period, the nationalization policy was applied in the development of the defense industry with importance to industrialization (Yavuzylmaz, 2014: 5). With the acceptance of defense industry as an important part of industrialization and development, Republic of Turkey administration, planned industrialization in this first period, and therefore the development and guidance of the defense industry was undertaken through the State. In line with this goal, some investments were made in the early years of the Republic to form the basis of Turkish national defense industry. These investments are as follows (Sallar, 2015: 48-49; Yavuzylmaz, 2014: 6);

- In 1921, General Directorate of Military Factories (Askeri Fabrikalar Umum Müdürlüğü)
- In 1924, Ankara light gun and cannon repair atelier, cartridge factories (Hafif Silah ve Top Tamir Atölyeleri ve Fişek Fabrikaları)
- In 1926, Turkish Aircraft and Engine Inc. (Tayyare ve Motor Türk A.Ş.)
- In 1927, Ammunition factory (Mühimmat Fabrikası)
- In 1930, Kayaş Percussion Cap Factory (Kapsül Fabrikası)
- In 1931, Kırıkkale Power Plant and Steel Factory (Elektrik Santrali ve Çelik Fabrikası)
- In 1936, Gunpowder, rifle and cannon factory (Barut, Tüfek ve Top Fabrikaları)
- In 1941, Ankara Turkish Aeronautical Association Aircraft Factory (Türk Hava Kurumu Uçak Fabrikası)
- In 1943, Mamak Gas Mask Factory (Gaz Maskesi Fabrikası)

were established.

The state supported the development of the defense industry until 1950 and implemented a policy of localization (Ziylan, 2001: 1). In this period, investments were mostly realized by the state (Özgen, 2016: 193).

### **3.1.2. 1950 – 1974 Period**

The second period, starts with Turkey being a member to the North Atlantic Treaty Organization (North Atlantic Treaty Organization / NATO). In this period, the needs of the Turkish Armed Forces (Turkish Abbreviation: TSK) were largely met by foreign aid and credit sales provided by the allied states. The efforts for the development of the national defense industry under the leadership of the state have almost stopped (Özgen, 2016: 3).

One of the most important reasons for this has been the grants and aids provided by the United Kingdom and the United States during the Second World War. The second important reason is increasing military aids, which has started with Turkey's membership of NATO. As a result of these aids, military factories lost their productivity and this became a significant burden on the budget by decreasing the domestic orders of the Armed Forces. Therefore, despite the level reached by the defense industry in the 1920s and 1930s, the industry declined (Çakır, 2010: 2).

During the Cyprus crisis in 1964, the use of defense equipment from allied countries in line with the national interests of Turkey has become an important issue. For this reason, various obstacles have been raised by some allied countries, especially by USA. This has revealed the drawbacks of becoming dependent on other countries in meeting the country's defense requirement (Sallar, 2015: 51).

### **3.1.3. 1974 – 1998 Period**

In the period following 1974 Cyprus Peace Operation, an arms embargo was imposed by the allied states. After this, foreign dependency was questioned and the awakening started in the third period (Özgen, 2016: 193). Thus, between 1974 and 1998, there has been a period in which various attempts have been made to re-establish the defense industry (Çakır, 2010: 2).

After 1980, a structural transformation process was started in Turkey for the defense industry. A new model has been created to solve the demand of the Turkish Armed Forces' increasing cost and technological requirements. In this context in 1985;

- Defense Industry Development and Support Administration (Turkish Abbreviation: SAGEB) was established to carry out defense industry projects.
- In 1989, Defense Industry Development and Support Administration (SAGEB) was reorganized as the Undersecretariat for Defense Industries of the Ministry of Defense.
- In this period, major defense projects such as F-16 (1987), Armored Combat Vehicle (1988), Mobile Radar Complexes (1990), F-16 Electronic Warfare, HF / SSB Radios, CASA Light Transport Aircraft (1991)

have been carried out (Sallar, 2015: 52).

In the third period, the military foundations and the State have established new companies or supported their establishment through different applications. However, it could not be said that these initiatives were based on any determined policy or strategy. Defense companies established in the said period are as follows (Table 5) (Ziylan, 2001: 2; Yavuzylmaz, 2014: 7-8; Eceral, 2017: 92).

**Table 5:** Defense Companies Established in 1974 – 1998 Period

<b>Company</b>	<b>Establishment Year</b>
Aselsan	1975
İşbir	1979
Aspilsan	1981
Havelsan	1982
TAI	1984
TEI	1985

**Table 5:** Defense Companies Established in 1974 – 1998 Period (Continued)

Mikes	1987
FNSS	1988
Marconi Komünikasyon	1989
THOMSON-TEKFEN	1990

Companies such as Otokar (Sakarya), Mercedes (Ankara / Aksaray), BMC (İzmir İstanbul), Nurol Makina (Ankara) have been established for civil production. These companies shifted their production for defense products after 1985 and new companies were founded under the leadership of private enterprise such as ROKETSAN which was established in 1988 (Sallar, 2015: 52).

It could not have been achieved the desired development with the policies implemented in this period. Because during this period, Turkish Defense Industry lacks the necessary production technologies. At the same time, Turkish Defense Industry had to acquire advanced production techniques and have the ability to design, after obtaining necessary production technologies and capabilities. To make designs based on these technologies, an industry with production technologies and capabilities was a necessity (Yavuzylmaz, 2014: 7). In the 1990s, the Cold War ended and a new sense of security began to form. The fight against separatist terrorism, defense and security has been in Turkey's agenda primarily in those years (Mevlütöğlü, 2016: 12).

#### **3.1.4. Period from 1998 and Afterwards**

In the fourth period after 1998, Turkish Defense Industry Policy and Strategy Principles have gained importance. In order to focus on the necessary technologies, technologies are classified according to their importance. In addition, stages that are more flexible and which protect the national defense industry are included in this policy (Yavuzylmaz, 2014: 8).

In the late 1990s in the light of experience gained within the defense industry development implemented since the 1970s, Turkey required to connect policy and strategy. Based on this decision, the document The Turkish Defense Industry Policy and Strategy Principles (Turkish Abbreviation: TSSPSE<sup>4</sup>) was developed with the experience gained from the development of the defense industry during the period between 1975 and 1988. The document was published in the Official Gazette on 20 June 1998 as the Council of Ministers' Decree No. 98/11173. The Turkish Defense Industry Policy and Strategy Principles has initiated a new era in Turkish Defense Industry (Ziylan, 2001: 4). The fourth period has been continuing since 1985 (because SSM was established in this year) and the international competitiveness has begun to be gained; the Undersecretariat for Defense Industry has been organized according to the needs of the period (SSB Strategic Plan, 2017: 36).

Sünnetçi (2015) stated that the domestic development model gained importance in this period and the dependence on foreign sources decreased. Due to the fact that quantitative values are significant, the decrease in foreign dependency should be emphasized. This situation can be understood from the fact that the rate of meeting the needs of the Turkish Armed Forces from the national level was around 20% at the beginning of the 2000s and this value reached to 60% at the end of 2014 (Özgen, 2016 : 193).

The decision of the Council of Ministers which was published in 1998, forms the basis of the current defense industry strategies. According to the Ministry Decrees', the required technologies are defined in three categories as "National", "Critical" and "Others". According to these definitions, it was decided to develop and produce the "National" and "Critical" requirements with local companies that have confidentiality certificate. This strategy aims to ensure the continuity of the gained technology. This strategy clearly demonstrates its purpose. It aims at the development of national technology and aims to compete at the international level. Aim of the strategy is divided into the following four main topics (Ziylan, 2001: 4-5; SSSSD<sup>5</sup>, 2018: 1).

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<sup>4</sup> TSSPSE: Türk Savunma Sanayi Politikası ve Stratejisi Esasları – 20 June 1998

<sup>5</sup> SSSSD: Savunma Sanayii Sektörel Strateji Dokümanı



- To meet the needs of the armed forces in a safe and stable manner in order to ensure the security of the country
- Production of high technology weapons and vehicles in Turkey
- Establishment of production facilities by establishing necessary technology base
- Encouraging and supporting national defense industry facilities which are already established

The International Cooperation and Export Strategic Plan was prepared by SSB in 2017 and it covers the period until 2021. With this strategic plan, strategic targets of the defense industry are determined by the following five items (UİİSP<sup>6</sup>, 2017: 2-8).

1. To lead the creation of financing models to increase the competitiveness of Turkish companies in international markets
2. To establish a strategic perspective with an integrated approach in international cooperation
3. To carry out studies to ensure maximum utilization of incentives in the financing of marketing
4. To carry out projects that will support the defense industry's promotion, business development and cooperation activities
5. To increase the Contribution of NATO-CNAD (Conference of National Armaments Directors) Activities for International Cooperation and Industrialization Activities

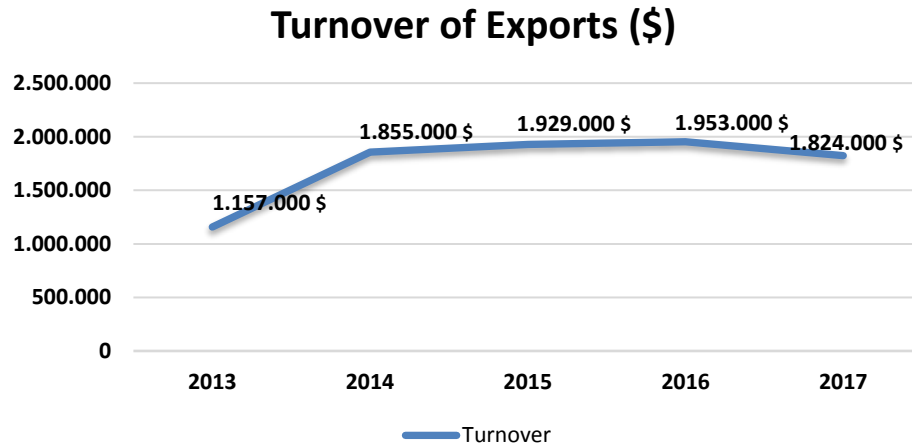
### **3.2. Turkish and World Defense Industry Current Situation**

The defense industry in the world is developing rapidly. In the defense industry sector, aviation has critical importance. Turkey has adapted quickly to this development in recent years. State budgets allocated for this sector have been increased and the importance given to this sector has increased significantly.

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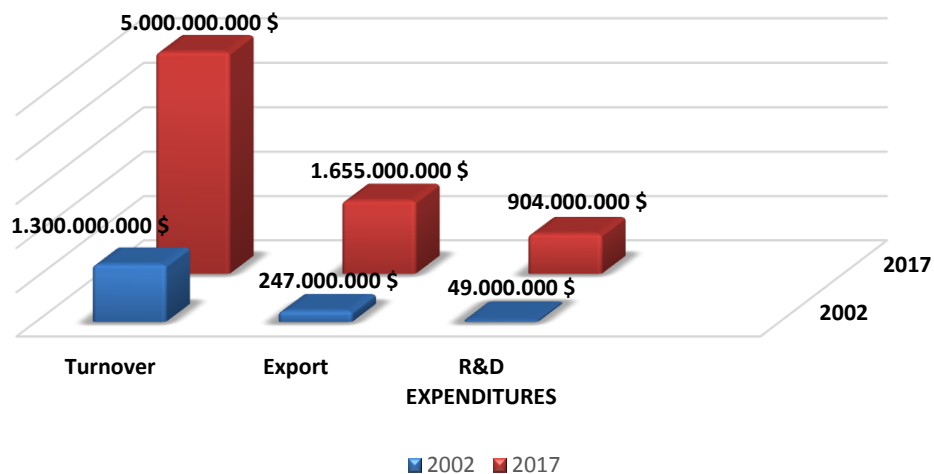
<sup>6</sup> UİİSP: Uluslar Arası İşbirliği ve İhracat Strateji Planı

Defense and aviation exports of Turkey, which were 1,953 million \$ in 2016, declined to 1,824 million \$ in 2017. The decrease in exports is 6,6%. The change in exports has been below expectations since 2014. The progress of exports in the defense and aviation sector between 2013-2017 is demonstrated in Figure 6 (Baran, 2018: 66).



**Figure 6:** Turnover of Exports (2013-2017)

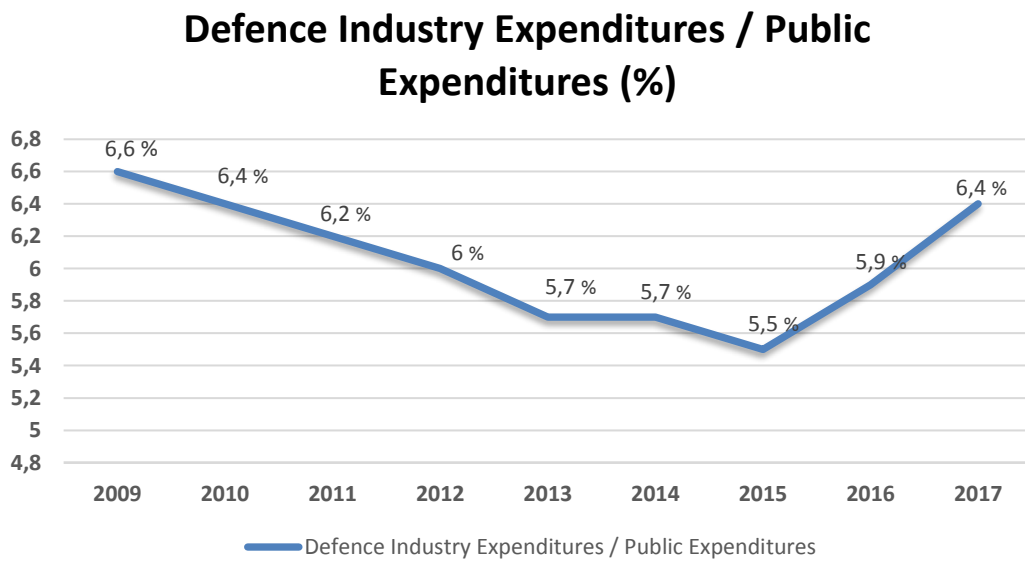
Defense and Aviation sector turnover, export rates and R&D values in 2017 with comparison of 2002 values are demonstrated in Figure 7 (SSB Strategic Plan, 2017: 5).



**Figure 7:** Comparison of Expenditures (2002 / 2017)

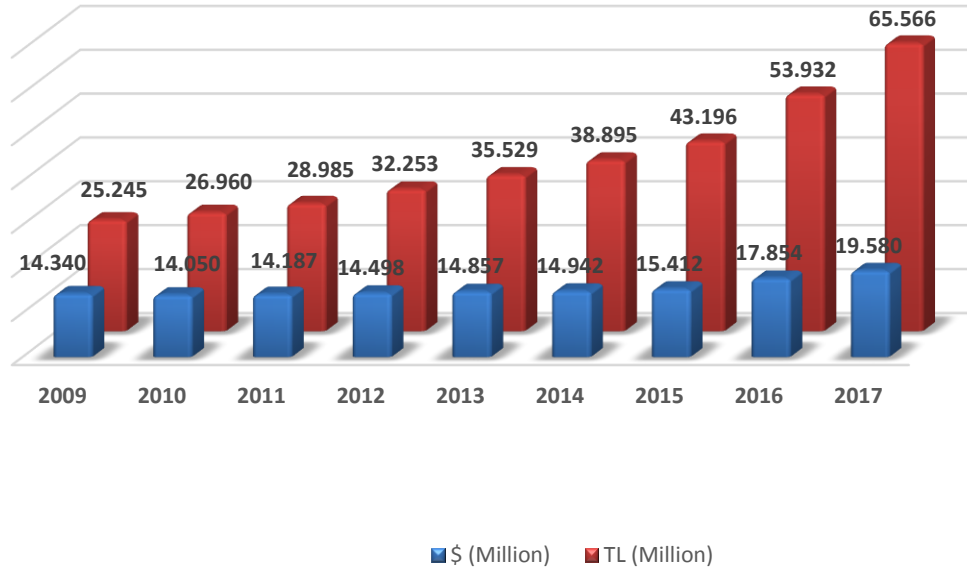
Figure 8 shows the rates of defense expenditures in public expenditures between 2009 and 2017 according to Stockholm International Peace Research Institute (SIPRI) data. These rates indicate a decrease from 6,6% to 5,5% from 2009 to 2015 (Baran, 2018: 64).

The ratio of defense industry expenditures to public expenditures increased to 5,9% in 2016, it reached to 6,4% in 2017 (Baran, 2018: 64).



**Figure 8:** Defense Expenditures Rate in Public Expenditures (2009-2017)

Between the years 2009 and 2017 defense spending in Turkey increased as mentioned in SIPRI 2017 report. The defense expenditures between 2009 and 2017 are shown in Figure 9 in terms of US Dollar (\$) and Turkish Lira (TL) (Baran, 2018: 64).



**Figure 9:** Defense Expenditures (2009-2017)

According to SIPRI's data, Turkey's 2017 defense expenditure ranks as the 15th country in the world. The sum of the expenditures of these 15 countries, which made the highest defense spending, is shown in Table 6. The defense expenditures of these countries accounted for 80% of the world expenditures (Sezgin and Sezgin, 2018: 3).

**Table 6:** Defense Expenditures in World in 2017

	Countries	Defense Expenditure Billion \$	Share in World (%)	Defense Expenditures / GDP (%)
1	USA	610,0	35,0	3,1
2	China	228,0	13,0	1,9
3	Saudi Arabia	69,4	4,0	10,0
4	Russia	66,3	3,8	4,3
5	India	63,9	3,7	2,5
6	France	57,8	3,3	2,3
7	UK	47,2	2,7	1,8
8	Japan	45,4	2,6	0,9
9	Germany	44,3	2,5	1,2
10	South Korea	39,2	2,3	2,6
11	Brazil	29,3	1,7	1,4
12	Italy	29,2	1,7	1,5
13	Australia	27,5	1,6	2,0

**Table 6:** Defense Expenditures in World in 2017 (Continued)

<b>14</b>	Canada	20,6	1,2	1,3
<b>15</b>	Turkey	18,2	1,0	2,2
<b>TOTAL (15 Country)</b>		<b>1.396,0</b>	<b>80,0</b>	<b>-</b>
<b>TOTAL (World)</b>		<b>1.739,0</b>	<b>100</b>	<b>2,2</b>

Between the years 2008 and 2017, 6 out of these 15 countries are the countries which have rapid increase (30% increase). These countries are China, Turkey, India, Russia, Saudi Arabia and Australia. Between 2008 and 2017, defense spending increased by less than 10% in Germany, France and Japan. Italy, United Kingdom and United States reduced defense spending during this period (Sezgin and Sezgin, 2018: 3).

Countries that import weapons, according to SIPRI data, within the scope of Turkey's defense industry between the years 2008-2017, are shown in Table 7. According to the table, the highest import and related defense expenditures are made from the US in 2017 world ranking, followed by South Korea (Baran, 2018: 69).

**Table 7:** Turkish Import of Weapons (2008-2017)

<b>Countries</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>TOTAL</b>
Canada			3	12	9	4					28
China	35	35	35	35	35						175
Denmark					9						9
France						15	8				23
Germany	287	167	126	40	28	13	50	14	2	30	757
Israel	97	320	69	22	9		17	15			549
Italy	30	5	5	13	168	35	69	32	139	92	588
Holland	13	13	13	42	38	67	38			42	266
Norway				12							12
Russia		16	16								32
Saudi Arabia				62							62
South Korea	104	130	181	206	198	165	6	6	6	6	1.008
Spain						135	229	73		146	583
UK	26	26	25								77
USA	49	21	11	333	1009	363	1109	320	201	94	3.510
<b>TOTAL</b>	<b>641</b>	<b>733</b>	<b>484</b>	<b>777</b>	<b>1503</b>	<b>797</b>	<b>1526</b>	<b>460</b>	<b>348</b>	<b>410</b>	<b>7.679</b>

The countries that exports weapons within the scope of the defense industry from Turkey between the years of 2008 and 2017 according to SIPRI data, are shown in Table 8. According to the table, the highest export was made to Turkmenistan with 396 million. Turkmenistan is followed by Saudi Arabia with 333 million (Baran, 2018: 69-70).

**Table 8:** Turkish Exports of Weapons (2008-2017)

<b>Countries</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>TOTAL</b>
Azerbaijan			4	7	20	5	17	9	16		78
Bahrain	2		4		25	11			6		47
Bangladesh	2					3					6
Columbia		4									4
Egypt				4	8						13
Georgia	25	25									50
Kazakhstan					1		6				7
Kosovo							1				1
Kuwait									11		11
Malaysia			32				14	14	24	36	120
Mauritania								1	1		2
Montenegro									0		0
Nigeria	22										22
Oman										28	28
Pakistan	26	7		22	22	22		24		8	131
Philippines			2								2
Qatar						11	22			5	39
Russia								16			16
Rwanda					5						5
Saudi Arabia	26	26	29	33	33	44	39	52	39	13	333
Slovenia		2									2
Tunisia							5		12	12	29
Turkmenistan				20	20	40	40	91	123	62	396
UAE	7		3		10	20	20	80	80	80	300
<b>TOTAL</b>	<b>111</b>	<b>63</b>	<b>72</b>	<b>86</b>	<b>143</b>	<b>156</b>	<b>165</b>	<b>288</b>	<b>311</b>	<b>244</b>	<b>1.639</b>

The general approach of the developed countries in the defense industry and the general approach of the countries when establishing the defense industry is indicated as follows (Ziylan, 2001: 5-6).

- It is argued that the 1% foreign share in the defense industry in the United States should be risky and by applying the existing laws the government should not create such a situation.
- It is known that only 15% of Germany's defense system tenders are contracted by open tendering and the rest is negotiated with one or several national firms. Although it is possible for foreign firms to participate in the tender in Germany, it is stated that three-quarters of the supply contracts are made with national firms.
- In France and Italy, defense industry dominates the state sector. The open tender is not available.
- Tendering is available in the UK but this method is applied to increase the chances of winning the British companies. 90% of the defense contracts are contracted with British companies.

In summary, actually the strongest defenders of liberalism are the US and all EU countries. Although they indicate that they practice free competition in trade and invite all other countries to trade under the conditions of free competition, the real situation in the trade of defense systems is as stated in the laws mentioned above and in the European Parliament report. Turkey, yet despite being a developing country, the defense industry, defense systems are more liberal than necessary compared to the US and traded EU countries. Foreign companies participate in the defense system procurement, if they have residence or find a suitable Turkish partner (Ziylan, 2001: 6).

## CHAPTER IV

### RESEARCH METHODOLOGY

#### 4.1. Multiple Criteria Decision Making

Making the correct decision is one of the fundamental elements of good management. This is because that decisions show how the organization solves its problems, how it uses its resources, and how it reaches its goals (Daft, 1991: 179). The decision maker for individual decisions is a single person. Such decisions are superior when time factor is prioritized and decisions are taken within a short period of time. In individual decision making, the decision maker chooses an alternative from the decision alternatives (Can and Tecer, 1978: 68; Zimmermann, 1987: 45). For group decisions, decisions are made by more than one person in organizations. Thus, it means that many people participate in the decision-making process and that different personal preferences become a single choice. Unlike individual decisions, making group decisions may take a long time. In addition, the responsibility of group decisions is shared among the decision makers, and the question of who has the responsibility arises (Can and Tecer, 1978: 68; Koçel, 2003: 79).

The decision is not a phenomenon that emerged suddenly, it is a process that has passed through various stages. In general, the process is all of a series of actions and works that lead to a certain end. If only the moment of decision is taken, then the investigation and analysis of the reasons leading to that decision will be ignored (Erkiletlioğlu, 2000: 5). Recognizing the need for decision-making is the first stage of the decision-making process and this step is also called sensitivity step. The decision-maker must first acknowledge that there is a situation that requires a decision based on the information received (Koçel, 2003: 83).



There is no single objective or criterion to be considered for the decision-maker. There are multiple objectives or criteria that could be chosen from different options (Mendoza and Prabhub, 2000: 108). Multi-Criteria Decision Making (MCDM) is a powerful decision-making tool that allows the selection of the best alternative from a variety of criteria. In the following sections, some of the frequently used multi-criteria decision-making methods that provide a certain result to the decision-making process are described and the AHP method which is preferred for this study is explained in detail. The methods described in this context are TOPSIS, ELECTRE, AHP, PROMETHEE and GRA-Based respectively. The selected methods evaluated within the scope of the research were decided and the solution method of the research has been decided to be AHP according to expert opinions.

#### **4.1.1. TOPSIS**

TOPSIS is one of the Multi Criteria Decision Making (MCDM) methods and it was first developed by Hwang and Yoon (1981). With this method, the distance of all alternatives from the positive and negative ideal solutions is calculated. The basis of this approach is that the selected alternative is the closest distance to the positive ideal solution and the farthest distance to the negative ideal solution (Chen, 2000: 1-2). In TOPSIS method, criterion values and criterion weights are numerical values. The solution, expressed as an ideal or positive ideal solution, is a solution that maximizes the benefit criterion and minimizes the cost criterion. The ideal solution is that after all of the criteria are met, the preferred alternatives meet these criteria at the ideal level (Uzun and Kazan, 2016: 101). The solution, which is expressed as the ideal or positive ideal solution, is the solution that maximizes the benefit criterion and minimizes the cost criterion. On the other hand, the negative or anti-ideal solution is the one that maximizes the cost criterion and minimizes the benefit criterion (Wang and Elhag, 2005: 2).

The solution steps are performed as follows (Opricovic and Tzeng, 2004: 448-449; Orçun and Eren, 2017: 145–147):

- A normalized decision matrix is created.

- A weighted decision matrix is created.
- Creating Positive Ideal (A +) and Negative Ideal (A-) Solutions
- Calculation of Discrimination Measures / the distances of each alternative from the positive ideal and the negative ideal are calculated.
- Calculation of Proximity to Ideal Solution
- Preferences are sequenced

#### 4.1.2. ELECTRE

The ELECTRE (ELimination Et Choix Traduisant la REalite) method was discovered in 1968 as a result of Bernard Roy's decision-making studies. At the end of the studies on ELECTRE method, six different ELECTRE methods have been developed. Information about the developed ELECTRE methods is given in Table 9 (Maystre and others, 1994: 13).

**Table 9:** ELECTRE Methods in Literature

	<b>Date of Invention</b>	<b>ELECTRE Methods</b>	<b>Developer</b>
<b>1</b>	1968	ELECTRE I	Bernard Roy
<b>2</b>	1971	ELECTRE II	Bernard Roy and P. Bertier
<b>3</b>	1978	ELECTRE III	Bernard Roy
<b>4</b>	1982	ELECTRE IV	Bernard Roy and J.C. Hugonnard
<b>5</b>	1985	ELECTRE IS	Bernard Roy and J.M. Skalka
<b>6</b>	1991-1992	ELECTRE TRI	Bernard Roy and D. Bouyssou and W. Yu

The method can incorporate quantitative and qualitative values together in problem solving. Although there are some differences between ELECTRE methods, the basis of all of them is the comparison of alternatives with each other and the preference of the superior option (Daşdemir and Güngör, 2002: 3). The general application steps of the ELECTRE method are as follows (Bülbül and Köse, 2011: 81–84; Ertuğrul and Karakaşoğlu, 2010: 28–31; Pang and others, 2011: 894–900; Afshari and others, 2010: 3071):

- Decision matrix is created, normalized values are calculated
- Calculation of weighted normalized decision matrix
- Formation of compliance and non-compliance sets
- Calculation of compliance and non-compliance indices
- Comparison of superiority
- Calculation of net compliance and non-compliance indices

#### **4.1.3. PROMETHEE**

The Promethee is a Multi Criteria Decision Making method developed by Brans in 1982, based on the difficulties in other decision making methods in the literature. It has been used frequently in studies on supply chain since its development. The application steps consist of the following seven steps (Brans and Vincke, 1985: 647-656; Brans and others, 1986: 228-238; Araz and Özkarahan, 2007: 585-606):

1. The weight matrix of criteria and alternatives is established.
2. Preference functions are defined for each criterion.
3. Common preference functions are determined based on preference functions.
4. Preference indices are determined for each alternative.
5. Positive and negative superiority are determined for each alternative.
6. Partial priorities are set. These priorities make it possible to determine whether alternatives are preferable to each other.
7. Exact priorities and ranking are calculated for alternatives.

#### **4.1.4. GRA**

GRA theory was developed by Deng in 1982. This theory enables the study of uncertain problems with few data and weak information. (Liu and Forrest, 2007: 111-115). It is used in uncertain situations in multi-criteria decision making problems. And it provides an easier solution in uncertain situations than mathematical analysis methods (Peker and Baki, 2011: 6). This method measures the relationship between criteria based on the degree of similarity and difference. Its most important advantage

is that it provides solutions to problems where the number of data is few and distribution is not normal (Feng and Wang, 2000: 136).

The calculation of the relationship degrees is carried out in six steps as follows (Wu, 2008: 141-142; Ecer and Günay, 2014: 42-43):

1. Creating of decision matrix
2. Creating of comparison matrix
3. Creating of normalization matrix
4. Creating of absolute value table
5. Creating of GRA relational coefficient matrix
6. Calculation of relationship degree

#### **4.1.5. AHP (Analytic Hierarchy Process)**

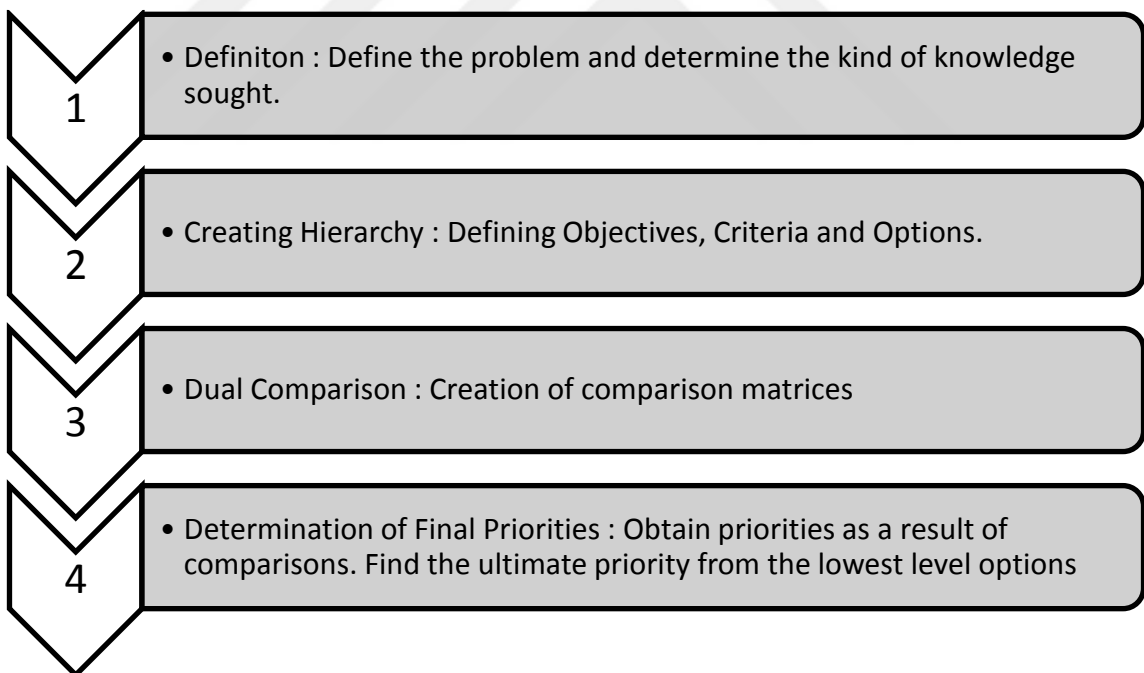
Thinking, problem solving and deciding is an innate ability. We know which problem to solve and we provide the solution. In order to reach the solution, some decisions must be made (Saaty, 2016: 4). According to many authors (Saaty, 1980; Partovi, Burton and Banerjee, 1990; Partovi, 1994; Kannan, 2010) Analytic Hierarchy Process (AHP) concept has been created by Thomas L. Saaty in the beginning of 1970s (Salem and Fantazy, 2014: 311). Saaty (2006:1) defined “*decision-making as the most central and pervasive human activity, intrinsic in our biology and done both consciously and unconsciously*”.

AHP is a quantitative method for the decision maker to rank the decision alternatives and choose the best of them. This method is searching the answer for "which?" question. AHP is a quantitative method for sequencing alternatives. This ranking depends on how well the decision maker compares the criteria (Russel and Taylor III, 2003: 322). AHP is a decision making method that takes into account the subjective criteria. This is the most important reason why it is preferred by decision makers. Qualitative factors are of primary importance in AHP, which is one of the multi-criteria decision making approaches. It is a technique that can combine qualitative and quantitative factors in detailed evaluation of alternatives (Anık, 2007: 13).

#### 4.1.5.1. Analytic Hierarchy Process Implementation Stages

Analytical Hierarchy Process is a multi-criteria decision making technique. This technique is a comparative method that examines problems with a hierarchical structure. An approach is presented where the factors are ranked in a hierarchical structure. This method makes it possible to choose from a limited number of alternatives. It is based on the evaluation of factors related to the decision and calculation of the weights (Kasapoğlu and others, 2006: 44; Felek and others, 2007: 8).

Saaty (2008) states that this process starts with the definition of the problem, continues with the creation of a hierarchy and making comparisons, the process is completed by determining the final priority among the options as it is shown in Figure 10.



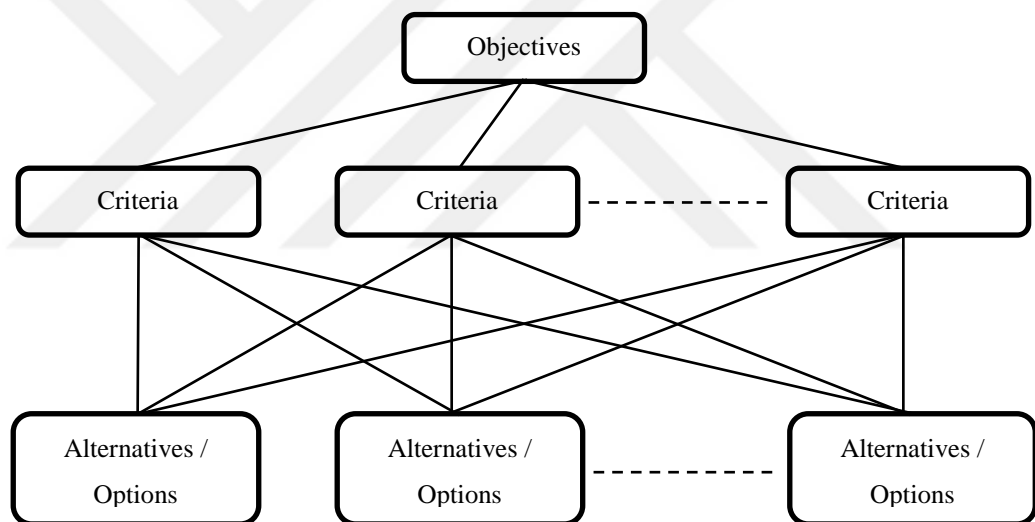
**Figure 10:** AHP Flow Chart (Saaty, 2008: 85)

The implementation stages of AHP were specified by Saaty (1980, 1986, 1990) as follows (Kapar, 2013: 210-212; Arslan, 2017: 1207-1208; Aydın and Eren, 2018: 133-137):

1. Define the problem and objective
2. Define the criteria and options

Saaty recommends that the criteria and comparisons of them with each other should be determined by face-to-face surveys.

3. The objectives, criteria and options should be placed in a certain hierarchical order as it is shown in Figure 11.



**Figure 11:** Hierarchical Structure of AHP (Saaty, 2000)

4. The values in Table 10 is used to determine which of the alternative is the dominant one against to the other one. As a result of this comparison an  $(n \times n)$  matrix (square matrix) is obtained.

**Table 10:** The fundamental scale of absolute numbers (Saaty, 2008: 86)

<b>Intensity of Importance</b>	<b>Definition</b>	<b>Explanation</b>
1	Equal Importance	Two activities contribute equally to the objective
2	Weak or slight	
3	Moderate importance	Experience and judgment slightly favor one activity over another
4	Moderate plus	
5	Strong importance	Experience and judgment strongly favor one activity over another
6	Strong plus	
7	Very strong or demonstrated importance	An activity is favored very strongly over another; its dominance demonstrated in practice
8	Very, very strong	
9	Extreme importance	The evidence favoring one activity over another is of the highest possible order of affirmation

It is important to determine priorities in this step. The importance of each criterion may be equal or different. The importance of the criteria should be determined in accordance with the purpose because a proper comparison will ensure that the accuracy of the solution is more accurate (Ballı and others, 2009: 18).

5. In order to normalize each column in the binary comparison matrix, column totals are taken and normalized matrix is generated. Each number in the matrix is divided into column totals and with this way the matrix will be normalized.
6. Priority vector matrix is obtained by taking the row totals of the normalized matrix.
7. The weighted total matrix is obtained, multiplying the priority values in the priority matrix by the column elements of the comparison matrix.

8. The sum of the row values of the weighted total matrix is divided by the line values of the priority vector matrix. Arithmetic mean is calculated by the matrix (n x 1) which is obtained by this method. Thus, priority values of the criteria or alternatives are obtained.
9. Consistency Index (CI) is calculated according to the below formula (Saaty, 1990: 13):

$$CI = (\lambda_{\max} - n) / (n-1)$$

10. The Consistency Ratio (CR) can be calculated by the combination of the Random Consistency Index (RI) (Table 11) and the CI values (Saaty, 1980).

$$CR = CI / RI$$

CR: Consistency Ratio

RI: Random Index

**Table 11:** Random Consistency Index (RI) (Saaty, 1980)

N	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
R	0	0	0.58	0.9	1.12	1.24	1.32	1.41	1.45	1.49	1.51	1.48	1.56	1.57	1.59

11. The consistency ratio should be less than 0,1. Otherwise, binary comparison matrix should be checked.
12. The priorities that result from binary comparisons are multiplied for each alternative and requested last priority value can be calculated.

#### 4.1.5.2. Basic Axioms of the Method

Analytic Hierarchy process consists of four axioms (Saaty, 1986: 844; Saaty, 2016: 30-31; Kuruüzüm and Atsan, 2001: 85), which are defined below.



### **Axiom 1 - Reciprocal Judgments**

The decision-maker must fulfill the reciprocal condition when making comparisons and determining the degree of preferences. The inverse of the values shown in Table 10 is expected as  $1/3$ ,  $1/5$ ,  $1/7$  and  $1/9$ .

### **Axiom 2 - Homogeneous Elements**

Criteria must not be too different to prevent the occurrence of logical errors. One of the criteria cannot be considered infinitely superior to the other. The values to be used for comparison are shown in Table 10 as 1, 3, 5, 7 and 9.

### **Axiom 3 – Hierarchical Dependency Structure**

It is the axiom of being independent which refers to the fact that the priorities of the elements in a hierarchical structure are independent of the priorities of those in another level. This axiom is based on the creation of the hierarchical structure in Figure 11.

### **Axiom 4 - Rank Order Expectations**

Each criterion and alternative affecting the current decision problem must be shown in the hierarchy. In other words, in order for the outcome to be in line with the expectations of the decision-maker, the judiciary and the opinions must be properly represented.

## CHAPTER V

### RESEARCH FINDINGS

#### 5.1. Semi-Structured Interviewees

The outsourcing criteria of a big-scale defense industry company has been analyzed within the scope of this research. The reasons for preferring the external source of the company, which is the 'buy' decision instead of 'make' have been evaluated. This strategy is actually preferred in many different sectors and of course, the strategy is highly preferred in the defense industry. But there are some criteria that differ from other sectors. Even if the criteria are the same, the degree of priority may differ.

Defense industry symbolizes the existence of a country's power. Because projects are carried out for a specific mission, a criterion such as cost can lose its importance or major investment costs may not be avoided. This usually directly affects the benefits of the country.

The four questions determined by expert opinion were evaluated by 6 different semi-structured interviews with 7 different participants. Two of the participants are Aerospace Engineers, one is a Military Helicopter Pilot, one is a International Finance, one is a Bachelor of Commerce, one is an Electrical and Electronics Engineer and one is a Mechanical Engineer. All participants were male, mean age was forty-five years and average experience was twenty three years. As a result of interviews conducted with 7 executives in the sector, 9 different criteria were determined for the decision of outsourcing of defense industry companies. The determination of these criteria was carried out by interviews with senior executives. Total of seven people were interviewed, five of whom were executives, one of them was a senior executive and

one of them was a retired senior executive. The participants who have been working as an executive have an average of 15 to 20 years of experience in the sector. The participants who are senior executives, have more than 30 years of defense industry experience.

Each interview has been conducted with one executive. Interview No.4 has been completed with the two executives in common. Semi-structure type of interview was conducted with the participants and four different questions were asked. The four questions mentioned below were evaluated by the participants.

1. How do you define outsourcing?
2. In which sectors is outsourcing preferred?
3. What are the advantages of outsourcing and which reasons make outsourcing preferable?
4. What are the risks and disadvantages of the outsourcing process?

Within the scope of these interviews, with these questions, the meaning of outsourcing, the factors affecting the outsourcing process were evaluated, the advantages and disadvantages of the process were discussed. It has been observed that similar answers are provided by the interviewees which is discussed in the below section.

## **5.2. Findings from the Interviews**

According to the interviews, outsourcing is defined as:

*“the transfer of a function to an external resource due to some constraints of an organization. These constraints can be defined as cost, capacity or strategy. In summary, it is the situation of getting help from a supplier due to requirements” (Interviewee 3)*

*“the situation where a a good or service is supplied from domestic or foreign markets. Undoubtedly, domestic procurement is the main objective of both us and state strategies” (Interviewee 4)*

*“It is the procurement of a product which is not within the company, requires expertise or due to its cost” (Interviewee 5)*

As a result of all interviews, a common definition has been reached, which is the procurement of a good or service from external sources according to requirements of organization.

With the second question, the opinions of the participants on the sectors in which outsourcing was preferred was taken. In general, the participants stated that outsourcing is mostly preferred in automotive and IT industries, and besides in some other manufacturing industries:

*“It is preferred in every sector where many components come together and form the final product. This example most closely evokes the automotive sector. Many different products require very different specialties from each other in the sector. In order to proceed, it is necessary to work with the companies who are experts in their own fields. It is also used extensively in the electronics industry. An electronic device is a combination of many components. This strategy is preferred for the assembly of semi-finished products for finalizing a device” (Interviewee 1).*

*“It is preferred in the automotive sector. A large variety of products and high sales circulation are the main factors that makes outsourcing necessary. Very much product sales are required for profitability in the automotive sector and this issue brings the necessity to work in an organized way. The establishment of this organized flow can be made possible by outsourcing support. The second important sector in this sense is the civil aviation sector. The difference from the defense industry is that the first criterion is profitability. Profitability depends on avoiding investment costs and cheap labor” (Interviewee 2).*

*“It is preferred in the construction, automotive, pharmaceutical production sector. In fact, a certain distinction can not be made because it is preferred in every sector. Every company is implementing this strategy due to desire to reach low cost level” (Interviewee 3).*

*“This strategy is applied in automotive, white appliances, electronics, and many other sectors. In fact, it cannot be said that it is more applied especially in any sector. Since outsourcing does not have any disadvantages, it should be preferred in every sector” (Interviewee 4).*

*“It is preferred in the automotive sector and IT sector. The IT sector realizes solution-oriented projects. Therefore, it can be said that the rate of preference in the IT sector is higher” (Interviewee 5).*

*“It is preferred in the automotive sector and IT sector. The IT sector realizes solution-oriented projects. Therefore, it can be said that the rate of preference in the IT sector is higher. It requires outsourcing support because it requires a lot of different areas of expertise such kind of sectors. Outsourcing agreements are made by making a successful business share” (Interviewee 6).*

Within the scope of the third question, participants were asked about the reasons and advantages of outsourcing. The answers were evaluated for the criteria that led to the decision of outsourcing an organization.

During the interviews, the participants were not informed about the exiting outsourcing criteria in the literature, which is shown in Table 12. Eight criteria in the literature and one sector-specific criterion were determined with the expressions of the participants.

**Table 12:** Outsourcing Criteria in Literature

<b>CRITERIA</b>	<b>REFERENCES</b>
Gaining New Skills	Genç, 2004: 215-216; Bragg, 2006: 2).
Reducing Costs	Lacity,1993:127; Mersin, 2003: 33; Lacey and Blumberg, 2005:15
Achieving Better Management	Çoroğlu, 2002: 22; Genç, 2004: 215-216; Bragg, 2006: 2
Quality Improvement	Kavrakoğlu, 1993: 105; Bragg, 2006: 2
Focus on Strategy	Karacaoğlu, 2001: 15-16; Phelps and Fleischer, 2002; Koçel, 2003: 387; Bragg, 2006: 2
Focus on Core Functions	Greaver, 1999: 3; Dinçer, 2004: 217; Bragg, 2006: 3
Avoiding Major Investment	Gençyılmaz and Zaim, 2000: 130; Vassard, 2002: 1; Bragg, 2006: 3

**Table 12 – Outsourcing Criteria in Literature (Continued)**

Handling Overflow Situation	Bragg, 2006: 4
Improving Flexibility	Quelin and Duhamel, 2003: 654; Rodriguez and Robania , 2004: 287-306; Bragg, 2006: 4
Enhancing Credibility	Bragg, 2006: 5
Maintaining Old Functions	Bragg, 2006: 5
Performance Improvement and Capacity	Bragg, 2006: 4; Rodriguez and Robania , 2004: 287-306; Bragg, 2006: 6
License Strategy	Fernandez and Neuenschwander, 2003; Pindyck, 2017: 26-27
Downsizing Organizational Structure and Assisting a Fast-Growth	Savaş, 1987: 182; İlter, 2002: 52; Bragg, 2006: 3

According to the interviews, “**Gaining New Skills**” is considered to be one of the reasons for outsourcing and its importance is emphasized by the participants. It is stated that it is important, especially in terms of closure of lack of information.

*"in order to achieve the project requirement, it may be necessary to reach some technologies. If this technology which is to be reached is not in line with the main activity of the company, it is considered as a function to be transferred to the external resource. These products which are obtained through external sources, are brought together within the company and the final product is obtained". (Interviewee 1)*

*“External resource can be used to gain a capability. On the other hand, an outsourcing strategy can also be implemented in order not to gain a talent. You can get support from any company in order to gain a new capability if you have the license of your own product. A design project in conjunction with a specialized design firm will enable you to acquire new capabilities. These gains will positively affect the projects to be done in future”. (Interviewee 3)*

*“The company which allocates all its resources for its main activity, can now use its resources to acquire new capabilities. The company can now buy new technologies, can improve this on its own”. (Interviewee 4)*

*“You may need to acquire a new feature in the project you are running. Therefore, you will need to purchase this technology and take the first step. It is also very important to give this decision in the beginning and correctly. In case of need of a technology that does not exist in Turkey, this strategy is very important. You can gain this ability by working with a partner. In time, by transferring this to external resources, you can bring this capability to the country”.* (Interviewee 5)

“**Cost reduction**” is one of the main reasons for the use of outsourcing for many sectors. This factor is stated to be important for the defense industry. However, there are some issues that distinguish defense industry from other sectors. It is stated that the companies should complete some tasks in a timely manner, due to the mission of the defense industry firms. At this stage, it was emphasized that some criteria such as cost can be ignored.

*“The first outsourcing criterion of the firms is cost. However, due to the intense tensions in the southern borders, the concept of cost has ceased to be the first criterion for the defense industry sector. Sometimes more costly and faster solutions can be preferred. The urgency of the needs raises the need for fast delivery”*( Interviewee 1)

*“Cost is of course an important criterion, but for the Turkish defense industry, the first criterion for the moment is not cost”* (Interviewee 2)

*“Timely response to request and responding with the appropriate product are more important than cost”* (Interviewee 3)

*“The priority of the cost is low because the defense industry firms work in line with a certain mission. However, it is evident that it is not possible to maintain firm continuity by ignoring the cost for a long time”.* (Interviewee 5)

Furthermore, it is stated that “quality” is important in every sector but it is more important in defense industry. Due to the quality standards, it is frequently encountered that the work is outsourced. The aim is to provide some standards. However, it is

emphasized that this situation causes additional audits, control mechanisms and costs. Therefore, **“Quality Improvement”** is another criterion suggested by the interviewees.

*“Quality is important in every sector but this is much more important in the aviation industry. There are standards to be provided and the product must be acquired through the companies providing these standards. Briefly, quality is the only criteria that cannot be compromised during all these processes. Reaching a higher quality product is a sufficient reason to transfer the functions to the external source”.* (Interviewee 1)

*“Quality is an important standard. There are costs to achieve these standards. It may be an appropriate decision to transfer these functions to a supplier who can provide the same standards”*( Interviewee 2)

*“Another important criteria is quality. Quality is a matter that should not be compromised in every sector. This is much more important in the aviation industry. In the defense industry, it is fatally important. External resources can be used to provide a standard . The certification process required for these standards may also require an outsourcing. Especially when you transfer a production to external sources, quality is of high importance. What is important here is that the external source adapts to you. It must be transferred to approved sources providing certain quality standards”.* (Interviewee 5)

All participants stated that outsourcing decisions were taken in line with the company strategy. One of the most important points is undoubtedly the company strategy. It has been said that this criterion contains many criteria and it is a decision taken by the senior management. **“Focus On Strategy”** is considered to be one of another reason for outsourcing and its importance is emphasized by the participants.

*“An Important reason is to focus on the main function and strategy by avoiding high investment costs”* (interviewee 1)



*“Companies that prefer the role of integrator should focus only on their main activities. External resources can be preferred for non-core activities”.*

**(Interviewee 3)**

*“Expertise in the defense industry sector is very important. In this sense, even engineering and design works can be transferred to external sources”.*

**(Interviewee 5)**

*“This process can be turned into an opportunity for localization. At this point, state strategies are becoming more important than company strategies”.*

**(Interviewee 6)**

**“Avoiding Major Investment”** is also proposed as an important criterion by the interviewees because of defense industry investment costs. It is stated that the transfer to the external source is evaluated together with other contributions, and it is possible to approve new investment if a new capability is gained. This criterion is evaluated with many different criteria together. However, it was emphasized that a decision was reached after this evaluation.

*“An Important reason is to focus on the main function and strategy by avoiding high investment costs”.* **(interviewee 1)**

*“Another important criterion is to ensure that investment costs are made in line with the main activities. Instead of making this investment, the transfer of the work to external resources can also be evaluated. Investments should be made for functions that are really needed. Decisions should be made in accordance with the strategy and main activities of the company and these strategies should be decided according to detailed analyzes”.* **(Interviewee 2)**

*“Under this strategy you will avoid unnecessary employment and investments”.* **(Interviewee 5)**

In addition, it has been stated that the strategies of the defense industry firms are long-term. But the demand is changing due to the sudden needs of the state. It is emphasized outsourcing is preferred in order to answer these sudden demands. **“Handling**

**Overflow Situation**” is one of the main reasons for the use of outsourcing for many different sectors.

*“Sometimes more costly and faster solutions can be preferred. The urgency of the needs raises the need for fast delivery”.* (Interviewee 1)

*“The period workload may increase and the need for engineering in these periods may increase. This may occur in the high-engineering area, which requires the design requirement. These types of peaks may be encountered in certain periods of the projects. These immediate needs must of course be satisfied by the company. It is not reasonable to provide the manpower required before these requirements arises. Because this is a seasonal requirement and does not have continuity. The balancing of the seasonal need can be eliminated by outsourcing engineering services. This need is generally preferred from foreign sources due to limited domestic resources”.* (Interviewee 2)

*“When you foresee an insufficient situation, outsourcing will be a reasonable solution”.* (Interviewee 5)

Besides, it is stated that there are some functions that make each organization privileged. These activities are defined as the core functions in the literature. The most important point is that these functions should not be transferred to the external source. It is stated that activities supporting these functions can be transferred to external sources. In particular, it is considered that the outsourced company is generally used for activities outside the scope of its expertise. **“Maintaining Old Functions”** is another important criterion suggested by the interviewees.

*“Another criterion is the old functions that must be maintained. These functions must of course continue. However, its added value is low and now it has become a serious burden. At this point, outsourcing will be an appropriate strategy”.* (Interviewee 2)

*“If it is a function that you do not aim to specialize, you should definitely transfer it to the external source. The most obvious example of this is titanium works. Hard forming is quite difficult and capable of work. There is a high requirement for defense industry companies. Although this function is not the primary capability of the firm, it must continue. This continuity can be maintained with the support of an external source”.* (Interviewee 3)

*“Many defense industries are transferring the side functions to external resources to avoid investment costs. Actually, nowadays the most of the big size companies transfers its own production machines to its suppliers. Production techniques are shared with all details and the aim here is to provide the same product. Thus, the company can focus on the main function and all the side works required for the final product can be transferred to the suppliers”.* (Interviewee 4)

*“It is also important to keep the supporting functions necessary for the main function to continue. In this sense, allocating resources to supporting functions will be meaningless. It is reasonable to transfer it to the external source because it is not a target of specialization”.* (Interviewee 5)

The strategies of defense industry firms are planned as long-term as previously mentioned. Therefore, it is stated that capacity problem should not be experienced. However as stated before, the state may have immediate and urgent demands. For these requests, the method of increasing the **“Performance and Capacity”** can also be used. And it is stated that it may be preferable to use an outsourcing for this increase.

*“If the resources are insufficient, the company may choose to invest if this function is an area that the firm aims to specialize”.* (Interviewee 1)

*“Another important criterion is to ensure that investment costs are made in line with the main activities. Instead of making this investment, the transfer of the work to external resources can also be evaluated. Investments should be made for functions that are really needed. Decisions should be made in*

*accordance with the strategy and main activities of the company and these strategies should be decided according to detailed analyzes". (Interviewee 2)*

*"Outsourcing is very important in setting long-term resource utilization. You have to adjust your manpower and capacity". (Interviewee 5)*

The interviewees opinions were compared with the outsourcing criteria in the literature and it was determined that eight of the fourteen criteria in the literature were mentioned in the interviews. In addition to these eight criteria, one sector-specific criterion was also mentioned by the interviewees. Since there is no criterion in the literature corresponding to it in the literature, this criterion is defined as "SSB Strategy" representing government strategies.

All of the participants stated that the strategy of the state has the most important effect. It is emphasized that the state strategies are parallel with the company strategies, but they have higher priority than company strategies. All participants stated that, this criterion which is defined as "**SSB strategies**", was the most important factor for outsourcing decision.

*"State strategies set a route for defense industry firms. The most obvious of these is the localization activities. A certain proportion of the works are required to be transferred to local firms. The aim here is to develop small / medium-scale firms by doing the jobs of large industrial companies. These strategies are clearly specified in the contracts of the projects. The ratio of the work to the external source is specified in contract". (Interviewee 1)*

*"Localization activities are one of the most important strategies implemented under the control of Presidency of Defense Industry by defense industry firms. In order to obtain a new technology or gain a new capability, a product supplied from abroad should be started to be produced locally in the long term. This strategy is planned to have two major gains. The first is the acquisition of skills that have not yet been achieved. The other is the development of small-scale companies by transferring some of the functions of large industrial companies to external sources". (Interviewee 2)*

*“Institutions as Land Forces Command, Air Force Command, Command of the Navy, etc... affiliated to the Defense Industry Presidency are the customers of defence industry companies. A developed product takes shape in line with the demand of the customers. The Defense Industry Presidency is forwarding these demands to the defense industry companies. In order to meet some requirements, it is necessary to reach new technologies. At this point, outsourcing is becoming a necessity rather than a preference.*

*In addition, the strategies applied by the Defense Industry Presidency also directs the preferences of the defense industry companies. The localization strategy is one of the most important examples of this. At the beginning of the process, a contract with all details is signed with the Defense Industry Presidency. The specification of the product to be developed and the ratio of work to be transferred to domestic companies in this contract is clearly stated. With the strateg, small and medium-scale companies are also self-improving when a product is obtained. At this point you have to transfer some functions to the external source even if they are within your ability. The important point here is that the work will be transferred to domestic resources”.* **(Interviewee 3)**

*“In the country, unfortunately the industrial production sector has not developed yet at the desired level. State strategies are aimed at the development of defense industry firms, as well as small-scale producers. Some of the works taken here have to be transferred to small scale producers even if they are not preferred. Of course, the result and advantages of the strategies will be noticed after a long time. All developed countries have implemented these strategies”.* **(Interviewee 4)**

*“In case of need of a technology that does not exist in Turkey, this strategy is very important. You can gain this ability by working with a partner. In time, by transferring this to external resources, you can bring this capability to the country. Here, the strategy of the company and the country is very important. These decisions should be taken together with the decisions of the relevant state departments”.* **(Interviewee 5)**

*“Outsourcing is sometimes a necessity. If the selection of Turkish armed forces is in question, outsourcing may become a necessity. The specifications the Turkish Armed Forces wants to be on the platform may not be within the capabilities. As an integrator, it is your primary duty to reach this system. It is a must to reach this system and to integrate into the platform within the contracts. This may sometimes lead you to domestic or foreign procurement process”.*( **Interviewee 6**)

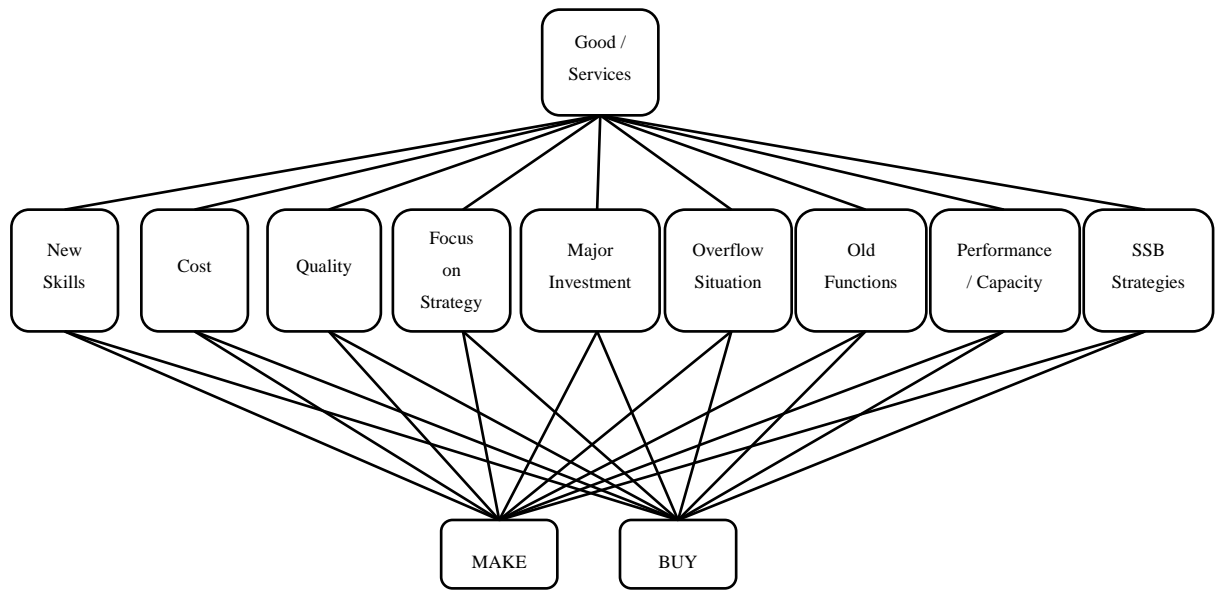
Thus, according to the experts’ common opinion, the following nine criteria are defined as criteria for outsourcing:

1. Gaining New Skills
2. Reducing Costs
3. Quality Improvement and Development of audits
4. Focus on Strategy
5. Avoid Major Investment
6. Handling Overflow Situation
7. Maintaining old functions
8. Performance and Capacity Improvement
9. Strategy and Obligations of Savunma Sanayi Başkanlığı (SSB)

### **5.3 AHP Analysis**

It was decided to implement a multi-criteria decision making method to determine the priorities of the identified criteria. Three important multi-criteria decision making methods (TOPSIS, ELECTRE and AHP) are described in the previous section of this study. The most suitable method for this research was decided to be AHP according to expert opinions.

First of all, the purpose, criteria and alternatives must be identified correctly. Criteria suggested by expert opinions are determined for a purpose. The purpose here is of course to reach a good or service as a result of make or buy strategies. The flow which will guide the whole of the research is as indicated in Figure-12.



**Figure 12:** Hierarchical Outsourcing Criterion Structure of the Study

The criteria were compared with each other and bilateral comparisons were performed as described in the literature. Bilateral comparisons were made with the six experienced program leaders in the selected company. As a result of these comparisons, similar results were encountered.

### 5.3. Definition and Comparison of the Criteria

In line with the common answers of the interviewees, nine criteria were determined as the research subject of this study. The participants declared their opinions about all of these nine criteria, but the importance was not evaluated.

The comparison of the criteria was carried out with the participation of six Program Leaders who have at least 10 years experience in the company. One of the participants is an Aerospace Engineers, one is a Flight Engineer, two are Industrial Engineer, one is an Electrical and Electronics Engineer and one is a Metallurgy and Material Engineer. One of the participant was female and the other five were male. mean age was thirty-seven years and average experience was fourteen years. All participants were interviewed separately so as not to affect each other's answers. The answers were

scored between 1 and 9 as described in the literature, and thus the priorities of the criteria were determined as shown in Table 13.

**Table 13:** Pairwise Comparison Table

	Gaining New Skill	Reducing Cost	Quality Improvement	Focus on Strategy	Avoiding Major Investment	Handling Overflow Situation	Maintaining Old Function	Performance/ Capacity	SSB Strategy
Gaining New Skill	1	7	1/3	1	5	2	3	5	1/3
Reducing Cost	1/7	1	1/7	1/5	1	1/5	1/3	1/2	1/9
Quality Improvement	3	7	1	1	5	3	3	3	1/2
Focus on Strategy	1	5	1	1	5	2	3	3	1/2
Avoiding Major Investment	1/5	1	1/5	1/5	1	1/3	3	1/3	1/7
Handling Overflow Situation	1/2	5	1/3	1/2	3	1	1	2	1/3
Maintaining Old Function	1/3	3	1/3	1/3	1/3	1	1	1	1/5
Performance/ Capacity	1/5	2	1/3	1/3	3	1/2	1	1	1/5
SSB Strategy	3	9	2	2	7	3	5	5	1

The comparisons determined by the 6 participants were as stated at the above Table 13 and all of the criteria were scored. The diagonal of the Table represents that the criteria are equal to each other.



#### 5.4. Normalization Process for the Criteria

The normalization process is the first step in calculating the consistency of the study. Within this step, the sum of each column is calculated. The priority of the criteria against each other is divided into column totals. This process is applied for each cell and the values are normalized by this method.

**Table 14:** Normalized Matrix

	Gaining New Skill	Reducing Cost	Quality Improvement	Focus on Strategy	Avoiding Major Investment	Handling Overflow Situation	Maintaining Old Function	Performance/ Capacity	SSB Strategy
Gaining New Skill	0,1067	0,1750	0,0587	0,1523	0,1648	0,1535	0,1475	0,2400	0,1004
Reducing Cost	0,0152	0,0250	0,0252	0,0305	0,0330	0,0153	0,0164	0,0240	0,0335
Quality Improvement	0,3200	0,1750	0,1762	0,1523	0,1648	0,2302	0,1475	0,1440	0,1506
Focus on Strategy	0,1067	0,1250	0,1762	0,1523	0,1648	0,1535	0,1475	0,1440	0,1506
Avoiding Major Investment	0,0213	0,0250	0,0352	0,0305	0,0330	0,0256	0,1475	0,0160	0,0430
Handling Overflow Situation	0,0533	0,1250	0,0587	0,0761	0,0989	0,0767	0,0492	0,0960	0,1004
Maintaining Old Function	0,0356	0,0750	0,0587	0,0508	0,0110	0,0767	0,0492	0,0480	0,0602
Performance/ Capacity	0,0213	0,0500	0,0587	0,0508	0,0989	0,0384	0,0492	0,0480	0,0602
SSB Strategy	0,3200	0,2250	0,3523	0,3046	0,2308	0,2302	0,2459	0,2400	0,3011

The matrix to be used in the next step is the normalized matrix as is shown in Table 14. The four digits after the comma are included in the calculations so that sensitivity can be measured as much as possible. And the same method will be applied throughout the calculations.

The sum of the rows of the normalization matrix is calculated, the value found is divided by the number of criteria. In other words, a matrix is obtained by calculating the average of each line. With this calculation a priority matrix is obtained as shown in Table 15. It can be observed in the Table that, which criterion is more prior than the other.

**Table 15:** Priority Vector Matrix

	Gaining New Skill	Reducing Cost	Quality Improvement	Focus on Strategy	Avoiding Major Investment	Handling Overflow Situation	Maintaining Old Function	Performance / Capacity	SSB Strategy
PRIORITY VECTOR	0,1443	0,0242	0,1845	0,1467	0,0419	0,0816	0,0517	0,0528	0,2722

### 5.5. Consistency Measurement Process

Even if Analytical Hierarchy Process has a consistent systematic within itself, the realism of the results depends on the scoring of the participants among the criteria. As an example, assume that the Criteria A is two times more important than the Criteria B and criteria B is three times more important than the criteria C. In this case, the criteria A must be 6 times more important than the C criteria. However, if the participant does not respond within this logic, the consistency ratio will decrease. At this point according to AHP, if the CR value is greater than 0,1, the analysis is inconsistent.

AHP proposes a process for measuring this consistency ratio. The consistency of the comparison is calculated with the CR value obtained at the end of the transaction. And weighting is performed to obtain a more consistent result.

The first step is to create a weighted matrix. The values to be used in this process are the value in the Priority Vector Matrix and Pairwise Comparison Matrix of that criterion. If the Criteria - Gaining New Skill is to be calculated, it is expected that the 0,1443 value of this criterion (Shown in the Table 15 Priority Vector Matrix) will be multiplied with 1 value (Shown in the Table 13 Pairwise Comparison Table).

**Table 16: Weighted Matrix**

	Gaining New Skill	Reducing Cost	Quality Improvement	Focus on Strategy	Avoiding Major Investment	Handling Overflow Situation	Maintaining Old Function	Performance/ Capacity	SSB Strategy
Gaining New Skill	0,1443	0,1696	0,0615	0,1467	0,2095	0,1632	0,1551	0,2642	0,0907
Reducing Cost	0,0206	0,0242	0,0264	0,0293	0,0419	0,0163	0,0172	0,0264	0,0302
Quality Improvement	0,4330	0,1696	0,1845	0,1467	0,2095	0,2448	0,1551	0,1585	0,1361
Focus on Strategy	0,1443	0,1211	0,1845	0,1467	0,2095	0,1632	0,1551	0,1585	0,1361
Avoiding Major Investment	0,0289	0,0242	0,0369	0,0293	0,0419	0,0272	0,1551	0,0176	0,0389
Handling Overflow Situation	0,0722	0,1211	0,0615	0,0734	0,1257	0,0816	0,0517	0,1057	0,0907
Maintaining Old Function	0,0481	0,0727	0,0615	0,0489	0,0140	0,0816	0,0517	0,0528	0,0544
Performance/ Capacity	0,0289	0,0485	0,0615	0,0489	0,1257	0,0408	0,0517	0,0528	0,0544
SSB Strategy	0,4330	0,2180	0,3690	0,2934	0,2933	0,2448	0,2584	0,2642	0,2722

These processes are applied for all criteria and the matrix specified in Table 16 is obtained. Line averages are calculated for each criterion specified in the matrix. Weighted Sum Matrix is obtained by this method as indicated in Table 17 below.

**Table 17:** Priority Matrix

	<b>CORRESPONDING PRIORITY</b>
<b>Gaining New Skill</b>	9,733868
<b>Reducing Cost</b>	9,603915
<b>Quality Improvement</b>	9,960306
<b>Focus on Strategy</b>	9,671512
<b>Avoiding Major Investment</b>	9,545599
<b>Handling Overflow Situation</b>	9,602446
<b>Maintaining Old Function</b>	9,39768
<b>Performance/ Capacity</b>	9,713576
<b>SSB Strategy</b>	9,721793
<b>TOTAL</b>	<b>86,95</b>

The total value obtained in the Corresponding Priority in Table 17 is divided by the number of criteria. Thus, an Average Value of 9,661188343 is obtained.

$$CI = \frac{\lambda - n}{n - 1} \quad CR = \frac{CI}{RI}$$

CI and CR values are calculated by the above-mentioned formulas and the following Consistency Indicator and Consistency Ratio results are obtained.

$$CI = 0,082649$$

$$CR = 0,056999$$

At this point, it is very important that the consistency ratio is below 0,1 value. If the value obtained is above the limit, it requires review of the transactions. If there is no error in the transactions, it will be determined that the participants did not respond consistently. In both cases, AHP will not achieve a consistent result and the analysis

will lose its validity. Since the calculated CR value is at the desired limits, the sequence obtained is as follows in Table 18.

**Table 18:** Priority Vector of the Criteria

	PRIORITY VECTOR	RANKING
Gaining New Skill	0,1443	4
Reducing Cost	0,0242	9
Quality Improvement	0,1845	2
Focus on Strategy	0,1467	3
Avoiding Major Investment	0,0419	8
Handling Overflow Situation	0,0816	5
Maintaining Old Function	0,0517	7
Performance/ Capacity	0,0528	6
SSB Strategy	0,2722	1

According to the results of the analysis, it was determined that the most important criteria were the SSB Strategies. Due to the issues stated in the interviews, the cost was expected to be of low priority. As a matter of fact, the expected result was encountered.

## 5.6. Definition and Comparison of the Alternatives

Two different alternatives are available for the following 9 criteria. The Make and Buy alternatives should be evaluated for each of the below criterion.

1. Gaining New Skills

2. Reducing Costs
3. Quality Improvement and Development of audits
4. Focus on Strategy
5. Avoid Major Investment
6. Handling Overflow Situation
7. Maintaining old functions
8. Performance and Capacity Improvement
9. Strategy and Obligations of Presidency of Defence Industry (SSB)

Six separate interviews were conducted with six program leaders for the alternatives seen in Figure 12. Make and Buy alternatives were scored and performed separately for each criterion within the scope of the interview. As a result of the evaluations, the results stated in Table 19 are obtained for each criterion. Column totals of each criterion are calculated for the normalization process.

**Table 19:** Pairwise Comparison Matrix

Gaining New Skill			Reducing Cost			Quality Improvement		
	Make	Buy		Make	Buy		Make	Buy
<b>Make</b>	1	1/7	<b>Make</b>	1	1/3	<b>Make</b>	1	1/5
<b>Buy</b>	7	1	<b>Buy</b>	3	1	<b>Buy</b>	5	1
<b>TOTAL</b>	8	1 1/7	<b>TOTAL</b>	4	1 1/3	<b>TOTAL</b>	6	1 1/5

Focus on Strategy			Avoid Major Investment			Handling Overflow Situation		
	Make	Buy		Make	Buy		Make	Buy
<b>Make</b>	1	1/7	<b>Make</b>	1	1/5	<b>Make</b>	1	1/5
<b>Buy</b>	7	1	<b>Buy</b>	5	1	<b>Buy</b>	5	1
<b>TOTAL</b>	8	1 1/7	<b>TOTAL</b>	6	1 1/5	<b>TOTAL</b>	6	1 1/5

Maintaining Old Function			Performance			SSB Strategy		
	Make	Buy		Make	Buy		Make	Buy
<b>Make</b>	1	1/7	<b>Make</b>	1	5	<b>Make</b>	1	1/7
<b>Buy</b>	7	1	<b>Buy</b>	1/5	1	<b>Buy</b>	7	1
<b>TOTAL</b>	8	1 1/7	<b>TOTAL</b>	1 1/5	6	<b>TOTAL</b>	8	1 1/7

## 5.7. Normalization Process for Alternatives

The same normalization steps as for the criteria should be applied for alternatives. Each cell is divided by the column sum value. The values obtained as a result of the process are as indicated in Table 20.

**Table 20:** Normalization Table

Gaining New Skill			Reducing Cost			Quality Improvement		
	Make	Buy		Make	Buy		Make	Buy
<b>Make</b>	0,1250	0,1250	<b>Make</b>	0,2500	0,2500	<b>Make</b>	0,1667	0,1667
<b>Buy</b>	0,8750	0,8750	<b>Buy</b>	0,7500	0,7500	<b>Buy</b>	0,8333	0,8333

Focus on Strategy			Avoid Major Investment			Handling Overflow Situation		
	Make	Buy		Make	Buy		Make	Buy
<b>Make</b>	0,1250	0,1250	<b>Make</b>	0,1667	0,1667	<b>Make</b>	0,1667	0,1667
<b>Buy</b>	0,8750	0,8750	<b>Buy</b>	0,8333	0,8333	<b>Buy</b>	0,8333	0,8333

Maintaining Old Function			Performance			SSB Strategy		
	Make	Buy		Make	Buy		Make	Buy
<b>Make</b>	0,1250	0,1250	<b>Make</b>	0,8333	0,8333	<b>Make</b>	0,1250	0,1250
<b>Buy</b>	0,8750	0,8750	<b>Buy</b>	0,1667	0,1667	<b>Buy</b>	0,8750	0,8750

Since the solution is performed on two alternatives, it is not necessary to calculate the consistency value. If a solution is made for more than two values, Consistency Ratio (CR) must be calculated as applied to the criteria. Therefore, according to the results of this consistent solution, the priority matrix was calculated as indicated in Table 21.

**Table 21:** Priority Vector of the Alternatives

PRIORITY VECTOR	Gaining New Skill	Reducing Cost	Quality Improvement	Focus on Strategy	Avoid Major Investment	Handling Overflow Situation	Maintaining Old Function	Performance	SSB Strategy
Make	0,1250	0,2500	0,1667	0,1250	0,1667	0,1667	0,1250	0,8333	0,1250
Buy	0,8750	0,7500	0,8333	0,8750	0,8333	0,8333	0,8750	0,1667	0,8750

Priority vectors were obtained for both criteria and alternatives. The overall priority value can be calculated using the values specified in Table 22. The values of each criterion in Table 18 and Table 21 are multiplied. As a result of this multiplication, the values for the Make and Buy alternatives are calculated.

**Table 22: Overall Priority Ranking**

ORDER	Make	Buy
Gaining New Skill	0,0180	0,1263
Reducing Cost	0,0061	0,0182
Quality Improvement	0,0308	0,1538
Focus on Strategy	0,0183	0,1284
Avoid Major Investment	0,0070	0,0349
Handling Overflow Situation	0,0136	0,0680
Maintaining Old Function	0,0065	0,0452
Performance	0,0440	0,0088
SSB Strategy	0,0340	0,2382

The results obtained for the Make and Buy alternatives were calculated for each criterion as it shown in Table 21. This is the overall result that covers all criteria and alternatives.

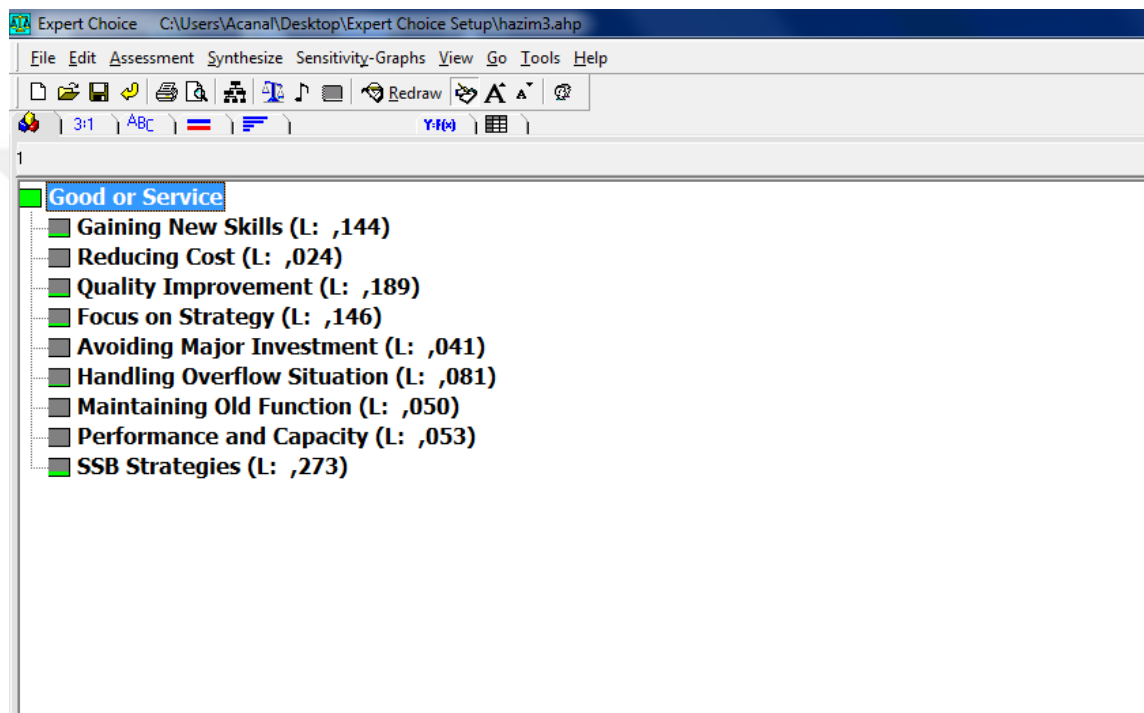
### 5.8. Problem Solving Process with Software

Multi-Criteria Decision Making problems can also be solved by using softwares. Thus, the normalization calculations and priority of the criteria and alternatives are determined automatically, overall priorities and the consistency rates are calculated by these softwares. Expert Choice was chosen according to expert opinions among the



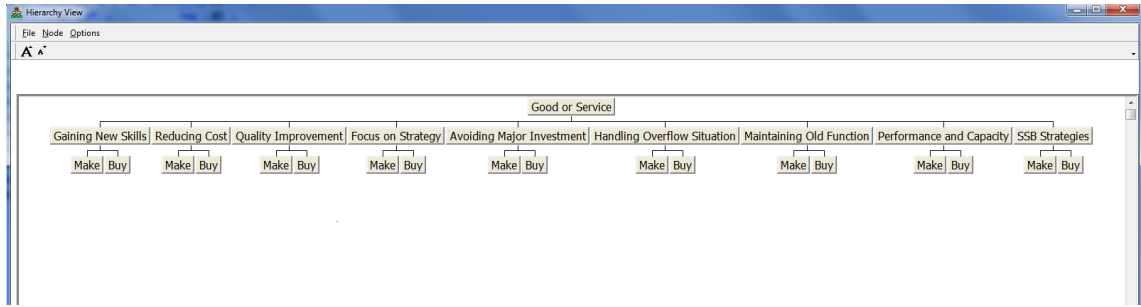
programs used for AHP problem solutions. Analytic Hierarchy Process solution method was performed with Expert Choice software.

The process starts with the definition of the objective, criteria and alternatives. The objective is defined as obtaining a good or service. It is researched that which criteria are effective in reaching this goal. Secondly, the criteria should be defined. For this study, criteria were determined by interviews with senior executives. The nine criteria identified by these expert opinions are defined in the program as shown in Figure 13.



**Figure 13:** Criteria and Alternative Definition

Alternatives should be defined, below the 9 criteria defined for the purpose of obtaining a good or service. The Make and Buy alternatives are defined below the individual criteria and the tree shown in the Figure 14 is created.



**Figure 14:** Hierarchical Outsourcing Structure

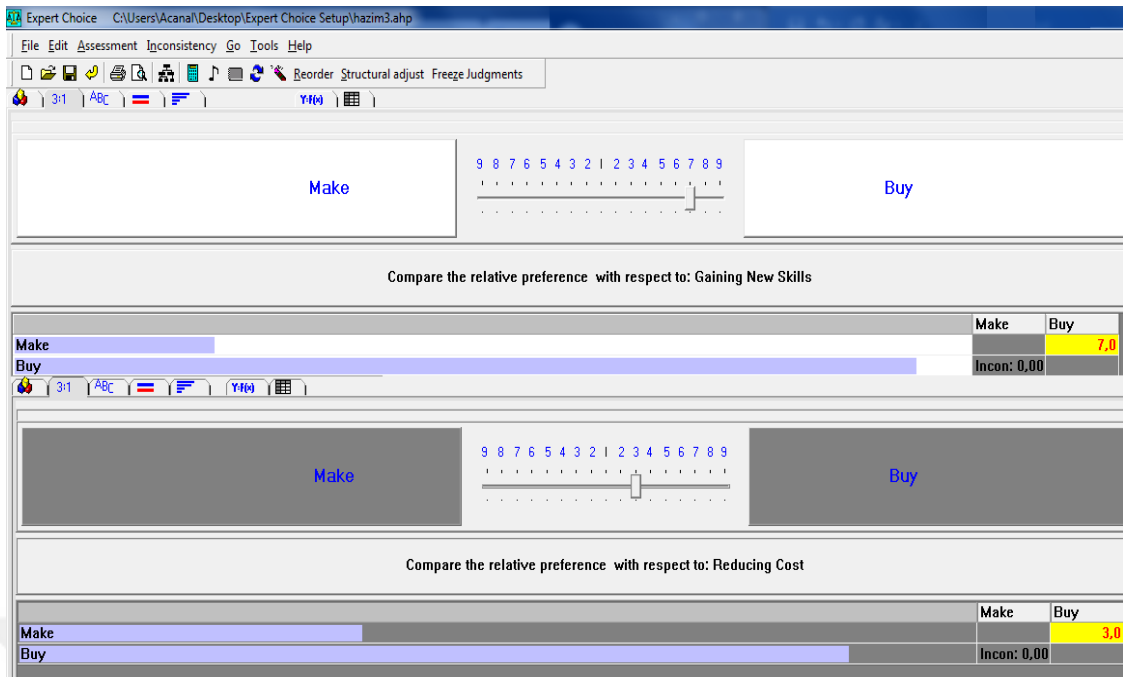
This hierarchical structure constitutes the main skeleton of the solution, therefore this stage must be carried out with great care. Now the main structure has been created and the scoring process can be started. Bilateral comparisons determined by interviews with program leaders should be defined in the software. The scoring to be used for this operation is as shown in the Table 10. The first identification was made between the "Gaining New Skills" and "Reducing Cost" criteria and the "Gaining New Skills" criterion was scored with 7 points. This bilateral comparison was made for all criteria and the scoring process was completed. The result obtained at the end of the scoring process is as shown in Figure 15.

	Gaining Ne	Reducing C	Quality Imj	Focus on S	Avoiding M	Handling O	Maintainin	Performa	SSB Strate
Gaining New Skills		7,0	3,0	1,0	5,0	2,0	3,0	5,0	3,0
Reducing Cost			7,0	5,0	1,0	5,0	3,0	2,0	9,0
Quality Improvement				1,0	5,0	3,0	3,0	3,0	2,0
Focus on Strategy					5,0	2,0	3,0	3,0	2,0
Avoiding Major Investment						3,0	3,0	3,0	7,0
Handling Overflow Situation							1,0	2,0	3,0
Maintaining Old Function								1,0	5,0
Performance and Capacity									5,0
SSB Strategies									

Incon: 0,06

**Figure 15:** Pairwise Comparison Table

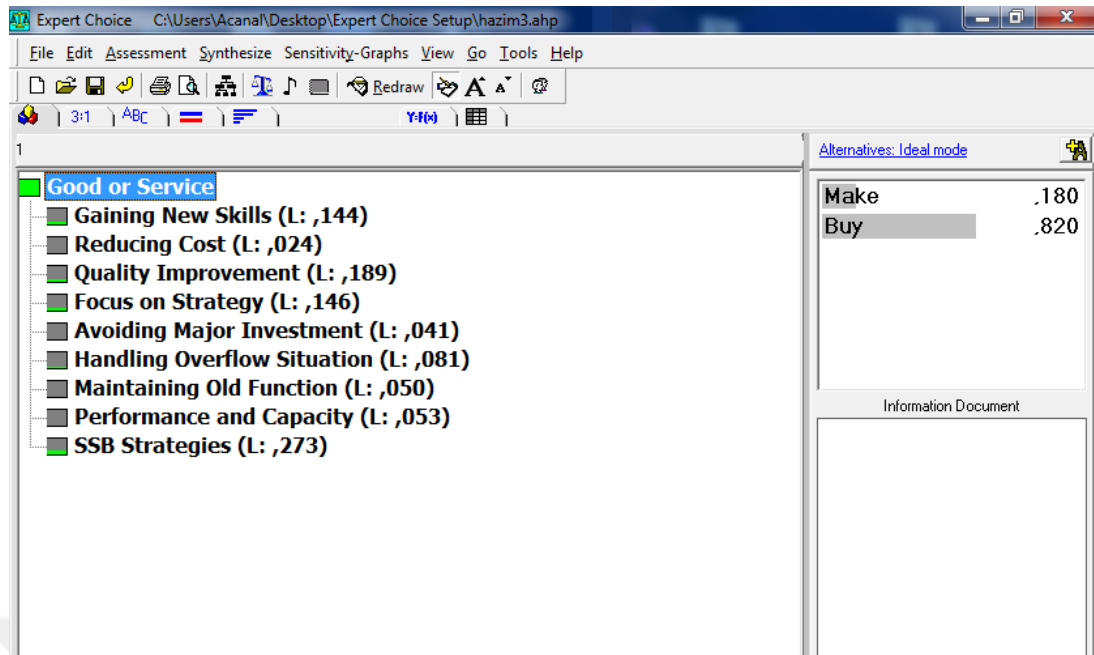
The next step is to score Make and Buy alternatives for each criterion. For this procedure, Make and Buy alternatives values must be entered for each criterion. The scoring for "Gaining New Skills" and "Reducing Cost" criteria in Figure 16 is shown as an example, and this should be done for all criteria.



**Figure 16:** Scoring of the Alternatives

In the score obtained here, it is identified that for "Gaining New Skills", "Buy" alternative is more important than "Make" alternative with 7 points. And it is stated that "Buy" alternative is more important for Criterion "Reducing Cost". After the completion of the scoring for all criteria, a general result is obtained. The validity of this result depends on the inconsistency ratio of less than 0,1 value and this rate is also calculated automatically by the software.

The abbreviation "Incon" at the bottom of Figure 16 shows the inconsistency ratio and the ratio has been automatically calculated as 0,06 by the software. The inconsistency rate below 0,1 indicates that the result is reliable. The overall priority is as seen in Figure 17 according to the obtained final values.



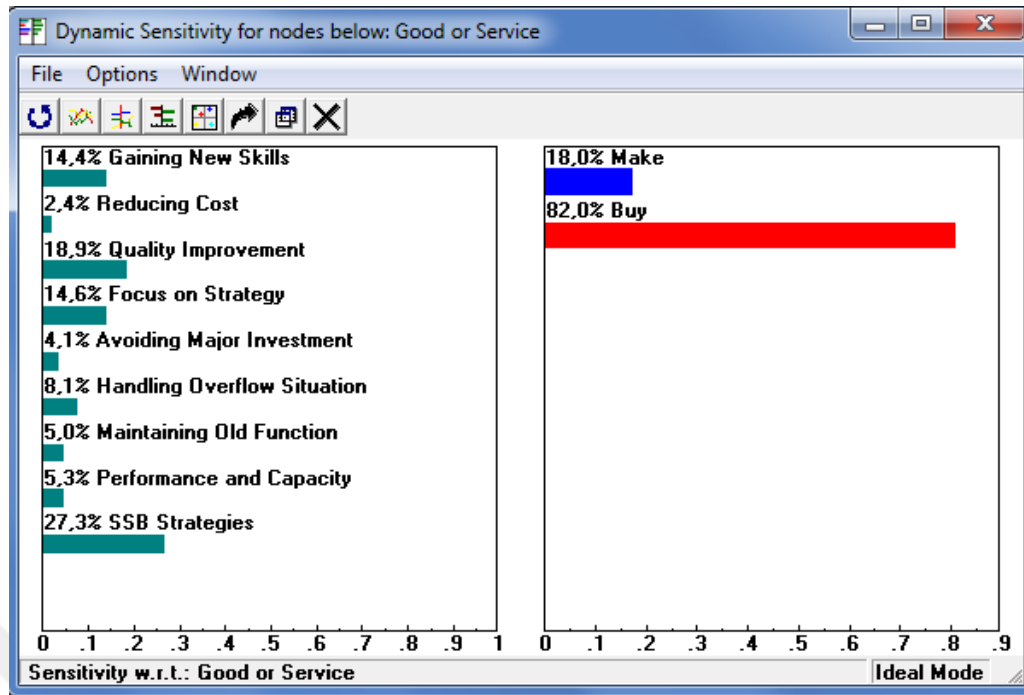
**Figure 17: Overall Priority**

"Buy" alternative which has a ratio of 82% was found to be dominant and it is observed that "Make" alternative has a ratio of 18% in the overall calculation. The L values indicated next to the criteria represent the weight of the criterion in the calculation. These weights are also calculated automatically by the software. The ranking of the factors affecting the outsourcing criteria is evaluated according to the L value.

### 5.9. Research Findings

The interviews constitute the basis of the research. Criteria were decided by senior expert opinions, bilateral comparisons and ratings are determined by program leaders. Therefore, the results and the interviews should be consistent with each other. In this section, the results obtained will be analyzed, compared with the issues stated in the interviews and their compatibility will be questioned.

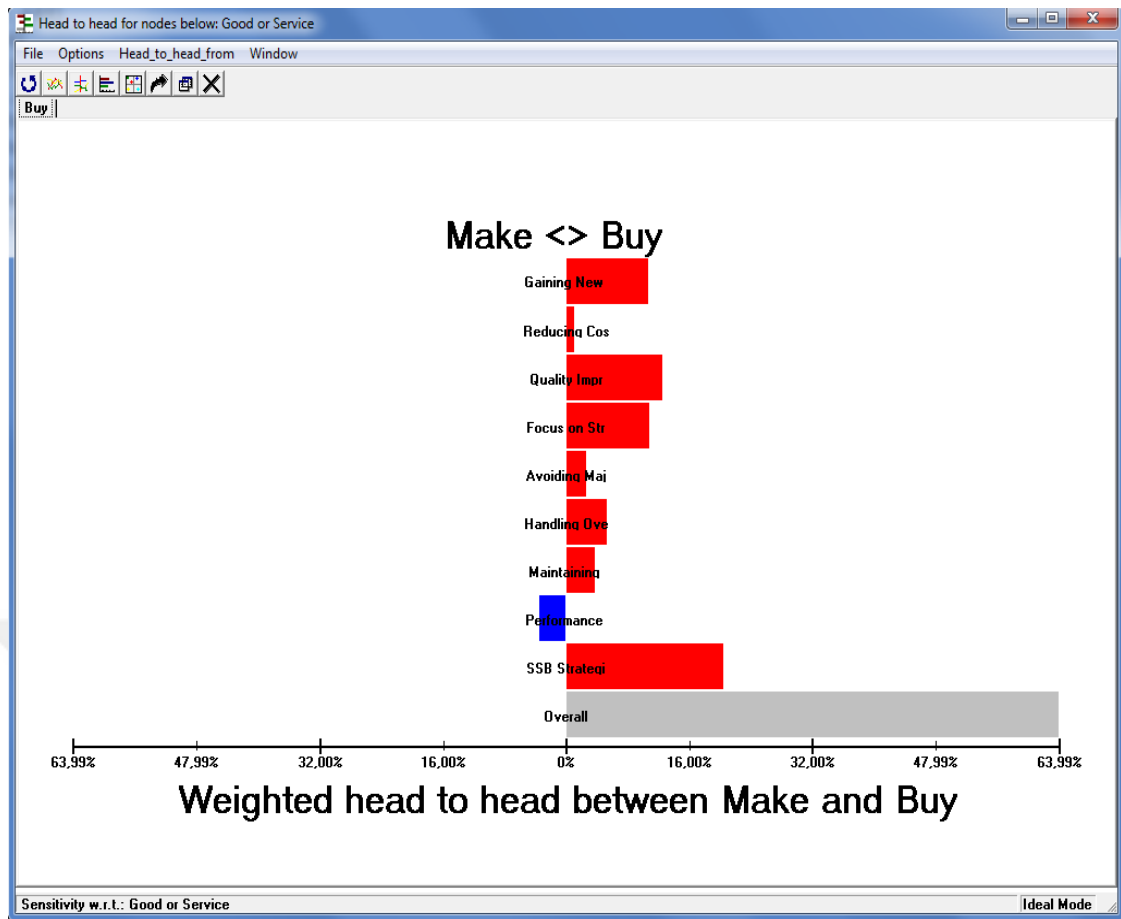
The significance weights of the nine factors determined as a result of AHP analysis are as indicated in the Figure - 18. Weighted values calculated by the software are shown as percentage values in Figure 18.



**Figure 18:** Overall Priority Table

The overall priority order is as calculated on the left of the figure. In other words, it is clearly seen that the most effective criterion giving direction to outsourcing within the selected company is SSB Strategies. The second criterion is quality, which is of high importance in every sector. It was clearly stated by the interviewees that the concept of quality in the defense industry is much more important. The third factor has been determined as the firm strategies, which are highly correlated with SSB strategies criteria. The cost has been calculated as the least effective factor among these criteria. The results are consistent with the data obtained by the interviews. The most important factor that directs the defense industry is undoubtedly state strategies. Developing countries ignore the cost in the first stage in order to reach the technology of the developed countries quickly.

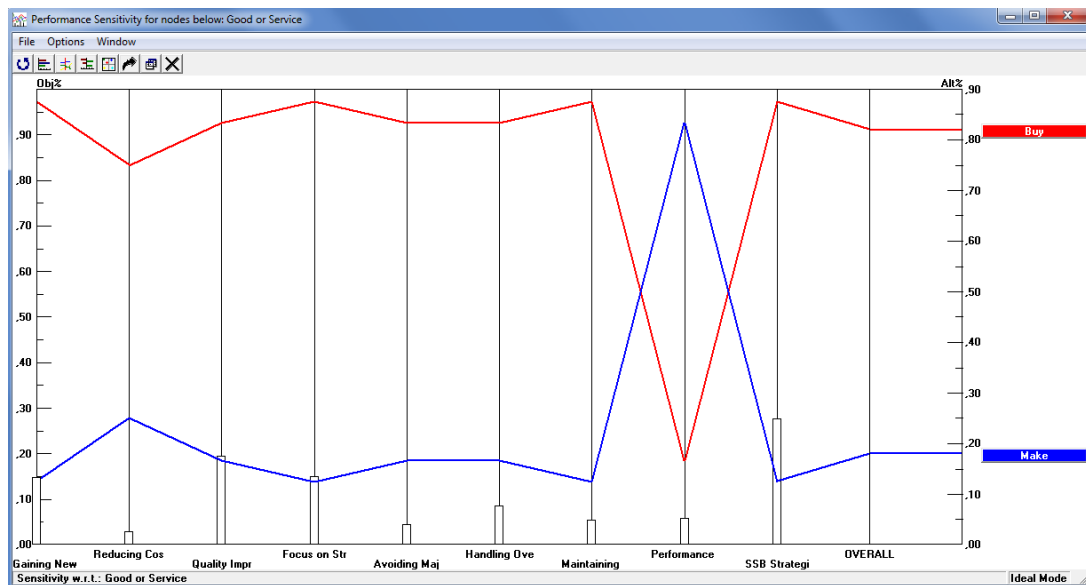
The result shown in Figure 19 is obtained when 'Make' and 'Buy' alternatives are compared one by one. The first factor that leads to 'Buy' alternative is SSB Strategies. Quality, Focus on Strategy and Gaining New Skill are ranked as the following criteria. The only criterion that leads to 'Make' alternative is determined as Performance and Capacity.



**Figure 19:** One-to-One Comparison Table

It was determined that the average direction of the criteria was towards the ‘Buy’ alternative and the calculated average value was 63%. The most important contribution to this value is obtained from the SSB Strategies criterion.

The criteria were scored and their priorities were determined. In the second stage, each criterion was scored for ‘Make’ and ‘Buy’ alternatives and the overall priority was calculated. The effect determined for ‘Make’ and ‘Buy’ alternatives has been calculated as shown in Figure 20.



**Figure 20:** Overall Priority Graph

The effects of each criterion on ‘Make’ and ‘Buy’ alternatives are shown in Figure 20. The first criterion "**Gaining New Skills**" has a purchasing effect of over 90%. There are two ways to acquire a new technology. The first is the self-development of the company. The second is to buy a new technology from the external sources. It is considered as an advantage that the second method gives faster results than the first one. The higher cost of the second method is considered to be a disadvantage.

The criterion "**Reducing Cost**" has the lowest priority in the process of outsourcing. At this point, it has not been concluded that the cost was insignificant. This means that the priority of criteria "Reducing Cost" is lower compared to other criteria. Due to the urgent requirements, the negligence of cost has been also expressed in the interviews.

"**Quality**" is not an option but an obligation that has been highlighted in interviews. The second most important criterion of the research has been obtained as quality. It is preferred to ensure and maintain quality standards. This process requires a serious control mechanism and this also causes an additional cost.

The next criterion is the third most important criterion of the research. The core function of the company is also considered within this criterion and represents the firm's long-term strategies. It has a high degree of similarity with "**SSB Strategies**"

criterion representing the state strategy. The company uses external sources due to the urgency of the equipment required to provide to the army. This strategy is in line with state strategies.

It is not preferred to invest for supporting activities that are not required to be made within the Company. In other words, this may be considered for every activity other than the core functions. The function can be transferred to suppliers instead of making high cost investments.

Sudden increases in demand can occur due to the urgent needs of military forces. It may not be possible to meet the demand within the company due to the fact that these demands are not in the annual plan. Especially in these cases, outsourcing is preferred because there is no possibility of rejection of the demand. Even if it is disadvantageous in terms of cost, it may be preferred to meet the demands of the army. Therefore, the criterion "**Handling Overflow Situation**" is also determined as one of the criteria that leads to the Buy alternative.

Functions that the company does not intend to specialize can be transferred to external resources. This has been mostly defined as supporting functions needed to reach the core function within the interviews. There is no inconvenience in the transfer of the supporting functions to the external resource. On the contrary, it will ensure that resources are used for main function purposes. The criterion "**Maintaining Old Function**" also leads the company to outsourcing.

The demands of defense industry companies are clarified annually. If the intensity of immediate demands is ignored, the resources can be foreseen. All resources needed throughout the year are provided in advance. Therefore, capacity increase is not based on external sources. There may be supporting functions in which the capacity increase will be reflected on the external source. In other words, "**Performance and Capacity**" leads the company to 'Make' the product by itself.

SSB conducts negotiations with the military forces to determine the requirements of the army. In line with these requirements, projects are developed and interviews are made with defense industry companies. After the parties have reached an agreement,

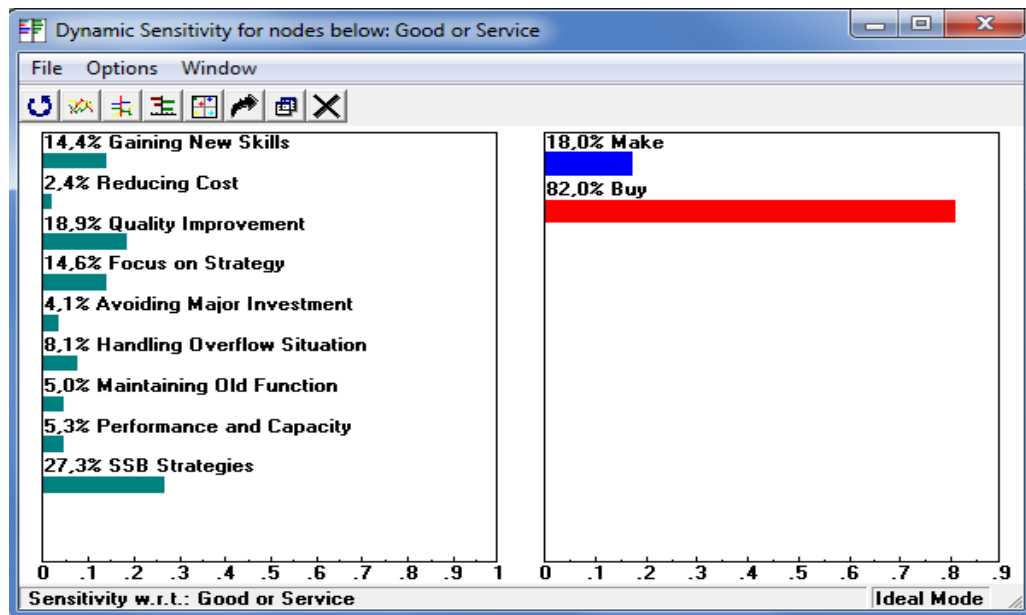


contracts between SSB and companies are signed. After this point, defense industry companies have responsibilities to the SSB and SSB has responsibilities towards the army. State strategies give direction to the defense industry and this process is realized through SSB. Therefore, the most important factor affecting the decisions of defense industry companies is SSB strategies. This was one of the issues discussed in the interviews and it was expected to have a high priority. At the end of the solution process, it is determined that the criterion with the highest priority is this criterion.

It has been determined that the priorities indicated in Table 18 and Figure 13 are in the same order. It shows that the solutions in sections 5.5 and 5.8 are compatible with each other. The most important criterion has been identified as "SSB Strategies", the criterion with lowest importance has been identified as "Reducing Cost" according to the solution steps which are consistent with each other.

The most important criteria affecting outsourcing decisions is the Presidency of Defence Industry Strategies criteria and the overall decision leads the company to 'Buy' decision by 82%.

The summary findings of the study are shown in Figure 21.



**Figure 21:** Sequences of the Criteria according to Buy and Make

## CHAPTER 5

### CONCLUSION

A new era has begun in Turkey's defense industry after becoming a member of NATO (North Atlantic Treaty Organization). In this period, it is seen that the defense industry activities carried out by the state have come to a halt. The requirements of the sector have been met mainly by the help and loans of the allied states (Özgen, 2016: 3). In this period, the main defense systems have been provided from foreign sources (Ziylan, 2001: 1-2). The crisis experienced during the Cyprus operation revealed the drawbacks of this situation (Sallar, 2015: 51). Dependency on foreign sources has led to the questioning because of the embargo which has been imposed on Turkey after military operation (Çakır, 2010: 2). The defense industry development activities carried out between 1975 and 1988 entered a new period with a document which was published in the Official Gazette on 20 June 1998 as the Council of Ministers' Decree No. 98/11173 (Ziylan, 2001: 4-5). In accordance with the ministerial decrees, the required technologies of the Turkish Armed Forces are defined in three categories which are “National”, “Critical” and “Others”. According to this decree, it was decided to meet the needs of category “National” and “Critical” from local sources instead of international suppliers. With this strategy, it is aimed to meet the needs in a secure way with local resources. The process starting from 1998 is defined as a period in which international capabilities are gained (SSB Strategic Plan, 2017: 36).

All of the companies that want to survive in this new period must comply with the changing and difficult conditions of competition. One of the most important strategies for survival and to gain international capabilities is a successful outsourcing strategy.

The power that enables a country to survive arises from defense industry. In order to maintain this power, a successful outsourcing strategy is a must in this industry.

This study is conducted on the analysis of outsourcing criteria of a large-scale defense industry company. Appropriate outsourcing criteria for the research was determined based on literature review. The process of determining, comparing and scoring the criteria was carried out with expert opinions. This study has been completed according to the interviews with 13 executives who are experts in their field. Seven participants have been interviewed to select the criteria determined in the literature and six participants have been interviewed in order to compare and score the criteria according to AHP method.

The eight criteria (Gaining New Skills, Reducing Costs, Quality Improvement, Focus on Strategy, Avoiding Major Investment, Handling Overflow Situation, Maintaining old functions, Performance and Capacity Improvement) defined in the literature and evaluated by the semi-structured interviews has been determined as appropriate for the aim of this research. A sector-specific criterion (Strategy and Obligations of Presidency of Defence Industry) has been explained according to expert opinions and defined according to SSB documents. The ninth criterion is sector specific and is only observed for defence industry companies. Criteria were scored in the second part of the study by program managers and the calculation has been completed by "Expert Choice" software. Final results and ranks were obtained for the large-scale defence industry company selected for this study.

Based on the analysis, the selected criteria have been ranked according to their priority as follows:

1. Strategy and Obligations of Presidency of Defence Industry (SSB)
2. Quality Improvement and Development of Audits
3. Focus on Strategy
4. Gaining New Skills
5. Handling Overflow Situation
6. Performance and Capacity Improvement
7. Maintaining Old Functions

## 8. Avoid Major Investment

## 9. Reducing Costs

First of all, it has been highlighted that the company's long-term strategy were in line with the state strategies and outsourcing decisions are taken in the light of these strategies. State strategies are decisive for the strategies of defense industry companies. At this point, the targets and strategies do not conflict with themselves. The concept of keeping the core function within the company has been evaluated under the scope of "Focus on Strategy" criterion. It is evaluated that the functions of the company which is defined as a core function should be done within the company. It has been evaluated under the criteria of "Maintaining old functions" that supportive activities can be transferred to external sources. Herein, it is stated in the interviews that the purpose of outsourcing is the continuity of the core function. Another objective is the usage of resources for the core function. The case of whether or not to invest for supportive activities has been evaluated under the criteria "Avoid Major Investment". The company does not refrain from investing for the development of the core function. However, in order to use resources for this purpose, supportive activities should be transferred to external sources.

It was also emphasized that quality is not an option but an obligation. The concept of quality, which is important for every sector, is much more important in the defense industry. It has been determined that external sources can be used to ensure quality standards. However, it was stated that this would cause additional control and audit costs. Regular control of the suppliers has great importance in order to achieve a certain quality standard.

Furthermore, it was determined that one of the important reasons of the outsourcing is "Gaining New Skills" criterion. It has been determined that the process leads to 'Buy' alternative due to the urgency of gaining new capabilities. This strategy is in fact implemented to be the first step of the localization strategy in Turkey.

The targets in the defense industry are determined as long term and the plans are prepared accordingly. The required work force or equipment is specified according to this target. However, the demands may show variability or increase according to the

sudden requirements of state or army. In these cases, the cost criterion should be ignored and decisions should be made to meet the requirements. Instantaneous demands have been evaluated under "Handling Overflow Situation" criteria and long-term demands have been evaluated under the criteria of "Performance and Capacity Improvement".

It has been stated in the interviews that the cost in defense industry is an important criterion as in every sector. It has been emphasized that sometimes the cost can be neglected within the scope of the projects which are shaped according to the requirements of the army. The cost criterion is considered not to be in the first place for defense industry companies, which has special missions. It is mentioned in the scope of the interviews that the cost can be neglected in case it is not long term.

These findings of this study shows similarity in some aspects with the existing studies in the literature and also the findings indicate differences in some aspects. When the studies about outsourcing are examined, it has been determined that cost is the most important criterion for the organizations. It is determined that the ease of employment, focus on core functions, human resource consulting, maintaining old functions, quality improvement, gaining new skills, performance and capacity, flexibility, effective warehouse management and prestige are other criteria that follow the cost criterion (Budak and Budak, 2004: 210; Gül, 2005:167; Margılıç, 2006: 9; Çoğan, 2006: 126; Oktay, 2006: 140 - 146; Öztemel, 2007: 34; Yüksel, 2008: 43; Kucur, 2010: 28; Peker, 2013: 51; Taştan, 2015: 33; Özyer and Döven, 2018 : 2 - 18). According to the research, it has been observed that the use of outsourcing was highest in human resources with 76,2%. The rate of using the strategy was 67,6% in the financial sector and 63% in the manufacturing sector (Özcan, 2015: 67-68). The defense industry is included in the manufacturing sector, but the criteria differ because of exceptional considerations. The cost factor was found as a high priority in all studies referred above. However, as stated by the interviews, cost is not a high priority for the defense industry. The employment, human resource consulting, flexibility, effective warehouse management and prestige criteria has not been clarified as a criterion in this research. Within the scope of interviews, it has been stated that prestige is not a reason for outsourcing for large scale companies. The result of the cooperation can provide a

prestige, but this is not a selection criterion. On the other hand, it has been evaluated that this study is compatible with the focus on core functions, maintaining old functions, performance and capacity, quality improvement and gaining new skills criteria mentioned above.

Research on defense industry in foreign countries has been evaluated and the similarities and differences with this study are determined. It has been seen that the 'Make' or 'Buy' decision of the defense industry requirement is given by the state. This strategy has been also considered an opportunity to acquire new capabilities. In addition, it is emphasized that this strategy will bring additional control costs and responsibilities (MacDonald, 2010: 19, 130-135; Halpin, 2011: 109-111; Marquis, 2011: 17-18). The findings of this conducted research have similarities with the three points mentioned above. It has been stated that cost is a priority criterion and it has high importance (MacDonald, 2010: 19, 130-135; Halpin, 2011: 109-111). In this respect, a different result was obtained from these studies. It has been stated that developing the use of outsourcing is a strategy which is aimed by the state (Erbel, Mark, 2016: 1-6, 13-14). From this point of view, it has been determined that there are similarities with the state strategy in Turkey.

As a result of the analysis, the evaluations of the findings are as follows:

- The companies have applied to the external source in order to gain a capability that is not owned by the company. In particular, defense industry companies use this strategy for technology transfer which is out of the firm's capability. With the interviews it was emphasized that this transfer is the first step of localization activities. Therefore, it has been determined that "Gaining new skills" criterion evaluated within the scope of the research is similar with the literature studies.
- The cost criterion has high importance for businesses in all sectors. As a result of the research, it was determined that cost was a criterion but it has low importance. With this aspect, it differs from the studies in the literature. The interviews revealed that skills to be acquired and urgent requirements decrease importance of cost criterion. It has been determined that this is a sector specific

situation. But normally, profitability is the most important criterion for firms in all other sectors.

The reason why the findings related to cost criterion is different from international studies can be explained as supply and demand from the same authority. Demand comes from Turkish Armed Forces in Turkey. However, the company that will meet the demand is a company belonging to Turkish Armed Forces Foundation. This situation is considered as the most important explanation of the fact that profitability is not prioritized. The requesting organization and the organization that will respond to this request depend on the same authority. This situation differs from international defense industry studies. There are private sector organizations to meet the demand in the UK and the US. The resulting competitive environment ensures that cost is an effective criterion, because the companies which are not state-owned attach importance to profitability.

- It has been emphasized in the interviews that the quality concept is an indispensable standard. This criterion which is important in every sector, has been evaluated to have a higher importance in the defense industry. In other words, the studies in the literature have been determined to have similarities with this study.
- Studies in the literature indicate that firms prefer outsourcing to focus on their main activities. It has been stated that the aim is to allocate the resources of the company to the core function. This issue is related to the long-term plans and strategies of the companies and it has been determined that the same result has been reached with this research.
- Meeting the demands is under the initiative of the companies. If the cost is not considered acceptable, it may be preferable not to meet the demand. Because profitability is essential and all companies make commercial decisions based on this issue. But it is stated that it is important to meet the demand in defense industry even if it is not profitable. Because the demand may be from the state or army, and in this case profitability should not be considered. "Handling overflow situation" criterion is discussed in the literature. However, the findings of this research differ in terms of the necessity of meeting this sudden demand.

- Each company has a core function that makes it privileged. All other functions that support the core function are out of the company's expertise area. These supporting functions and old functions can be transferred to the external source and this is stated in the literature as a preferred strategy. It is determined that this criterion is similar to the studies in the literature.
- It has been suggested that there is a sector-specific criterion in addition to the eight criteria which are defined according to the studies in the literature. This criterion which is examined under the heading of "SSB strategies" represents the identified state strategies. Long-term government strategies guide the strategies of defense industry companies. The most important state strategy to promote outsourcing is SKO (Sanayii Katılım/Offset) agreements. The aim is to transfer some of the works of large scale defense industry companies to small and medium-scale companies. This transfer process, which should be carried out at the rates specified in the contracts, aims the development of small and medium scale companies. Even if the large-scale companies can carry out these works within their own structure, they have to transfer them at the rates specified in the contracts. The state aims to enable small and medium scale companies to develop their technologies with this strategy. Large-scale companies are directed to outsourcing within the scope of this strategy. It has been determined that this situation is specific to the defense industry sector.

As stated, important findings has been obtained with this research. According to the findings, all criteria except 'Reducing Costs' and 'SSB Strategies' were found to be similar to other studies in the literature. However, there are also some limitations. First of all, this research was conducted for only one large-scale defense company and the evaluations were conducted with thirteen participants for determination and ranking of the criteria. Although, all of the participants are experienced engineers of defense industry, the number of participants forms a limitation. The future studies can be done by interviewing more participants from more than one defense industry companies. In addition, questions evaluated within the scope of interviews can be extended to cover all other issues related with outsourcing. Apart from these limitations, it is expected that the findings of this study will shed light on more comprehensive studies about outsourcing decisions of defense industry companies to be conducted in the future.



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