Öneri.C.9.S.36.
Temmuz 2011.115-136.

ENVIRONMENTAL STRATEGIC ANALYSIS ON VOIP (Voice Over Internet Protocol) SERVICES INDUSTRY IN TURKEY

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Abstract: As a segment of telecommunication industry that is a major supplier and driving force of almost all industries, VoIP is an internet-based industry offering opportunities to hardware and software producers and service providers, while challenging the conventional telecommunication. For developing competitive strategies, VoIP companies need to understand their environment. By the aim of presenting a strategic analysis framework that provides inputs to policy makers, this paper analyzes the external strategic factors of VoIP Services Industry in Turkey through practicing PEST, Five Forces, Value Chain and partial SWOT analyses. These environmental factors act as potential opportunities and threats that need to be considered in industrial and corporate strategy making processes. VoIP services industry has a complex value chain where buyers and suppliers have high bargaining powers. Besides threat and opportunities of substitution are significant, causing an intense competition that is also highly affected by social, economic and especially legal factors as well as technological issues.

Keywords: Telecommunication, VoIP, Strategic Analysis, PEST, Industry Analysis, Value-Chain, SWOT.

TÜRKİYE'DEKİ TELEKOMUNİKASYON ENDÜSTRİSİ VOIP (Voice over IP) SEKTÖRÜNÜN STRATEJİK DIŞ ÇEVRE ANALİZİ

Özet: Günümüzde telekomünikasyon sektörü, tüm diğer sektörlere, bilgi ve iletişim altyapısı sağlayan kritik bir tedarikçi olarak küresel ekonomide önemli bir rol oynamaktadır. Telekomünikasyon endüstrisinin, VoIP (Voice Over IP- Internet Protokolü üzerinden ses iletimi) alt sektörü ise, donanım ve yazılım üreticilerine ve servis sağlayıcılara ses iletişiminde düşük maliyet ve veri tabanlı yapısı gibi gelecek fırsatları sunmakta, aynı zamanda da geleneksel telekomunikasyonu tehdit etmektedir. Bu fırsatlar özellikle, bilişim altyapılarını, çok kısıtlı kaynakları ile geliştirmek amacı güden Türkiye gibi gelişmekte olan ülkeler açısından önem taşımaktadır. Bu çalışma, Türkiye'deki VoIP hizmetleri endüstrisindeki sektörel ve kurumsal strateji geliştirme süreçlerine girdi sağlayabilecek bir çerçeve sunmak amacıyla, PEST, Rekabet (Beş Güç), değer zinciri ve SWOT analizleri uygulayarak Türkiye'deki VoIP servisleri endüstrisine, fırsat ve tehdit teşkil eden çevresel stratejik faktörleri incelemektedir. Çalışma sonuçları, karmaşık bir değer zincirine sahip bu endüstride, alıcı ve tedarikçilerin pazarlık güçleri yüksek; ikame tehdit ve fırsatlarının belirgin olduğu, teknolojik faktörler kadar, sosyal, ekonomik ve özellikle yasal faktörler endüstrideki rekabeti artırdığını göstermektedir.

Anahtar Kelimeler: Telekomünikasyon, VoIP, Stratejik Analiz, PEST, Rekabet Analizi, Değer Zinciri, SWOT.

I. INTRODUCTION

Telecommunication industry with all its segments is the major provider of all industries and societies that are becoming more and more information and communication day by day. Due to the increasing global demand for easier, faster and cheaper voice and data communication, Telecom infrastructure markets have changed dramatically during the past years. Overall traditional telecom equipment markets have declined gradually as operators have declined capital investments partially because of the recent economical crisis in global markets. One major change in the telecom infrastructure market is the shift from traditional large-scale, hardware-driven system roll-outs to software and services-driven business models. The operators are forced by high cost pressures to replace or modernize their networks by migrating to IP –based (VoIP) solutions. Internet telephony, Voice over IP, has attracted much attention recently due to its potential to significantly reduce long distance and international voice communications costs, and because it presents entirely new and enhanced ways of communicating.

Companies in diversified structure of telecommunication industry's segments like VoIP infrastructure and services are in need of highly dynamic and unique competitive strategies and related flexible structures, cultures and business models. VoIP Services Industry is a growing, opportunity offering segment that competes with other mature segments of Telecommunication industry. VoIP technology is in the agenda of especially developing countries where cost sensitiveness on telecommunication is higher (not in

terms of call costs but also infrastructure investments as well). This raises the need for understanding and building competencies in this industry.

VoIP companies have the same tasks of institutionalization and strategic management in highly competitive and changing industrial environment. However, as in emerging segments of information and communication industry, value chain and customer/supplier relations are more complex in VoIP industry than traditional industries. It is even harder to define industrial borders or competitors or customers. Therefore, especially small and medium sized companies face challenges in applying and using structured strategic analysis methods and techniques that are essential for understanding the general and task environment and hence for designing competitive strategies that can lead to sustainable competitive positions. Moreover, there is almost no or just limited research that represent sample solutions and case studies regarding VoIP industry or similar segments of telecommunication industry not only in Turkey but also in other developing countries.

In this context, this paper aims to make a detailed analysis of the general and task environment of VoIP Services Industry, hence provide important clues about the future of the industry, hence the future positioning needs of the competitor companies. Study is expected to contribute to the knowledge base on strategic analysis in VoIP industry by providing a practical framework that can offer guidance to VoIP companies in their strategic analysis practices and representing the findings that can be used as inputs to strategy making processes in this emerging, complicated and unique industry. Through applying PEST and Five Forces analyses, the environmental strategic factors of companies in VoIP Services Industry in Turkey are explored from a strategic point of view analyses. Potential opportunities and threats for the companies in this diversified industry are defined to be considered in competitive strategy making processes.

In the second chapter, based on the literature search done, we briefly presented the theoretical information on the strategic analysis tools and methods that are used and applied in the study. Third chapter is about the general information on the telecommunication industry as a whole and VoIP Services Industry particularly. Fourth chapter is the application of strategic analysis methods to VoIP Services Industry that sum up with the environmental analysis of the companies. The fifth and the final chapter covers the conclusion and discusses findings of Chapter four within the theoretical framework with the highlights of findings that should be considered when improving the strategic positioning of the companies in the industry.

II. INDUSTRY OVERVIEW

II.1. The Telecommunications Industry

Telecommunications refers to how data and information are sent and received globally, and although that has remained constant over time, specifically how information is transmitted has changed due to technological advances. Once limited to transistors and antennas, it currently refers more to fiber-optic cables and communication networks [1]. Telecommunication is a fast-growing industry that affects each and every aspect of life including simple voice telephone calls, internet access, high speed data communications, internet, video conferencing and cable TV [2]. Industry is always in a transformation creating new opportunities and challenges for infrastructure and service providers. Rapid technological developments and increasing market turbulences have added new dimensions to an already complex scenario. Many tested business models, frameworks, tools or techniques have become obsolete [3].

As a global network of networks, the Internet is a more economical means of transmitting voice, data and video than proprietary networks [4]. Capitalizing on digitalization, the Internet has enabled the vertical disintegration of the traditional pipes (phone networks, cables etc) and created opportunities for many new entrants to participate in the telecommunications market. In telecommunication industry different companies can launch products that work together due to the open standards for communications, applications, and services. Besides, the deregulation enabled customers to be independent from providers [3]. Before the Telecommunications Act that was issued in 1996 with the 1998 pan-European Union liberalization, the industry was in control of monopolies or oligopolies [4]. Today, market is open to new entrants enabling customers choose different service components from different vendors and build their own solutions [4-6]. In many countries, government monopolies are now privatized and they face new competitors, and privatization combined with an independent regulator is positively correlated with telecom performance measures [7,8].

Though plain old telephone calls continue to be the industry's biggest revenue generator, due to advances in network technology, telecom is becoming less about voice and increasingly about text and images, turning traditional markets upside down, as the growth in mobile services out paces the fixed line and the internet starts to replace voice as the staple business [1].

High-speed internet access, which delivers computer-based data applications such as broadband information services and interactive entertainment, is rapidly entering to homes and businesses around the

world. The main broadband telecom technology, Digital Subscriber Line (DSL) ushers in the new era and the fastest growth comes from services delivered over mobile networks [1]. Third-generation mobile networks are characterized by the convergence of the wireless, the fixed Internet and the media industries. Expectations on agents' ability to generate revenues (and profits) within this technological intersection are high and will be further geared up by the future broadband capacity [9]. Residential and small business markets among the all customer markets seem to have the highest competition with hundreds of companies that rely heavily on price. Competitiveness is also based largely on strong brands. Besides, the companies make large investments in efficient billing systems [1,10].

On the other hand, in the corporate market which remains the industry's favorite, big corporate customers concerned mostly about the quality and reliability of their telephone calls and data delivery, hence are less price-sensitive than residential customers [1,11]. Large multinationals spend heavily on telecom infrastructure to support far-flung operations and willingly pay for premium services like high-security private networks and videoconferencing. Figure.1. shows the product life cycle in telecommunications industry for 2007. Mobile voice, mobile SMS are in mature phases while traditional wireline and leased lines are in decline phases. VoIP and mobile data are in the pre-growth phase with promising market success. Mobile TV and video telephony are in the introduction phase and still structuring their market segments [12]. Telecom operators also have business models that create income from providing network connectivity to other telecom companies in need, and by wholesaling circuits to heavy network users like internet service providers and large corporations. Interconnected and wholesale markets favor those players with far-reaching networks [13].

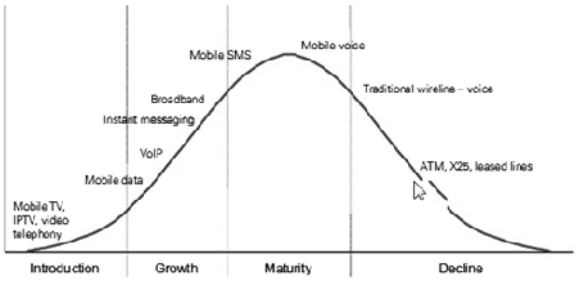

Figure.1. Telecom Product Life Cycle

Source: *Peddy, G.; Bloxham, M. & Jenkins, G. (2006). Telecom for Beginners 2007– Industry and Technology Primer. London, Deutsche Bank /Europe Telecommunications [12].*

II.2. VoIP Telecommunications Industry

The Voice Over Internet Protocol (VoIP), also known as Voice over Internet Protocol, Voice over Broadband, and IP telephony is a revolutionary new method for taking analog audio signals (telephone calls and voicemail) and turning them into digital data that can be transmitted over the internet [14].

The concept of VoIP originated in 1995, when hobbyists began to recognize that sending voice data packets over the Internet rather than communicating through standard telephone services had great potential. Traditional phone lines slowly being phased out as businesses and households around the world embrace the benefits VoIP technology offers [15]. Over the last several years, enterprises of all sizes have evolved from merely piloting voice over IP (VoIP) technology to enacting full-scale deployments. The deployment of hosted services, IP PBX switches, hybrid systems, and other IP telephony-related technologies is reaching an early majority-adoption phase [16]. Over the past decade, the move to Voice over IP (VoIP) in the enterprise has generally been focused on the IP-PBX and VoIP networking across private enterprise IP networks. According to Walder [17], as that adoption has flourished with great success, enterprise IT departments are looking outward for VoIP services and technologies that can yield similar benefits. VoIP technology were used in the contact center industry for years, their acceptance within the PSAP environment is rather recent [18].

As VoIP adoption continues to accelerate, traditional phone companies will face fiercer competition from VoIP-enabled service providers. This disruption may drain traffic from discount long distance service providers, and decrease demand for the services of third party voice/telephone companies [14]. By contrast, the companies that provide access services or manufacture the VoIP equipment, software or semiconductor chips used in developing VoIP networks, will have the greatest opportunity to gain market share from incumbents and accelerate revenue growth [14].

II.3. VoIP SERVICES INDUSTRY IN TURKEY

Main service categories in the VoIP infrastructure equipment and services industry are listed below with the number of the companies that offer these services in the Turkish VoIP Services Industry:

- Internet Telephony Service Provider (26),
- International VoIP Wholesale Provider (25),
- VoIP Termination ISP (18),
- SIP Billing (15),

- Hosted VoIP billing service provider (15),
- VoIP Billing Software Provider (14),
- Internet VoIP and Video Conferencing Service Provider (14),
- Hardware (10),
- VoIP consulting (9),
- Wireless Broadband (7).
- Network Service Provider (6),
- Wholesale VoIP Carrier (5),
- Cloud-based Unified Communications Service Provider (3),
- Incumbent PTT (2),
- Internet Fax Service Provider (2),
- Hosted PBX Service Provider (1),

There are almost 40 companies in the industry that offer these services, however though the companies have different entities almost half of them are the strategic business units of a parent company that also operates for another service in the same industry. Companies in diverse businesses combines to provide end to end turn-key solutions compromising of next-generation infrastructure solutions & professional services, managed IP voice services and wholesale carrier voice services to address the needs of wireline and wireless carriers, network operators, and service providers. The companies in the segment has customers like carriers, network operators and service providers including wireline operators, wholesale Carriers, VoIP Service Providers, Mobile Operators, Broadband Service Providers, Wireless Operators, Fixed/Mobile Virtual Network Operators/Enablers.

Studied companies are generally small and medium sized companies (as the industry is mainly composed of small and medium sized companies as in other sales and service based segments of information and communication technology industries) with average 70 employees (%90 technical staff and management) focusing on different segments of the VoIP telecommunications equipments (hardware), services and solutions. Companies that supply hardware are the licensed distributors and providers of multinational VoIP equipment manufacturers. These companies also provide services to their customers in technologically newly-developing regions line MENA (Middle East and North Africa).

In VoIP Services Industry in Turkey, market share is distributed to large ISP or start-up VoIP companies. Effective solutions for managing VoIP services are becoming critically important for alternative telecoms to stand out among their competitors.

III. METHODOLOGY

This study aims to explore the general and industrial environmental strategic analysis of VoIP companies in Turkey for providing a framework for strategy analysis practices and providing inputs to the competitive strategy formulation processes of VoIP companies that are mostly small or medium sized. The limitation of the study is that it is based on in-depth interviews and industrial resource research.

III.1. Data Collection Method

Industry news stories and articles are useful sources to get insights about the latest topics of the industry evolution especially when the intention is to look into the future of telecom infrastructure markets [19]. Hence the study of the factors impacting VoIP Telecom industry having a weight on the strategic fit between operators and vendors started with literature study.

As the primary data collection method, in-depth interview method is applied. In-depth interviews were chosen in this study to gain more insight into the companies' perceptions about the industry and its environment and to get depth information about the environmental factors. This is essential because of the fact that there is no previous research and accumulated knowledge about VoIP industry in Turkey. So this research had to design all topics and questions from scratch. During this process, expertise and knowledge of industry professionals as experts were highly needed and their contribution and participation in listing the factors were critically guiding.

As the secondary data and information collection method, industrial information resources are also searched. This research included the industry reports and white papers of public institutions and non-governmental industrial organizations, various company publications, company catalogues and web sites, press releases, international research companies' reports and statistics, scientific, academic articles and books utilizing scenario planning in telecom ecosystem related topics, and other topic-related books as well. Industry news from different portals and channels were also exhaustively followed during the research and information cross-checked for better consistency of the overall industry status and forces driving the change. Additionally, as a new and emerging

industry, VoIP industry has a complex and flexible structure that companies offer various "bundles of services or products" and they are positioned in various ways. Under these conditions, designing a standard survey can hardly be practical as the responses would need to be validated with complementary information.

In-depth interviews are conducted with 13 individuals who are executives, marketing and business development managers of 8 local VoIP infrastructure equipment and service provider companies (Total number of companies in the industry is 40 in March, 2011). These professionals were interviewed as they are the decision and strategy/policy makers in VoIP companies, therefore they are the most familiar experts with the content of the research. Also %80 of the interviewed managers were also technical persons with an engineering background, so they had an advanced understanding about the VoIP and telecommunication technology and could give information about the technological aspects and Based on the information that is obtained from the resource search, topics to be interviewed are defined.

III.2. Strategic Analysis Methods and Tools

According to Wheelen and Hunger [20], strategic analysis is a theoretically informed understanding of the environment in which an organization is operating, together with an understanding of the organization's interaction with its environment in order to improve organizational efficiency and effectiveness. Hence it also aids to increase the organization's capacity to deploy and redeploy its resources intelligently.

The following attributes are commonly associated with strategic analysis [21]:

- Identification and evaluation of data relevant to strategy formulation.

- Definition of the external and internal environment to be analyzed.

- A range of analytical methods that can be employed in the analysis.

Downey [21] emphasizes that the aim of the analytical tools of strategic analysis that rely on historical, backward looking data to extrapolate future assumptions is to sharpen the focus of the analysis and to ensure a methodical, balanced approach. According to Bensoussan and Fleisher [19], "classic" techniques involved in analyzing business and competitive data and information include environmental analysis, macro environmental analysis (PEST), five forces industry analysis, value chain analysis, competitor analysis, and organizational analysis models that may help to draw effective conclusions from limited data and to put together information that may not often fit together. Some analytical methods that are used in this study for environmental strategic analysis include:

a. PEST Analysis

b. Porter's Five Forces Analysis

c. Value Chain Analysis

d. SWOT Analysis

III.3. PEST Analysis

PEST stands for Political, Economical, Social & Technological factors of the external macro-environment that affect all firms in an industry. It is also referred to as the STEP, STEEP or PESTLE (Political, Economic, Socio-cultural, Technological, Legal, Ethical) analysis [22]. Muensriphum, et al. [23] stated that PEST is a useful business measurement tool for understanding the political, economic, socio-cultural and technological environment that an organization operates in so it can be used for evaluating market growth or decline, and as such the position, potential and direction for a business. According to Thompson and Strickland [24], PEST analysis headings present a framework for reviewing a situation and so they can effectively be used for marketing and business development assessment and decision-making, Besides, as Chapman [25] emphasized, the PEST template encourages proactive thinking, rather than relying on habitual or instinctive reactions. As can be seen in Table.1 that refers to Drummond and Ensor [26], PEST analysis provides a framework used in environmental scanning. Such external factors that usually are beyond the firm's control present themselves as threats or opportunities [22]:

- **Political factors:** These include government regulations such as employment laws, environmental regulations and tax policy. Other political factors are trade restrictions and political stability.

- **Economic factors:** These affect the cost of capital and purchasing power of an organization. Economic factors include economic growth, interest rates, inflation and currency exchange rates.

- **Social factors:** These impacts on the consumer's need and the potential market size for an organization's goods and services. Social factors include population growth, age demographics and attitudes towards health.

- **Technological factors:** These influence barriers to entry, make or buy decisions and investment in innovation, such as automation, investment incentives and the rate of technological change.

Table.1. The PEST Analysis of Influences in the External Environment

Political/legal issues	Economic factors
• Taxation policy • Monopoly controls • Environmental protection measures • Employment law • Environmental legislation • Foreign trade agreements • Stability of the governmental system	• Interest rates • Inflation rates • Money suppley • Bussines cycles • Unemployment • GNP trends
Social/cultural issues	**Technological factors**
• Age profiles • Social mobility • Changes in lifestyles • Family structures • Levels of education • Work behaviour • Leisure activities • Distribution of income • Patterns of ownership • Attitudes and values	• Focus of government research • Rate of technology transfer • Materials • Developing technological processes

Source: Drummond, G. & Ensor, J. (2001). Strategic marketing: planning and control. 2nd Ed. Oxford, MA, Butterworth-Heinemann Publishing [26].

Many macro-environmental factors are specific to country specific and a PEST analysis should be performed for all countries of interest. Bensoussan and Fleisher [19] pointed out that, although many organizations recognize the importance of the environment, all too often this analysis ends up making a small or minimal contribution to strategy analysis and formulation because most of the organizations see the environment too uncertain to do anything about or because many environmental factors have delayed or indirect effects on the organization and often escape the notice of strategy makers

PEST factors can be classified as opportunities or threats in a SWOT analysis. It is often useful to complete a PEST analysis before starting a SWOT analysis [20]. Social, technological, economic, ecological, and political/legal aspects of the environment that can affect the competitiveness of industries and companies are generally considered to be beyond the direct influence of an individual company [19]. However, as Grant [27] stated, prerequisite for effective environmental analysis is to distinguish the vital from the merely important. Though systematic, continuous scanning of the whole range of external influences might seem desirable, such extensive environmental analysis is unlikely to be cost effective and creates information overload. The key issue is how these environmental factors affect the firm's industry environment. In this sense, in order to understand the industry environment in a multi-dimensional approach gains importance.

III.4. Five Forces Of Competition

Five forces of competitive position analysis was developed by Michael E. Porter [28] of Harvard Business School as a simple framework for assessing and evaluating the competitive strength and position of a business organization. This theory is based on the concept that there are five forces which determine the competitive intensity and attractiveness of a market. Competitive advantage is the ability to excel in the marketplace due to price, product, service level or performance (Most enterprises regard obtaining competitive advantage as an imperative and its achievement ultimately determines whether an enterprise is successful [29].

Porter's five forces helps to identify where power lies in a business situation. Bensoussan and Fleisher [19] emphasized that a proper understanding of the five forces is important in developing company's competitive strategy, as the ultimate aim of the analysis is in developing competitive actions to cope with and, ideally, influence or change these forces in favor of a firm. Wheelen and Hunger [20] find this analysis useful both in understanding the strength of an organization's current competitive position, and the strength of a position that an organization may look to move into. Strategic analysts often use Porter's five forces to understand whether new products or services are potentially profitable. Porter [30] concluded that, by understanding where power lies, the theory can also be used to identify areas of strength, to improve weaknesses and to avoid mistakes. This model focuses on the analysis of the current situation (customers, suppliers, competitors etc) and on potential developments (new entrants, substitutes etc). Content of

five forces of competition in industry is illustrated in Figure.2 [28] and explained below:

1. Supplier power: An assessment of how easy it is for suppliers to drive up prices. This is driven by:

- the number of suppliers of each essential input
- the uniqueness of their product or service
- the relative size and strength of the supplier
- the cost of switching from a supplier to another.

2. Buyer power: An assessment of how easy it is for buyers to drive prices down. This is driven by:

- the number of buyers in the market
- the importance of each buyer to the organization
- cost of switching from one supplier to another.

3. Competitive rivalry: The key driver is the number and capability of competitors in the market. Many competitors, offering undifferentiated products and services, will reduce market attractiveness.

4. Threat of substitution: Where close substitute products exist in a market, it increases the likelihood of customers switching to alternatives in response to price increases. This reduces both the power of suppliers and the attractiveness of the market.

5. Threat of new entry: Profitable markets attract new entrants eroding profits. Unless incumbents have strong and durable barriers to entry, for example, patents, economies of scale, capital requirements or government policies, profitability will decline to a competitive rate.

Porter [28] also emphasized that all of these forces act on a company seeking competitive advantage that can be developed by strengthening the position within this Five-Forces Framework in a market. The stronger these forces are, the more likely the profits will be less for the industry.

III.5. Value Chain Analysis

In his book "Competitive Advantage", Michael Porter [28], introduced a generic value chain model that comprises a sequence of activities found to be common to a wide range of firms. Porter [28] identified primary and support activities as shown in the Figure.3.

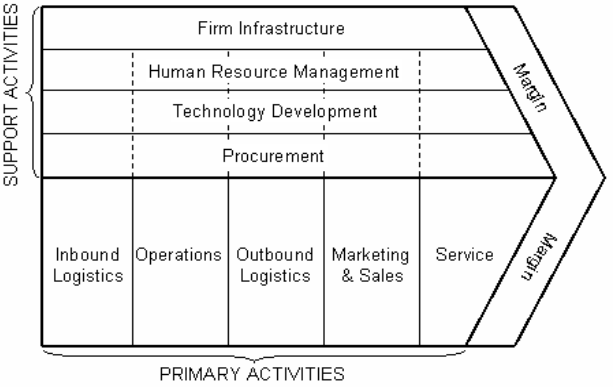

Figure 3. The traditional Value Chain

Source: Porter, M.E. (2004). Competitive Advantage -Creating and sustaining superior performance. New York: The Free Press [28]

The goal of these activities is to offer the customer a level of value that exceeds the cost of the activities, thereby resulting in a profit margin [28] defined the primary value chain activities as:

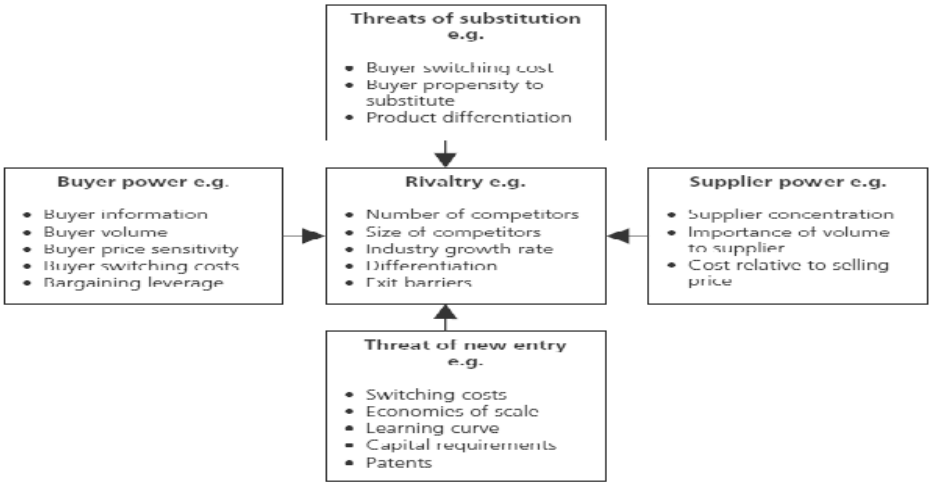

Figure.2. Five Forces of Competitiveness of an Industry

Source: Porter, M.E. (2004). Competitive Advantage - Creating and sustaining superior performance. 1st Ed. New York: The Free Press [28]

- Inbound Logistics: the receiving and warehousing of raw materials and their distribution to manufacturing as they are required.

- ·Operations: the processes of transforming inputs into finished products and services.

- ·Outbound Logistics: the warehousing and distribution of finished goods.

- Marketing & Sales: the identification of customer needs and the generation of sales.

- Service: the support of customers after the products and services are sold to them

These primary activities are supported by:

- The infrastructure of the firm: organizational structure, control systems, company culture, etc.

- ·Human resource management: employee recruiting, hiring, training, development, compensation.

- ·Technology development: technologies to support value-creating activities.

- ·Procurement: purchasing inputs such as materials, supplies, and equipment [28].

However, industries are composed of interlinked value chains of companies that are suppliers and buyers of each other. A firm's value chain is embedded in a system of interlinked value chains [28]. The business value system of interlinked firms in an industry is shown in Figure.4 as adapted from Hannick [31].

Activities of companies in the industry are interdependent with the activities of the buyer or supplier companies but also are under the impact of new entrant companies' and substitutes The overall system is thus a chain of sequentially interlinked primary activity chains that gradually transform raw materials into the finished product valued by the buyer [32]. Especially firms' primary activities that are interdependent to each other in an industry as a result of supply chain or customer relations are simply presented in Figure.5 as adapted from Hannick [31], these interdependencies can result in collaborations and industry patterns that can raise barriers to entry, better inventory control or less stock-outs better production coordination that reduces costs etc. Also new activities and services can be introduced to industry.

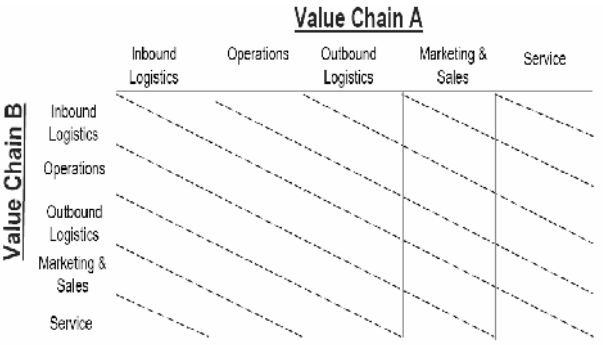

Figure.5. Interdependence of Activities in Industry Value Chain

Source: Information Technology Strategy: Interlinked Value Chains, Integrating E systems: Technology, Strategy, and Organizational Factors. Spring 2002 Lecture Notes, MIT Open Course Ware, Sloan School of Management, Boston,MA [31].

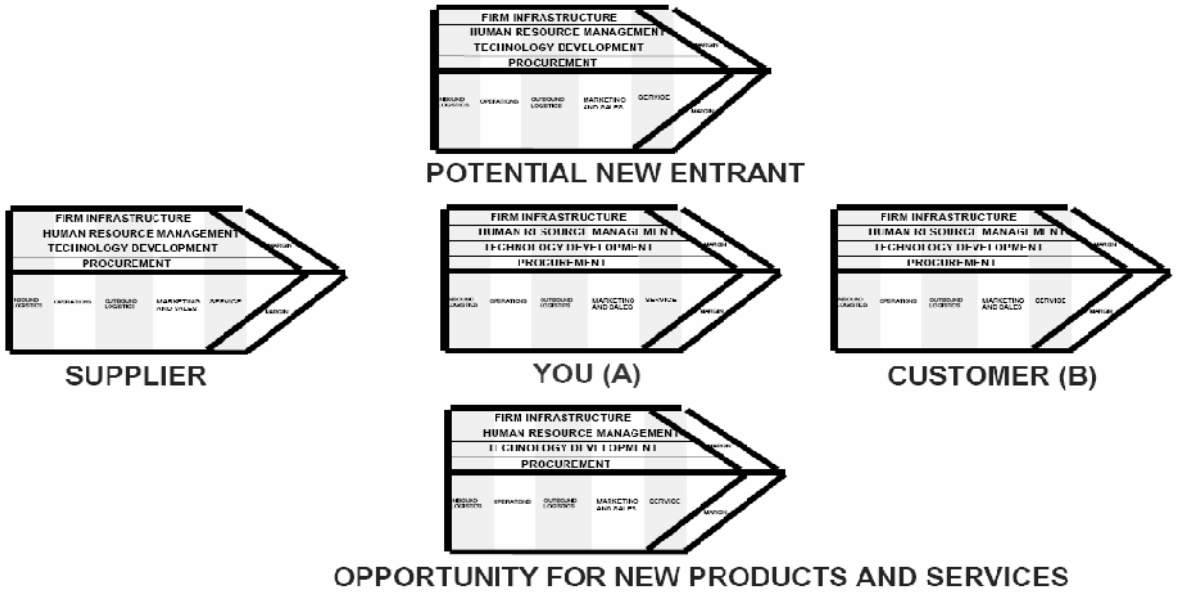

Figure 4: Interlinked Value Chains of Companies in an Industry

Source: Source; Porter, M.E. (2004). Competitive Advantage - Creating and sustaining superior performance. 1st Ed. New York: The Free Press [28]. Hannick, L.I. (2002). Information Technology Strategy: Interlinked Value Chains, Integrating E systems: Technology, Strategy, and Organizational Factors. Spring 2002 Lecture Notes, MIT Open Course Ware, Sloan School of Management, Boston, MA [31].

III.6 SWOT Analysis

A SWOT analysis is a simple but widely used tool that helps in understanding the strengths, weaknesses, opportunities and threats involved in a project or business activity. SWOT analysis is grounded in the basic principle that strategy making efforts must aim at producing a good fit between a company's resource capability (as reflected by its balance of resource strengths and weaknesses) and its external situation [24]. SWOT Analysis is another important tool that enables subjective examination of companies', industries', regions' and even countries' Strengths, Weaknesses, Opportunities and Threats [21]. Outputs of PEST and Five Forces analyses can be used in SWOT analysis in defining the external factors that cover opportunities and strengths [20] [29]. Strengths and weaknesses are usually internal to the organization, while opportunities and threats are usually external. Often these are plotted on a simple 2x2 matrix. Strengths are positive aspects and weaknesses are negative aspects internal to the organization. Opportunities are positive aspects and threats are negative aspects external to the organization [22].

Table. 2. SWOT Analysis Diagram

Strengths	**Opportunities**
• What does your organization do better than others? • What are your unique selling points? • What do your competitors and customers in your market perceive as your strengths? • What is your organization's competitive edge?	• What political, economic, social-cultural or technological (PEST) changes are taking place that could be favorable to you? • Where are there currently gaps in the market or unfulfilled demand? • What new innovation could your organization bring to the market?
Weaknesses	**Threats**
• What do other organizations do better than you? • What elements of your business add little or no value? • What do competitors and customers in your market perceive as your weakness?	• What political, economic, social-cultural or technological (PEST) changes are taking place that could be unfavorable to you? • What restraints do you face? • What is your competition doing that could negatively impact you?

Source: Downey, J. (2007), Strategic Analysis Tools-Topic Gateway Series No. 34, The Chartered Institute of Management Accountants, London [21]

In further research, insights on internal factors including resources, capabilities and norms of each individual company and averages of these internal factors in the industry can be provided.

IV. FINDINGS

Common factors that were reported by the interviewers and included in literature are used in the external analysis of the industry. Based on the findings of interviews, PEST analysis for VoIP Infrastructure industry in Turkey has been conducted. With the Porter's Five Forces Competitive Analysis, competitive intensity and the attractiveness of the market had been determined. Finally, based on the findings from PEST analysis and Porter's Five Forces Analysis we concluded the potential threats and opportunities of the companies in the industry.

IV.1 PEST ANALYSIS

The VoIP sector all around the world has experienced a tremendous growth in the last few years. The majority of the key forces driving the market from the VoIP telecom vendor point of view are technological, obviously, but also many of them are political. As Enqvist and Casey [33] also reported, economic and social forces also play an important role in forces study but their impact is not as direct and intense as technological and political forces.

Political Factors

-*Internet telephony (VoIP) is banned in some countries for political or security reasons.* VoIP is known to be banned in some of the Gulf nations - Saudi Arabia, UAE, Kuwait, Bahrain, Oman, etc. The security reason to ban VoIP is that the country does not have the capabilities to track internet telephony calls, both domestic and international, which is in the interest of national security as there are also some examples of using VoIP telephony for terrorist attacks.

In the US and Europe, VoIP service companies have provisions that allow governments to track these calls. They also installed equipment at their premises to monitor VoIP calls upon orders from governments.

- *Internet telephony (VoIP) is banned in some countries due to Telco monopolies*. These countries have state owned telecom companies monopolizing the international gateway and international VoIP is seen as bypassing their gateways and threatening their revenues. Scared of the loss of revenue posed by VoIP, some incumbent telecom companies and government have in the past blocked ports or are continuing to do so presently so that calls cannot connect with a user on their network. This situation brings some risks for other applications For example, ISPs may block IM (Instant Message) from contacts that are not in their network or bounce e-mails from a sender using a competitor ISP.

- *In some countries, there are strict regulations against VoIP applications.* For example in Turkey, VOIP

is not banned however strictly regulated. The VOIP operators are called as alternative operators and the others (fix line or mobile operators) are called as main operators. Even the alternative operators are owned by a main operator, main operators are trying to limit their market shares by applying high interconnection fees.

- *There is unfair competition with traditional Telecom companies*. Termination/Interconnection rates are the charges which one telecommunications operator charges to another for terminating calls on its network. Termination may take place on a fixed or mobile network. For example, a customer of operator A wishes to call a person who is registered to Operator B. Operator A will charge the customer a fee per minute (the retail charge) for this call. Operator B will charge Operator A a fee for terminating the call on its network. This termination rate therefore forms part of Operator A's cost of providing the call to its customer. Unfair interconnection fees are applied to the alternative VoIP operators to take them out of the market and strict regulations against VoIP operators. Termination rates may be commercially negotiated or may be regulated.

- *Competition Authorities* do not take sufficient measures to prevent unfair competition. Turk Telecom and GSM operators charge interconnection fees [34]. Turkish regulator (BTK), has lowered the interconnection rates for both Fixed-line and mobile operators. Moreover, main operators charge their customer higher fee for calling anybody who is registered to alternative operators. So, alternative operators cannot give low rate to their customers. Against this unfair interconnection fee, Turkish Competition Authority does not take any measure.

- *Political Instability in MENA region:* Public investments and individual spending are limited and postponed due to the emerging political instability in MENA region caused by public reactions to political authorities. This also threatened all other segments of telecommunication industry and companies had to revise their business strategies and plans regarding the region

- *VoIP licenses do not seem to be available in short term*. There are regulations that are expected for closed or semi-open Telco licenses. Closed license means there is no VoIP business as it is banned by the government owning telecom monopoly while semi-open license meaning there are some operators providing VoIP services illegally. Many companies fear to implement VoIP due to concerns about future government regulations of the technology, which could result in additional taxes and fees. With supportive government policies and regulatory environment, companies will gain more customers in MENA region. Also in some developed countries regulations are expected to demand VoIP services to adopt 911 hosted Solutions.

Economic Factors

Factors caused by Economic Recession forcing cost savings and budget limitations:

- *Low interconnection rates:* As communication became a basic need for today's society, it is unlikely that people will tend to communicate less during a recession. People's loss of confidence in the economy will drive them to trim their budgets, and VoIP offers considerable cost advantages and savings in this respect. Users today face huge and unfair interconnection rates in telecommunication industry. Significant cost saving in the government, private and home telephone bills are needed for closing the deficits caused by the recession. The main reason why individuals and businesses switch to VoIP is its ability to make them communicate better for cheaper. Though the additional traffic that is brought by VoIP usage almost certainly requires network upgrades, VoIP is still more efficient with lower equipment cost as it cuts costs by replacing separate voice and data networks with one common infrastructure eliminating duplication. Companies also have lower total cost of ownership as they invest in the spare capacity on their existing data networks, instead of continuously paying telecom companies to carry their voice traffic. The cost pressures force MNOs to switch to VoIP infrastructure by replacing their old telecom network elements with IP-specific network elements.

- *Free or cheap communication even for mobile phones:* There will be more interest for soft/smart phones and PC-based VoIP services, which, under certain conditions, allow users to make local and international phone calls with low costs.

- *Profit increase at ISPs*: A VoIP provider can also be an Internet Service Provider. Thus the same organization can expect revenue not only from VoIP telephony but also from other sources of ISP with low profits flow.

- *Economics of VoIP Adoption:* VoIP adoption is on a steady, upward course as companies are replacing obsolete and aging analog phone systems. The economics of VoIP implementations are mostly positive, although small organizations have difficulties in achieving effective return on investment. The total cost of ownership sometimes exceeds budgetary estimates.

Social Factors

- *Need for tracing/identification of the caller*: Phone usage is *critically* important for emergency calls and users require the ability of their calling system to be compatible with emergency calling systems like 911. Due to the tracebility problem caused, VoIP cannot meet this requirement. VoIP Services Industry should understand

the delta between today's public safety environment and what the driving needs are for improvement in the public safety organizations of the future [35].

- *Widespread usage of PC and Internet:* Individuals are fastly becoming users of Internet not in developed countries but in developing regions as well. As PC and internet penetration increases, VoIP usage is becoming widely used. In Turkey, there are 35,000,000 Internet users as of June/10, 52.0% of the population, while Internet access rate of households had reached %40, 6 in May 2010 [36].

- *Increasing mobility and changes in life styles:* Due to wide usage of mobile phones and mobile internet, users in Turkey and other developing countries in the region request mobile services. As the VoIP services are available to users anywhere on the network with high functionality, it provides productivity improvements, especially for businesses with mobile employees.

- *Young population rate:* Usage of new technologies of VoIP is strongly driven by the young individuals and new-generation business decision makers in business. Turkey have a population growth rate of 12.1 [37], and like other countries in the MENA region have high young population rates that are familiar and more competent with the usage of VoIP.

- *End-users' preference for easy to use telecommunication products and services:* To use VoIP services, users only need to download and install applications on their computers or communication devices and register. Users do not need advanced technological knowledge for using VoIP technology.

- *Globalization:* In the era of globalization, unlimited long distance calls are desired to take the home businesses to the global market. Beside these, VoIP promises with lots of job creation all over the world, as call centers are being enabled via VoIP. While monitoring the increasing trend of product support and telemarketing, call center business offers new potential customers to VoIP providers.

Technological Factors

- *The quickly changing pace of the global telecommunication industry:*

- *Inability to track the calls and reliability concerns:* For the countries lack of tracking capabilities, in the absence of Caller Line Identification (CLI) parameters of calls landing from abroad, it may be impossible to identify the country of location of the caller. For example, India's Intelligence Bureau [38] has instructed the Ministry of Communications and Information Technology to block all Internet telephony services in and out of India till DoT can devise a method to track such calls. They reported that the calls passing through the VoIP/IP route contain inadequate parameters rendering it impossible to trace the actual callers. Allowing VoIP usage seems to be hard until the technological solution is found to track the internet telephony call. There are still security risks and vulnerabilities associated with VoIP networks, however there are technical developments and R&D efforts to offer proven, ecdetailed recommendations for suring networks [39]. In case the ISP or government blocks VoIP, there are ways around it like setting up an encrypted Virtual Private Network, or using applications for bypassing VoIP blockings or using a Bound-IP that is an application built to overcome the blockings of ISPs. These alternatives allows subscriber to use VoIP freely in blockage region such as Middle East and Africa without compromising of voice quality [40].

- *Unability to make emergency calls through 911 or similar services:* VoIP technology's problem with identifying the caller for emergency calls constitutes a challenge for expanding its usage. It is rather unlikely to find a service with emergency calling facility. Traditional phone equipment can trace the caller's location. However, because a voice-over-IP call is essentially a transfer of data between two IP addresses, not physical addresses, with VOIP it is hard to determine where VOIP phone call is originating from. In using a POTS (Plain Old Telephone System) phone, even during power cuts, user can still make emergency calls. Else, for prepaid lines, users even with no credit can still dial free emergency. However, there are infrastructure changes as new modules are integrated or current systems are replaced. There are various recording options for VoIP as well as capture considerations for non-standard means of communication [18]. Authentication or better the insecurity of authentication methods major threats and other unpleasant effects still to be resolved for VoIP as Identity-Management, Public-Key-Infrastructures (PKI) and authentication are solutions waiting for a widespread deployment. A major challenge is the integration of these solutions to existing users [41].

.- *Dependency on* electricity *supply:* Another problem is the dependency of hardware-based VoIP on electricity. During a blackout, a regular phone is kept in service by the current supplied through the phone line. Usage of battery backups or power generators is required.

- *Dependency on internet connection and quality concerns:* Because VOIP relies on an Internet connection, VOIP service is affected by the quality and reliability of broadband Internet service and sometimes by the limitations of PC. Poor Internet connections and congestion can result in garbled or distorted voice quality clipping, voice delay, or dropped calls especially when using the same computer for routine usage and for VOIP

call. Hence VoIP call quality and service labels still are hardly robust for business usage

- *Cable "Triple Play" :* The growth in "Triple Play" (the bundling of internet, VoIP, and cable services) from cable companies generates great IP-telephony adoption rates.

- *Functionality, Managed Services and Free features:* VoIP provides the features include call waiting, call forwarding, conference calling, voice mail, caller ID, an online call log, time-based rules for call handling, do-not-disturb setting and more. At mobile operators, the features are charged however they are standards, not extras hence free at VoIP. To use these and much more VoIP services, users only need to download and install applications on their computers or communication devices and register. (This factor is also reported by Unuth [42] for US VoIP industry) Besides, VoIP is a requirement for unified communications systems that integrate voice with other IP communications and desktop applications like email and video conferencing. By this way VoIP enables a new usage model that is extremely expensive or difficult to deploy in traditional enterprise phone networks. There is some evidence in the US that hosted/managed VoIP is becoming a bandwagon with many DSL providers now moving into hosted VoIP [43]. There is a big opportunity for companies that offer Managed Services.

- *Software based technology and lower equipment costs*: VoIP installation and maintenance can be based on software rather than hardware. Thus the system is more robust and easy to upgrade. The networks used are more efficient due to compression and packet switching. The technical and economic advantages of packet switching are numerous. First of all, VoIP is more efficient with lower equipment cost. Although the cost of telephony switching and computer equipment has decreased, port prices for VoIP are relatively high but they are falling rapidly. Low cost routers are starting to replace switches. However, developing complex VoIP and converged communication applications is challenging, but deploying them in a production environment causes new challenges. Operators face some issues like load balancing, high availability, seamless fail-over, monitoring, logging for troubleshooting, disaster recovery [44].

- *Flexibility and* Mobility*:*VoIP gives the ability to be mobile. It provides with a chance to intermingle different software solutions with the telephony system. Thus users can be in contact anytime, anywhere with an internet connection. VoIP effectively removes the distinction between LANs (Local Area Networks) and wide area network links in terms of speed, performance and reliability. Depending on how the system identifies extensions, phones can be located anywhere with internet connection, making it easy to add and move extensions. (Systems that use Network Address Translation (NAT) allow phones to be moved at will while systems that use IP addresses may not.) This means IT services can be deployed anywhere on the network as remote services and applications will appear to users just the same as local servers on a LAN. Also Wi-Fi is a good way for the communication, since it can be completely free, unlike other wireless networks. Wi-Fi hotspots are available for users, especially in developed regions in many places (airports, cybercafes, campuses etc). Users connect their portable devices to the Internet and use VoIP (adapted from Unuth, [42])

- *Developments in ISP technology:* Because VOIP relies on an Internet connection, VOIP service is affected by the quality and reliability of broadband Internet service developments in ISP technology is critical for the VoIP companies**.**

IV.2 Competitive Analysis Of VoIP Segment With Five Forces Model

This section presents the competitive analysis of the whole VoIP industry in Turkey including telecom network hardware vendors, distributors, software or service providers from companies' point of view in the industry.

As all telecommunication companies, VoIP service and equipment provider companies must offer products and services that have an attractive bundle of value. They have to produce or buy goods and services, present them, and find buyers for its offerings and advertisers to promote them. Hence, they operate in the framework of the five forces described by Porter [28] that were presented in section III.4.

Figure.6 summarizes the findings of the Five Forces analysis of VoIP Services Industry in Turkey. In this figure, factors that are marked with (+) are the ones that contribute to, hence strengthen the related competitive force in the industry, while the factors that are marked with (-) challenge and decrease the power of the related force.

Bargaining power of buyers:

In today's telecom equipment markets bargaining power of buyers (mainly Telecom Operators) to lower equipment prices is a pressure driven by buyers' decreasing profits. The main reasons are the growing VoIP and wireless data traffic so the declining voice revenues from traditional telecom services. Hence, the value received from sole equipment, including hardware and related software is decreasing. As Enqvist and Casey [33] stated, low profit margins drive the physical network component prices down forcing equipment vendors to

adapt to the business ecosystem and possibly find new sources of revenue from sub-industries like VoIP.

Porter [30] introduced several determinants for high bargaining power of buyers as buyers' profit margins, purchase concentration, volume and switching costs. Low profits create incentives to lower purchasing costs. Also, "Impact on quality and/or performance" is a determinant of buyer power [30]. In VoIP Services Industry, bargaining power of the buyer is also greater than that of the supplier when the buyer's profit margin is low. The key factor lowering the bargaining power of buyers is the fact that network maintenance and operation are still extremely critical aspects of operator business as operator's entire business is based on network availability and service quality. The suppliers in the industry may raise solution prices if they can improve the quality of their products and services (as also had been concluded by Enqvist and Casey [33].

The switching costs of operator for swapping a supplier will result in whole network replacement and swap in support services. Hence switching costs build a barrier, decreasing buyers' bargaining power. Also, the purchase volumes are significant in telecom equipment market as operators' purchasing costs of network solutions are large in proportion to overall costs and that increases the power of suppliers.

Despite the factors that decline operator power as a buyer group, operators still hold a strong position as network equipment buyers. There is a trend that operators are concentrating their procurement organizations leveraging their bargaining power by choosing suppliers in a more centralized and professional manner.

Rivalry among the existing competitors

The rivalry among the existing large, established telecom vendors is aggressive. Already some of the players have exited from the market in previous years as a result of economic crisis followed by the recession however they were acquired by other players. One example is Nortel Networks that went on a bankruptcy in 2009 whose VoIP business unit was acquired by Genband (major global supplier of VoIP equipment. There are indicators for that there won't be place for all of today's established vendors in the future. The declining profitability has been driven mainly by the shrinking of the market during the past few years, seeing the bottom in the end of 2009. This forced companies to apply strict cost cutting programs.

Industry growth is one of the key determinants of the intensity of rivalry among the existing competitor [30]. Intensive competition is brought to the industry by low cost telecom infrastructure vendors like Huawei and ZTE from China. In Turkey all government related telecom infrastructure has been provided by ZTE. Along with declining profit margins, low cost players have influenced the increasing price decline of hardware in network equipment by focusing from hardware to software, "Support Services" and value added "Application Business".

The intensity of the rivalry is also driven by the current combination and characteristics of entry and exit barriers. The entry barriers are high and difficult to overcome as end-to-end solutions that are critical high-profit services requiring experience and expertise of complex multi-vendor environment still holds great value for buyers.

At the same time the exit barriers in the industry are high because of the large mergers that created great fixed costs and built strategic interrelationships with suppliers and buyers. There are also emotional barriers of long organization histories in mature organizations.

The industry is experiencing a situation where there are no new entrants and no leavers. Leaving the entire industry is only possible with bankruptcy [33]. Most VoIP businesses so far have focused on residential/retail business, eg Skype, offering relatively limited functionality. Skype dominates VoIP Services Industry. By offering value added services, companies can gain business customers with their greater requirements for application. This niche can serve as the residential, retail or wholesale business go on maturation.

Entry of new competitors

Entry barriers of entering to the telecom infrastructure industry are relatively high as mentioned above. Most powerful position of large, established telecom vendors against new entrants is their strong experience in networking technologies and complex, multi-vendor systems. When operators are searching for a partner who can deliver and support deployments of highly complex systems, the value which is received by the buyer comes from the vendor's expertise of technology and earlier relationships with buyers. This source of competitive advantage is difficult to gain by possible new entrants in the current status of the industry.

However, the industry trends and future visions are implying that the "end-to-end" expertise of network vendors may lose some of its power in the future. The main drivers for this are the trend that software and hardware are decoupling at increasing pace, creating standardized interfaces between hardware and software platforms, middleware and application software.

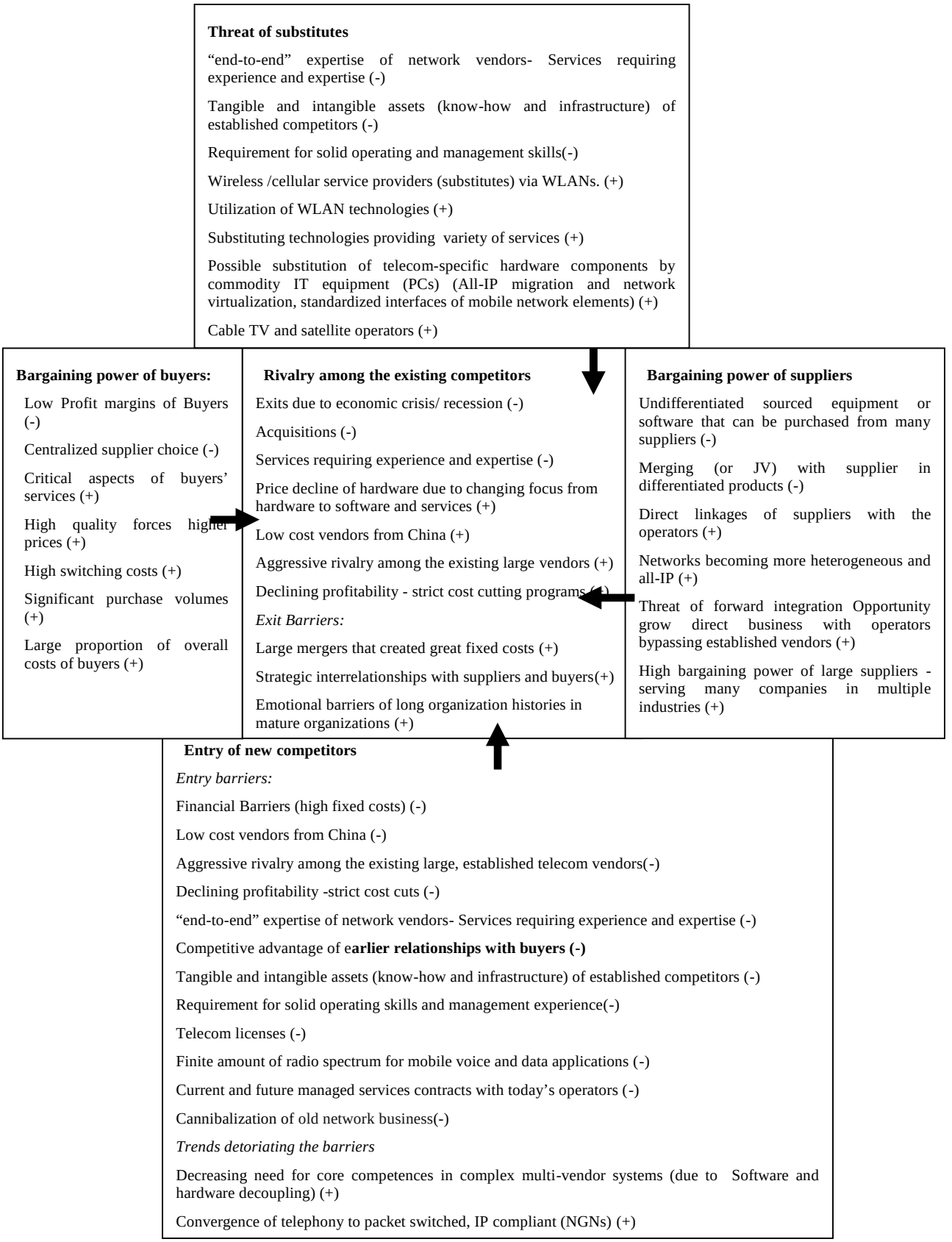

Figure.6. Porter's Five Forces Model in VoIP Services Industry in Turkey

It is yet uncertain how the standardization of interfaces between network elements and management systems (OSS) solutions will come, but if it could be that network hardware adopt the role of a “plug” in the networks and networks could be deployed and managed independently by players with no core competence in complex multi-vendor systems, then the telecom industry structure would be different than of today’s.

Despite the trends mentioned above that deteriorate the entry barriers, today’s entry barriers are still high because the tangible and intangible assets of established competitors which are know-how and company infrastructure scare new possible entrants.

As telecom industry is a capital-intensive industry requiring high fixed costs to enter, the biggest barrier to entry is financial. In case necessary capital has been available, another barrier is telecom license. There is also a finite amount of radio spectrum for mobile voice and data applications. In addition, solid operating skills and management experience is also needed to enter the market. There is a growing uptake of VoIP by traditional voice operators. Many carriers are moving towards supporting VoIP networks and looking to establish direct relationship to exchange voice traffic via an IP handoff at a few strategic locations [45].

According to Enqvist and Casey [33], one strong advantage of the established companies is the current and future managed services contracts with today’s operators. These services contracts bind operators to vendors for several months (approximately 12 to 24 months on average) in terms of service and sometimes of equipment, making it harder for new entrants to acquire customers.

Convergence is expected to be happening in telecoms, and in particular, telephony will be a packet switched, not circuit-switched, and IP-compliant within the decade. Most larger telcos will need to take some time to make the switch to new generation networks (NGNs), and there is a medium term opportunity for new firms to create substantial businesses before this happens. Older telcos began to learn by their experience to cannibalize their old network business rather than have it stolen by new competitors. They will therefore become serious competitors once their NGNs are in place.

Bargaining power of suppliers

The bargaining power of suppliers remains low in today’s telecom equipment industry, although it has been strengthening over the past years. Suppliers are hardware and software platform vendors, broadband access providers, and third party services vendors such as assembly, integration, and consultation service providers.

These suppliers also have direct linkages to the operators. As networks become more heterogeneous and all-IP, these vendors could increase opportunity to grow their direct business with operators bypassing established vendors in the industry and strengthen their bargaining power by increasing the threat of forward integration.

The bargaining power of large suppliers is stronger than medium and smaller companies. Large IT and software companies usually serve many companies in multiple industries. On the other hand, smaller companies may have only a few buyers who purchase products to complement their own solutions. The bargaining power of the suppliers decreases if the sourced equipment or software is undifferentiated and thus can be purchased from many suppliers. On the other hand, if the supplier’s product is highly differentiated to complement the buyer’s solution, the bargaining power will be increased. In this type of business relationship there is a trend that the supplier is bought by the buyer or a joint venture is created which was recently done by Nokia Siemens Networks (rival) and Juniper Networks (supplier) who established a joint venture to address global carrier Ethernet market [33].

Threat of substitutes

The Internet and broadband-based VoIP market could soon face competitors from the wireless /cellular service providers (substitutes) via wireless local area networks, WLANs. Operators and telecom vendors should also consider enterprise customer and customer choices for technology and services to fully understand the threat of substitution. The majority of enterprises and consumers utilize WLAN technologies and VoIP solutions for communications. Additionally, the majority of wireless traffic is generated in indoor locations, the current substituting technologies with no real mobility support (e.g. WLAN) are already able to provide a variety of services to these customers. Considering the service and technology providers of these solutions (internet service giants, IP-network operators and IP-networking vendors) it can be seen that there is a threat of substitution to the entire traditional telecom value chain.

The level of the threat of substitute solutions for mobile infrastructure is driven by the all-IP migration and network virtualization. If interfaces out from mobile network elements are standardized, the threat of commodity IT equipment such as PCs to substitute telecom-specific hardware components is possible.

Internet is becoming a viable vehicle for cut-rate voice calls. Delivered by ISPs instead of telecom operators, "internet telephony" could take a big portion out of telecom companies’ voice revenues. For all telecommunication companies, products and services from non-traditional telecom industries pose serious

substitution threats. Beside satellite operators now cable companies compete for buyers with their own direct lines into homes, offer broadband internet services, and satellite links can substitute for high-speed business networking needs [46]. However, “end-to-end” expertise of network vendors in services requiring experience and expertise and their tangible and intangible assets (know-how and infrastructure) stand as barriers to substitutes as well.

IV.3. VoIP Services Industry VALUE CHAIN

The established value chain of Telecommunications industry and its segments is increasingly being deconstructed, with the entry of powerful new players [3]. As presented in Figure.3 Porter’s value chain model creates value through a two-level activity hierarchy. The value chain configuration includes primary activities that have a direct impact to value creation and delivering it to the customer, while supporting activities help improving the primary activities. However, Porter’s [28] this traditional value chain model is hardly applicable to VoIP telecom infrastructure markets. Comparing to the other markets which traditional value chain is applicable VoIP telecom infrastructure market is very different. Clients, especially in developed markets, already own a lot of infrastructure and Ip-networking vendors’ focus is turned to other sales opportunities such as professional services and software up-sell (upgrading the software for new features). Interlinked industry value chain is applicable but interdependencies between activities form a unique combination that differs from traditional industries.

VoIP market remarkably shifted from the first three primary activities to the last two activities of Porter’s model (sales, marketing, and services). The power position of hardware is weakening while the software and services business is growing rapidly. The value realized by the client is not derived completely alone from the hardware anymore, but the value of today’s market resides in solutions and services.

According to a study of IP networking operator’s covering the following three years (2007-2009) the main goals of operators today are to increase end-user service experience, lower the high operating costs (OPEX), and to identify new revenue streams [47]. These are driving the network infrastructure vendors to offer managed services deals consisting of operations, administration, and maintenance services of the operator network to lower the operator OPEX, improve the network availability, and service quality. This is why the first three of the Porter’s primary activities of logistics and manufacturing are losing relative importance as a company core competence in comparison to the sales, marketing and service activities.

IV.3.1 VoIP Services Industry Value Network

The VoIP services value network can be considered as a combination of three distinct value chains devices, access, services. The value chains are rapidly evolving into value networks, with multiple entry and exit points, creating enormous complexity for all the players involved [3]. This change is particularly obvious especially between the infrastructure companies and the end users where free entry is encouraged. Although, in other parts of the telecommunications industry entry is still limited (by licenses for example) the traditional linear value chain is being deconstructed as the companies in even the limited entry areas increasingly outsource and collaborate with companies from other industries [3].

Historically, the connectivity between people and devices in telecommunications has been provided by telephone operators via their highly specific telecom infrastructure. As Enqvist and Casey [33] stated, in today’s telecommunication world, there is increasing opportunity for internet infrastructure vendors. To survive and thrive in this new environment, these companies that have become nodes on a series of inter-twined value chains, or called value-networks, need to understand their positions in each of the value chains within the value network, and to re-evaluate their strategies and business models, especially their revenue models [3].

Major hardware and operating system (OS) platform vendors, independent software suppliers (ISV) and IP networking equipment vendors are expanding their businesses to telecom markets more intensively [48]. Figure.7 describes these three value chains combined to form the VoIP services value network representing different stakeholders in the ecosystem. The ovals in figure represent the stakeholders. Considering this project scope access value chain in the middle will be under closer attention than the device chain in the top and services chain on the bottom of Figure.7.

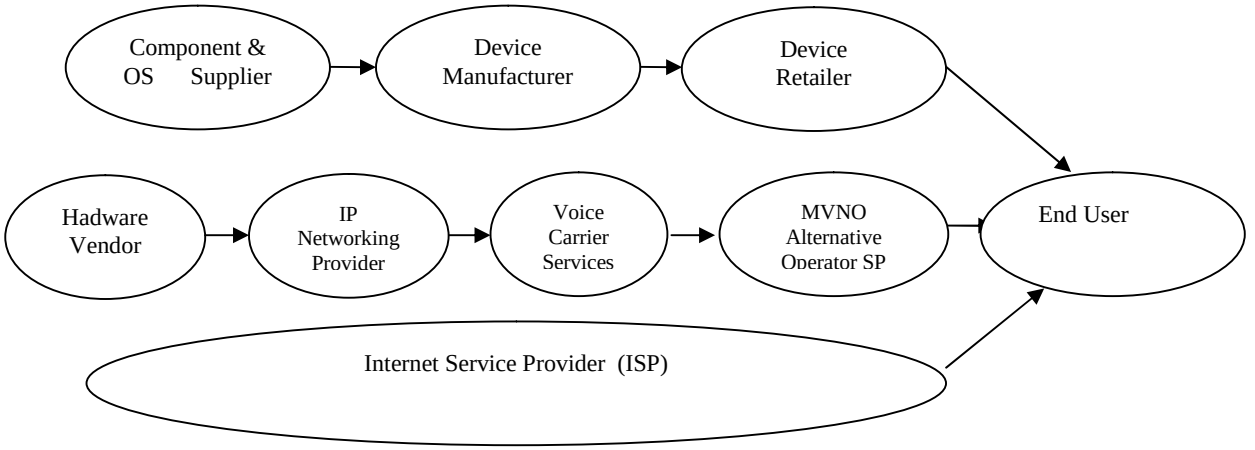

Figure.7. VoIP Telecom Services Value Network

Source: Enqvist, H. & Casey, T. (2010), Mobile Communications Industry Scenarios and Strategic Implications. 21st European Regional ITS Conference, Copenhagen, 13-15 September, 10-31 [33].

IV.4 Threats and Opportunities uf VoIP Industry in Turkey- Partial SWOT Analysis Based on PEST and Five Forces Competitive Analysis Findings

PEST Analysis findings represent important issues about the macro (or general) environmental factors that have the potential to have impact in time on the VoIP industry – not the VoIP companies - in Turkey while results of the five-forces based competitive analysis points out the industrial factors that affect the task environment of the companies. Based on the findings of these two previous analyses, Table.3 shows the frameworks of a partial SWOT analysis that include possible opportunities and threats for the companies in VoIP industry in Turkey. This SWOT analysis does not include the internal/organizational factors that define the weaknesses and strengths of companies in the industry as defining these factors require a further research on in-depth organizational analysis of companies.

Here it must be noted that, the attitudes of the factors in the presented SWOT analysis as being threats or opportunities are expected to be relative for each company in the industry, meaning that these attitudes can vary in accordance with the attitude of the internal/organizational factors of the company. For example, an external factor can act as a threat for a company that have weaknesses due to its insufficient resources, capabilities and norms while the same factor may bring opportunities to a company that have advanced strengths, hence that can turn threats to opportunities. Related to that, some of the external factors (those are marked with (*) in the table) in Figure 2 act both as threats and opportunities depending on the organizational factors of each company like business model, strategies, supplier relations etc. Therefore, findings of a further research that is based on firms' competencies and resources can present strengths and weaknesses of the companies, hence can contribute to relatively position the findings of PEST and Five Forces Analyses that are presented as possible opportunities and threats in this paper on VoIP industry in Turkey.

As can be seen from Table.3, VoIP industry in Turkey has significant opportunities but also considerable threats that are caused by macro environmental factors.

In task or industrial environment, there are opportunities that can prevent the entry of new competitors. However, these opportunities can be challenged by trends detoriating the barriers that may act as threats in the future.

Factors that are related to Threat of Substitutes have to be seriously considered by the companies in the industry, but these can be utilized as opportunities if the companies can position themselves successfully in accordance with the trends. Main threats in industrial environment are caused by "rivalry among existing competitors". Bargaining power of suppliers is highly influenced by the product differentiation levels and there are threats regarding forward integration of suppliers.

There are important political challenges of VoIP Services Industry like it is banned or there are strict regulations against it in some countries for political or security reasons or due to Telecom monopolies. Another threat is sourced by insufficient measures taken by Competition Authorities to prevent unfair competition with traditional Telecom companies. As all other industries, VoIP Services Industry is threatened by political instability in targeted markets like MENA region. Besides, VoIP licenses are unavailable in short term.

Table.3. Partial SWOT Analysis for Threats and Weaknesses of VoIP Industry in Turkey

Threats and Weaknesses of VoIP Industry in Turkey based on Five Forces and Value Chain Analysis

OPPORTUNITIES	**THREATS**
Bargaining power of buyers:	**Rivalry among the existing competitors**
Low Profit margins of Buyers (mainly Telecom operators) in telecom equipment industry)	Acquisitions by major global suppliers of VoIP equipment
Entry of new competitors	Low cost players' influence on price decline of hardware, Intensive competition by low cost vendors from China
Exits from the market due to economic recession	Strict cost cutting programs
Residential/retail business dominating VoIP Services	Aggressive rivalry among the existing largetelecom vendors
Maturation of other residential, retail or wholesale business	Remarkable shift in value chain from the first three activities
Substitution of solutions for mobile infrastructure (IP migration and network virtualization)	**Entry of new competitors-** *Trends detoriating the barriers*
Telecom licenses-Finite amount of radio spectrum for mobile voice and data applications	Software and hardware decoupling creating standardized interfaces between hardware and software
Bargaining power of suppliers	Uncertain standardization way of interfaces between network elements and management systems
Undifferentiation of sourced equipment/ software	Decreasing need for core competences in complex multi-vendor systems
Merging (or JV) with supplier in differentiated products	Convergence of telephony to packet switched IP compliant
Threat of substitutes	**Bargaining power of suppliers**
Threat of substitution by service technology providers to traditional telecom value chain (*)	Threat of forward integration - direct business with operators bypassing established vendors
Possible substitution of telecom-specific hardware components by commodity IT equipment	Inter-twined value chain,complex-rapidly evolving value network
Possible substitution of telecom operators by internet infrastructure vendors, ISPs, in "internet telephony" (*)	**Threat of substitutes**
	Wireless /cellular service providers (substitutes) via WLANs.
	Threat of substitution by service technology providers to traditional telecom value chain (*)
	Possible substitution of telecom-specific hardware components by commodity IT equipment, telecom operators by ISPs in internet telephony(*)
	Products and services from non-traditional telco industries

Threats and Weaknesses of VoIP Industry in Turkey based PEST Analysis

OPPORTUNITIES	**THREATS**
- Globalization	- Banned Internet telephony (VoIP) in some countries for political or security reasons and due to Telco monopolies, Strict regulations against VoIP applications in some countries
- Economic Recession forcing cost savings and budget limitations	
- Cost pressures on MNOs , OPEX reduction at the operators	
- Profit increase at ISPs	- Unfair competition with traditional Telecom companies, insufficient measures taken by Competition Authorities to prevent unfair competition
- Increasing Wi-Fi	
- Widespread usage of PC and Internet	
- Increasing mobility and changes in life styles	- Political Instability in MENA region:
- Young population rate	- VoIP licenses unavailable in short term.
-End-users' preference for easy to use telecommunication products and services	- The quickly changing pace of the global telecommunication industry
- Cable "Triple Play"	
- Developments in ISP technology	- Need for tracing/identification of the caller
- Many DSL providers moving into hosted VoIP - Managed Services	

Economic recession that forced cost savings and budget limitations created opportunities for the industry that offer low interconnection rates and lower equipment costs. The negative trend in infrastructure investments forced companies to lower operational costs. Though this may threaten the other vendors, companies can gain advantage by starting managed services business as a strategy that prevent threats by using strengths like organizational flexibility, quick decision making processes, qualified human resources.

Young population rate, widespread usage of PC and Internet and increasing mobility and changes in life styles also act as driving forces. However, technological weaknesses of VoIP like reliability concerns, inability of tracing/identification of the caller or make emergency calls through 911 or similar services, dependency on electricity supply and internet connection are expected to play the major role in the future of the industry. Though the advantages like functionality, managed services and free features, real time applications and billing support, software based technology, flexibility and mobility, Also the fact that many DSL providers moving into hosted VoIP Managed Services and recent developments in ISP technology offer opportunities for the industry. First of all, the traditional telecom industry (fix line and mobile) is obviously at the mature phase of the life cycle as the revenue of the operators is declining and affecting telecommunication equipment vendors directly. Because the infrastructure is extremely expensive needing huge human resources for support and R&D, some of those vendors also went in the opportunity offering VoIP telecommunication equipment business with their existing resources and know how, increasing the competition.

On the other hand, substitution ability of VoIP can make VoIP equipment vendors rivals to traditional telecom equipment vendors by offering networking infrastructure solutions with rather cheap prices hence enabling the economies of scale advantages. Based on the literature research and technological developments it is concluded that in telecommunication industry segments, the cost pressures force MNOs to share their network with their rivals to minimize operational costs or investments or to switch to VoIP infrastructure. Besides, as MNOs will replace their old telecom network elements with IP-specific network elements, it is expected that VoIP will increasingly replace traditional circuit voice and SMS services. This trend will expand the VoIP market providing opportunities for existing companies. In accordance with this threat, as the revenue at hardware sales declines, another opportunity raises with application business besides professional services. When companies realize that the niche segment had been totally covered, they will already add application and professional services under the product /service portfolio.

When analyzed for Five Forces of Porter [30], bargaining power of buyers in the industry is high due to low profit margins of buyers, centralized supplier choice processes and significant purchase volumes. However, large proportion of overall costs of buyers, critical aspects of buyers' services and high switching costs can be used by the industry for leveraging power of buyers. Market competition, hence rivalry among the existing competitors is high due to price decline of hardware caused by changing focus from hardware to software and services, low cost vendors from China, aggressive rivalry among the existing large, established telecom vendors and declining profitability that resulted in strict cost cutting programs. Besides the exits due to economic recession, acquisitions are consolidating the industry.

Services requiring experience and expertise, high fixed costs, competitive advantage of earlier relationships with buyers, requirement for solid operating skills and management experience, finite amount of radio spectrum for mobile voice and data applications and difficulties in obtaining telecom licenses, current and future managed services contracts with today's operators stand as entry barriers to industry. However, the need for core competencies in complex multi-vendor systems is decreasing due to software and hardware decoupling. There are also exit barriers like large mergers that created great fixed costs, strategic interrelationships with suppliers and buyers, emotional barriers of long organization histories in mature organizations.

In the industry, bargaining power of large suppliers is high as they serve many companies in multiple industries. Also, direct linkages of suppliers with the operators, threats of forward integration and possibilities of direct business with operators by passing vendors increase bargaining power of suppliers. However, networks are becoming more heterogeneous and all-IP, equipment or software are getting undifferentiated sourced that can be purchased from many suppliers and possibility to merge (or JV) with supplier of these differentiated products threatens the bargaining power of suppliers.

The main challenge of the industry is in fact is caused by the threat of substitutes like wireless /cellular service providers (substitutes) via wireless local area networks, WLANs that utilize WLAN technologies. Substituting technologies are providing variety of services. There is a risk of possible substitution of telecom-specific hardware components by commodity IT equipment. However "end-to-end" expertise of existing vendors on services requiring experience and expertise and their tangible and intangible assets (know-how and infrastructure) of established competitors, including solid operating and management skills stand as barriers for the substitutes. As also concluded by Li and Whalley [3] and Enqvist and Casey [33] for VoIP Services Industry it is to define a value-network rather than a value chain, similar

with the whole telecommunications industry. Companies in VoIP Services Industry and market act as nodes on a series of inter-twined value chains simultaneously and form a complex and rapidly evolving value network.

One of the important findings is the remarkable shift in value chain from the first three activities (logistics and manufacturing) to the last two activities that are sales, marketing and service activities, hence companies must build and improve their core competencies on these. As traditionally strong-positioned hardware is losing its power as a part of vendor solutions, telecom vendors must be able to adapt to the new rules of business by transforming their internal resources and capabilities to better support software and services with innovative business models that can meet customer needs flexibly.

V. CONCLUSION

Detailed analysis of the general and task environment of VoIP Services Industry provided important clues about the future of the industry, hence the future positioning needs of the competitor companies. In this kind of turbulent, high-velocity market which is characterized by rapid-fire technological change and short product life cycles, the only strategy should be "managing the change". By this way, companies can get prepared and positioned for the future. Therefore, companies in the VoIP Services Industry have to monitor the changes in their societal and task environments at first. For doing this, they must have proper information channels and systematic information gathering and sharing systems that will enable all the departments and managers be aware of the upcoming trends with threats and opportunities. This will provide not only a learning environment through a early warning system, but also a wider and deeper integration with the industry, suppliers, customers and even competitors from different degrees.

Not only understanding but also correctly commenting these findings in strategy making is another critical task for these companies. As the scale and structures of small and medium sized companies in the market are not suitable for employing professional strategists, turning their current management team into strategy makers is the most effective way. These companies have multiple businesses that enable them manage their business risks in highly changing and competitive environment, so they may face the problem of resource allocation. In this respect, the effective usage of multidisciplinary teams that can function in different businesses stands as a basic alternative. However, it must be noted that qualification of the workforce is the major resource of this capability, while the flexibility and leadership of management team empowered the teams. Organizational and marketing innovativeness are other two important strengths for these kinds of companies as these will enable them to introduce new business models that can be effectively adapted on-time.

Further research on organizational factors that can present weaknesses and strengths of companies in VoIP industry in Turkey will serve to have a deeper look and roadmap for strategy making processes in the industry. Also researches on other niche segments of Telecommunication industry will also be useful to provide new insights to strategic traps of SMEs in Telecommunication industry. By combining the findings of each company based case study and industrial analyses, it will be possible to design an advanced guiding roadmap that is valid for similar companies.

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