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A CALL FOR COMPETITION: RESTRUCTURING POLICIES IN THE U.S. WIRELESS
TELECOMMUNICATION INDUSTRY

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ABSTRACT

Competition is what drives companies to provide better products and services than their competitors. It acts as a catalyst for the advancement of many technologies used to create the mobile devices and the functionality of those devices which people depend on every day. This study describes the implications of a lack of competition within the U.S. wireless telecommunications industry. The purpose of this research is to develop policy recommendations to improve competitive conditions in the U.S. wireless telecommunications industry. After analyzing the strengths, weaknesses, opportunities, and threats (SWOT) of the proposed acquisition of T-Mobile by AT&T; policy recommendations have been created that could improve competitive conditions within the industry if implemented by the Federal Communications Commission (FCC). The findings of this study provides detailed information on what needs to be in place in order for competition to exist in a market or industry, what sort of impact mergers and acquisitions have on competition within a market or industry, and what could have happened in the wireless telecommunications industry if AT&T had been successful in acquiring T-Mobile.

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CHAPTER 1: INTRODUCTION

Competition in business is defined as "the effort of two or more parties acting independently to secure the business of a third party by offering the most favorable terms" (Merriam-Webster). By having competition in place, customers have more choices when selecting a product or service and the price of the product or service is kept lower than it would be without the existence of competition. Competition acts as an important driver in keeping competitors motivated to provide quality products or services in a particular market or industry and stimulates the advancement of that market or industry.

Historically, in the United States, the telecommunications industry has lacked competition, particularly in long distance communications services. A major outcome of a lack of competition is one or a few firms gaining the majority of the market share and forming a monopoly in the market (Duignan, Singh, Chauhan, & Jain, 2007). The verb "monopolize" refers to the process by which a company gains the ability to raise prices or exclude competitors. A monopolistic firm has no incentive to offer competitive prices, invest in innovation, or improve the way they operate (Holmes, Levine, & Schmitz, 2008). Therefore, monopolistic markets generally have adverse impacts on consumer and economic welfare (Stewart, 2009).

The telecommunications industry has experienced many changes over the years from the formation of a monopoly to the decommissioning of that monopoly, from having one company offering long distance services to many competing companies offering long distance services. As the telecommunications industry progressed over time, the communications carriers developed a submarket in the industry offering wireless telecommunications services, and eventually this market evolved into an industry all its own. Rapid change has occurred in the industry over the years causing continuous evolution in wireless technology, carrier acquisitions,

and an astounding growth in customer adoption. The number of wireless subscribers has grown exponentially in the five years leading to 2011. There were an estimated 306.2 million subscribers in the U.S. by the end of 2011 (Thormahlen, 2011). That's a growth of approximately 5.9% per year while industry revenues have increased at an annual rate of 3.9% (Thormahlen, 2011). At the end of 2012 there were a total of 4.3 billion people (unique users) on the planet with mobile devices and 5.3 billion phones. Mobile phone owners with multiple subscriptions drove the total number of subscriptions to 6.7 billion. *"There has never ever been any industry as widely spread as mobile is today - and it grew 11% this year by paying customers. This industry is viciously profitable - the most profitable company on the planet used to call itself a PC company, 'Apple Computer' but now just calls itself a 'mobile' company"* (Ahonen, 2012). In the years leading to 2016, the wireless telecommunications industry is expected to grow at an annual rate of 3.2% (Thormahlen, 2011).

With change occurring quickly, a consolidation of carriers has taken place as firms have acquired competitors in order to keep pace with the ever-evolving industry (Robinson, 2004). In 2011 one of the largest wireless carriers in the U.S., AT&T Wireless, attempted to acquire T-Mobile, which threatened to form a duopoly in the U.S. wireless telecommunications industry as AT&T and Verizon would possess over 70% of the market share within the industry. If this merger was to go through, the industry would have had three nationwide carriers for subscribers to choose from, fewer mobile devices offered by carriers, and AT&T Wireless would have had the majority of the market share, similar to that of AT&T Inc. the monopolizing firm offering long distance telecommunications in the past.

The motivation of this study is to emphasize the benefits of effective competition in the wireless telecommunication industry. Due to deregulation which was one provision of the

Telecommunications Act of 1996 and the approval of several mergers and acquisitions occurring since the breakup of the AT&T Inc. monopoly in 1982, the industry has become concentrated with only four carriers offering nationwide coverage in many local markets across the nation. This study contributes to literature by examining the proposed AT&T/T-Mobile merger in light of literature from economics and social sciences along with the innovations and alternatives that current technologies offer; it discusses the catastrophic consequences of lack of competition; and finally proposing preliminary technology and policy resolutions to spur a healthy competitive market in the U.S. wireless telecommunications industry. In this paper the proposed acquisition of T-Mobile by AT&T is used as one example of how the industry might be impacted by such a change. If this merger was approved, the landscape of the wireless telecommunications industry would have been negatively impacted by the new company as it would have been able to move towards monopolization in many local markets based on the current policies governing the industry.

New wireless telecommunications industry policies need to be considered, created, and implemented, that will force carriers to change their strategies in effectively competing with competitors. New strategies will cause carriers to rethink how they exhaust resources such as spectrum to provide services to customers. As competitors implement successful strategies to gain more subscribers they will see the fruits of their labor in the form of revenue generated from new customers, customer retention, and innovative products and services to gain and hold a competitive edge over competitors. This study examines the existing policies currently governing the wireless telecommunications industry and their shortcomings, and provides insightful considerations for the development of an appropriate set of policies addressing the needs of the industry.

Each section of this study explains or discusses examples used to promote the understanding of the technology and services offered by competitors in an effectively competitive market. It examines the reasons for firms to enter mergers or acquisitions and the effects of an industry with only a few major players. It discusses the disapproved megamerger between two firms that would have further concentrated an already highly concentrated industry. Section 2 defines wireless telecommunications and gives insight into the wireless telecommunications technology used by competing carriers. Section 3 gives a breakdown of the elements necessary for an effectively competitive communications market. Section 4 highlights the advantages of mergers and acquisitions and explains why carriers may enter into such agreements with competitors. Section 5 looks at the impact of mergers and acquisitions on the industry as well as the employees of the firms participating in the transaction. Section 6 evaluates AT&T, T-Mobile and their proposed merger. This section explains how efficiency is not always gained through synergy. Section 7 analyzes the strengths, weaknesses, opportunities, and threats of the proposed acquisition of T-Mobile by AT&T and its impact on the industry. Section 8 gives insight into the current landscape of the U.S. wireless telecommunications industry and presents policy recommendations to improve the state of competition in the wireless telecommunications industry. Section 9 concludes this study with discussion as to why competition is important to a market or industry, implications of the policy recommendations discussed in section 8, and considerations for future research.

CHAPTER 2: WIRELESS TELECOMMUNICATIONS INDUSTRY

The wireless telecommunications industry is fast-paced and competitive; these aspects are important when understanding the reasons for its growth. This can be seen in the industry's technological advancement over its 27 year lifespan and the competitive pricing used by carriers. Carriers sell mobile devices, particularly cellular phones, and mobile services. They offer services to their customers under a contract agreement for a specified length of time. The agreement states the carriers will offer their customers voice, text, and data services for the span of the contract as long as the customer pays the carrier a monthly payment for this service.

In addition to voice, data, and text messaging services, carriers also provide mobile broadband services which customers can add as a service under their plan. Mobile broadband services can be described as mobile Internet service. Customers purchase a PC card, laptop card, or USB device to connect their laptop or other USB capable device to the Internet via cell phone towers. In contrast to Broadband Internet services like DSL, cable modem, and fiber-to-the-home (FTTH) which are wired to specific buildings, mobile broadband uses a carrier's cellular network and is designed to broadcast signals everywhere. Traditional Wi-Fi hotspots also provide wireless connectivity but over a limited radius around fixed wireless access points and uses Wi-Fi, not cell towers.

The connection strength and stability of the broadband Internet service depends on the kind of cell reception in the area. The speed of mobile broadband is the same as 3G and 4G speeds experienced on mobile devices when connecting to the Internet over cellular networks. In the case of a phone call, the packets of information transmitted carry voice data. For mobile broadband, the packets of information transmitted carry other types of data like e-mail, loading web pages, opening music files, and streaming video content.

Mobile devices and wireless telecommunications have become such an integrated part of the personal and professional lives of consumers; it is important to look at the technology used in the industry and how that technology has grown in importance and demand. Wireless telecommunications technology allows users to remain connected at all times through the use of mobile and handheld devices providing many of the same functions as their fully-loaded desktop counterparts. It is because of this convenience that the wireless telecommunications industry has shown rapid growth consistently since its beginning and with it the demand for faster more powerful devices that are portable.

2.1 Wireless Technology

Wireless telecommunications can be defined as the transfer of information between two or more points that are not connected via physical media. One of the best-known examples of wireless technology is the mobile phone, or cellular phone. There were more than 4.6 billion mobile cellular subscriptions worldwide as of the end of 2010 (UN, 2010). Wireless phones use radio waves to enable their users to make phone calls from many locations worldwide. Although wireless competitors provide similar services and connect with one another, wireless communications technology differs between carriers.

In the U.S. cellular market, there are two main competing network technologies: Global System for Mobile Communications (GSM) and Code Division Multiple Access (CDMA) (Kayne, 2012). The four major carriers in the U.S. are AT&T, Sprint, T-Mobile, and Verizon. Both AT&T and T-Mobile use GSM technology while Verizon and Sprint use CDMA. Over the years network technologies have progressed from second-generation (2G) to third-generation (3G). Today carriers are rolling out fourth-generation (4G) networks to their customers. 2G initially launched in 1991 and offered three primary benefits. Phone conversations could now be

digitally encrypted, 2G systems were significantly more efficient in spectrum use allowing for far greater mobile phone penetration levels, and 2G introduced data services for mobile, starting with SMS text messages. 2G technology used digital radio signals where as its predecessors used analog.

3G technology evolved from 2G technology and was first introduced by Universal Mobile Telecommunications System (UMTS) in 2001. It can be used for voice telephony, mobile Internet access, fixed wireless Internet access, video calls and mobile TV. 3G is able to offer simultaneous availability of voice, video, text communication features, and ubiquitous networking i.e. global networking over its predecessors. Because 3G is more data intensive than 2G technology, carriers charge customers a higher rate for the use of that network technology. Currently, carriers are executing their plans to provide 4G technology to customers in various areas across the nation. 4G technologies are able to provide mobile ultra-broadband Internet access, for example to laptops with USB wireless modems to smartphones, and to other mobile devices. Conceivable applications of 4G include amended mobile web access, IP telephony, gaming services, high-definition mobile TV, video conferencing and 3D television. Both CDMA and GSM offer their own varying technologies that are classified as 2G and 3G technologies. All U.S. carriers are moving towards GSM-based Long Term Evolution (LTE) as their solution for 4G because of the improved data transmissions speeds that address the demands of their customers.

GSM technology divides frequency bands into multiple channels so that more than one user can place a call through a tower. This defines how GSM implemented 2G over digital cellular networks. When GSM advanced and the developers of the technology were able to offer 3G services, via UMTS, they were able to offer greater spectral efficiency and bandwidth to

mobile network operators than those using 2G. The progression of this network technology has paved the way for emerging technologies just beginning to be implemented in the U.S.

CDMA networks differ in that they layer digitized calls over one another, and unpack them on the back end with sequence codes for their 2G. This underlying technology was evolved to offer 3G speeds and capabilities and was rebranded as CDMA2000. Network speed is important to those who use the phone for more than making phone calls. Having 3G provides superior data services over 2G, but lacks sufficient bandwidth for many video and web-based services, such as streaming video (Jamison & Hauge, 2011).

4G LTE is the next generation technology that all nationwide carriers are moving to at this time. The innovation behind LTE technology will bring data transmission speeds comparable to the fastest wired internet services currently available. Although LTE is based on UMTS/High Speed Packet Access (HSPA), and UMTS is derived from GSM technology, all carriers, both GSM and CDMA, will have to develop and roll out LTE on their networks. In fact, CDMA-based Verizon is the farthest along in their LTE rollout with 230 cities while AT&T covers a far less portion of the U.S with only 32 cities in 2012 (Bilton, 2012). All carriers are exhausting their resources to grow their LTE network in order to be “first” in areas across the U.S. Table 1 highlights some of the differences between CDMA, GSM and the emerging LTE technology. Traditionally, CDMA technology has been faster than GSM; however both technologies continue to leapfrog one another while advancing toward the next generation of data speeds using 4G technology (Kayne, 2012). Table 1 compares and contrasts CDMA, GSM, and LTE network technologies.

Table 1. A Comparison of Mobile Network Technologies

	CDMA	GSM	LTE
Worldwide Market Coverage	14%	73%	33.7%
Data Transfer Speeds	300-700 kilobits per second (kpbs) over 3G	275-380 kpbs over 3G	3-8 megabits per second (mbps) over 4G

Source: (Lambert, 2012; Smith, 2011)

2.2 Growth in the Wireless Industry

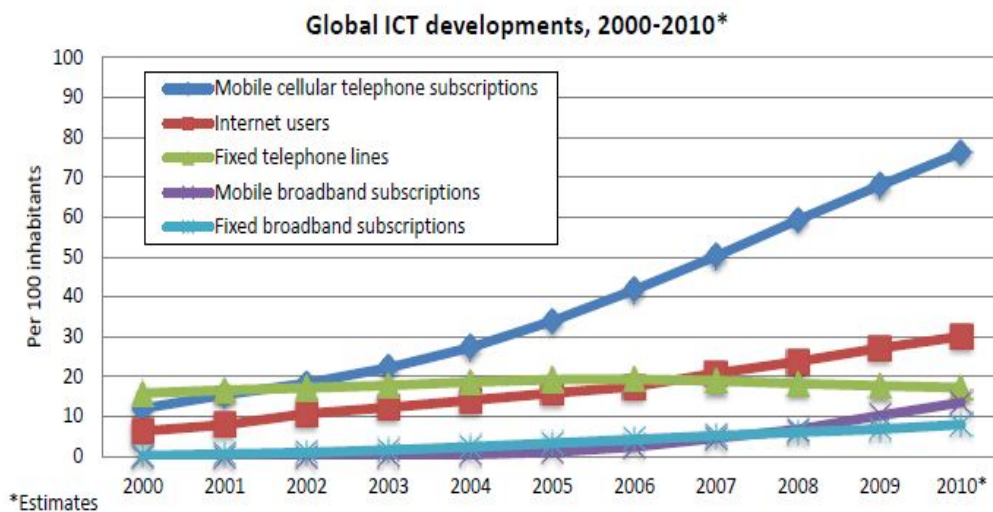
As with wireless telecommunications technology growing at a rapid pace, so has the number of subscribers. Since the 1980s, the number of users of cellular services has grown tremendously. Figure 1 gives a broad view of the growth of the industry. It shows a drastic leap in subscribers between 1985 and 2011 is observed shortly after the year 2000. This is due to the luxury of constant convenience and the efficiency owning a smartphone produces. Another measure of growth is provided in Figure 2, which shows the growth of several Information and Communication Technologies (ICT) in a 10-year period. Compared to other technologies, the mobile cellular telephones showed the greatest growth.

Figure 1. Subscriber Growth Since 1985



Source: http://files.ctia.org/pdf/CTIA_Survey_MY_2011_Graphics.pdf

Figure 2. Global Information and Communication Technologies Growth



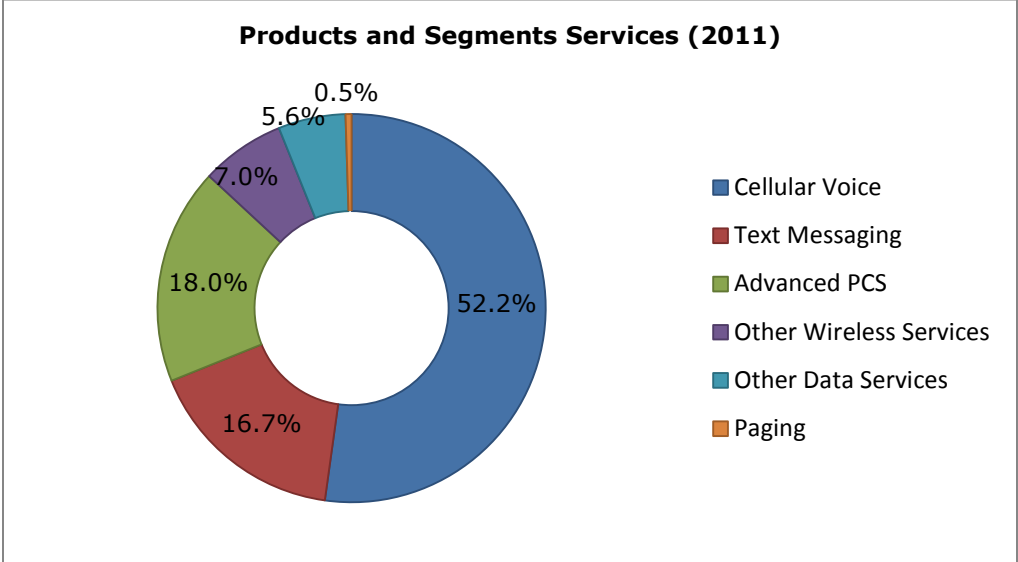
Source: <http://www.theresearchpedia.com/research-articles/growing-mobile-subscription>

Taking a step back to compare the growth of the wireless telecommunications industry to that of the entire telecommunications industry, it is worth mentioning that it took over a century for wireline telephone subscriptions to reach approximately 20 phones per 100 people globally. It took only a couple decades for mobile telephony to exceed 75 phones per 100 people globally

(Cooper, 2011). This is perhaps due to the ease of adding additional antennas to cell towers for wireless services versus installing the infrastructure used for wireline phone services. Taking a deeper look into the composition of the cellular market reveals voice service make up the largest segment of the market (Figure 3). There has been a growing desire for people to have communication capabilities wherever they go and mobile phones are able to provide this capability.

People on the go prefer text messaging as their method of communication over voice calls. Figure 4 shows that as the use of cellular phones has grown over the years, the use and convenience of sending a text message has become more desired than making a voice call on the fly. A comparison between the minutes used in cellular voice calls and texts sent using text messages in the U.S has come to a point of equilibrium. Looking at the graph, the minutes used has flattened out and it is predicted that in the future messaging will exceed voice minutes used (Cooper, 2011).

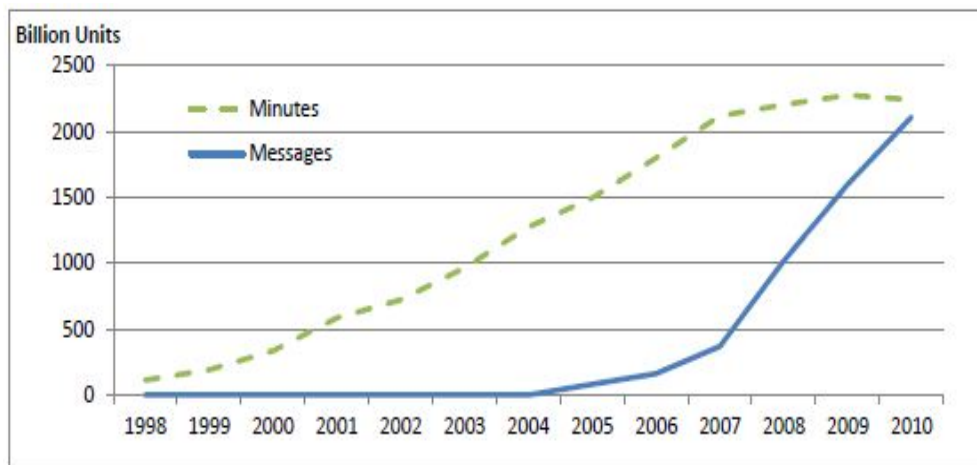
Figure 3. Segmentation of Services in the U.S.



Source: www.IBISWorld.com (Thormahlen, 2011)

Despite the U.S. experiencing a recession, revenues the wireless telecommunications industry have continued to increase. Revenues increased at a rate of 1.1% and 2.4% in 2009 and 2010, respectively (Thormahlen, 2011). The growth factor by which technology and subscribers are growing is outpacing of the ability of carriers to acquire and ration necessary resources such as spectrum for their radio networks.

Figure 4. Minutes vs. Messages in the U.S.



Source: (Cooper, 2011)

2.3 Convergence of Services

Just as customer usage of smartphones and other mobile devices continues to grow, the wireless telecommunications technologies used to offer the services provided by these devices are continuing to advance to meet the growing needs of customers. As these technologies advance, the distinction between voice, text, and data services are becoming blurred. The technologies behind these distinctive services are converging into one technology offering various services. Convergence involves joining previously distinct technologies such as telephony and data communications into common interfaces on single devices. It is defined as

“the degree to which diverse media such as phone, data broadcast and information technology infrastructures are combined into a single seamless all-purpose network architecture platform” (Menon, 2006).

Communication networks were initially designed to carry different types of information independently. The idea of telecommunications convergence began with the emergence of the mobile phone and the Internet. Traditionally, application architectures were tied to a specific network (fixed, mobile or Internet Protocol (IP)) and different networks required diverse software implementations of the same services. Convergence allows operators to make use of a single IP network to provide multiple services such as voice, data, mobile and television at the network level. At the terminal level, users are able to access all these services via a single device such as a cellphone. Lastly, service convergence allows a single service, such as email, to be accessed from various devices, such as PCs, handhelds and cellphones (Tan, 2006).

2.4 Spectrum Aggregation

Offering voice, text, and data services to a growing number of subscribers has caused carriers to near their capacity in available spectrum to offer these services to customers. Carriers are facing what is known as a spectrum exhaust, where the amount of spectrum they can offer to their millions of customers has been nearly maxed out in consumption. FCC Chairman Julius Genachowski cautioned, *“Without action, demand for spectrum will soon outstrip supply.... If we don’t tackle the spectrum crunch now, network congestion will grow, and consumer frustration will grow with it”* (Genachowski, 2011). The White House is also concerned, concluding that there is a “current spectrum crunch that will hinder future innovation” (Gibbs, 2011).

Although convergence could aid in limiting spectrum use to provide voice, text, and data services to users, the implementation of Spectrum Aggregation (SA) could be another answer.

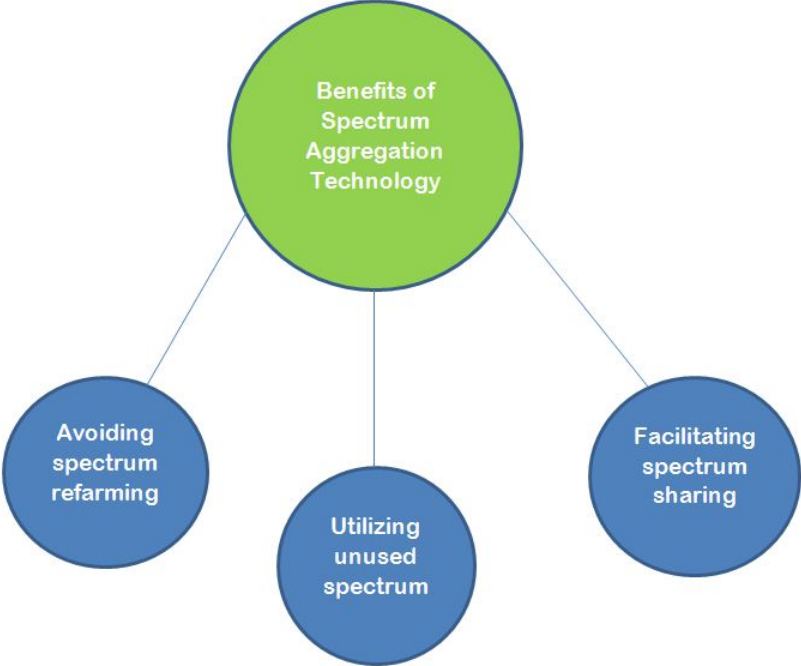
SA “allows multiple small fragments of spectrum to be exploited to provide high transmission rate broadband services which cannot be achieved without this technology” (Alotaibi & Sirbu, 2011). This concept can be applied to spectrum purposed for various technologies such as cellular or television white spaces. Spectrum fragmentation is typically caused by market outcomes based on spectrum-trading and regulatory allocation decisions. As more and more attention is being brought to the awareness of spectrum fragmentation and the idea of aggregation to effectively use it, there are many organizations exploring the benefits of using SA.

The 3rd Generation Partnership Project (3GPP) has analyzed its use in its Technical Specification Group Radio Access Network for use in LTE-Advanced technology that’s currently being deployed by wireless telecommunications carriers. Wireless World Initiative New Radio, a European Union sponsored consortium, has examined spectrum aggregation issues regarding the flexibility of its use for digital dividend, inter-operator sharing models, utilization and the sharing of spectrum and Spectrum Aggregation and Multi-user MIMO: Real-World Impact (SAMURAI) is another EU-sponsored organization interested in assessing SA techniques and systems.

In addition to organizations and consortiums, researchers have studied the usage of Spectrum Aggregation and written literature reviews on it. Alotaibi and Sirbu have created a benefit/cost analysis to determine the incremental costs for operators (carriers) using SA technology as a substitute for wideband contiguous channels. They have constructed a cost model to reveal their results. Their model looks at wireless broadband network deployment costs. This calculates the number of cell sites used for nationally delivering the cellular service of a wireless network of a carrier when using contiguous vs. non-contiguous spectrum.

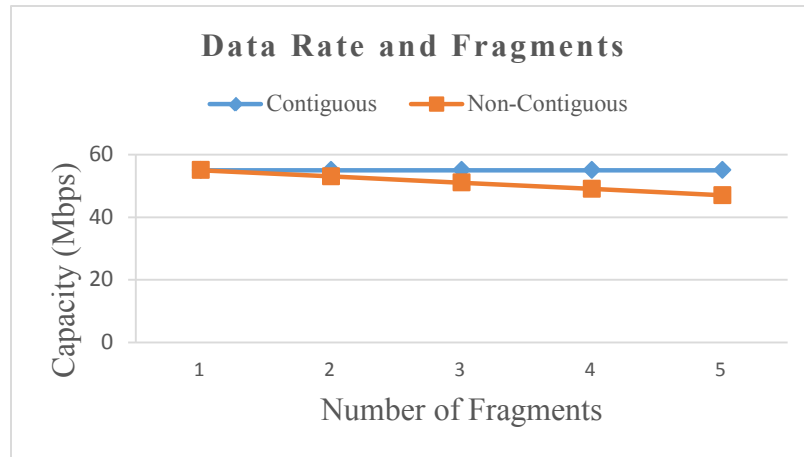
In addition to creating this model for Wireless Broadband Network Deployment Costs, the authors have also examined the factors of equipment costs, network configuration assumptions, and cost assumptions. They estimated a relative increase in cost for wireless broadband while using non-contiguous spectrum and concluded that carriers would experience a 10% increase in the initial cost for radio network due to coverage, capacity, and radio equipment costs. The benefit from of using Spectrum Aggregation comes from reducing the costs necessary to meet demand by aggregating multiple channels to avoid the need to build more cells or costly refarming. SA not only increases network capacity but it also permits higher peak data rates and can facilitate spectrum sharing between carriers, which yields an increase in utilization. Based on data analysis by the authors they were able to demonstrate the importance of spectrum contiguity. Figure 5 shows benefits of SA technology.

Figure 5. The Benefits of Spectrum Aggregation



Source: (Alotaibi & Sirbu, 2011)

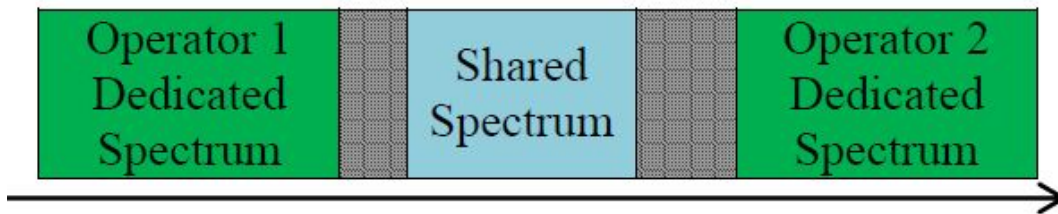
Figure 6. Fragments vs. Capacity



Source: (Alotaibi & Sirbu, 2011)

SA technology would be able to take unused fragmented bands and make them usable by combining them with each other. This makes those small fragments of spectrum as useful as large contiguous channels for enabling higher bit rate wireless and greater capacity. Figure 6 compares contiguous to non-contiguous fragments. The more non-contiguous fragments that are collected, the lower the capacity they have together. In contrast, contiguous fragments collectively maintain the same capacity as they are combined. Carriers could aggregate spectrum from various frequency bands to reach a target bandwidth. In addition to allowing operators to reach the peak rate, spectrum aggregation would allow the carriers to have access to different spectrum bands with different characteristics. Concurrently, a carrier has the ability to optimize its allocated spectrum to use it for one user. In addition, it leads to spectrum availability that removes the barriers to enter the market.

Figure 7. Spectrum Sharing



Source: (Alotaibi & Sirbu, 2011)

Figure 7 depicts spectrum sharing between two carriers. They each own a dedicated frequency band and have access to a shared band. Because the shared spectrum is not contiguous to the assigned spectrum of the two carriers, use of the shared pool can expand capacity, but not raise the peak bit rate. With SA, operators can combine spectrum from the shared pool with dedicated spectrum to realize higher bit rates thus increasing utilization. This is one option that can be explored by the FCC and through cooperation with carriers open up the availability of more spectrum for a growing number of subscribers.

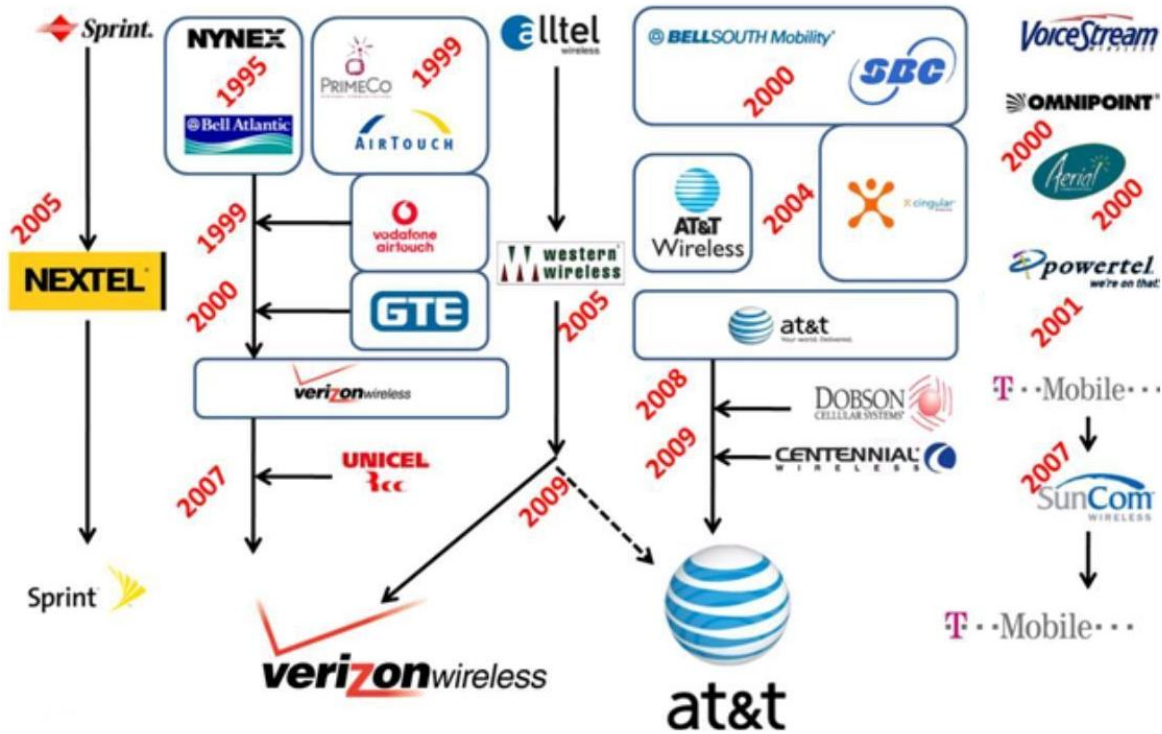
As the wireless telecommunications industry continues to move towards converging the technologies that provide voice, messaging, and data services and new ways to manage spectrum are being explored, carriers are beginning to take a conservative approach to the issue of spectrum exhaust. It has become necessary that these carriers explore and implement innovative strategies to maintain their resources while remaining competitive. The necessity of innovation will drive the wireless telecommunications industry forward, however there are several elements that are necessary for competition to exist within the wireless telecommunications industry.

CHAPTER 3: COMPETITION IN THE TELECOMMUNICATIONS INDUSTRY

There has been numerous mergers and acquisitions in the telecommunications industry since the breakup of the AT&T Inc. monopoly in 1982. Figure 8 shows the M&A activities and the four major carriers remaining after the gradual consolidation of the industry. This consolidation has caused a deficiency in competition within industry in the U.S.; however, at its inception there were several carriers competing for subscribers in the new submarket of the telecommunications industry. Establishing a market of competitors does not establish an effectively competitive market.

Competition in a market is central to its operation and advancement; it fosters innovation, productivity, and growth. In order for competing carriers to effectively compete and remain relevant in an industry with the level of growth that has taken place in the wireless telecommunications industry, there are specific conditions that must be present. Bar and Borrus (Bar & Borrus, 1997) describe the elements that reinforce competition in the telecommunications industry. These elements give insight on how to make competition possible, how to make it work, what makes it real/effective, and what makes it enforceable.

Figure 8. History of Wireless Industry M&A



Source: <http://www.deadzones.com/2011/05/history-of-us-wireless-telecom.html#.UQIQUb962So>

3.1 Competition in the Wireless Industry

Market competition is “a means to generate and capture new opportunities for economic growth and industrial innovation opened by the new information technologies” (Bar & Borrus, 1997). Technologies existing within the wireless telecommunications industry make participants capable of providing services to customers, however it does not make competition possible. It is the allowance and use of these technologies that can make competition possible.

3.1.1 Make Competition Possible

In order for competition to exist in the wireless telecommunications industry it must be possible for it to exist. There is a need for unrestricted resale/reuse of the dominant carriers’

facilities and services in order to facilitate regional carriers. For new carriers to compete without using the resources of existing carriers, they would have to build or rent their own infrastructures which would require a costly, complex acquisition of rights of way resulting in substantial delays before entry (Bar & Borrus, 1997). Currently there are high barriers to entry in the wireless telecommunications industry, this makes it difficult for new competitors to enter the industry and pose any real threat to existing carriers. Hence, competition only really exists between the four major carriers. Without the ability to enter into resale agreements, new entrants would not be able to use the facilities of existing carriers.

Given access to an incumbent carrier's network establishes facilities-based competition. Although this does provide a solution for new entrants into the industry, the new entrants might be subject to discriminatory behavior by incumbent carriers. The new carriers would have to enter into an agreement with incumbent carrier in order to sublease their rented infrastructure and an incumbent carrier may charge unreasonably high prices for this access or may not allow new entrants to fully use their resources and provide services that are as great as those provided to the incumbent. For these reasons, it is necessary to establish policies that address facilities-based competition and make it "fair" for new entrants to use the resources of incumbents. This will make effective competition possible.

3.1.2 Make Competition Work

Simply making competition possible is not enough for there to exist effective competition. In order for competition to work there must be non-discriminatory, transparent, terms of interconnection between all competing networks. Additionally, there must be reasonable pricing of access and interconnection. *"Any form of discrimination between the conditions under which the dominant carrier offers access to new entrants, and the conditions it*

grants to itself, places a new entrant at a disadvantage” (Bar & Borrus, 1997). In order to originate and terminate calls to another carrier’s network, access charges are incurred. Access charges refer to payments made to local service providers for originating and terminating calls on their networks. Prior to the FCC governing access charges for making and terminating calls, local network providers could charge long distance carriers higher rates than others for calls. When a new entrant enters the industry there must be terms agreed upon regarding the cost to access the network of another carrier. The terms and pricing of access must be fair and the same for all carrier networks.

Regulating access charges allow smaller carriers to connect and compete with larger carriers, without be excessively charged. This brings a level of balance to the competition within the U.S., however it is the inclusion of foreign competitors that allows the nation’s carriers to be challenged on a broader scale and gauge the state of the technology they use. For this reason there must be policies to include the use of foreign competitors in the wireless telecommunications industry.

3.1.3 Make Competition Real and Effective

Policies that allow for foreign competitors to enter the U.S. telecommunications industry and compete are essential for the growth of the wireless telecommunications industry within the U.S. Foreign competitors bring their resources and practices into the U.S. industry. Their methods may be popular within the industry causing incumbent carriers to adopt these methods and boost profits in the industry. This further stimulates competition and innovation within the industry. Foreign competitors bring creativity to the market, by coming up with new bundled plans to entice subscribers to change carriers, consequently forcing incumbent carriers to be innovative in order to keep their existing subscribers and prevent churn.

It is necessary that there are policies to regulate both foreign and domestic competitors within the industry. These policies must keep fair competitive practices in mind and all participants in the industry must have an equal opportunity to compete. In order to ensure these policies are adhered to, there must be an entity vested with the power to enforce rules that fairly allocate resources such as spectrum and settle disputes that are raised amongst carriers.

3.1.4 Make Competition Enforceable

In the wireless telecommunications industry, competition must be enforceable. Not only should there be policies that stimulate competition and promote fair practices, there must be an entity that oversees the industry and its competitors. In the United States, the FCC governs the industry. It is their responsibility to promote competition, innovation, and investment in wireless telecommunications. They ensure new entrants into the industry have an opportunity to effectively compete with incumbent carriers through the enforcement of policies, regulations, and legislations set by the government.

These six elements 1) Unrestricted re-sale (and re-use) of a dominant carrier's facilities and services 2) Facilities-based competition 3) Non-discriminatory, transparent terms of interconnection between all competing networks 4) Non-discriminatory, reasonable pricing of access and interconnection 5) Non-discriminatory foreign access and participation on World Trade Organization (WTO) terms and 6) Independent, neutral regulatory authority must all be present for effective competition to exist within the wireless telecommunications industry. Policies must continue to evolve as innovation continues to shape the industry. Not only should policies address the six elements that create competition there must be policies there preserve competition as well. The current state of the industry presents a challenging environment for new participants to enter as there are high barriers to entry in the industry.

3.2 Barriers to Entry

Although competition can be established given the six elements proposed by Bar and Borrus, there is little effective competition within the U.S. wireless telecommunications industry, the entry barriers into the industry are very high. New participants in the industry must establish services by 1) building out a network of their own and obtaining spectrum through auctions held by the government, which has a high cost, or 2) piggy-backing off an existing carrier's network in addition to purchasing their own spectrum. This way is much quicker, but more restricted as network access, contract terms, and growth are all dependent on the competitor's willingness to allow the use of resources.

Cell towers, also known as base stations are the antennas placed in high locations such as towers or on buildings to provide cellular coverage for wireless devices. These base stations may appear to be owned by a particular carrier, but they are actually rented or subleased in most cases at a rate that is determined by how much a particular location is worth to a carrier. Cell towers are typically the property of the owner of the land upon which the tower is built. Negotiations between carriers and these third party property owners are typically through what is referred to as a site acquisition agent who can get the carrier the best deal on renting the cell site. These property owners typically rent the site to carriers for an amount based on the amount of space needed to build the tower if one is not already in place. Other factors determining the price are demand for the cell site if several carriers are interested in renting it and the amount of coverage it provides to the surrounding area (Steel in the Air, 2009).

Once a carrier has negotiated terms with the property owners and begins leasing the site, they have the ability to sublease the tower and collect a "co-location" fee from other carriers. A "co-location" fee is a percentage of the rent paid to the subleasing carrier, typically by another

carrier, in the event the carrier subleases a portion of its leased property to another carrier or carriers (Steel in the Air, 2009). New entrants into the industry subleasing from existing carriers will not only need to gain capital in order to sublease this cell site, they will also be subjected to regulatory provisions enforced by the FCC. The FCC may be in favor of competition within the wireless telecommunications industry, but new entrants will still have to adhere to the regulations just as any other competitor within the industry. This means they will also be limited in when and how much spectrum they obtain in order to support a built from the ground up infrastructure.

Spectrum is purchased through auctions held by the U.S. government. Carriers require specific spectrum frequencies to support their network, and new entrants purchasing spectrum to support their fledgling network will be competing with established carriers with more capital to invest. This may make piggy-backing a more appealing option. Firms entering the wireless industry have the option of using the network resources of their competitors in order to provide services to subscribers. Although this could be a cheaper alternative to building their network, it is not ideal as they are subjected to the conditions of the resource owner.

3.3 Purely Competitive Markets

The usage of competitor resources or the cost associated with building base stations, towers, and other network infrastructure are just a few of the adversities hindering improvements to competition in the wireless telecommunications industry. One possible solution to these discouraging hardships is to work towards creating a perfectly competitive market. Without barriers to entry and carriers with the ability to influence market prices there can exist a wireless telecommunications industry where all carriers can provide qualitatively similar products or services to all U.S. subscribers regardless of their geographic location. There are other factors

that must be present for there to be perfect competition including, homogeneity of products and services, and the existence of buyers with perfect knowledge about product quality, price, and costs.

The absence of barriers to entry can allow new entrants into the market for a geographic region at a leveled playing field with incumbent carriers. In the wireless industry spectrum availability is considered a substantial barrier to entry. In 2008 over \$19 billion was spent in the 700MHz auction (Thormahlen, 2011). Spectrum scarcity means there is a finite number of companies that can operate cellular/PCS services within a specific geographic location. Once all spectrum licenses have been allocated within a specified area, then it will be closed to new entrants until the spectrum next comes up for auction. However if spectrum were allocated to start up wireless carriers with a monetary return to the government within a given period and without auction, this could allow new entrants into the market and provide them independence and with a foundation to effectively compete.

If firms were not able to set their own prices, all businesses would have to accept the price that is set by the enforcing entity governing the industry. This means that no matter the size or market share of a competing firm they cannot influence the prices of products sold in the market or industry. Historically in the wireless telecommunications industry T-Mobile has offered similar services as its nationwide competitors at a lower price than its competitors. In order for competitors to compete they typically offer similar plans at a price that is not quite as low, but with the added bonus of greater network coverage.

Price setting is one way carriers differentiate themselves from one another. It can give one an edge over another. From the point of view of carriers this is necessary as competing carriers offer homogenous products and services. Competitors offer cellular plans including

voice, text, and data services to their subscribers when they purchase and activate a mobile device at varying prices. Mobile devices such as the Apple iPhone offer identical capabilities on the AT&T, Sprint, and Verizon networks. Because carriers offer similar products and services, customers in a geographic region either have a choice in carriers offering these products and services or must select the sole carrier in their area who offers these products and services. They can do this without feeling like they are getting less for their money than those in areas that are heavily populated and have more carrier options.

In a perfectly competitive market, customers have perfect knowledge of the products and services they are selecting. The result of this would be improved customer satisfaction after selecting from homogenous products or services offered by competing carriers. If customers knew the capabilities and caveats of each product they were selecting they would select the product that best fit their needs for the duration of their contract with a carrier. This would result in customers being happy with the product they purchased from the carrier and they would mostly likely sign another contractual agreement with that carrier once their contract expired. This could improve customer retention for carriers and these customers would suggest their carrier to new subscribers.

3.4 Advantages of Competition

Although it is not likely for a perfectly competitive environment to exist, there are several advantages to healthy competition in a market or industry. Competitive markets or industries exist when there is genuine choice for consumers in terms of what is sold and how many players in the market offer the desired product or service. Choice results in competitors aiming to out-do one another and this results in an overall improvement to the quality of products or services

being offered. Viable choice exists when the same quality of products or services are available for customers to choose from.

In March of 2011, the FCC adopted new rules that would assist in facilitating competition among wireless carriers. The FCC voted 3-2 to require nationwide wireless carriers to open their data networks to smaller regional operators in places where their service does not extend (Tessler, 2011). This meant that regional carriers offered the same coverage as nationwide carriers in many areas where their coverage could not reach. The nationwide carriers have to offer these network resources at a reasonable price and the FCC will resolve any conflicts. These newly set “data-roaming” rules are intended to level the playing field in local markets. This is one example of how the U.S. government has recognized and facilitated competition in the wireless telecommunication industry.

3.4.1 Competitive Pricing

In an economy with effective competition, competitive pricing will be present. Investopedia defines competitive pricing as “*setting the price of a product or service based on what the competition is charging.*” AT&T Mobility, Sprint Nextel, Verizon and T-Mobile have resorted to price cutting and setting prices relative to what other major competitors are offering in the face of an increasingly saturated and competitive market. This strategy is typically used by competitors to set a price for a product or service that has reached a level of equilibrium. What this means is that none of the four major carriers are seeing extremely high revenues as individual companies within the industry, but collectively the four carriers are continuing to see growth in revenues each year due to the fact that the market has not become completely saturated. This is good for the industry as the competitors are not able to use revenue as a

competitive edge over the other major carriers within the industry. This also benefits customers in the industry.

When mobile network operators use competitive pricing to attract customers, the customers reap the benefit of paying a lower price for carrier services and new devices on the market. This may adversely affect profitability for carriers, but they are able to gain and maintain more customers than their competitors. Both customers and carriers are able to see benefits from competitive pricing.

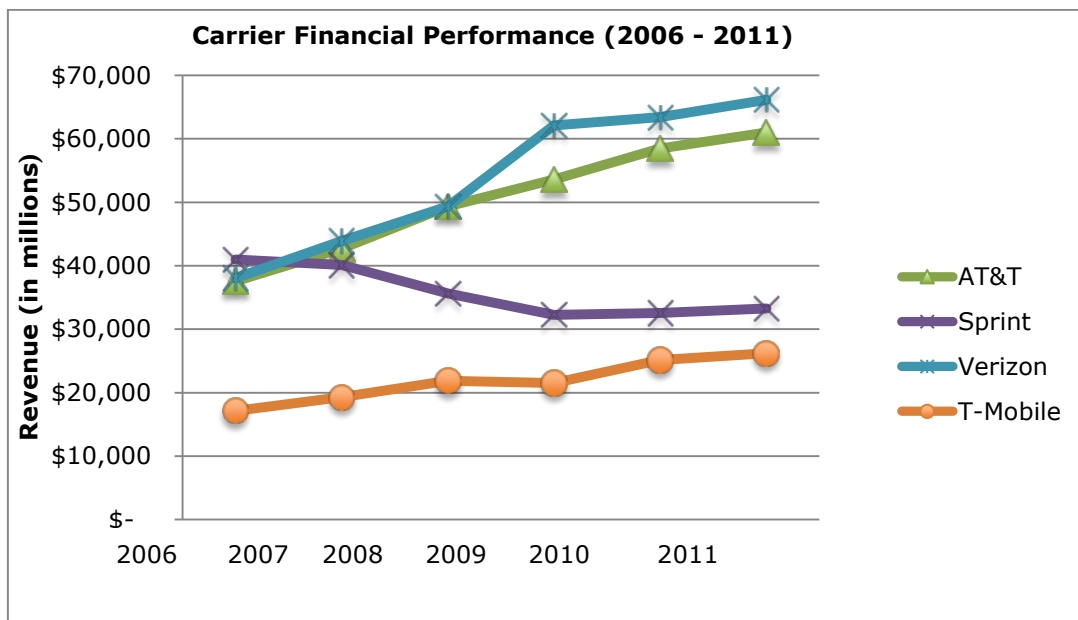
3.4.2 Innovation

Competition can be seen as a catalyst for product development and economic growth. Product and service innovations can be a crucial weapon against competitors. Recently, CTIA documents reported that there are at least 33 device manufacturers selling over 630 different handsets in the United States (Farber & Faulhaber, 2010). One example of an innovative product that changed the industry is iPhone. *“In the first 30 hours of sales, customers activated 146,000 iPhones. By the end of 2007, approximately 2 million U.S. consumers were enjoying a groundbreaking mobile experience on a brilliant screen with a simple flick of their finger”* (AT&T, AT&T Inc. 2007 Annual Report, 2007).

Software vendors and developers are able to create an application specific to a platform such as the iPhone and sell it for a fee or free to owners of the device. Applications for productivity, emails, games, and other informative or entertaining purposes continue to hold the interest of device purchasers and motivate them to purchase fully capable smartphone devices in order to utilize these applications. Platforms left without popular applications may see a lack of purchases due to incompatibility. These devices and applications increase smartphone adoption each year by both business and personal customers.

Figure 9 shows the financial performance of the four major carriers in the U.S. from 2006–2011. With the exception of Sprint, each carrier has shown growth over the five year period. The wireless telecommunications market is not yet saturated. What this means is there are still new subscribers purchasing a cell phone for the first time. New customers have made it easy for carriers to see large spikes in growth in the past few years. However, once the market has become saturated, carriers will not see the same trend and they will not see the same growth each quarter and each year. Product and application innovation will become the main sources that will boost revenue for carriers and give them an advantage over competitors after market saturation.

Figure 9. U.S. Carrier Financial Performance from 2006 - 2011



Source: (Thormahlen, 2011, pp. 31, 32, 34, 35)

3.5 Churn Rates for Carriers

One aftereffect of increasing market saturation and a lack of innovation can be churn. Churn, or the churn rate, is defined as the percentage of subscribers to a service that discontinue

their subscription to that service in a given time period. In wireless telecommunications churn is the percentage of subscribers that move from one carrier to another. What carriers are doing to lessen or stop this subscriber loss is finding innovative ways to bundle services using promotional deals when customers enter into new contract agreements. Investopedia defines bundling as *“a marketing strategy that joins products or services together in order to sell them as a single combined unit.”*

Carriers will bundle voice, data, and text messaging services at a price relative to its competitors' with the addition of another incentive in order to increase its subscriber base. This incentive may be additional text messages per month or a larger amount of data to use per month. Although this does bring in a few customers per contract period and helps to maintain existing customers, the question is does bundling reduce the churn rate for carriers? If so, by how much? This will determine whether or not current carrier strategies are effective in the wireless telecommunications market. Prince and Greenstein (Prince & Greenstein, 2011) examined whether bundles reduced churn for cable and broadband service providers between 2007 and 2009. This study measured cable/broadband services, and the results show that bundling services can reduce churn.

“A survey by the Federal Communications Commission (FCC) provides suggestive evidence of the role of bundling, as nearly 40 percent of respondents noted that having to change their bundle was a major reason for keeping their broadband service” (Prince & Greenstein, 2011). The survey results show bundling may reduce churn by altering the cost of switching. People, if satisfied with what they have, will keep their current service rather than going through the process of changing it. Switching costs are not necessarily monetary as a new bundled service typically produces more additions at the same or a higher price to include all of the

bundled features. Switching costs can come in the form of displeasure or inconvenience due to the change or the process of change.

In wireless telecommunications, carriers such as AT&T and Verizon have ceased to offer unlimited data through their mobile device plans. AT&T allows customers who are “grandfathered” in, or existing customers unlimited data, but new subscribers to the company are not given the option of unlimited data. Verizon has capped data for all of its customers, new and existing when they sign a new contract. This change has caused customer disapproval, but has not increased their churn rate. Both carriers offer greater coverage than smaller competitors such as Sprint and T-Mobile and this has been enough to prevent a significant churn rates each quarter since the changes in their bundles have been put into effect. With both carriers the only way to keep the bundled service offering unlimited data is for customers to keep what they currently have and not accept a new bundled service. Consequently, bundling services can reduce churn and establish loyalty to a carrier by convincing subscribers to not change their plan or carrier to maintain the services they currently have.

A look at the offering of bundled services and the effect it has on the churn rate of subscribers in wireless telecommunications shows customers will remain with their carrier to avoid undesired change, but bundled services can also reduce churn if they offer services that customers will be intrigued by. In 2008 carriers began offering unlimited data to customers. The price was \$30 per billing cycle. This was a price smartphone owners were willing to pay in order to use the web on their devices without the worry of overage charges by carriers. This significantly increased the popularity and adoption of smartphones, but also caused subscribers to remain with their carrier even though they offered similar services to its competitors. Because customers could not differentiate between the offerings of carriers, it was largely convenient to

remain with their current carrier and upgrade to a bundled service offering unlimited data. When unlimited data was first offered subscribers may have moved to carriers offering the same services with greater coverage such as Verizon or AT&T, but in the long-term this established loyalty and reduced the churn rate of those carriers as customers stayed on when bundled unlimited data was offered. Table 2 below provides data on the companies' subscribers, churn, and revenue per user per month.

Table 2. Subscriber, Churn, and Revenues per User

Subscribers, Churn, and Revenues per User, by Company, End-2010			
Company	Million Subscribers	Monthly Churn	Monthly Revenue per User
AT&T	95.54	1.3%	\$48.98
T-Mobile	33.74	3.6%	\$46.59
Verizon	102.25	1.3%	\$50.61
Sprint	49.65	2.7%	\$47.87

Source: (Pawelec, 2011)

Whether the bundling of services caused subscribers pleasure or displeasure, it has aided in reducing the churn rate carriers have experienced. What this shows is that it can be expected that carriers will continue to offer bundled services for the foreseeable in order to remain competitive but to also yield innovation. In August of 2012, T-Mobile began to offer unthrottled unlimited data once again to its customers after removing this offering from its contract agreement for customers in 2011. The unlimited data plans were replaced by tiered plans to follow the lead of carriers AT&T and Verizon. Despite these tiered plans AT&T and Verizon remain the largest carriers in the nation even though it is Sprint and T-Mobile, who are nationwide carriers, continue to offer unlimited data to their customers.

CHAPTER 4: IMPACTS OF MERGERS & ACQUISITIONS

The fundamental aim of mergers and acquisitions is to generate synergies that can bring benefits to the companies involved in the merger or acquisition. Benefits from synergy include greater market share in the industry, innovation, the ability to set and control pricing for products and services, and greater resources. In concentrated markets, when major competitors acquire other major competitors, efficiency can be produced, but that does not mean synergy is produced. A merger or acquisition is able to create economies of scale which generate cost efficiency. Economies of scale is described by Investopedia as “*the increase in efficiency of production as the number of goods being produced increases.*” As the two firms form a new company, production is done on a much larger scale and the cost of production per unit of output gets reduced.

4.1 Economies of Scale and Market Share

Size does matter. Economies of scale yield a greater quantity of products at a lower cost per unit. Advancements in technology systems nearly always guarantees synergy when such companies are acquired (Zain, 2008). Companies that acquire technology-focused firms can develop a competitive edge against their competitors. Similarly, new technology can lead to aggressive product development and cost reduction. In the wireless telecommunications industry, a competing carrier becomes larger through an acquisition and will be able to reduce what it charges its customers because it has coverage in so many areas and has the resources to roll out their 4G LTE network at a faster pace than competitors still developing their technologies on their own. Having a larger geographic footprint, a larger carrier would be able to reach more customers, thus obtaining a greater market share. There have been many studies in

the past that have shown a correlation between market share and change in market share as a measure of performance and competitive performance (Buzzell & Gale, 1975; Stigler, 1958).

An increase in market share is one of the more obvious benefits of mergers and acquisitions. In the case of a financially powerful company acquiring a relatively distressed one, the resulting organization experiences a substantial increase in market share (Benefits of Mergers and Acquisitions, 2012). The new firm is usually more cost-efficient and recognized as a viable competitor compared to its financially weak parent organization. Brush (Brush, 1996) argued that a comparison of a company's market share and the change in it after a merger or acquisition is the only way to properly show a difference before and after a merger or acquisition. Brush also stated the advantage of these results is that it can be held as a constant model for those findings and it can be viewed as a consistent measure across the industry.

Collectively, a firm's products, services, and geographic markets can give a good sense of the market power that firm has in the industry. Investopedia defines market power as *"a company's ability to manipulate price by influencing an item's supply, demand or both."* If a large firm acquires another firm and the resulting firm has significantly higher production or distribution efficiencies or the ability to set and control prices for products or services, it is said to have power within the market (Trahan, 2000). Firms with market power are said to be "price makers" as they are able to set the price for an item while maintaining market share. In wireless telecommunications, nationwide carriers have a greater influence on price setting than smaller regional carriers. A company with market power is able to influence pricing to its benefit and a great number of customers in the market would be subjected to it. Growth in the market share and in profits of the new company can be seen as another advantage of acquisitions.

4.2 Growth

After an acquisition, growth will immediately be seen in the revenue of the resulting company. This is due to all assets, including the revenue, of the acquired company being combined with the assets of the acquiring company. Many economists have often thought of an acquisition as an alternative form of investment (Farrell & Shapiro, 1990). When companies consider acquiring other companies, one pre-condition to an acquisition is to project future profitability from their investment. Companies typically engage in acquisitions when it is the most profitable means of enhancing capacity, obtaining knowledge or skill, entering new products or geographic areas, or reallocating assets into the control of the most effective managers/owners. Another way to increase profitability in a market or industry is by reducing the number of competitors in the market or industry. Carriers do this when they acquire or merge with other firms. The downside of this is it will give customers fewer competing companies to choose from.

Acquisitions can reduce the number of competitors in a market. If there are fewer competitors, the existing firms will be able to obtain the customers of its acquired competitor, thus increasing their market share. However, as Sirower (Sirower, 1997) emphasized, a lack of clear understanding on how to maximize the probability of success in acquisition programs can lead to an acquisition being a bad investment for a company. Acquiring companies in a market or industry can either grow or shrink in comparison to the rest of the market based on an acquisition.

Once a merger or acquisition has been completed, a measure of financial performance is the most popular method of evaluation. Definitive measures of financial performance can be measured through profits and growth. Cochran and Wood (Cochran & Wood, 1984) stated that

although there is no real consensus on the identity of the proper measure of financial performance, such measures fall into two broad dimensions: accounting profits and stock returns.

Understanding the sources and/or determinants of value creation or value loss is vital to comprehending the causes of success or failure of corporate acquisitions. In the case of AT&T acquiring T-Mobile, it will not be enough for AT&T to purchase T-Mobile and its resources, they will have to be able to create value from the company's resources and use it to further their market influence and power and generate greater profits than their competitors. If AT&T were to fail in making the most of their T-Mobile purchase it is possible that the company itself could one day be the target of acquisition (Mitchell & Lehn, 1990). If the merger of AT&T and T-Mobile had been approved, the new company would have to find synergies in order to create value, produce economies of scale in regional markets where they operate, and continue seeing growth. Many of the same factors that influence major investment decisions also influence merger activity (Yaylacicegi, 2005).

4.3 Synergies through Acquisitions

Synergy or synergistic effects of an acquisition or merger can be represented by a simple arithmetic equation of $1+1=3$. Synergy, according to dictionary.com, is defined as "*the interaction of elements that when combined produce a total effect that is greater than the sum of the individual elements, contributions*". Synergistic acquisitions can be seen as quicker, cheaper, and less of a risk than the efforts a company takes to create their own resources to effectively compete. Acquisitions can present a myriad of advantages such as possible market penetration or instant economies of scale. Acquisitions are not limited to the purchase of direct competitors; by purchasing complementary companies, synergies can be achieved through acquisition. If a firm were to buy another firm that provides a different level of service in the production process,

the new company would be able to take advantage of owning both stages of the production process. This has the advantage of avoiding the cost of paying a middle entity to produce in order to get to an end result product or service.

One example of this was the purchase of Motorola's Mobility department by Google. Google produces the software and operating system that powers many smartphones and tablet devices created by various hardware manufacturers. When Google purchased Motorola's mobile device division it gained control of the hardware and software manufacturing of Android devices. This allows the company greater control of the design and experience of many of their future devices. Synergy has been produced by Google gaining control of the hardware and software production process of future Android devices.

Another way synergy is produced through acquisitions is when a firm purchases another firm in the same industry, producing similar products or services, but in a different geographic location. If firms operating in a specific location or region have their business operating in only that particular geographic area, then the purchase of a competitive firm in a different location would allow for the new firm to have business in both locations, increasing their geographic presence (Roney, 2013). One example of this would be if one regional carrier were to purchase one or more regional carriers operating in locations outside of the regional carrier's geographic footprint. The branding, logos, products, or services of the acquiring company would now be extended into the areas owned by the acquired company. The result of this is a greater presence of the acquiring company in more than one location. The nationwide wireless carriers operating in the U.S. were formed through mergers and acquisitions after the breakup of the AT&T Inc. monopoly in 1982 meaning the merging or acquiring of several regional carriers across the nation could lead to another nationwide carrier in the future.

There are few major companies that have grown to where they are today without acquiring a few companies. This is particularly true of rapidly changing industries such as telecommunications and technology. Successful companies often bank on acquisitions to achieve growth, market share, economies of scale, and marketing clout. The catalyst driving many business acquisitions involve synergies. When companies merge together, the whole is often greater than the sum of its parts.

4.4 Asset Acquisition

Another benefit to companies merging is the additional resources added to the acquiring company. All patents, processes, technologies and other assets owned by the acquired company will be owned by the acquiring company. Asset acquisition can also come in the form of employees and geographic locations. In some cases the only reason an acquisition takes place is for a company to obtain a patent or technology that would take longer to develop. Expansion through acquisition can be a quick but costly way to for firms to grow, gain an advantage and gain assets over direct competitors. These resources can be used for faster production releases and greater support for releases. In the case of AT&T acquiring T-Mobile, the most valuable assets that would have been acquired was the spectrum owned by T-Mobile that would have provided greater network coverage across the nation. AT&T stated that if their merger with T-Mobile had been approved, the spectrum purchased with T-Mobile would have been used for their 4G LTE network rollout.

Acquisitions can also benefit the company being acquired. During times of economic recession, or in the event a company is unable to effectively compete, that company may be faced with the decision of continuing to lose money and building debt, or consider being acquired through a horizontal or vertical merger or acquisition to ensure some sort of continuity.

By being acquired the company can continue to provide their products or services, and the employees of the company can remain employed. Any technology or processes they have can be kept and used by the acquiring company, or it may be replaced by the acquiring competitor's processes and technologies. The greatest difference for the company being acquired in an acquisition is it may take on the name and direction of the acquiring company; however they will remain as a business under the acquiring company.

There have been instances where an acquired company has kept its name, branding, and operations as a business under the acquiring company. Examples of this include Microsoft's purchase of Skype and Google's purchase of YouTube. Both companies have kept their name, branding, and technologies. The reason these companies have kept their identities is because they were established. Their customer bases were loyal and identified with the established company brand. If acquired companies remain largely untouched, customers are unable to notice a change in the company's ownership or services, and the acquired company obtained the support of larger companies with greater financial resources.

4.5 Accounting Profitability & Stock Returns

After an acquisition has been completed, account profitability measures (profit/sales ratio, return on equity, and return on net assets), can be used to see post-acquisition performance. Other options of measuring accounting profitability are total operating profits, return on equity, and return on sales. These measures appear to show abnormally high profitability after an acquisition has been completed. Meeks and Meeks (Meeks & Meeks, 1981) argued that accounting profitability inherently possesses biases and distortions. However, Grant et al. (Grant, Jamine, & Thomas, 1988) justified the use of return on assets by arguing that managers extensively used them as effectiveness and efficiency measures of their businesses and

accounting profits reflect firm performance more directly than stock price. He attested the use of these measures against return on net assets and found their statistical significance to be lower.

The authors have integrated accounting and stock return information in a consistent pattern in order to produce high quality hypothesis testing methods in takeover inquiries, through investigating the correlation between the post-acquisition cash flow performance and the acquisition-related stock market performance. In 1992, Cornett and Tehranian (Cornett & Tehranian, 1992), investigated the post-acquisition performance of a large banking industry acquisition transaction between 1982 and 1987. They examined the correlation between cash flow performance and the stock market performance of the firm. They acknowledged that this approach permits decisions about whether stock market gains accompanied with acquisition announcements are the result of pure economic profits. Thus, they imply that they are the sources of any acquisition-related benefits, even though the accounting information is not a perfect measure of economic performance of acquisition transactions.

CHAPTER 5: NEGATIVE EFFECTS OF ACQUISITIONS ON CONCENTRATED INDUSTRIES

When mergers or acquisitions occur in a concentrated market or industry, not only are the participating firms impacted by the transaction, competitors, customers, and employees of the individual firms are as well. The joining firms may see greater benefits from their combination, but all other stakeholders may suffer from the negative implications that result from it.

The proposed acquisition of T-Mobile by AT&T is one example where parties outside of the transaction would have suffered from the negative implications of an approved acquisition. The combination of AT&T and T-Mobile was projected to give the new company the largest market share in the nation and the most spectrum to advance its LTE network. The proposed merger was predicted to provide positive valuation for the new company however it was also predicted to bring an anticompetitive presence to the industry.

In addition to negative implications occurring externally, there are also negative implications that occur internally. Combining firms who separately produced the same products or provided the same services will not duplicate services or processes within the new company. This reduces efficiency and increases costs. Downsizing or relocation typically occur after mergers or acquisitions have been completed and employees of the separate companies are negatively impacted.

5.1 Job Loss

After an acquisition, a newly formed company must assess the need for additional staff, particularly in the case of horizontal mergers where two companies are offering similar products or services. Acquisitions give a company the opportunity to determine best practices and new

ways to streamline processes (Phillips, 2008). It allows them to remove any unnecessary or additional resources and expenses. Post-acquisition companies try to recover from the cost of an acquisition as quickly as possible and having more employees than necessary will only add to their expenses. It can be expected that some employees will leave a company when word of an acquisition spreads, they assume that post-acquisition evaluations may be what cost them their jobs. The resulting effect of acquisitions can lead to a stressful work environment.

Change is often difficult for employees, especially if they were not directly involved in decisions that impact their jobs (Richards, 2008). The fear of company downsizing and job loss can result in lower work performance during the time between the announcement of the acquisition and the time after evaluations are completed post-acquisition. During mergers and acquisitions, change can be especially difficult and can lead to stress. To ease the tension in the work environment and relieve some of the stress, communication is critical during these times (Richards, 2008). If managers do not take an interest in their employees during the time of an acquisition, and do not work to keep their stress levels low, this can have a negative impact on employee work performance and morale.

5.2 Declining Morale

The period during which an acquisition takes place can be a stressful time for the employees of both companies. Staff members worry about job security, changes in benefits and adjusting to a new corporate culture. *“Since new management teams will be formed, employees may have to adjust work habits and redefine roles. This stress, along with the reality of coworkers losing jobs, can impact morale in a negative way. Low morale often translates to decreased productivity as employees are distracted by worry and misinformation”* (Phillips,

2008). Research conducted by the Kenexa Research Institute (KRI) revealed a downward pattern in employee engagement levels.

According to the research, *“being merged and acquired has a pervasive, negative impact on nearly every aspect of how an employee views their organization. It undermines an employee’s feeling about the company and confidence in its future, and prompts many employees to consider leaving. Yet, employees in merged or acquired organizations are less likely to leave voluntarily when their leadership is credible and demonstrates a clear and compelling vision of the future”* (Kenexa, 2007). When employees are not performing at their best, this negatively impacts the merging companies. Employees may be distracted with the search of another job or unwilling to put forth as much effort because of their potential dismissal from their current position. Positions may be removed with the merging of two companies using differing technologies to offer similar products or services. This can force employees into a different position entirely within the new company or force them to relocate to another location where they can perform the same tasks as an employee of the merged company. The executives of the two companies will need to discuss how to minimize any business disruptions as the transition happens and how to mitigate costs to the company as they will have suffered a loss financially but purchasing another company.

5.3 Business Disruption

Once an acquisition has been approved, the two companies are challenged with the task of getting their different systems to interoperate with one another or replacing the existing systems of one of the companies. For example, if the two businesses use different software programs, information will need to be merged into one system, which is necessary so that information can be shared and accessed by both businesses. Incorporating the systems can mean

down time while the work is done, rendering some information inaccessible for a time. Such a task had to be taken on in the acquisition of Wachovia by Wells Fargo beginning in late 2008. *The change meant converting 3,088 Wachovia retail branches to Wells Fargo branding. This also meant connecting Wells and Wachovia systems used to run 80 very different lines of business--from mortgage lending and credit cards to brokerage accounts and business loans. Within the three year timeframe Wells Fargo had the task of eliminating half of the major IT platforms used to run the businesses* (Murphy, 2012).

In addition to potential business disruptions due to change, the merging companies must consider how to avoid any disruptions in the customer experience. In the case of the Wells Fargo/Wachovia acquisition, IT leaders made the decision to not implement new technologies in order to limit customer disruptions at the expense of adding many new features. *"The what-ifs were just tremendous to deal with,"* says Wayne Mekjian, head of information services at Wells Fargo (Murphy, 2012). When implementing a change to a great amount of customers there is a possibility of outages or the inability of a system to be scalable and handle the increased load of customer activity. If there are any outages or incompatibilities this could mean a loss in money to the company. Customers do not always respond positively to change when the company they have dealt with has been acquired by another. These changes can lead to customer dissatisfaction.

5.4 Customer Dissatisfaction

One result from the merger of AT&T and T-Mobile would be the effects on customers of the individual carriers. James Cole, deputy attorney general, said in a press conference, *"we feel the combination of AT&T and T-Mobile would result in tens of millions of consumers across the*

U.S. facing higher prices, fewer choices, and lower quality products for wireless services” (Goldman, 2011).

One disadvantage customers would have experienced if the acquisition had occurred was a change in the pricing of their service plans as they would have been moved over to AT&T’s network. Ralph de la Vega, AT&T’s head of wireless and consumer services stated, *“The spectrum they [T-Mobile] use for third-generation services, or 3G, will be re-purposed for 4G, which is faster. That would leave current T-Mobile phones without 3G. They would need to be replaced with phones that use AT&T’s 3G frequencies”* (DeRuvo, 2011). De la Vega assured customers it would be a gradual process and the switch would occur after contracts were expired and renewed. This transition would happen over time and would not be immediate.

With T-Mobile customers being moved over to a different network over time, and expecting to pay higher prices with new contract installments it can be expected that some customers will move to other carriers simply because of the disapproval they feel over their carrier and plans being replaced if competition exists in the local market.

5.5 Negative Impacts of Concentrated Markets

Since the consent agreement of 1982, dismantling the monopoly of AT&T Inc., and the formation of the wireless carriers we have today, significant market share in the wireless industry has been divided amongst four nationwide carriers. Due to only a few players controlling a majority of the market, an oligopoly has formed in the U.S. wireless telecommunications industry. Oligopolies are markets or industries dominated by a small number of companies. Typically in these markets, there is said to be a high amount of market concentration. Market concentration, sometimes referred to as industrial concentration, refers to the low number of firms competing in a particular market that make up the majority share of the market. When a

market is high in concentration there are a few major participants in the market. If two or more of these major participants in the market were to merge, this would produce largely anticompetitive effects on the market and cause a trend towards monopolization of the wireless telecommunications industry.

Firms in an oligopoly have monopoly power. Between them they “own” the market and therefore share the powers that a pure monopolistic firm would have. There are three types of oligopolies (Boxonomics, 2012)

1. A perfect oligopoly – a market where the goods are homogenous (i.e. perfect substitutes for each other). If firms compete it must be on price.
2. An imperfect oligopoly – A market where goods can be differentiated. If firms compete it must be by using marketing techniques and on quality.
3. A competitive oligopoly – A market where firms are interdependent. Firms will take account of its competitors’ likely reactions when making decisions.

In the wireless telecommunications industry, firms in the U.S. exhibit the behaviors of an imperfect oligopoly. The services provided by the carriers can be differentiated based on nationwide coverage in both rural and urban areas. The greater the nationwide coverage the greater network quality a carrier will boast. Carriers have used television commercial advertisements in order to highlight difference in network coverage as well as bundled plans offered to customers.

Advertisements and other marketing techniques do show a level of competition exists within the wireless telecommunications industry; however it is only recognized amongst the four major carriers. This shows a level of high concentration in the industry within the United States.

Trending towards greater concentration is a move towards monopolization as there are only a few participants who are able to effectively compete, the fewer the competitors, the greater the monopolistic effect on the industry. With an increase in concentration and moving towards monopolization in most local markets, it will be difficult for competitors to trump a monopoly in market despite their best efforts.

5.5.1 Competition within a Highly Concentrated Market

As with all markets there are essentially two ways competition exists; by price or through differentiating your products from the competition (Boxonomics, 2012). In an oligopoly prices are typically kept stable. A given firm in the market believes that if it raises prices then other firms will not follow and therefore demand will fall, but if they drop their prices other firms will as well. This is known as the kinked demand curve theory (Boxonomics, 2012). In some instances, a firm will mirror the competitive prices and offerings of its competitors. This is called price parallelism. This may be because they are taking the ruling market price or following the price leader.

The other way that firms compete in a highly concentrated market is by differentiating their products and services. Exclusive outlets for a firm's goods or services give it a competitive advantage (Boxonomics, 2012). This is where carriers can promote their brand logo, product packaging, and other distinguishing features from its competitors such as device offerings. The carriers in the wireless telecommunications industry focus mainly on service offerings such as unlimited data for a set monthly fee during the duration of a customer contract or the ability to overcome 'dead zones,' which are areas where signal strength is weakest. A carrier may show a customer being unable to complete phone calls on a competitor's network and which shows why customers should switch to their network.

These two methods of competition can be found within a market or industry with few or many competitors. However, in a market with few competitors, customers have only a few choices and offerings may tend to be more homogenous as competitors are less likely to deviate too far from what other major competitors are offering (Boxonomics, 2012). This is unless the firm initiating a change holds enough of the market share or possesses some feature that other major competitors cannot offer. Having a specific trait to offset a company will allow them to disregard any fear of losing its place as a major competitor after offering a radical change that may not be popular amongst customers. An example of this was when Verizon announced in 2012 that it would no longer offer unlimited data plans to its customers. The company remains the competitor with the greatest market share after implementing this because it offers the greatest coverage nationwide, a trait customers prefer not to give up.

5.5.2 Limiting Competition

In an oligopolistic industry, the dominating participants want to remain in a dominant position. Sometimes it is easier to limit the numbers of competitors to compete with than it is to actually compete, and as a result, firms can maximize profits. Sometimes firms use unfair practices in order to limit competition. One way that major participants can limit competition is through limit pricing. A firm can purposefully set low prices to keep new entrants from entering the market. This is known as predatory pricing. *“Predatory pricing is where major competitors set prices just low enough to where minor competitors using competitive pricing are not be able to sustain their business and not be able to compete with the amount of resources and lower prices that the major participant is offering”* (Boxonomics, 2012).

Another way unfair practices limit competition in a highly concentrated market is by using price discrimination. This is a price strategy where the firm offering a product or service

can charge different prices for the same product or service. Carriers may use price discrimination in local markets where they may be the dominant carrier offering network coverage. Carriers may offer higher prices to customers in those areas as they do not have a choice in carriers to choose from. This is another technique to maximize profits while competition is minimized.

Participants in the oligopoly are able to maximize profits if they are able to limit competitors who can threaten their methods of profit maximization. In areas where they are few or no competitors, major competing firms may resort to using strategic barriers to entry. The use of patents is one way a firm protects itself and create barriers to entry. The use of advertising can be another way to create barriers to entry. Carriers spend money on advertising that shows their competitors in negative way by showing possible shortcomings. Smaller carriers simply do not have the financial resources to compete with larger carriers in advertising and this can cause their network to be overlooked by indecisive customers interested in entering a contract with a carrier.

Natural barriers to entry are the ones that exist due to the state of the environment (Boxonomics, 2012). Because one company is larger than a competitor there exist barriers that put the smaller company at a disadvantage when competing with the larger carrier. The use of economies of scale creates a natural barrier to entry and limits competition. Currently, carriers are working tirelessly to deploy their 4G LTE networks in larger city areas and offer devices that can take advantage of the updated network. Larger companies are able to roll out the network at a faster pace than smaller carriers and they have a greater presence in larger cities, which provides greater appeal to new and existing customers. This is another natural barrier which gives the oligopoly participants an advantage.

The acquisition of competitors is another way to limit competition. Larger firms with enough capital are able to purchase competitors which offer either similar products or services, or offer a different stage of the production process. This lessens competition in a particular market or industry and increases the assets and resources of an already dominant firm. This results in fewer choices for customers and an even greater market share for the acquiring firm. Another result is a further concentration of an already concentrated market or industry, this brings monopolistic tendencies and with it a negative impact on competitors and customers.

5.5.3 Negative Impact on Efficiency

There are three factors making up the incentives for firms to compete, keep prices competitive, and to innovate in order to distinguish themselves from other firms in a market or industry; market share, market power, and profitability. In the absence of these incentives, customers will be subjected to the same level of service or lower levels of service if firms know they are the only option available. Profits seen by major firms continue to increase and market share will be as well because customers will continue pay for products or services they have grown accustomed to having. Market power will be greatly proportion to one or a few firms. There is a positive correlation between incentives and efficiency in highly concentrated markets. As concentration in a market or industry goes up, the incentives to be efficient go down and the desire to effectively compete also goes down.

Less efficiency and less innovation prevent a market or industry from moving forward and presents an opportunity for competitive technologies to replace established industries or markets. Without efficiency and keeping pace with the growth and demand of customers, the wireless telecommunications industry could face the threat of being over taken by alternative technologies such as Voice over Internet Protocol (VoIP). *VoIP refers to communication*

protocols, technologies, and transmission techniques involved in the delivery of voice communications and multimedia sessions over Internet Protocol networks such as the Internet.

(Wikipedia, 2013) Communications via SMS, data, and/or voice-messaging applications can be transmitted without the need for public switched telephone networks or dedicated cellular spectrum.

Transmissions over the Internet are faster than transmissions over carrier 3G networks, however the reason it has not completely replaced communications over telephone networks is because its presence is not perpetual across the nation. Internet connectivity is not available in all locations and connectivity cannot be reached in areas out of range of an Internet Service Provider's (ISPs) network. Carriers must continue evolve their technologies regardless of whether or not they exist in a concentrated market or industry. The incentive to remain efficient in the concentrated wireless telecommunications industry is to avoid the risk of becoming obsolete.

CHAPTER 6: AT&T/T-MOBILE ACQUISITION

In 2011, it was announced that AT&T would acquire T-Mobile from its parent company Deutsche Telekom. It was stated by several industry observers that the new company would negatively impact the industry. Examination of the individual companies provides a look at their respective positions in the market in terms of subscribers, revenues, net income, value on the New York Stock Exchange (NYSE), and top tiered pricing plans. Table 3 compares AT&T to T-Mobile during the time of the proposed acquisition based on these criteria. From this information it cannot be determined whether or not the new company will produce synergies, if the acquisition were to have been approved, however it does show how financially equipped both companies are to support their subscriber base during this time and in the future. Once an evaluation of the individual companies has been done, and if it does not violate regulations, it can then be decided whether approving the acquisition will provide a greater good to the company or to the industry.

Table 3. AT&T vs. T-Mobile (Q2 2011)

	AT&T	T-Mobile
Subscriber at the end of the Q2	98.6 million	33.6 million
Top tier plan pricing	\$114.99	\$99.99
Revenues	31.5 billion	5.1 billion
Value on NYSE April 1, 2011	31.82	17.22
Net income	3.6 billion	212 million

Source: (T-Mobile, 2011; AT&T, AT&T Financial and Operational Results, 2013)

Grunes and Stucke (Grunes & Stucke, *The AT&T/T-Mobile Merger: What Might Have Been*, 2012) examined the proposed AT&T-T-Mobile acquisition and analyzed its implications

against section 7 of the Clayton Act. They concluded the proposed merger violates the incipiency standard of the act, which states, “*Section 7 does not require proof that a merger or other acquisition [will] cause higher prices in the affected market. All that is necessary is that the merger create an appreciable danger of such consequences in the future*” (Grunes & Stucke, *The AT&T/T-Mobile Merger: What Might Have Been*, 2012). Given the new company’s position in the market after a finalized acquisition, it would have greater market share, and market power, and in this free market, the ability to raise prices for their benefit.

6.1 AT&T

AT&T is the nation’s second largest wireless telecommunications carrier and continues to grow in its subscriber base. The company showed growth even after losing its exclusivity deal with Apple over the iPhone, it gained 62,000 subscribers in the first quarter of 2011 (AT&T, *AT&T to Acquire T-Mobile USA From Deutsche Telekom*, 2011). The deal to acquire T-Mobile was valued at 7.1 times T-Mobile’s 2010 adjusted earnings before interest, taxes, depreciation and amortization (EBITDA) (AT&T, *AT&T to Acquire T-Mobile USA From Deutsche Telekom*, 2011). This shows the acquiring company, AT&T, considered the assets of T-Mobile to be worth more than what T-Mobile made as their own company. This is because it would increase AT&T’s market power to own the nation’s only other GSM-based carrier. As many customers in the U.S. travel outside of the company they prefer to have a phone that can be used internationally. CDMA-based devices do not work internationally and are specific to the nation they are located in, however GSM devices can be used internationally.

At the time of the proposed merger, AT&T had a total of 98.6 million subscribers (AT&T, *AT&T to Acquire T-Mobile USA From Deutsche Telekom*, 2011). The company came only second to Verizon’s 106 million subscribers in contrast to the United States’ total wireless

subscribers at 302.9 million (AT&T, AT&T to Acquire T-Mobile USA From Deutsche Telekom, 2011). AT&T had a total of 266,590 employees and promised to bring back 5,000 call-center jobs if the merger were to be approved. Acquiring T-Mobile would increase the company's staff by 42,000 before any post-acquisition downsizing. AT&T Chairman and CEO Randall Stephenson said in a statement announcing the deal. "*It will improve network quality, and it will bring advanced LTE capabilities to more than 294 million people*" (AT&T, AT&T to Acquire T-Mobile USA From Deutsche Telekom, 2011). The denial of approval for this merger would not stop the roll out of AT&T's LTE network, however it would slow down the deployment. With T-Mobile's assets, AT&T could roll out LTE various locations at a rate comparable to direct competitor Verizon. They would also have the spectrum to support these rollouts.

The main reason for AT&T's interest in acquiring T-Mobile was to improve wireless service for AT&T and T-Mobile customers, expand 4G coverage to more of the country and, as a stated benefit, add a significant number of jobs to the U.S. workforce. AT&T has claimed that because it has been a leader in the mobile wireless industry, and in wireless innovation, and has a larger portion of customers who use spectrum-hungry data applications on smartphones, it is "on the leading edge of the mobile traffic growth curve." (AT&T, AT&T to Acquire T-Mobile USA From Deutsche Telekom, 2011). AT&T reported mobile data volumes had increased by 8000% between 2007 and 2010. Based on AT&T's road map, the company planned to use T-Mobile's 1700MHz spectrum for its eventual 4G LTE deployment in addition to addressing its network-capacity challenges by adding thousands of cell sites to extend and deepen its network and by deploying indoor and outdoor distributed antenna systems and Wi-Fi hotspots and hot zones.

AT&T claims that these efficiencies would allow the combined company to offer LTE in some markets where neither company could have offered it separately. Also, "*it would provide*

benefits for consumers by increasing overall output, producing better services, and resulting in more competitive prices than would prevail absent the merger. AT&T customers would experience fewer dropped and blocked calls, better in-building and in-home coverage, and faster and more reliable data services, particularly during peak periods” (AT&T, AT&T to Acquire T-Mobile USA From Deutsche Telekom, 2011).

6.2 T-Mobile

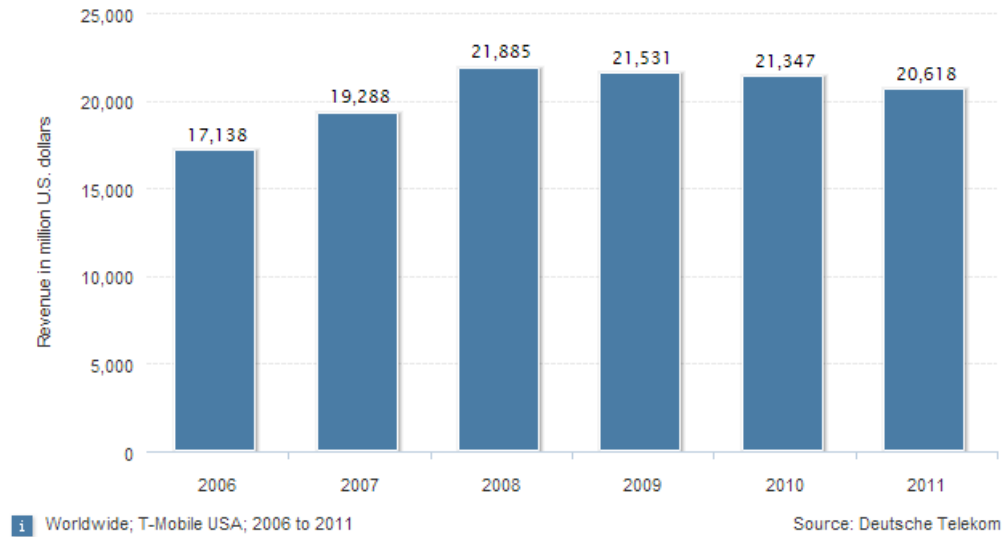
T-Mobile is the nation’s fourth largest wireless telecommunications carrier and it has trailed far behind its national competitors, AT&T, Verizon Wireless, and Sprint Nextel and has been considered by AT&T as “*not a significant competitive constraint of AT&T*” (AT&T, AT&T to Acquire T-Mobile USA From Deutsche Telekom, 2011). In the first quarter of 2011 T-Mobile was actually losing subscribers. This is in part because AT&T has successfully positioned itself in the submarket that focuses on high-end customers who seek advanced data services and who use advanced smartphones not available from all providers. T-Mobile, in contrast, has focused more on “value customers,” who are sensitive to price and who have been very receptive to the low price pre-paid services offered by companies like MetroPCS and Leap.

It was T-Mobile who purchased SunCom wireless in 2006. From 2006 to 2008 the company saw a rise in revenues (Figure 10). This was likely due to the purchase and acquisition of SunCom’s resources. Initially after an acquisition a company sees growth, however over time the trend should continue to rise showing the acquisition was a worthy investment. T-Mobile has lost revenue each year since 2008 and is now a target of acquisition by AT&T (Figure 10).

Figure 10. T-Mobile - Total Revenues 2006-2011

T-MOBILE USA - TOTAL REVENUES 2006-2011

Total revenue of T-Mobile USA from 2006 to 2011 (in million U.S. dollars)



© Statista 2012

Source: (T-Mobile, Q2 2011 Earnings Press Release, 2011)

T-Mobile had a total of 33.6 million customers in 2011 prior to the proposed merger with AT&T (AT&T, AT&T to Acquire T-Mobile USA From Deutsche Telekom, 2011). The company held 42,000 employees which was less than 6 times that of AT&T. The addition of T-Mobile would increase the load on AT&T's network by 30%. However, T-Mobile has substantial holdings in the Personal Communications Service (PCS) and Advance Wireless Services (AWS) frequency bands; its spectrum is contiguous to AT&T's spectrum in those bands. The 1.7/2.1GHz, also known as AWS spectrum is what AT&T would use to augment its 4G/LTE network. AT&T already operates in: AWS, 1900 MHz, 700 MHz and 850 MHz spectrum. T-Mobile does not face an immediate spectrum shortage, however it faces projected growth in customer demand for spectrum-intensive data services.

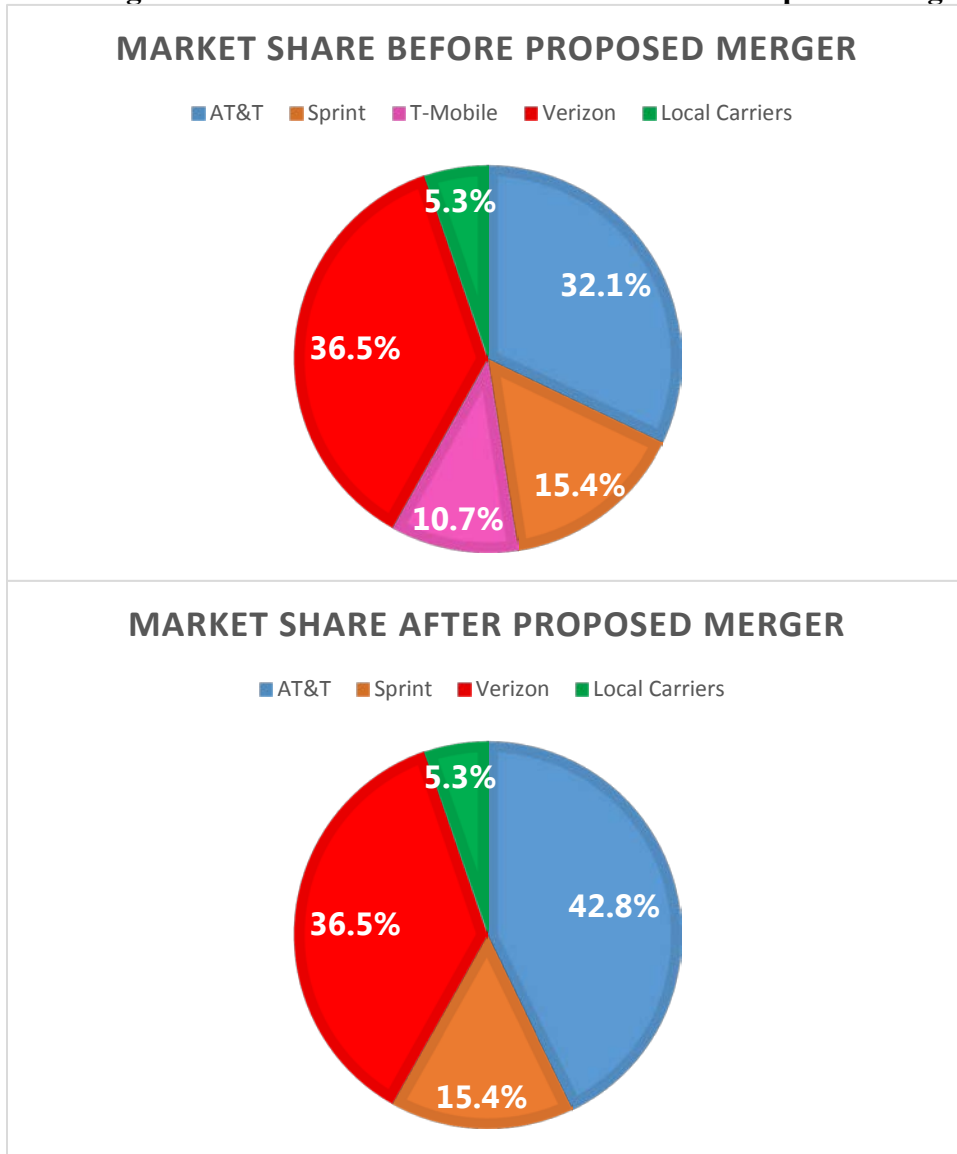
T-Mobile offers HSPA+, just like AT&T, which delivers 4G-like speeds, but it is not a real 4G technology. T-Mobile, during the time of the proposed acquisition, lacked of a “clear path” to deployment of 4G LTE network technology, which has been considered the “gold standard for advanced mobile broadband services.” During the time of the proposed acquisition it had not announced any plans for network expansion beyond HSPA+. T-Mobile would require additional spectrum to deploy LTE during this time. Deutsche Telekom has made the business decision to focus on its core business in Europe and will not provide the billions of dollars in investment capital needed to acquire the additional spectrum (AT&T, AT&T to Acquire T-Mobile USA From Deutsche Telekom, 2011). It can be concluded from these facts that the motivations behind the potential purchase of T-Mobile by AT&T include economies of scale, growth, market share, and asset acquisition.

6.3 AT&T/T-Mobile Acquisition

If the proposed merger were to have occur, the deal, valued at \$39 billion, included \$25 billion in cash and \$14 billion in stock. The approval of this merger would have formed the largest wireless telecommunications company in the United States giving the new company the efficiency it needed to produce economies of scale and market share dominance. If the merger were to have been approved the new firm would have had approximately 132 million connections across the United States and more than \$72 billion in mobile wireless telecommunications services revenues. The new AT&T Wireless would have had more customers than current leading carrier Verizon, showing a surge in market share, while further increasing the gap between the now second and third wireless carrier which is Sprint Nextel. Figure 11 below shows the change in market share before and after the proposed merger. What this shows is AT&T’s market share increasing beyond Verizon’s market share in the industry.

By having T-Mobile’s technology and spectrum, AT&T Wireless would have been able to roll out their 4G LTE network at a faster rate. By being able to cover the cost of spectrum, AT&T could have offered 4G to its customers at a lower cost.

Figure 11. Market Share Before and After the Proposed Merger



Source: (Alegria, Kaczanowska, & Setar, 2012)

In addition, T-Mobile’s parent company would have an 8% share of AT&T. plus a seat on the company’s Board of Directors. With T-Mobile, AT&T would control approximately 40%

of the U.S. wireless market. This growth would have allowed the company to direct its efforts towards advertising its expanded nationwide coverage and assumingly affordable 4G LTE network. If the deal were to fail, AT&T would have had to pay Deutsche Telekom \$3 billion in cash plus wireless spectrum and roaming agreements that could be worth \$1-3 billion more. There were a total of 11 attorney's generals and 17 state governors in support of the proposed merger (AT&T, AT&T to Acquire T-Mobile USA From Deutsche Telekom, 2011). In contrast, 11 AT&T customers filed arbitration cases against the merger and seven attorney's generals supported the antitrust lawsuit against merger.

The combined company would be the largest mobile wireless service provider in the U.S. Both companies have claimed benefits to all customers of AT&T and T-Mobile. In addition to the size of the combined subscriber bases, antitrust regulators would have been likely to be concerned that the deal would also merge the two largest GSM carriers in the U.S., giving their customers only one carrier to choose from if they wanted to use that wireless standard. Randall Stephenson, Chairman and CEO of AT&T stated, "*This transaction represents a major commitment to strengthen and expand critical infrastructure for our nation's future*" (AT&T, AT&T to Acquire T-Mobile USA From Deutsche Telekom, 2011).

AT&T claimed it would have experienced "spectrum exhaust" (in some of its 3G markets) if it could not acquire additional spectrum through T-Mobile by the year 2013. Both AT&T and T-Mobile asserted that the merger would have created "*an efficient capacity-enhancing combination that would have the incentive to increase output, improve quality, and lower prices*" (AT&T, AT&T to Acquire T-Mobile USA From Deutsche Telekom, 2011). AT&T and T-Mobile already have compatible networks. They are hybrids of the same older

generations of wireless technology, 2G GSM standard and the 3G UMTS/HSPA standard, therefore their customers have devices that can be readily modified to work on both networks.

Although there were several attorney's generals and state senators who supported this merger, there were several who did not. Senator Herb Kohl stated, "*The proposed merger between AT&T and T-Mobile will bring together two of the four remaining national cell phone carriers to create the nation's largest cell phone network, with an estimated 43% market share. This would significantly increase concentration in ninety-seven of the nation's top one hundred local markets*" (Grunes & Stucke, Antitrust Review of the AT&T/T-Mobile Transaction, 2011). According to a survey compiled by the FCC to investigate the possibility of the merger, 99 of 100 local markets would have suffered from the anticompetitive effects of this merger (Federal Communications Commission, 2011). This statistic came from the usage of the Herfindahl-Hirschman Index (HHI) — a widely accepted indication of how competitive a market is.

6.4 AT&T/T-Mobile Synergies

The most common reason behind the decision for firms to merge is the benefit of efficiency gains (Yaylacicegi, 2005). In wireless telecommunications industry, synergies would refer to the combination of unique and irreplaceable assets of two firms such as towers or spectrum. A recent attempt at synergism was seen with the proposed acquisition of T-Mobile by AT&T. When AT&T announced its acquisition of T-Mobile it announced synergies that would be produced from the merger. They claimed that revenue synergies would come from opportunities to increase smartphone penetration and average revenue per user (ARPU). They also claimed that cost savings would come from network efficiencies, subscriber and support savings, reduced churn and savings on capital expenditures and spectrum purchases.

In truth, a merger between the two firms would not produce efficiency through synergy because AT&T would continue with its same efforts in the market; it would just have a greater market share and more resources, which would have established AT&T as a monopoly in many local markets. Also, there would be no other competitors not using GSM technology which would have given AT&T an additional advantage in the industry. In its promotion of gains based on the merger, AT&T claimed they would have a "run rate of \$3 billion three years after closing going forward," experts were quick to point out AT&T's broken promises of the past (AT&T, AT&T to Acquire T-Mobile USA From Deutsche Telekom, 2011). AT&T's acquisition of Bell South in 2006 promised run rates of \$2 billion by 2008 and \$3 billion by 2010; however EBITDA grew only 34.5% in 2006 and only moved to 34.6% in 2008. Profits barely increased thanks to diminished staffing and advertising costs. Run rates are how the financial performance of a company would look if you were to expect an outcome out over a certain period of time. They can be deceiving as a period of high activity cannot accurately give a view of the financial standing of a company.

Historically when AT&T Inc. has acquired companies it has laid off workers. In the past 10 years AT&T has cut more than 100,000 jobs while T-Mobile has added more than 20,000. With duplication of roles and job tasks it could have been expected that there would have been company downsizing to cover the cost of purchasing T-Mobile and to remove unnecessary positions. Also, with the combining of the technologies used by the two companies even more jobs could have been expected to be eliminated as processes became automated and there would have been less of a need for operators of the technology. If the merger were to have been approved it is likely that employees of both companies would bear the concern of job loss. It is not always the acquiring company that maintains its employees after an acquisition, but the most

talented employees who remain employed. With the uncertainty of employment it can be expected that employee morale at both companies would decrease with the approval of an acquisition.

One possible outcome of declining morale might be employee churn in light of the acquisition announcement. *One-quarter of top performers leave within 90 days of a major change event being announced* (Farrell C. , 2005). With employees at all levels concerned about their position in the new company, the performance of employees could be adversely impacted. AT&T and T-Mobile fortunately use the similar types of spectrum, which would have made it easier for both companies to combine from a technological standpoint; but specific systems or processes used by one company or the other might not remain after the acquisition. Executives would have been tasked with deciding which technologies to keep, update, or discontinue. If an employee's only function at the company was to operate a specific technology or process that is not used after the acquisition, then as a part of downsizing that employee might not have a position within the new company.

In addition to AT&T saving money after employee downsizing, the acquisition would have been able to save AT&T approximately \$10 billion in the six year period after the merger had taken place. AT&T claims it spent \$8 billion on this proposed acquisition as an investment; if this proved to be a successful investment, this would have eliminated use of approximately \$18 billion dollars T-Mobile would have spent as a separate company continuing to build out its high-speed wireless network. Cutting costs could have benefitted AT&T stockholders, management, and union. However, the question should be asked of whether or not these lower costs for the company would have been passed on to its customers? The answer is that it is not likely. Without their position being threatened, firms in an oligopoly or monopoly will likely

keep prices high in order to keep seeing profits in the industry. When oligopolies gain greater market, share they become greater oligopolies. They have less of a desire and less pressure is put on them by industry to remain strongly creative and strongly competitive.

Table 4 below provides details and facts about the misleading information AT&T has announced after stating it will acquire T-Mobile. AT&T has attempted to campaign the need for the acquisition of T-Mobile and benefits it would bring to stakeholders of the newly formed company. However an article posted on freepress.net provides insight into state of the industry and informs readers the acquisition is not necessary at all.

Table 4. Myths about the AT&T/T-Mobile Acquisition

Myths About the AT&T T-Mobile Acquisition		
Myth	Fact	Details
The merger will create American jobs and increase investment	More than 20,000 workers are expected to lose their jobs so AT&T can achieve post-acquisition “synergies”	AT&T stated this takeover is good for America because some of T-Mobile’s employees will now be free to unionize. This is a benefit for those lucky enough to survive the post-acquisition layoffs
Elimination of T-Mobile as a competitor does not matter because most Americans will still have other providers to choose from	This merger will give AT&T and Verizon 80% of the market, and no other carrier has the spectrum or other advantages of these giants	If the top two “too big to fail” U.S. banks were to merge they would only control 20% of the U.S. market. This merger will only make it harder for smaller firms to compete
This merger will not increase prices for customers	AT&T uses misleading data to claim that past mergers led to price declines. But the facts show that consumers’ monthly bills have increased even as wireless carriers’ own costs to offer services have dropped severely	Customers are paying more for wireless services as the market has consolidated. The elimination of AT&T and Verizon’s unlimited will only exacerbate this trend. Voice services are not getting cheaper because carriers are forcing customers to buy more minutes with new contracts than they will use.
This merger is necessary to ensure rural Americans have access to next-generation mobile internet	Even if the deal is blocked, 97% of Americans will have 4G services available from at least carriers by 2014	Verizon has stated that their entire network will be LTE capable by 2014. AT&T stated it will stop just at 80% of deployment of its LTE technology to the U.S., but it is not likely they cede to Verizon and AT&T will expand LTE to all its areas whether or not the acquisition is blocked
This merger is necessary to alleviate congestion on AT&T’s network	AT&T’s claim of capacity issues is a sham because the company has vast amounts of spectrum it does not use	The notion that AT&T must acquire T-Mobile to relieve congestion is baseless; give it is the only carrier that isn’t using next-generation spectrum holdings.

Source: http://s3.freepress.net/outreach/Five_Myths.pdf

6.5 AT&T/T-Mobile Merger Violates Anti-Competitive Regulations

In addition to false synergies claimed by the companies in the proposed merger, the merger was anticompetitive by law. The merger would have violated section 7 of the Clayton Act of 1914, which prohibits mergers and acquisitions when the effect of the transaction “*may substantially lessen competition, or tend to create a monopoly*” (Grunes & Stucke, Antitrust Review of the AT&T/T-Mobile Transaction, 2011). Section 7 of the Clayton Act was intended to block the anticompetitive effects of market power in their incipiency. The incipiency standard of the Clayton Act states, “*Section 7 does not require proof that a merger or other acquisition [will] cause higher prices in the affected market. All that is necessary is that the merger create an appreciable danger of such consequences in the future*” (Grunes & Stucke, The AT&T/T-Mobile Merger: What Might Have Been, 2012).

To evaluate this proposed acquisition, the first thing, based on the Clayton Act, was to determine if the transaction lessens competition, or creates a monopoly. Consistent with the legislation of the Clayton Act, in a similar situation, courts have regarded such a transaction that would lead to further concentration in an already highly concentrated market as presumptively illegal under Section 7. In the *United States v. Philadelphia National Bank*, it was ruled that a merger resulting in a single firm controlling thirty percent of a market trending toward concentration in which four firms controlled seventy percent of the sales was presumptively illegal (Grunes & Stucke, Antitrust Review of the AT&T/T-Mobile Transaction, 2011). In the circumstance of the acquisition of T-Mobile by AT&T, four carriers controlling approximately 90 % of the market collectively, AT&T would control over 40%.

6.6 AT&T Proposed Benefits of Acquisition

By AT&T holding such a large percentage of the market, it would have adverse effects on competition in wireless services. AT&T contended they could replace any competition that was lost as a result of this merger because of the efficiencies that would be created would be so substantial they would dwarf any anticompetitive effects on the industry (Besen, Kletter, Moresi, Salop, & Woodbury, 2012). AT&T boasted several benefits to the proposed acquisition of T-Mobile; from improved wireless service for all its customers to the creation of jobs. AT&T claimed it would be able to use T-Mobile towers and spectrum to extend its wireless broadband to consumers across the United States. It also claimed it would spend an additional \$8 billion to grow its wireless network in rural areas despite its pre-merger plan to cover 80% of the population with its move to 4G network technology.

Similarly, such claims were proposed by the local exchange carriers prior to their approved mergers and acquisitions and after the approval the company canceled such plans which had the public's interest in mind. For the AT&T-BellSouth proposed merger, the firm committed to providing "*Internet access service at speeds in excess of 200 kbps in at least one direction) to 100 percent of the residential living units in the AT&T/BellSouth in-region territory*" (Kushnick & Goldman, 2009). The company also claimed it would sell DSL service for \$10 to new customers. However the acquisition resulted in most customers not being offered \$10 DSL and the company never fulfilled their 100% of their territories having broadband capable of 200kbps in one direction (Kushnick & Goldman, 2009).

AT&T claimed the merger would result in immediate network improvements, however in the report by the FCC, "*the Applicants did not provide the backup materials necessary to verify*

the engineering analysis of signal quality and 3G roaming improvements from integrating the networks” (Brunell, 2011).

Prior to the SBC-Pacific Telesis acquisition, in 1993 Pacific Bell committed to spending \$16 billion and rewiring 5.5 million homes in California by the year 2000, however in 1997 after the merger closed occurred all previous broadband commitments were cancelled with only a fraction of the money spent and no finished fiber-based homes deployed (Kushnick & Goldman, 2009).

In the AT&T-T-Mobile merger proposal, AT&T promised the Department of Justice it would bring 5,000 wireless call center jobs back to the United States if the deal were allowed. This claim would assist the U.S economy by providing jobs to its citizens, however the FCC stated its staff found AT&T's claims "to be inconsistent with AT&T's internal analyses." The company has a history of downsizing after merger, with the company dropping well over 100,000 jobs in the past decade (Why The AT&T - T-Mobile Deal is Bad for America, 2011). The impact this acquisition would have had on the U.S. wireless telecommunications industry is large enough where consequences should be observed as this transaction would have significantly impacted the entire industry across the nation and not just in a specific region. The severity of these consequences could impact customers, competition, and even innovation driving the progression of the industry.

CHAPTER 7: CONSEQUENCES OF CONSOLIDATION IN THE WIRELESS TELECOMMUNICATIONS INDUSTRY

A consolidation of carriers in the U.S. Wireless telecommunications industry through the approval of the AT&T/T-Mobile acquisition would consequently reduce the amount of competition in many local markets across the nation and could prompt other carriers to propose mergers or acquisitions to remain competitive. For this reason a closer look has been given to the proposed acquisition of AT&T and T-Mobile and the impact it could have had in local markets, on customers in those markets, and competitors across different regions in the United States. From this research a SWOT analysis has been constructed that addresses the strengths, weaknesses, opportunities, and threats this union could have had on the entire industry.

7.1 Analysis of the AT&T/T-Mobile Proposal

The acquisition of T-Mobile by AT&T, if it had been approved, could have reduced price competition in many local markets in the nation which could have resulted in customers of the newly formed carrier paying higher prices for wireless services as carriers seek to make a profit and competition acts as an incentive to keep prices lower in order to appeal to subscribers. Another consequence that could have occurred if the acquisition were to have been approved could have been a negative impact on innovation in the wireless telecommunications industry. Competition drives carriers to be innovative in order to distinguish themselves from competitors, this could be in the form of faster network technologies or new bundled services plans with new handsets for subscribers to choose from.

The absence of competition gives rise to the possibility this new carrier could become stale in its offerings to customers as the carrier would not have the motivation to continue being

innovative. The result of higher local market prices and less innovation would be customer dissatisfaction as customers in many local markets would not have another carrier to choose from and would be subject to the offerings provided by their only option. These consequences could result if two of the nation's largest carriers would have received approval for their acquisition from the FCC and the Department of Justice (DOJ).

It is largely speculated that if this acquisition had been approved it would have greatly impacted the industry in a negative way. However, this perspective is just one look at the consequences of a proposed acquisition involving these two carriers. In order to understand the full impact of this acquisition and gain a different perspective, further analysis must be done reviewing the strengths, weaknesses, opportunities, and threats to this acquisition and to the industry. This analysis could be used to decide whether or not this union would help or hurt the industry and its customers if it were to have been approved. This analysis could also be used to evaluate future mergers and acquisitions and determine their contribution, if any, to the industry.

7.2 SWOT Analysis

On March 20, 2011, AT&T announced that it intended to acquire T-Mobile, USA. This proposed merger would have made the new company the largest wireless carrier in the U.S. and reduce the number of major carriers in the U.S. wireless industry from four to three. Although this proposition did not pass, there were many positive and negative implications due to its possibility that could be observed. These consequences would have impacted both the two companies participating in the merger, customers of both companies, and competitors of the two companies. To examine what impact this acquisition would have had on an already concentrated industry, a SWOT analysis has been completed that considers the current state of the wireless telecommunications industry, scholarly research from experts on the industry, and various web

resources. From this analysis recommendations can be made to determine the best course of action in deciding whether or not this acquisition would have a greater positive or negative impact on the industry.

7.2.1 Strengths

The proposed merger of AT&T and T-Mobile would have primarily benefitted AT&T and T-Mobile if it would have been approved. It was AT&T's primary objective to gain the spectrum of T-Mobile across the nation. AT&T planned to use T-Mobile's resources to deploy its 4G LTE network across the nation. Based on AT&T's road map, the company planned to free up T-Mobile's 1700MHz AWS spectrum by migrating T-Mobile's subscriber off the frequency. Once the migration was completed, AT&T then planned to pair its 700MHz spectrum with T-Mobile's now cleared 1700 MHz AWS spectrum to provide a majority of the population with 4G LTE service. This acquisition would have benefitted both business customers and personal customers of both companies as LTE would be deployed in a greater number of regions at an accelerated rate. Prior to the acquisition, T-Mobile had no plans to develop and deploy its own LTE network. This might have been because T-Mobile did not have nearly as much in acquired spectrum as its competitors, but this was not explicitly stated and the company continued to focus on its HSPA+ network. This new company with its nationwide LTE coverage could have further facilitated the move many business are taking towards mobility.

The benefit of mobility is just one of the strengths the possibility of this acquisition provided. In this section benefits of convergence which is the use of a single technology to provide voice, data, and text services, and post-acquisition price reduction will also be discussed. If this acquisition were to have taken place the 4G LTE network services provided by the

company would support all customers of the new company across the nation as the trend in technology has been moving towards services on mobile devices. The demand for data to drive these mobile devices would be less exhausting on the new carrier's network as convergence allows multiple services to be offered using the same technology. The joining of the two companies to offer more in coverage at faster data speeds to its customers might raise the issue of higher prices, however the trend in the industry has been a decline prices after acquisition have taken place involving major carriers in the industry. It can be expected that prices would continue to decline and customers would still be able to enjoy faster data speeds across the nation on their mobile devices.

7.2.1.1 Mobility

One of the greatest strengths for the proposal was the fact businesses are going mobile. They are moving away from the model of stationary employees tied to a desktop in an office or cubicle reaching out to clients or customers on a landline. Business people are now carrying with them only a smartphone and tablet into and out of the workplace from home to different customer sites. Mobile devices allow them to make calls and access data they would normally only have access to at their desk on a desktop computer. If the AT&T/T-Mobile merger were to have been approved it would have created the largest carrier in the nation and allowed the new company to provide faster data speeds in more locations than AT&T could as a standalone company. Domestically this would have benefited traveling businesspersons who may not have coverage in a particular area if the companies AT&T and T-Mobile were to remain separate. 4G LTE in AT&T and T-Mobile's rural locations would have provided a better experience for customers of both carriers.

Just as business subscribers are equipping their employees with mobile devices to remain connected at all times, personal customers are also purchasing mobile devices for personal use to remain connected at all times. From emails to the news, people rely on these mobile devices to know what's going on in the world around them. The joining of AT&T and T-Mobile would have provided a large network with the ability to provide fast 4G LTE to all of their combined customers across the nation. When the proposal was announced AT&T presented an opportunity to provide 4G LTE to a majority of the population with the approval of the acquisition. *“AT&T has made a commitment to expand its 4G LTE service to an additional 55 million people thereby providing access to 95% of the U.S. population”* (Communications Workers of America, 2011).

4G represents a generational improvement in data transfer speeds over its predecessor 3G. This evolution is necessary to meet the data-driven needs of mobile device users. As services voice, text, and data are converging to be offered over the same technology. This has the benefit of reducing the amount of spectrum needed to provide these services. AT&T, if it had acquired T-Mobile, it would have even more spectrum available for subscribers by adding T-Mobile's acquired spectrum to its existing spectrum. This gain in spectrum would have accelerated the deployment of AT&T's 4G LTE service across the nation as it would have had available spectrum already in those locations across the nation. More spectrum in more locations would have benefitted the new company in addition to its subscribers in those locations. Additionally, convergence would have assisted this union as these technological advances have made it less cumbersome for carriers to offer voice, messaging, and data services to its customers.

7.2.1.2 Convergence

Network convergence (or convergence) refers to the provisions of telephone, video, and data communication services within a single network. It is the use of multiple communication modes in a single network to offer convenience and flexibility not possible with separate infrastructures. If AT&T would have acquired T-Mobile it claims it could have provided 4G data transfer speeds to more of the U.S. population than without the acquisition; this could have had a positive effect on voice, text, and data communications experiences for many Americans. Philip Humm, CEO of T-Mobile USA stated in regards to the proposed acquisition, *“for T-Mobile and AT&T customers, the merger will result in better coverage, fewer dropped and blocked calls, and faster and more consistent app performance and data downloads — particularly at peak times and in high-demand locations”* (Humm, 2011).

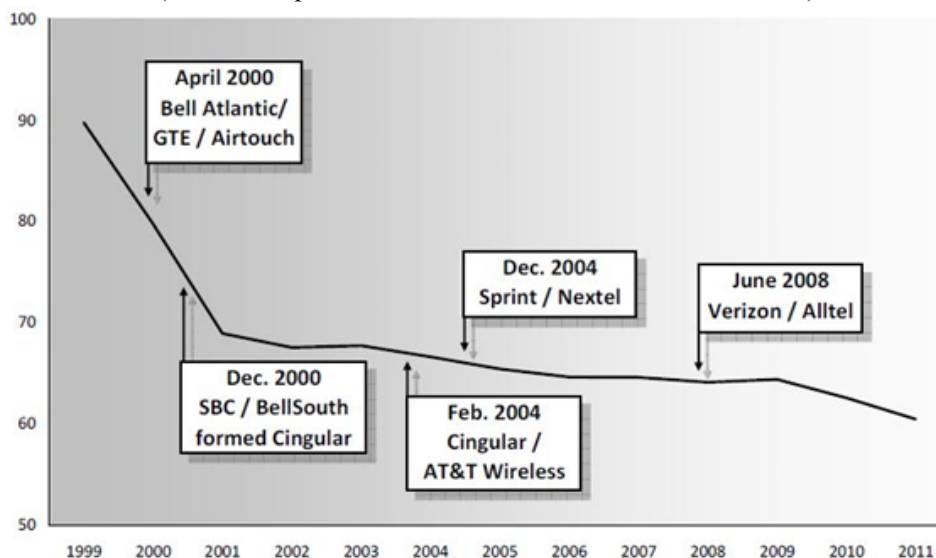
One main goal of convergence is to deliver better services at lower prices to consumers. Convergence acts as an upgrade to the technology that provides all three services. It can be seen as a benefit for customers as they will receive faster data speeds which will have a smaller impact on their carrier’s network. T-Mobile customers who were not expected to receive the network upgrade to 4G LTE would have had an opportunity to experience similar data transfer speeds as Verizon, Sprint, and separate AT&T customers. Improvements in performance and quality of service can result in greater customer satisfaction. With these customers now getting wireless coverage from a larger carrier there might be concern of a trade-off as customers will be getting more due to the combination of the companies; some customers might expect their wireless bill from their carrier to soar in price as their carrier offers greater services, however prices in the industry have actually declined over the years post-acquisition.

7.2.1.3 Post-Acquisition Price Reductions

With the trend in technology moving towards mobility, personal and business customers could benefit from such an acquisition as AT&T services and coverage could have reached a broader range of customers in the U.S. During the period of the proposal and its evaluation by the FCC, many customers showed concern that such an acquisition would increase prices for customers of both companies as AT&T would become the largest carrier in the nation, however, research has shown that advances in technology have not only made it easier to produce the services offered by carriers, but also reduce the cost to produce mobile devices offered by carriers. For these reasons overall prices in the wireless telecommunications industry have dropped and it is expected they will continue to decline in the future. Figure 12 below shows a drop in prices after mergers/acquisitions between 1999 and 2011 (Communications Workers of America, 2011)

Figure 12. Wireless Prices Decline Even as Wireless Carriers Merge

(Consumer price index for wireless services 1999-2011)



Source: <https://prodnet.www.neca.org/publicationsdocs/wwpdf/52011cwa.pdf>

Over the 12 year period mergers have taken place involving three of the four major carriers in the U.S. and prices have continued to decline. Based on the trends in the graph, prices will continue to drop overtime even if the AT&T/T-Mobile acquisition were to have been approved. With these predictions the acquisition appears to have many strengths and could have improved the experiences of all customers of the new company. These claims were strongly promoted by both companies during the time of the proposed acquisition and its evaluation, however there were caveats to this acquisition that made it detrimental to the existence of competition in the industry and, based on historic data, a potential problem for customers as it could result in prices increases in many local markets for customers even if prices are dropping in the industry overall.

7.2.2 Weaknesses

The AT&T/T-Mobile acquisition claims it could have provided 95% of the U.S. population with greater network coverage at greater transfer speeds, however there are several disadvantages to this acquisition as it would have greatly impacted the landscape of the wireless telecommunications industry. From a spectrum perspective, the combination of the spectrum of the two companies appears to just provide broader network coverage and improved performance for AT&T customers, however from an industry perspective, it is appears this acquisition would result in increased market concentration, reduced consumer choice, and will lead to price increases in the most heavily populated U.S. wireless markets.

Both AT&T and T-Mobile made claims that this acquisition was necessary for both companies to offer 4G LTE services to their customers however there were weaknesses or evidence that reveal this acquisition would not have benefited the industry as it would have adversely impacted competition. In this section market concentration, price competition, and

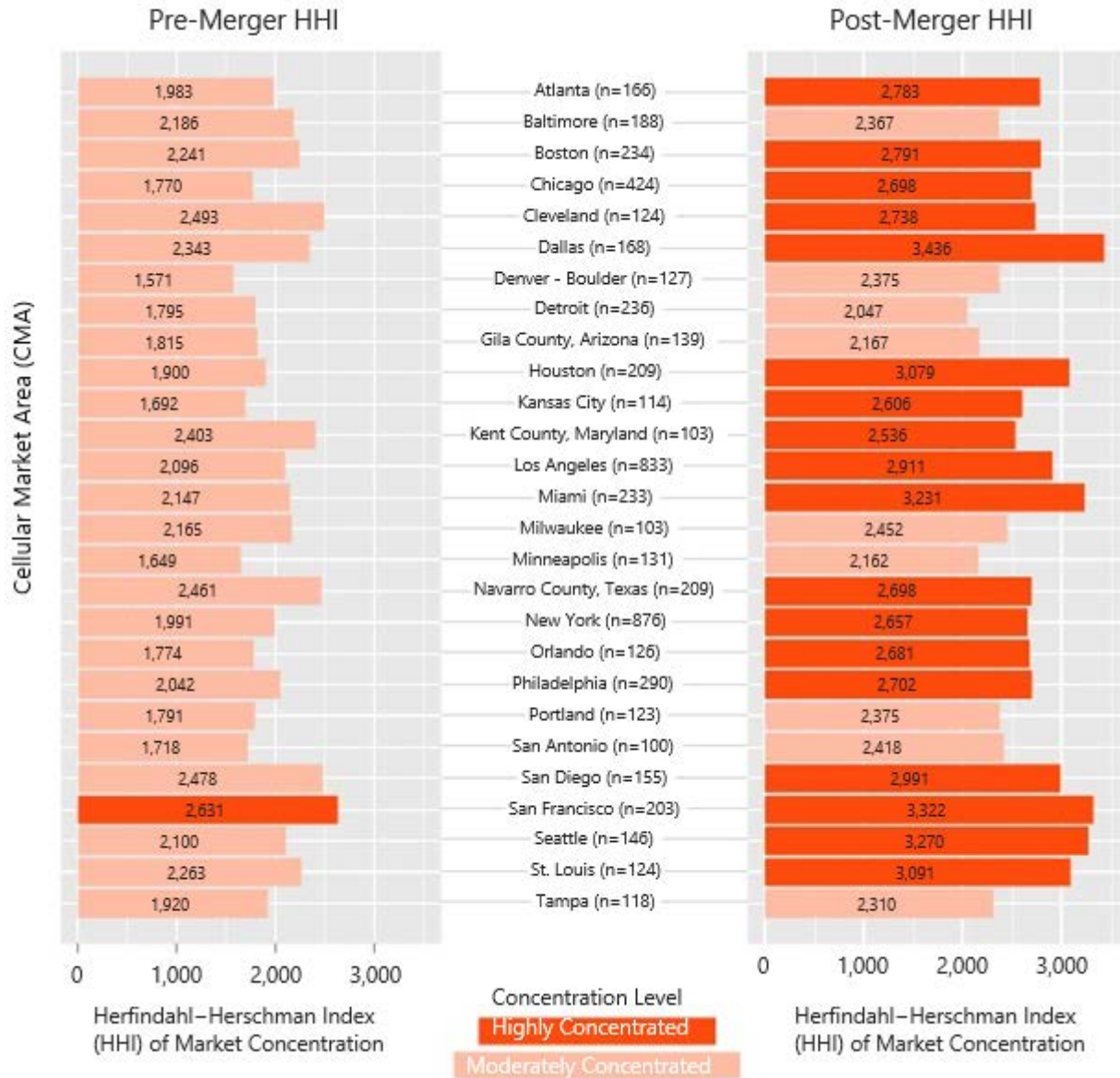
spectrum constraints are all weakness that validate why the proposed acquisition was not approved. Less competition due to market concentration would have resulted in fewer carriers competing for the subscribership of customers in local markets across the nation. With market concentration and less competition there is expected to be a reduction in price competition. Price competition is what keeps prices lower in local markets. Carrier offer products and services at lower prices in order to convince potential subscribers to choose their company over a competitor. Another claim by the companies was that it was necessary for T-Mobile to join AT&T in order for them to possess the necessary spectrum to support their millions of customers. Through research on this acquisition it was determined that this is not the case as both carriers have the spectrum needed to support customers using 4G. These carriers as standalone companies need only to be innovative and implement aggressive strategies that would allow them to deploy equipment that would support 4G and move customers onto devices that support this new technology. By doing this these carriers could avoid reducing competition in the industry and increasing market concentration.

7.2.2.1 Market Concentration

The acquisition of T-Mobile by AT&T would have been a large step towards further market concentration in many local markets, this is measured by using the Herfindahl-Hirschman Index (HHI). The HHI is a metric used by the DOJ to measure market concentration, and it was concluded that 99 of 100 local markets would suffer from concentration post-acquisition. Research completed by the Yankee Group took a sample of 27 out of 734 local markets that make up cellular markets in the U.S. and calculated pre-acquisition and post-acquisition HHI metrics for the 27 markets. Before the acquisition only one of the 27 markets was highly

concentrated, however after the acquisition 63% of the 27 markets would be concentrated. Figure 13 shows their results.

Figure 13. Pre- to Post-Merger Local Market Concentration

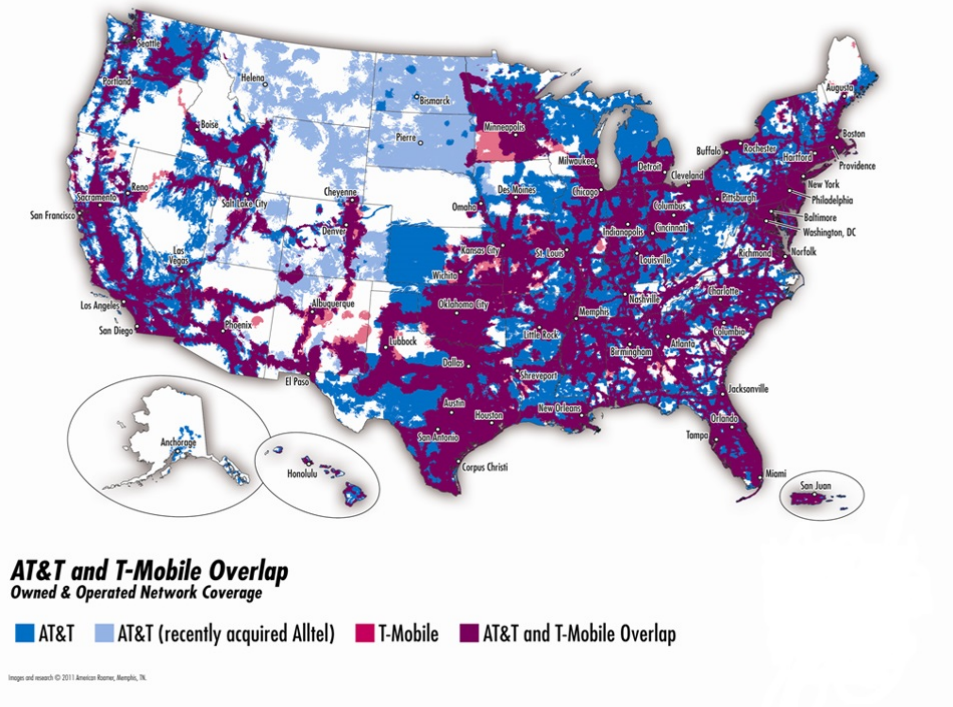


Source: <http://web.yankeegroup.com/rs/yankeegroup/images/2011AT%26T-T-Mobile-Merger-Report.pdf>

The increase from one to 18 concentrated markets out of 27 represents a drastic change in the wireless landscape. The DOJ's 2010 guidelines state that any HHI increase of 200 points or more is considered significant. 25 of the 27 cellular markets see HHI increases over 200, but four of the markets had HHI increases of over 1,000 (Wang & Howe, 2011). Market concentration would have a largely negative effect on competition and prices customers must pay for wireless services from their carrier. Greater concentration would most likely result in higher prices for customers in many local markets. Based on the chart in Figure 12 yes, prices in the industry as a whole are declining, but prices in local markets, where there are fewer competitors, can be expected to increase as carriers seek higher profits when there is no competition to create competitive pricing.

Figure 14 provides a map of the network coverage AT&T and T-Mobile have across the nation. Areas in blue represent all areas where AT&T has a presence and T-Mobile does not. All areas in pink represent areas where T-Mobile has a presence and AT&T does not. Areas in purple represent areas where AT&T and T-Mobile both have a network presence. It should be observed that there are very few areas where there is T-Mobile coverage and no AT&T coverage, and from these observations it can be concluded that the areas in purple would experience high levels of concentration as those are areas where AT&T had an existing presence and added to their coverage at the cost of taking over a competitor. Conclusively, fewer or no competitors in many local markets would result in less price competition in these markets. Competing carriers typically use competitive pricing to gain and maintain their customer base. These prices are typically lower than it would be in the absence of competition.

Figure 14. AT&T and T-Mobile Owned & Operated Network Coverage



Source: <http://www.mosaik.com/news/american-roamer-is-the-mapping-intelligence-source-for-att-t-mobile-coverage-overlap/>

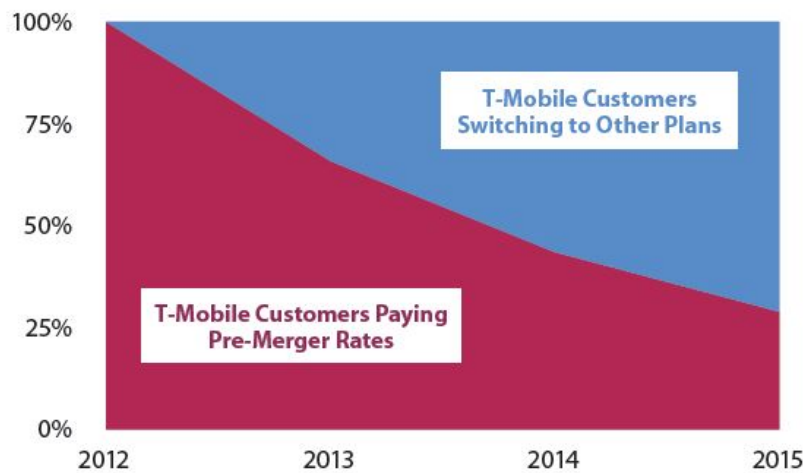
7.2.2.2 Reduction in Price Competition

As price competition is reduced among wireless carriers in many local markets, it is expected that consumers in these local markets will see higher prices over time. Based on research for this thesis, it is likely many T-Mobile customers would have left their carrier if the acquisition by AT&T had taken place. These subscribers are used to getting similar services to that of competitive carriers, but at a lower price. To back these statements, one historical reference to a monopoly leading to higher price was the monopoly held by AT&T Inc. before the consent decree took effect in 1982. AT&T's position allowed the company to increase prices local exchange carriers had to pay to offer long distance services and as a result these prices were passed on to customers to cover the charges. Additionally, research used from Yankee Group

estimates how much T-Mobile users are currently paying and predicts customer churn that might occur after the acquisition and the shows the increase in prices these customers remaining with T-Mobile would most likely pay. Their analysis applies T-Mobile's published churn rate to determine the mix of existing customers who will be grandfathered in with current T-Mobile pricing and new customers who switch to the new AT&T/T-Mobile from other carriers.

It cannot be known what AT&T/T-Mobile would charge customers of their new company, however it is anticipated that 33.6 million of T-Mobile's subscribers would experience higher rates paid by AT&T's existing 98.6 million customers over time according to their research. Based on an expected acquisition completion date of January 2012, it was projected that T-Mobile's nearly 34 million subscribers would decline to fewer than 10 million by January 2015 (Wang & Howe, 2011). Figure 14 shows their predicted customer decline.

Figure 15. T-Mobile's Expected Subscriber Decline by 2015



Source: <http://web.yankeegroup.com/rs/yankeegroup/images/2011AT%26T-T-Mobile-Merger-Report.pdf>

These projections show the proposal was not in the interest on customers when announced. Customer are never happier paying more for services offered. To get the estimated pricing for old and potential new T-Mobile customers, researched completed by the Yankee Group applied churn figures to nine of the largest carrier markets and estimated how the migration of subscribers to AT&T's rates would change in January 2015. They concluded in this part of their research that only two markets would see a decline in the rates they pay for service, two would see an increase in their rates greater than \$5 and the rest would see an increase less than \$5 (Wang & Howe, 2011). This research was applied to only 9 out of the 734 local markets, however it is expected that if more markets were used in this research, it would show more local markets would experience an increase in prices.

Despite price increase occurring in many local markets, wireless devices have become a part of the everyday lives of American citizens. For this reason, many people are activating mobile devices for the first time each year. As more and more individuals are activating mobile devices for the first time, more spectrum is being used by carriers to support these new subscribers. Due to continuing growth in subscribership, carriers are experiencing what they call spectrum exhaust which are limitations or constraints due to difficulties they expect to experience supporting a growing number of data-hungry subscribers with only a limited amount of resources.

7.2.2.3 Spectrum Constraint

With the proposed merger of AT&T and T-Mobile not only did AT&T plan to acquire more customers, but it also planned to gain the spectrum owned by T-Mobile to support those customers. AT&T made the claim that it needed additional spectrum to avoid spectrum exhaust and transition to LTE, however many institutions in various industries are doing more with less.

Through creative tactics and strategies, AT&T would be able to offer 4G LTE and other advanced services to subscribers without acquiring T-Mobile and adversely impacting competition within the industry. The transition to LTE is primarily a factor of (1) a company deploying LTE capable equipment on their network and (2) the number of LTE devices that are adopted by subscribers. Although this acquisition would have made it easier for the carriers involved to obtain more spectrum, it would have been at a cost to its customers and other carriers in the industry. Based on research for this thesis, acquisition is not the only way for these carrier to transition to offering LTE. If these carriers were to just increase their efforts in distributing more spectrally efficient LTE-capable radios and equipment on their networks, as well as providing customers with dual mode HSPA/LTE devices, they would be able to better cope with foreseeable subscriber growth given their available spectrum.

AT&T and T-Mobile may have been concerned with whether or not they would have enough spectrum to support future subscriber growth, but a conservative approach to spectrum management could be the incentive carriers like AT&T become more efficient in their use of what's available to them. Based on the knowledge acquired through research, it is possible for carriers to repurpose their existing spectrum. Using a more conservative approach to addressing the issue of spectrum, and taking a more aggressive approach to transitioning subscribers to LTE-enabled devices would allow both companies to free up UTMS spectrum that can be repurposed for supporting LTE. This approach would require creativity on the part of both companies as standalone competitors to meet the challenge of spectrum limitation in the industry. This approach would preserve competition in the industry and force these companies to be progressive in their technology developments. By continuing to be innovative and creating

opportunities for themselves, all carriers will be able to support new customers without sacrificing the experience of existing customers.

Conclusively, carriers have the spectrum they need in order to facilitate these high speed networks they are deploying for subscribers, they do not need to feel constrained by the spectrum they currently own and do not have to be concerned about how they will accommodate anticipated subscriber growth. It is worth noting that AT&T has the most unused spectrum of all U.S. carriers at this time and that AT&T already had plans to implement 4G LTE prior to its announced plan to acquire T-Mobile. AT&T's plan to implement 4G LTE in markets across the nation shows it does not need T-Mobile in order to deliver a more advanced network to its subscribers. As for T-Mobile, although the company had no plans of implementing LTE on its network, there was never any doubt that the company could implement LTE if it chose to. More recently, T-Mobile acquired MetroPCS on May 1, 2013, and is testing the company's 4G LTE with plans to adopt the service across their network in the future.

7.2.3 Opportunities

The proposed acquisition of T-Mobile by AT&T presented more than just an opportunity for the joining companies to combine their assets. It provided opportunities for both personal and business customers of both companies to have a better mobile experience through their carrier, by receiving 4G LTE network services in most locations across the U.S. If this were possible, the new company could have seen a surge in subscribership growth as personal customers seeking a better mobile experience might leave their current carrier for the new company. The additional spectrum purchased with the T-Mobile company would have been used to facilitate the data consumption needs of those new customers; for this reason the AT&T/T-Mobile acquisition presented the new company with subscribership opportunities.

Subscribers old and new would have had the opportunity to receive greater network coverage and faster data speeds across a majority of the country than they would if AT&T remained a standalone company from T-Mobile. This section discusses potential opportunities the acquisition of T-Mobile by AT&T could have brought including subscribership opportunities, network improvements, and a path to LTE for T-Mobile customers who were not expected to receive the network upgrade prior to the proposal. This upgrade would have been the most apparent benefit for T-Mobile customers as the standalone company focused on improving their HSPA+ network at that time. HSPA+ network speeds do not compare to that of 4G LTE and customers could have missed out on a greater mobile experience from their carrier. At the time, the promise of LTE in a majority of locations across the U.S. presented subscribership opportunities for the new company if the acquisition had been approved.

7.2.3.1 Subscribership Opportunities

If AT&T had acquired T-Mobile it could have presented new offerings for customers in the form of bundled services. T-Mobile has been known for its innovation in bundling services for its customers during a contract period and if acquired by AT&T this creativity could be implemented to not only show a positive change has occurred with one company acquiring another, but to prevent churn of existing T-Mobile customers who are accustomed to “getting a good deal” on mobile services. This could be achieved through economies of scale. With an increase in spectrum post-acquisition added to the existing spectrum of AT&T, it would cost the new company less in resources to provide wireless telecommunications services to a greater number of customers.

Not only would personal customers of the new company experience better services in more locations, business customers could see new offerings to support their wireless

telecommunications needs if the acquisition had taken place. LTE-enabled devices and coverage in many local markets could have made traveling to various locations a more convenient work experience for business customers. Greater coverage for business customers and personal customers would have resulted in greater customer satisfaction. By improving the experience of customer the new company could see greater profits. These profits could have been used to research ways to continue providing superior wireless services to a growing number of customers without relying on spectrum which is growing in shortage as new subscribers are continuing to enter the market.

The initial boost in spectrum might draw from T-Mobile's unused spectrum, but would gradually come from the spectrum currently used to offer T-Mobile's 3G and HSPA+ services. AT&T's CEO announced the company's intentions to repurpose T-Mobile's spectrum for their company's 4G LTE network. In addition to repurposing T-Mobile's spectrum to provide new services, the new company has AT&T's unused spectrum to facilitate their 4G LTE. The abundance of spectrum if used effectively, available through the joining of these two companies could result in network improvements across the nation.

7.2.3.2 Network Improvements

The combination of AT&T and T-Mobile creates an opportunity for both companies to provide a better network experience for customers of both standalone companies. T-Mobile as a separate company does not have the same geographic presence in the United States as AT&T. AT&T stated in its initial press release, *“AT&T's acquisition of T-Mobile USA provides an optimal combination of network assets to add capacity sooner than any alternative, and it provides an opportunity to improve network quality in the near term for both companies' customers. In addition, it provides a fast, efficient and certain solution to the impending*

exhaustion of wireless spectrum in some markets, which limits both companies' ability to meet the ongoing explosive demand for mobile broadband' (AT&T, AT&T to Acquire T-Mobile USA From Deutsche Telekom, 2011).

An improved network would have resulted in the customer satisfaction of 294 million Americans being able to benefit from the advanced 4G LTE speeds available after the acquisition as stated by AT&T. A greater experience for personal and enterprise customers creates an opportunity for economic stimulus. AT&T CEO and Chairman, Randall Stephen stated, *"We are confident in our ability to execute a seamless integration, and with additional spectrum and network capabilities, we can better meet our customers' current demands, build for the future and help achieve the President's goals for a high-speed, wirelessly connected America"* (AT&T, AT&T to Acquire T-Mobile USA From Deutsche Telekom, 2011). If personal customers see a real benefit from the widely available 4G LTE network, it is expected they would have switched to the new carrier and purchased 4G LTE capable devices or existing customers would have upgraded to 4G LTE capable devices, which would have stimulated spending in the economy. Enterprise customers, who use AT&T for mobile broadband for their company's network and to mobile device coverage for portable devices, would purchase new devices in bulk to take advantage of the network speeds available after the transaction takes place.

Upgraded equipment and new/renewed service plans could have caused a surge in demand for new technology that takes advantage of the data speeds that the new company could have offered. *"This transaction delivers significant customer, shareowner, and public benefits that are available at this level only from the combination of these two companies with complementary network technologies, spectrum positions and operations"* said Stephenson (AT&T, AT&T to Acquire T-Mobile USA From Deutsche Telekom, 2011). With the ability to

benefit most Americans, these network speeds would not only reach customers in densely populated cities, but customers in rural areas who may experience inconsistent network coverage. T-Mobile customers have been known to experience dropped calls and sometimes find themselves in “dead zones.” With AT&T’s network, it can be predicted that these customers would be less likely to find themselves in dead zones; they could have experienced 4G LTE speeds which T-Mobile had made no mention of during the time of the proposal.

7.2.3.3 A Path to LTE for T-Mobile

Deutsche Telekom Chairman and CEO René Obermann said, *“After evaluating strategic options for T-Mobile USA, I am confident that AT&T is the best partner for our customers, shareholders and the mobile broadband ecosystem. This logical combination provides an efficient path to gaining the spectrum and network assets needed to provide T-Mobile customers with 4G LTE and the best devices”* (AT&T, AT&T to Acquire T-Mobile USA From Deutsche Telekom, 2011). Prior to the announcement of the acquisition of T-Mobile by AT&T, T-Mobile had no clear path to LTE deployment to its customers. The company only focused on its HSPA+ network which is considered a high-end, high-speed 3G network, at the time T-Mobile advertised itself as having the *“fastest download speeds, by far, of any non-LTE service”* (Dudley, 2013). However, these speeds do not compare with that of 4G LTE. If T-Mobile had joined AT&T, their customers would have experienced speeds much greater than what they are currently receiving. The results of speed tests done March 11, 2013 show just how much of a difference there is in carrier 4G LTE speeds versus T-Mobile’s HSPA+ offering, the results were as follows (Dudley, 2013):

AT&T

Average download speed: 18.6 megabits (Mbps)

Peak speeds: 57.7 Mbps

Average upload speed: 9 Mbps

Verizon

Average download speed: 14.3 Mbps

Peak speed: 49.3 Mbps

Average upload speed: 8.5 Mbps

Sprint

Average download speed: 10.3 Mbps

Peak speed: 32.7 Mbps

Average upload speed: 4.4 Mbps

T-Mobile

Average download speed: 7.3 Mbps

Average upload speed: 1.5 Mbps

Although AT&T provides the fastest 4G LTE based on these test, it is Verizon who has the broadest LTE coverage in the nation. These results provide definitive proof that by joining AT&T, T-Mobile customers would have experienced greater connection speeds and greater network coverage in most areas. By adding T-Mobile executives to the staff of AT&T it is possible for the new company to develop innovative cost efficient plans for customers similar to that of T-Mobile as a standalone company. Even if the new company were to offer new plans at a slightly higher rate than what T-Mobile currently charges its customers, the benefits could have been enough to compensate for the price increase. The claim of 4G LTE for 95% of Americans with T-Mobile's innovative plans could have created an opportunity for customers to join a carrier with greater network coverage, at a reasonable price.

The AT&T/T-Mobile acquisition proposal presented an opportunity for the companies to increase AT&T's subscribers and improve its network speeds by accelerating its 4G LTE deployment, it also provided T-Mobile with customers with a path to 4G LTE which they did not have prior to May 2013; however it is not the only opportunity for the companies to improve

their offerings and gain new subscribers. In fact, the proposal presented an opportunity that threatened to further imbalance the state of competition in the wireless telecommunications industry. The number major carriers would be reduced from four to three, boosting AT&T's market share beyond 40% in the industry. Based on research for this thesis there are several alternative methods that could be used by T-Mobile and AT&T to advance their respective networks and offerings to customers. These alternatives present reasons why the AT&T/T-Mobile acquisition proposal was unnecessary and methods that could be adopted by all carriers to mitigate any foreseeable spectrum constraints without impacting the experience of current subscribers.

7.2.4 Threats

The proposed acquisition of T-Mobile by AT&T did not occur; the proposal by the two companies faced adversity from the FCC as well as competitors such as Sprint. On December 19, 2011, AT&T announced it was ending its bid to purchase T-Mobile. This cancellation marked the end of what might have been a threat to the state of competition within the industry, market share owned by competitors within the industry, and market power possessed by one company in many local markets within the industry. The FCC made several valid statements in their report evaluating the proposed acquisition of T-Mobile by AT&T. Based on their evaluation and research done on alternative methods of wireless offerings, the acquisition was not necessary for either company.

This section discusses the opportunities that threaten the claim AT&T and T-Mobile have used stating it was necessary that the companies join in order for them to offer 4G LTE across the nation. Additionally, this section discusses how the acquisition, if approved, would have threaten to further consolidate the wireless telecommunications industry under a few carriers and

further shift the market share in favor of one of the largest carriers in the nation. The market would resemble a duopoly in appearance as AT&T and Verizon would maintain over 80% of the market share within the industry post-acquisition. Market share is important as it represents relevance in the market and what percentage of subscribers in the market is with a specific carrier.

All companies have the opportunity to explore complimentary technologies that will support their cellular and data offerings such as white spaces or WiMAX technologies. These technologies offer network connections similar to that of Wi-Fi and could be used to minimize the impact a growing number of subscribers have on a carrier's network. Alternatively, carriers have the opportunity to repurpose their existing spectrum. Equipment supporting 2G could see an end of support as carriers no longer offer the services and focus on using that spectrum to provide 4G LTE. If carriers were to use alternative technologies or repurpose their existing spectrum they would have the resources necessary to support a growing subscriber base.

7.2.4.1 Repurposing 2G

Both AT&T and T-Mobile have unused spectrum they can use in the event they are drained of their current offerings for subscribers. Additionally, both carriers have the ability to repurpose existing spectrum for 4G LTE. Repurposed spectrum could be existing spectrum used for wireless telecommunications or spectrum used for other purposes such as television broadcasting. It not only presents an opportunity for carriers, who are suffering from spectrum exhaust, to gain additional spectrum to facilitate their 4G LTE network, it threatens the claim that the acquisition is needed, in fact, Sprint took action to repurpose its 2G offerings to focus on improving its 4G LTE offerings. This example provides evidence that carriers have the resources they need to improve their services. Sprint announced on May 2, 2013 it is on

schedule to shut down its 2G iDEN network on June 30 to reduce operating costs and repurpose the spectrum for higher speed services. This move will reduce the number of cell-sites operated by Sprint from more than 60,000 to around 40,000. This is an opportunity for the carrier to narrow its focus on services offered and improve those services. The company will repurpose the 800 MHz spectrum used for the 2G iDEN network and add it to its 1.9GHz band currently being used for 3G and 4G.

Sprint's strategy will allow them to not only free up spectrum for their 4G LTE network, it allows them to cease support for their 2G iDEN network and narrow their focus on improving their 3G voice and data quality and developing stronger in-building signal penetration. Sprint is notifying customers to migrate from the iDEN network via letters, legal notifications, email reminders and text messages. This strategy can be adopted by AT&T to address its concerns of spectrum exhaust. If AT&T were to follow Sprint's example, competition would remain intact in the industry and AT&T would be able to improve its services offered while continuing to rollout 4G LTE. If AT&T does not choose to shut down its 2G offerings across the nation there are alternative technologies that could be explored that could support data-driven subscribers, one such technology being white spaces.

7.2.4.2 White Spaces

The threat of T-Mobile joining AT&T faced the challenge of convincing the FCC there was no other way for AT&T to offer LTE without being constrained by spectrum exhaust, however alternative technologies exist which can help carrier facilitate the growing desires of data-driven subscribers. White spaces spectrum can be used to relieve some of the strain on a carrier's network caused by data services. White spaces refer to the portions of old unused analog television spectrum that can be repurposed for wireless Internet networks. It is

comparative to Wi-Fi however it can broadcast over much longer distances. Google CEO, Larry Page, has referred to white space as "Wi-Fi on steroids" (Whitt, 2008). This unused resource has been piloted for public use by several organizations as testing has revealed greater transmission distances than Wi-Fi, and better coverage in densely covered areas. *"It operates at lower frequencies, its better at penetrating buildings and trees than cellular,"* said Akshay Sharma, research director for Gartner's carrier network infrastructure team (Tynan, 2012).

Because of white spaces' multipurpose capabilities, carriers or other companies interested in wireless communications could potentially use these frequencies to offer wireless telecommunications services without being restricted by the amount of spectrum they have purchased. Although white spaces are still being tested, the idea of its use can be seen as an opportunity for carriers to use this spectrum in addition to their purchased cellular spectrum to offer wireless telecommunications services to customers. In addition to repurposed 2G spectrum, white spaces can be seen as avenue for available spectrum to facilitate the growing number of subscribers in a market that is not yet saturated.

Spectrum repurposing is an idea that carriers should consider in order to continue adding subscribers to their network. How available spectrum is used and how available spectrum is repurposed will require innovation from carriers. Carriers are not maxed in the amount of spectrum they can offer subscribers. They are still accepting new customers every day and these new subscribers are not impacting the experience of existing subscribers. Spectrum repurposing not only presents an opportunity for AT&T and T-Mobile to prevent spectrum exhaust without negatively impacting the competitive landscape of the industry, but other carriers such as Sprint and Verizon as well. White spaces spectrum is not the only alternative carriers have to acquisitions and spectrum repurposing, WiMAX is a comparable technology that is available and

could even be used to support 4G as Sprint experimented with the technology in 2008 before switching to LTE.

7.2.4.3 WiMAX

An alternative wireless technology to white spaces that further disproves the necessity of an acquisition of T-Mobile by AT&T. *WiMAX is an IP based, wireless broadband access technology that provides performance similar to 802.11/Wi-Fi networks with the coverage and QOS (quality of service) of cellular networks. With WiMAX, Wi-Fi-like data rates are easily supported, but the issue of interference is lessened*" (WiMax.com Broadband Solutions, Inc., 2012). It is a wide area network (WAN) technology that can provide wireless network availability that can span areas as large as cities in some cases. Covering a greater radius at relatively cheap rates, and providing Wi-Fi-like capabilities, WiMAX technologies can be used with hardware devices to provide hotspots that together with VoIP can provide subscribers with an alternative form of wireless communications.

Although WiMAX can be a viable solution to spectrum exhaust that is cost effective, the greatest drawback to its adoption is a lack of support from hardware manufacturers. Network equipment manufacturers are not developing WiMAX compatible devices as the trend seems to be that LTE is becoming the standard next generation technology for high-speed communications. Another flaw in the development of WiMAX that has caused its popularity and usage to diminish is its performance is adversely affected by terrain, climate, and buildings (Unuth, 2012). For these reasons WiMAX is not considered an option to replace a carrier's cellular network and it is the reason U.S. carriers have decided to use LTE for their 4G network speeds. It is possible however, for carriers to offer devices that support both LTE and WiMAX, and in doing so, allowing for WiMAX hotspots to offset taxing bandwidth usage from growing

customer demand. Spectrum exhaust gives rise to innovative ways for carriers to remain competitive using alternative resources.

One company attempting enter the foray and tackle the issue working with limited spectrum through innovation is Republic Wireless. Republic Wireless offers unlimited calls, text, and data for just \$19 dollars a month to its customers without a contractual obligation. The way the company operates is, customers purchase the one phone offered by the carrier which includes special software for \$249 and \$19 each month for the unlimited services. Alternatively, customers can buy in at \$99 for the phone and pay \$29 monthly for your service. The way this company differs from other carriers is that it their phone signs into a Wi-Fi access point and it drops the 3G data connection to use it, but it also drops voice service and uses Republic's VoIP service for calls. When a customer is not in range of a Wi-Fi access point, the phone uses Sprint's service for voice and 3G data. If a customer is in the middle of a call and leave Wi-Fi range, the call drops unfortunately, and the user connect to cellular, the phone then automatically redials (Hildenbrand, 2013).

Although Republic Wireless does not have the best solution for a lack of spectrum to support the growth network needs of subscribers, it does represent an innovative approach to addressing the issue. Repurposing 2G or exploring the uses of WiMAX or white spaces are all ways for AT&T or T-Mobile to handle expected customer growth and it does not impact competition within the industry. Alternatives to mergers or acquisitions preserve competition and prevent further industry consolidation. Preventing consolidation helps to avoid monopolization in many local markets across the nation.

7.2.4.4 Consolidation

In the case of the proposed acquisition of T-Mobile by AT&T consolidation posed the threat of making AT&T the only option for customers in many local markets. This kind of impact on the industry would allow for the temptation of AT&T to flex its market power and unfavorably raise prices in these markets to take advantage of their standing in the industry. With this kind of price adjustment, particularly to T-Mobile customers who are accustomed to innovative and affordable price plans, it's likely that customer dissatisfaction will develop.

Another impact caused by the joining of AT&T and T-Mobile would be the change in the number of significant players in the wireless telecommunications industry. The reduction from four major carriers to three would change the market share portions owned by competitors nationwide. The industry would face a potential duopoly with Verizon having over 30% of the total market share in the industry and the new AT&T who would be raising its market share to over 40% of the market. This would only leave Sprint as the only other significant contender in the industry, however its market share was under 20% at the time.

If the industry were to be dominated by two carriers, it would be necessary for other carriers to also join in mergers or acquisitions in order to increase their market share and compete with Verizon and AT&T. Approvals of other mergers and acquisitions in the interest of creating competitors for Verizon and AT&T would further reduce the competition within the industry. The FCC has taken measures to aid in creating competitors in local markets by ruling to require nationwide wireless carriers to open their data networks to smaller regional operators in places where their service does not extend. This will help regional carriers in their local markets provide comparable coverage to that of nationwide carriers, however it does not expand their geographic footprint in the nation and it does not improve their market share. Having a

significant market share within an industry is a measure of how much of a particular market is accounted for by a company within the market.

7.2.4.5 Market Share

It is important for carriers to be concerned about their market share as this determines their significance within the market. Carriers with less significance within the industry bring in less revenues and have less resources to offer its customers without assistance. Carriers with a large amount of the market share are seen as stronger companies with the necessary resources to provide greater coverage to its subscribers. These companies are less likely to be targets of acquisitions in the future. Carriers that are large enough to provide nationwide coverage engage in monopolistic practices when attempting to acquire smaller companies, this is in the interest of increasing their market share and obtaining the other company's resources such as spectrum. AT&T had plans become a monopoly by acquiring T-Mobile, it would become the only carrier in the nation offering GSM network coverage.

Departing FCC chairman Julius Genachowski made the decision in 2011 to block the merger between AT&T and T-Mobile stating "it was the right call." Genachowski stated, *"Two and a half years ago, we were on the doorstep of duopoly, People thought [the AT&T/T-Mobile deal] was inevitable. If you look at the market now, T-Mobile and Sprint, instead of moving down, they're moving up."* (Fung, 2013). As the market is not yet saturated, there are still opportunities for carriers to gain more market share without mergers or acquisitions. It will be imperative that carriers gain new subscribers through innovation before the market reaches its saturation point as customers tend to develop loyalty or find convenience in remaining with their wireless service provider.

Once the wireless telecommunications industry reaches subscriber saturation it will be difficult for regional carriers to significantly impact the market share of the major players in the industry. Regional carriers need to find alternative methods to provide comparable data transmission speeds as carriers offering nationwide 4G LTE coverage. As dedicated cellular spectrum is a scarce resource mostly held by the four major carriers in the nation, alternatives such as white spaces, WiMAX, and Wi-Fi should be explored further by carriers. What these carriers should do is begin offering services through these alternative means. By advertising competitive service offerings and bundled plans at lower prices, they will be able to acquire some of the market share from their competitors. These carriers will also need to advertise new devices that are capable of supporting these alternative technologies in addition to cellular networks. Republic Wireless is an example of one such company.

7.2.5 Discussion

Through researching various aspects of the proposed acquisition of T-Mobile by AT&T the SWOT analysis in Table 4 lists the attributes of the strengths, weaknesses, opportunities, and threats this acquisition would have had if it had been approved. Based on the characteristics included in Table 4 it can be concluded that this proposed acquisition was not in the best interest of the customers of either company as they could face higher prices post-acquisition, it would not foster efficient competition in the U.S. wireless telecommunications industry, and it was not necessary for either company to deploy 4G LTE services across the nation.

Upon closer review of the SWOT analysis it was determined that the strengths and opportunities could be achieved by carriers not engaging mergers acquisitions. At this time carriers have yet to find the perfect solution that allows their networks to handle continuous customer growth and data consumption, however, it is through innovation that they will be able

to support new customers while continuing to offer the same quality of service (FCC, Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services, 2013). They will be able to advance their LTE offerings and through the capabilities of convergence experience less exhaust from data-hungry customers. As a result carriers such as AT&T and T-Mobile could see the fruits of their labor in the form of subscribership growth or increased revenues.

A review of the weaknesses that would have resulted if the acquisition had taken place would have had an adverse impact on the industry as a whole. An industry with only a few carriers making up a majority of the industry is said to be high in concentration. One result of a highly concentrated industry with only a few competitors is a reduction in price competition which can mean higher prices paid by customers. If customers have one or no other carriers to choose from, then these carriers may reduce the level of customer services they offer as they do not have to worry about customer churn in many local markets. However, it is because of alternative technologies and the ability of AT&T and T-Mobile to repurpose spectrum used for 2G that this acquisition was denied. AT&T has proven it did not need T-Mobile in order to deploy 4G LTE across the nation as it did so as a standalone company in 2012.

These threats to the validity of AT&T's claim that it needs T-Mobile mobile in order to remain competitive and offer 4G LTE across the nation give cause for this proposals denial by the U.S. government. Additionally, weaknesses presented explaining why this acquisition would not improve the level of competition in the industry provide further reason this acquisition did not occur. The strengths and opportunities listed could be achieved in the absence of this acquisition as AT&T and T-Mobile as standalone companies have the resources available to provide 4G LTE to their customers. Through innovative offerings these carriers could continue

seeing subscribership growth and increased revenues as the market for new subscribers is not yet saturated however denying this acquisition does not improve the competitive conditions in the wireless telecommunications industry as there are still four major carriers holding over 90% of the market share within the industry. For this reason observations from this analysis in addition to reviewing FCC’s position on the state of the wireless telecommunications landscape will be necessary to determine policy recommendations that will improve the state of competition within industry and allow carriers of all sizes and regions to more effectively compete for new subscribers with one another.

Table 5. SWOT Analysis Proposed AT&T/T-Mobile Acquisition

SWOT Analysis AT&T/T-Mobile Acquisition			
Strengths	<ul style="list-style-type: none"> • Long Term Evolution (LTE) • Smartphone demand • Synergism • Convergence of services • Mobility 	Weaknesses	<ul style="list-style-type: none"> • Concentrated industry • Reduction in price competition • Claims of spectrum constraints • Poor customer service
Opportunities	<ul style="list-style-type: none"> • Subscriber growth • Increased network coverage • Increased revenue • Nationwide hotspots • White spaces • WiMAX • Wi-Fi 	Threats	<ul style="list-style-type: none"> • Ability to repurpose 2G • Ability to use repurposed white spaces • Increased churn (customer dissatisfaction) • Threat of industry monopoly/duopoly • Threat of industry consolidation • Ability to use VoIP

CHAPTER 8: CURRENT INDUSTRY LANDSCAPE IN THE U.S.

The wireless telecommunications industry is one of the most profitable industries in the United States. Each year the industry is continuing to see higher profits; however, these profits are abnormally high. This is due to the industry not yet reaching saturation and the profits in the industry being shared between mainly four carriers. It is expected that an industry will show growth over time from its beginning in terms of profits; however, at a certain point these profits should level off as healthy competition keeps competitors from their raising prices. It is the responsibility of the Spectrum & Competition Policy Division (SCPD), a subdivision of the FCC, to formulate and implement spectrum, competition, and infrastructure policies that promote access to and efficient use of radio spectrum for wireless communications and encourage competition in the telecommunications marketplace. This division needs to reevaluate the policies governing the wireless telecommunications industry and propose new and relevant policies given the current state of the industry.

New policies for wireless telecommunications must address policies for spectrum, competition, and infrastructure as each of these topics is causing a deficiency in the state of the industry. Little attention has been given to large carriers behaving monopolistically; however, the government has taken notice. The SCPD produces an annual Mobile Wireless Competition Report about the state of the industry. The report released in June 27, 2011 addresses the state of competition in the industry and why there has not been new legislation addressing the oligopoly in the industry. The lack of update to legislation is due to the Department of Justice's inability determine "policy levers" that will produce superior outcomes in competition policy. Policy levers come from an analogy that policy instruments, such as sanctions or incentives, are like levers that can be pulled to change the behaviors of individuals or groups (Mayo, 2011).

The government needs to properly address the diminishing competition in the industry in the form of policy reformation. These policies should act as a catalyzing force behind establishing what the industry defines as “effective competition,” acceptable competitive practices, barriers to entry, and the past, present, and foreseeable future technologies used by carriers. The current state of the industry is one where the government provides little intervention into the affairs of carriers. It is now necessary that policy makers develop “fair” legislation that will even the playing field for carriers large and small.

According to the latest report, released March 21, 2013, the FCC still does not acknowledge the lack of competition existing within the industry. *“The Sixteenth Report also makes no formal finding as to whether there is, or is not, effective competition in the industry. Rather, given the complexity of the various inter-related segments and services within the mobile wireless ecosystem, the Report focuses on presenting the best data available on competition throughout this sector of the economy and highlighting several key trends in the mobile wireless industry”* (FCC, 2013). Their latest report states what they consider the determining factors affecting mobile wireless competition.

8.1 Mobile Wireless Competition Report Findings

The first factor according to the report affecting competition is the bundling of wireless service subscriptions with purchased handsets. The model typically followed by wireless carriers is to offer a wireless handset and wireless service plan as a single bundled product under a contract with a duration of usually one or two years. The price of this bundle is distributed monthly over the term of the agreement. Customers enter into an agreement with these carriers and sign contracts that are valid during the one or two year period. Carriers lock down these wireless handsets so they cannot be easily ported to a competitor’s network during the contract

period, and by charging early termination fees for subscribers who exit the contract early. One disadvantage to this is some buyer's experience "buyer's remorse" due to entering a multi-month contract. After the commitment was made, opaqueness surrounding how the handset price and the monthly subscription price are aggregated to obtain the price of the bundle; the monthly subscription prices paid by the customer equates to that of the discounted reduction in price at the time the customer entered into the agreement.

The second factor affecting mobile wireless competition is handset interoperability. A handset that functions on one network may not be compatible with a network using the same air interface technology if the networks operate on different spectrum bands. One example of this, T-Mobile's WCDMA handsets operate in the AWS-1 spectrum (1.7/2.1 GHz band) while AT&T's WCDMA handsets operate in the Cellular (850 MHz band) and PCS (1.9 GHz band) spectrum. Licensees of the 700MHz lower frequency A block have stated there are various competitive issues with there being a separation between 700MHz frequencies in blocks A, B, and C.

As a result these licensees filed a petition asking the FCC to require that all mobile devices for the 700MHz band be capable of operating over all frequencies in the band. In response, in April 2011, the FCC held a workshop on the interoperability of mobile devices across commercial spectrum blocks of the 700 MHz band. Panelists at the workshop explored a number of topics related to promoting the development and availability of equipment for the 700MHz band, including the technical feasibility of an interoperability condition and how an interoperability requirement might affect such factors as device cost and performance. Evaluating this as a legitimate concern affecting competition in the industry, on March 21, 2012, the FCC released a Notice of Proposed Rulemaking to promote interoperability and encourage

the efficient use of spectrum in the 700MHz band. After this proposal, parties disputed whether or not the unified band class would result in harmful interference to lower 700MHz licensees in the B and C blocks and whether or not these issues, if they exist can be mitigated. On February 13, 2013, the Wireless Telecommunications Bureau granted a limited waiver, citing review of the issues raised in the 700MHz interoperability proceeding. The Bureau extended the interim construction benchmark deadline for the lower 700MHz A Block licensees until December 13, 2013.

Although this can be an issue for licensees this is not one of the main issues affecting competition within the industry. Device interoperability may be able to reduce costs to manufacturers by carriers owning the 700MHz spectrum, and possibly to customers, but this does not provide carriers with any sort of competitive edge in the market over the larger, more dominant carriers. More attention should be given to how to provide a way for these smaller, regional carriers, to effectively compete with nationwide carriers in local markets. The Report released in March of 2013 states the SCPD finding that *“high market concentration is not synonymous with a non-competitive market or with market power, high market concentration may indicate that a firm or firms potentially may be able to exercise market power, but market concentration measures alone are insufficient to draw such a conclusion”* (FCC, 2013). This conclusion is the reason more attention has not been given to improving the competitive conditions in the market. Additionally, factors preventing new entrants into this thriving market and effectively competing have also not been addressed by the FCC.

In the latest report the FCC states SoftBank, a publicly traded holding company in Japan, entered the wireless telecommunications industry by placing a bid to purchase a 70% stake in Sprint at approximately \$20 billion on November 15, 2012. The Applicants, Sprint and

SoftBank, seek FCC consent to the transfer of control of various wireless licenses and leases held by Sprint and its subsidiaries, and by ClearWire, to SoftBank. The FCC is currently reviewing this proposed transaction. Although this is an instance of new competition within the industry, it is at the expense of one of the dominant domestic carriers in the industry. The infrastructure, spectrum, market share, and market power owned by the four major carriers is not affected by this new entrant, simply a transfer in the ownership of the existing market power is occurring. This is not a new entrant entering the industry from the ground up and rising up to pose a threat to these dominant players, this new entrant is simply keeping Sprint in place while owning a majority of the company. The Report announces Atlantic Tele-Network (ATN) as the only other entrant to enter the market at the time data was collected for this report.

ATN is another publicly-traded company operating in digital wireless, wireline, and both terrestrial and submarine fiber optic networks. ATN serves niche markets that are geographically separated to satisfy the needs of underserved populations (ATN, 2010). In 2010 ATN acquired 26 of the divestiture markets from the Verizon- Alltel transaction. ATN offers wireless voice and data services to customers under the 'Alltel' name in rural markets located mainly in the Southeast and Midwest of the U.S. Because of this acquisition, ATN is considered a new retail entrant that replaced certain existing Alltel operators that the FCC required be divested after the transaction with Verizon (FCC, 2013). ATN also operates another wireless provider, Commnet, providing wholesale wireless voice and data roaming services to national, regional and local wireless carriers in rural markets located also in the Southwest and Midwest U.S.

The two subsidiaries under ATN operating in the Midwest and Southeast regions of the U.S. might appear to show a carrier rising up in local markets to pose a threat to dominant

carriers, however what the Report does not reveal is ATN agreed to the sale of its U.S. retail wireless operations, operating under the Alltel brand for \$780 million in cash on January 22, 2013 to AT&T. This sale will give AT&T wireless properties, including licenses, network assets, retail stores and approximately 585,000 subscribers (AT&T, 2013). The acquisition includes spectrum in the 700 MHz, 850 MHz and 1900 MHz bands and is largely complementary to AT&T's existing network. Although this transaction has yet to be approved by the FCC, if it were to be approved it would reduce a regional carrier and augment the already large and dominant AT&T in the states Alabama, Georgia, Idaho, Illinois, North Carolina, Ohio, South Carolina, and Washington. The latest report by the SCPD outlines the many considerations given to regulations governing market entry and exit conditions. These conditions are outlined in the SCPD's report and classified under regulatory entry and exit conditions and non-regulatory entry and exit conditions. Based on these conditions and the considerations given to the strengths, weaknesses, opportunities, and threats posed with the potential merger of AT&T and T-Mobile, policy recommendations can be made to stimulate competition between carriers large and small.

The SCPD defines non-regulatory entry and exit conditions as market conditions that directly affect a firm's ability to enter into or exit from a market. The primary factors determining market entrance include *“(1) the cost of acquiring spectrum licenses or spectrum leases; (2) network coverage costs such as site acquisition and preparation costs, site construction and leasing costs, network equipment costs, backhaul transport costs and other potential interconnection and roaming costs; (3) the costs of offering customers a portfolio of attractive wireless devices; and (4) the costs of marketing and distributing wireless services and devices. On the demand side, population, population density, income, other socioeconomic*

variables, and macroeconomic conditions affect the service revenue projections of potential entrants” (FCC, 2013). Spectrum can be obtained in several ways including purchasing licenses at FCC auctions, purchasing licenses in the secondary market, and leasing spectrum in the secondary market. Secondary markets are opportunities for one entity to purchase spectrum from an entity already owning the market. One example of this is one carrier purchasing spectrum from another carrier. The cost of acquiring spectrum licenses or spectrum leases can be high. In two major spectrum auctions in 2006 and 2008, “the average price ranged from \$0.53/MHz-POP for the AWS-1 (Advanced Wireless Service) band (1700/2100 MHz band) in Auction 66 to \$1.28/MHz-POP for the 700 MHz band in Auction 73. At these prices, aggregating a significant regional spectrum footprint would involve an outlay of hundreds of millions of dollars and a national footprint would require billions of dollars” (FCC, 2013).

8.2 Policy Recommendations

The Telecommunications Act of 1996 provisioned deregulation to promote competition in the U.S. wireless telecommunications industry, however, the result of deregulation was the consolidation of carriers within the industry. Over half the market share in the industry is now owned by two carriers, Verizon and AT&T. For these reasons, new legislation must be passed to restore regulation. The FCC has made some recommendations that can preserve competition within the industry and allow carriers to improve their offerings; however, their recommendations are not comprehensive. They have suggested that companies take an aggressive approach to moving their customers off of 2G networks in order to free up that spectrum for 4G LTE. They have also recommended that companies begin offering devices that support 4G technologies instead of previous technologies. These are viable recommendations; however, in light of new technologies and consideration for other concerns surrounding industry

such as spectrum management and high barriers to entry a list of comprehensive policy recommendations has been made and listed in Table 6.

Table 6. Policy Recommendations for the U.S. Wireless Telecommunications Industry

Policy Recommendations
• End spectrum auctions
• Buy back excess spectrum used in the secondary markets
• Make cellular spectrum available in the public domain
• Require carriers to discontinue use and support for 2G technologies by a certain date
• Aggressively deploy hotspots across the nation that support alternative technologies
• Require handset manufacturers to produce equipment that supports alternative technologies
• Establish fixed prices for tower leasing/subleasing and other variable charges

The FCC would need to work with state commissions in order to enact these policy recommendations. The first step towards improving competitive conditions within the industry would be for these policy makers to end spectrum auctions. Based on research in this study, the distribution of spectrum is largely responsible for the current barriers to entry within the industry today. Established carriers with an abundance of spectrum and capital are allowed to continue bidding on and winning more of the available spectrum within the industry. This makes it difficult for entering and even existing carriers to obtain any desirable spectrum that has become newly available spectrum. The established carriers have amassed so much spectrum that there are now raising concerns of spectrum exhaust.

Spectrum auctions began shortly before the passing of the Act of '96 which lowered regulatory barriers and facilitated the development of secondary markets in spectrum usage rights. Secondary markets allow carriers to make their spectrum accessible to other carriers through spectrum leasing agreements. The existence of secondary markets raises the question, if there's enough spectrum owned by a carrier where they are able to sell or lease it in the secondary market, why are these carriers able to purchase more spectrum, which has become a

limited resource? For this reason it is recommended that these carriers give or sell excess spectrum back to the FCC to be made available for public domain access. The FCC should take the necessary steps to regain excess spectrum owned by the big four carriers and take an aggressive approach to making it available to new and existing regional carriers in local markets. They can decide who is to use this freely available spectrum by evaluating the amount of licensed spectrum within a given market; carriers in possession of spectrum in this market should not be allowed to use the publicly available.

If carriers were to give back spectrum that is considered to be excess, these carriers would be more likely to express concerns about spectrum constraints, however, these carriers already have the spectrum they need to provide 4G LTE. If these carriers were to repurpose their spectrum used to support 2G networks, then there would be no need for them to obtain additional spectrum with the hope of supporting 2G, 3G, and 4G networks. Freeing up the spectrum used for 2G, these carriers would be able to recycle this spectrum and use it to power their 4G networks. In order to end support for 2G in the United States and progress the industry forward, it is recommended that the FCC to require carriers to discontinue the use of 2G technologies on their network by a certain date. This technology has become obsolete and has been succeeded by newer technologies. 3G and now 4G network speeds are what carriers are advertising to their customers. Advertising 4G networks with faster speeds than their competitors is one way for carriers to promote competition within the industry.

Another way to stimulate competition within local markets would be to strategically deploy hotspots across the nation that supports the use of whitespaces spectrum, Wi-Fi, WiMAX, or some comparable network technology. What this could do is offset some of the heavy data consumption by subscribers on carrier networks, but in order for this to be successful the FCC

must require handset manufacturers and network equipment manufacturers to develop devices that support comparable technologies in addition to frequency bands used by a particular carrier. This opportunity could be available to all carriers in order to mitigate concerns for spectrum exhaust and should be seen as an opportunity to lower barriers to entry.

Another opportunity to lower barriers to entry within the industry would be for variable charges incurred by carriers within the industry to be fixed. To do this, it is recommended that the FCC set prices for fees paid by carriers within the industry such as leasing or subleasing towers. By setting these fees for everyone, the FCC would be preventing any price discrimination from occurring. Regardless of the size of the company if all carriers were paying the same for services within the industry, then carriers at a disadvantage would still be able to afford industry services. The FCC has already taken some steps in the interest of facilitating disadvantaged carriers in local markets by adopting new rules, back in March 2011, which required nationwide wireless carriers to open their data networks to smaller regional carriers where their services do not extend. Prior to this ruling, the FCC already implemented rules that allowed voice calls from regional carriers to roam on a nationwide competitor's network; this new ruling added data services as well.

CHAPTER 9: CONCLUSION

The last major legislation passed which governs the telecommunications and wireless telecommunications industry is the Telecommunication Act of 1996. This Act, passed over a decade ago is no longer relevant in its provisions to deregulate the industry in the interest of creating a pro-competitive environment for wireless carriers. The result of continuing to follow outdated legislation has been the consolidation of the wireless telecommunications industry. The result of this is high barriers to entry, which make it difficult for new entrants to enter the industry and effectively compete. New policies and regulations must be implemented to address the deficiencies in the industry caused by the FCC not taking action to acknowledge and resolve apparent issues of ineffective competition, market concentration, and high barriers to entry. A set of policy suggestions to spur the competition are provided in Chapter 8 of this thesis. These suggestions include some technical remedies for the current issues. The policy makers need to be aware of the changes and the opportunities the progressive technology offers in a timely manner and assure the presence of a healthy competitive market that would consider the consumer welfare.

9.1 Discussion

Competition in a market is essential to its progression and overall industry growth as it leads to reduced market concentration and greater product or service innovation. Effective competition can exist in the U.S. wireless telecommunications industry when there are lower barriers to entry and carriers are motivated to be innovative and progressive as a means to outdo one another. Currently, the wireless telecommunications industry needs more competition in order to keep prices in the industry at market equilibrium which will result in customer satisfaction. Customer satisfaction is important as it results in customer retention for these

service providers. There are typically some advantages to mergers or acquisitions; however, if there are greater weaknesses and threats that could arise as a result of these combinations, the M&A activity should not be approved and the carriers should seek alternative methods in order to remain competitive and innovative.

The research in this study contributes to the literature by reviewing the AT&T/T-Mobile acquisition proposal as an example of monopoly threat in consideration of existing literature from economics and social sciences. It examines the consequences of an industry lacking in competition and proposes potential policy and technology solutions that will establish an effectively competitive U.S. wireless telecommunications industry.

The proposed acquisition of T-Mobile by AT&T would have made AT&T the only carrier in many local markets across the nation and as a result the customers of this new company would have been required to pay AT&T's prices for AT&T's services regardless of their level of satisfaction with their provider. With these customers having fewer or no other choices to choose from in many local markets, it is not likely that customer satisfaction or welfare would be a priority for the new company as it would be less concerned about customer churn. Due to the fact that the AT&T/T-Mobile acquisition would have had largely anticompetitive effects on the industry, it was not approved by the U.S. government and AT&T canceled its bid for T-Mobile.

Since the end of the bid the wireless telecommunications industry has progressed. Table 7 compares AT&T and T-Mobile in 2011, during the time of the proposed acquisition, and at the end of the first quarter in 2013. It is evident in this table, even though these companies were not combined, and remained competitors; they have both increased their number of subscribers in addition to their service and product offerings. The companies have not seen as much in

revenues or net income on the part T-Mobile, but that is to be expected as these companies have remained competitors. The prices for their top-tiered plans have been reduced as a result of the companies remaining competitors; however, both companies have made progress towards providing 4G LTE. AT&T has launched 4G LTE in 263 markets at this time and received an award for having the fastest 4G LTE mobile network by PC Magazine (Segan, 2013). T-Mobile has tested 4G LTE in 7 markets with plans to launch in at least 15 markets by the end of 2013.

Table 7. AT&T vs. T-Mobile (Then and Now)

	Q2 2011		Q1 2013	
	AT&T	T-Mobile	AT&T	T-Mobile
Subscriber	98.6 million	33.6 million	107.3 million	34 million
Top tier plan pricing	\$114.99	\$99.99	\$109.99	\$69.99
Revenues	31.5 billion	5.1 billion	16.7 billion	4.7 billion
Value on NYSE	31.82	17.22	36.71	12.06
Net income	3.6 billion	212 million	4.7 billion	107 million
4G LTE by the end of quarter	15 markets (without T-Mobile)	0 markets	263 markets	7 markets (tested)

Source: (AT&T, AT&T Financial and Operational Results, 2013; T-Mobile, Q2 2011 Earnings Press Release, 2011; T-Mobile, T-Mobile 1Q13 Earnings Release, 2013)

T-Mobile's plans to launch 4G LTE were announced after they agreed to merge with MetroPCS on October 3, 2012 pending regulatory and shareholder approval. This merger was approved by shareholder on April 24, 2013 and completed with regulatory approval on May 1, 2013. The combined company operates under T-Mobile US Inc. Sprint is in the middle of a bidding war between Dish Network Corp. and Japanese telecommunications company SoftBank. SoftBank has made a bid to purchase 78% of Sprint for \$21.6 billion in cash and this deal is currently under review by the FCC. Dish has made its bid for Sprint offering \$25.5 billion for the

company or \$4.40 per share to stockholders. These bids for acquiring Sprint have the same motives as past mergers/acquisitions and have been reviewed under the same scrutiny by the FCC.

Each year the FCC releases an Annual Mobile Wireless Competition Report containing data and information that the FCC uses to analyze competition in the mobile wireless industry. According to the latest Annual Mobile Report released by the government, the FCC has made no formal finding as to whether there is or is not effective competition within the industry. Their report focuses on presenting data available on competition and highlighting several key trends in the mobile wireless industry. In their report they have concluded the factors affecting competition within the industry are (1) the bundling of wireless service subscriptions with purchased handsets, and (2) handset interoperability. The FCC believes customers who enter into a one or two year contract with a carrier may experience “buyer’s remorse” after realizing they have entered into a multi-month contract and conclude the price of the handset purchased is subsidized at the time of purchase only to be paid out over the span of the contract.

Contrary to this statement research done in this study on how bundled services affect subscriber churn show customers entering into contracts with a carrier will typically not change carriers after their contract has ended. Customers might change carriers if another is offering some benefit that outweighs the inconveniences that come with changing carriers, but this is not typical. Due to the fact carriers offer very similar products and services, customers will actually stay with their carrier even if a change is made in their offerings. For this reason the claim of bundled services with handsets as a factor affecting competition is a moot point. The second factor affecting competition according to the FCC is handset interoperability. Currently, a handset that operates on one carrier’s network may not operate on another carrier’s network,

which leads the FCC believe that the subscribers will largely limit themselves in the number of carriers they will choose from in order to purchase high-end devices. This may be a large part of the decision-making process for many new subscribers purchasing a device and selecting a carrier, but there are few if any popular devices restricted to a single carrier.

Changing handsets to be interoperable and requiring carriers to offer devices and services without locking subscribers into a contract for a specified period would not address the state of competition in the industry. It would not address the advantage the big four carriers currently have by owning a majority of the spectrum dedicated to mobile wireless and it would not lower barriers to entry that make it difficult for new carriers to enter the industry and compete such as raising capital to purchase handsets from manufacturers or rent/sublease towers for network coverage. Addressing these factors do however direct the FCC in the direction of establishing a more liberalized mobile wireless industry.

9.2 Implications

Due to the fact that a deregulated industry has resulted in a consolidated industry, a new approach should be taken. The current model of allowing carriers to purchase spectrum in auctions then resell or lease it in the secondary market has caused concerns that carriers will eventually run out of spectrum to purchase and use.

Based on conclusions from this study, if carriers were creative in their spectrum management, by repurposing existing spectrum used for outdated technologies or exploring alternative methods of providing the same service such as WiMAX or white spaces spectrum, they could be convinced they have the spectrum they need to support industry growth. If the FCC were to also set prices for offerings of facilities-based carriers, tower subleasing, and other variable charges then all carriers would pay the same amount for services in the industry making

industry a fairer for regional competitors to compete. There would be no issues of carriers setting prices to discourage competitors from using their resources and as a result regional carriers could compete on the level of nationwide carriers. The result of an even playing field for all carriers would be more choices for customers to choose from, innovation from carriers to be distinguishable, and as a result customer satisfaction.

Upon concluding research for this study, an open wireless telecommunication industry under the regulatory observation of the FCC and states commissions is a radical approach to resolving issues with the state of the mobile wireless industry. An open mobile wireless industry is an industry where one carrier is not at an advantage or disadvantage based on the amount of spectrum they own. To establish an open industry, it is recommended the FCC cease to offer spectrum for purchase in auctions where the highest bidder will be able to purchase large amounts of available spectrum. The carriers with the greatest capital have the greatest amounts of spectrum. They are aiming to increase their supply, which has not been depleted, and further raise barriers to entry in the industry. It was the Act of '96 that lowered regulatory barriers and facilitated the development of secondary markets in spectrum usage rights. Secondary markets allow carriers to make their spectrum accessible to other carriers through spectrum leasing agreements.

The existence of secondary markets raises the question, if there's enough spectrum owned by a carrier where they are able to sell or lease it in the secondary market, then is it questionable as to why these carriers are able to purchase more spectrum, which has become a limited resource. Carriers giving or selling excess spectrum back to the FCC to be resold in the primary market or made available for public domain access could be a viable solution to this problem of high barriers to entry. By regaining what can be considered to be excess spectrum,

there is an opportunity for the FCC, specifically the SCPD, to open up this spectrum for new entrants into the industry to effectively compete in local markets. If the FCC were to open available spectrum up to public domain access carriers, it would allow having more of a fair environment for competitors in local markets. Furthermore, if the FCC were to require handset manufacturers to create devices that supported white spaces technology and WiMAX in addition to a carrier's frequencies for network services, they could deploy hotspots across the nation that support these technologies. As WiMAX technology is comparable to Wi-Fi, network speeds offered by smaller carriers would be comparable to that of nationwide carriers.

Opening up the wireless telecommunications industry is one certain way to lower barriers to entry into the industry. Lowering barriers to entry make it easier for new players to enter the industry and act as a viable alternative to the existing big four U.S. wireless carriers. A boost in competition would result in the existing carriers finding new ways to differentiate themselves from other carriers and it will also give customers more of a choice when it comes to selecting a carrier. In a service-oriented industry customer satisfaction is one key performance indicator. It is a measure of how well a company's services are aligning with the needs or wants of its customers. In many local markets customers have only one viable carrier to choose from for nationwide wireless services. This can mean customer satisfaction is not a priority of a carrier if they are the only choice for customers. By opening up the industry and lowering barriers to entry, more carriers could enter the industry and introduce competition in many of those local markets. If customers had more carriers to choose from, carriers would have to focus more on keeping customers happy. With more competition and an open wireless telecommunications industry, the size of a carrier's network could not be used as leverage to prevent or reduce

significant churn. The summary of the policy recommendations given in Table 6 should serve as an initial framework for policy makers.

9.3 Future Work

The findings of this study can be used as a guide by industry observers and policy makers seeking to determine the best course of action for improving the state of competition in the wireless telecommunication industry. They can use this research to understand motives and evaluate future merger and acquisition proposals within the industry. Further exploration can be done into the implications of an open wireless telecommunications industry and policies can be made revolving around this idea. The wireless telecommunications industry is ever-evolving as communications technologies continue to progress. The work done in this study should not be viewed as a permanent solution to high concentration or a lack of competition in the wireless telecommunication industry, but as work addressing where the industry is currently. Observers and policy makers should continue to study the state of the industry and make recommendations based on the current state and future direction of the industry.

REFERENCES

- 3G vs 4G. (2011). Retrieved from Diffen: http://www.diffen.com/difference/3G_vs_4G
- Ahonen, T. (2012, December 19). Latest Mobile Numbers for End of Year 2012 - This is getting humongous.. Retrieved from <http://www.communities-dominate.blogs.com/brands/page/2/>
- Alegria, A., Kaczanowska, A., & Setar, L. (2012). *Highly Concentrated: Companies That Dominate Their Industries*. IBISWorld. Retrieved from <http://www.ibisworld.com/Common/MediaCenter/Highly%20Concentrated%20Industries.pdf>
- Alotaibi, M. N., & Sirbu, M. A. (2011). Spectrum Aggregation Technology: Benefit-Cost Analysis and its Impact on Spectrum Value. *TPRC 2011*. Retrieved from <http://ssrn.com/abstract=1985738>
- AT&T. (2007). AT&T Inc. 2007 Annual Report. AT&T Inc. Retrieved from http://www.att.com/Investor/ATT_Annual/downloads/07_ATTar_FullFinalAR.pdf
- AT&T. (2011, March 20). *AT&T to Acquire T-Mobile USA From Deutsche Telekom*. Retrieved from AT&T New Release Archives: <http://www.att.com/gen/press-room?pid=19358&cdvn=news&newsarticleid=31703>
- AT&T. (2011, March 20). *AT&T to Acquire T-Mobile USA From Deutsche Telekom*. Retrieved from ATT.com: <http://www.att.com/gen/press-room?pid=19358&cdvn=news&newsarticleid=31703>
- AT&T. (2013). *AT&T Financial and Operational Results*. Dallas, Texas: AT&T. Retrieved from http://www.att.com/Investor/Earnings/1q13/master_1q13.pdf
- AT&T. (2013, January 22). *AT&T to Acquire Wireless Spectrum and Assets from Atlantic Tele- Network, Inc., Enhance Wireless Coverage in Rural Areas*. Retrieved from AT&T: <http://www.att.com/gen/press-room?pid=23674&cdvn=news&newsarticleid=35955>
- ATN. (2010). *About Us*. Retrieved from Atlantic Tele-Network, Inc.: <http://www.atni.com/about.html>
- Bar, F., & Borrus, M. (1997). *Why Competition is Necessary in Telecommunications and How to Achieve It: The Experience of the Advanced Economies*. Berkeley Roundtable on the International Economy.
- Benefits of Mergers and Acquisitions. (2012, April 24). *Role of HR in Mergers & Acquisitions*. Retrieved from Finance Maps of the World: <http://finance.mapsofworld.com/merger-acquisition/benefits.html>
- Besen, S., Kletter, S., Moresi, S., Salop, S., & Woodbury, J. (2012). An Economic Analysis of the AT&T-T-Mobile USA Wireless Merger. *Available at SSRN 2045713*.
- Bilton, R. (2012, April 17). *The State of 4G LTE: Verizon, Sprint, and AT&T*. Retrieved from ZDNet: <http://www.zdnet.com/blog/gadgetreviews/the-state-of-4g-lte-verizon-sprint-and-at-and-t/29218>

- Boxonomics. (2012, November 17). *Oligopolies and Concentrated Markets*. Retrieved from SlideShare: <http://www.slideshare.net/boxonomics/oligopolies-and-concentrated-markets>
- Brunell, R. (2011). The Effect of AT&T's Acquisition of T-Mobile is Likely to Substantially Lessen Competition. *Available at SSRN 1940147*.
- Brush, T. H. (1996). Predicted Change in Operational Synergy and Post-Acquisition Performance of Acquired Business. *Strategic Management Article, 17(1)*, 1-24.
- Buzzell, R. D., & Gale, B. T. (1975). Market Share - A Key to Profitability. *Harvard Business Review, 53(1)*, 97-106.
- Cochran, P. L., & Wood, R. A. (1984). Corporate Social Responsibility and Financial Performance. *The Academy of Management Journal, 27(1)*, 42-56.
- Communications Workers of America. (2011). *The AT&T/T-Mobile Merger Benefits for Consumers and Workers*. Retrieved from <https://prodnet.www.neca.org/publicationsdocs/wwpdf/52011cwa.pdf>
- Cooper, M. (2011, September 24). The Central Role of Wireless in the 21st Century Communications Ecology: Adapting Spectrum and Universal Service Policy to the New Reality.
- Cornett, M. M., & Tehranian, H. (1992). Changes in Corporate Performance Associated with Bank Acquisitions. *Journal of Financial Economics, 31(1992)*, 211-234.
- DeRuvo, J. (2011, March 21). *T-Mobile Customers Will Have to Replace Their Phones After AT&T Merger*. Retrieved April 15, 2012, from Slash Gear: <http://www.slashgear.com/t-mobile-customers-will-have-to-replace-their-phones-after-att-merger-21141342/>
- Dudley, B. (2013, March 11). *LTE speed test: AT&T fastest, then Verizon*. Retrieved from The Seattle Times: <http://blogs.seattletimes.com/brierdudley/2013/03/11/lte-speed-test-att-fastest-then-verizon/>
- Duignan, B., Singh, S., Chauhan, Y., & Jain, P. (2007, March 16). Monopoly and Competition. *Encyclopedia*. Chicago, Illinois, United States of America: Britannica. Retrieved from <http://www.britannica.com/EBchecked/topic/390038/monopoly-and-competition>
- Farber, D. J., & Faulhaber, G. R. (2010). Innovation in the Wireless Ecosystem: A Customer-Centric Framework. *International Journal of Communication*. Retrieved from <http://ssrn.com/paper=1574966>
- Farrell, C. (2005, July 1). *How to Boost Morale During Organizational Change*. Retrieved from HR.com: http://www.hr.com/en/communities/organizational_development/how-to-boost-morale-during-organizational-change_eacuk919.html
- Farrell, J., & Shapiro, C. (1990). Horizontal Mergers: An Equilibrium Analysis. *The American Economic Review, 80(1)*, 107-126.
- FCC. (2011). *Mobile Wireless Competition Report (15th annual)*. Washington, D.C.: Federal Communications Commission.

- FCC. (2013). *Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services*. Washington, D.C.: Federal Communication Commission. Retrieved from http://transition.fcc.gov/Daily_Releases/Daily_Business/2013/db0321/FCC-13-34A1.pdf
- Federal Communications Commission. (2011). *FCC Staff Analysis and Findings: AT&T/T-Mobile*. Retrieved from <http://www.natoa.org/policy-advocacy/FCCStaffReportATTMerger.pdf>
- Fung, B. (2013, April 30). *FCC Chair: Blocking the AT&T/T-Mobile Merger Was 'Absolutely the Right Call'*. Retrieved from National Journal: <http://www.nationaljournal.com/tech/fcc-chair-blocking-the-at-t-t-mobile-merger-was-absolutely-the-right-call-20130430>
- Genachowski, J. (2011, January). Prepared Remarks of Chairman Julius Genachowski Federal Communications Commission. *Consumer Electronics Show*, (pp. 1-8). Las Vegas, NV. Retrieved from http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-303984A1.pdf
- Gibbs, R. (2011, February 10). *President Obama Details Plan to Win the Future through Expanded Wireless Access*. Retrieved from The White House: <http://www.whitehouse.gov/the-press-office/2011/02/10/president-obama-details-plan-win-future-through-expanded-wireless-access>
- Goldfarb, C. B. (2005, April). Intercarrier Compensation: One Component of Telecom Reform. *CRS Report for Congress*.
- Goldfarb, C. B. (2005, August). Telecommunications Act: Competition, Innovation, and Reform. *CRS Report for Congress*.
- Goldman, D. (2011, August 31). *DOJ files antitrust suit to block AT&T merger with T-Mobile*. Retrieved from CNN Money: http://money.cnn.com/2011/08/31/technology/att_tmobile_antitrust/index.htm
- Grant, R. M., Jammine, A. P., & Thomas, H. (1988). Diversity, Diversification, and Profitability among British Manufacturing Companies. *The Academy of Management Journal*, 771-801.
- Grunes, A., & Stucke, M. E. (2011). Antitrust Review of the AT&T/T-Mobile Transaction. *Federal Communications Law Journal*, 64(2011), 47.
- Grunes, A., & Stucke, M. E. (2012). The AT&T/T-Mobile Merger: What Might Have Been. *Journal of European Competition Law & Practice*, 3(2), 196-205. Retrieved from http://www.bhfs.com/portalresource/lookup/wosid/contentpilot-core-2301-35704/pdfCopy.name=/Grunes_Journal%20of%20European%20Competition%20Law%20&%20Practice.pdf
- Hertz, E., & Sullivan, L. A. (1989). The AT&T Antitrust Consent Decree: Should Congress Change the Rules? *Berkeley Technology Law Journal*, 233-255. Retrieved from <http://www.law.berkeley.edu/journals/btlj/articles/vol5/Sullivan.pdf>
- Hildenbrand, J. (2013, February 23). *Republic Wireless Offers Unlimited Everything for \$19 A Month, but is it too Good to be True?* Retrieved from Androidcentral:

<http://www.androidcentral.com/republic-wireless-offers-unlimited-everything-19-month-it-too-good-be-true>

- Holmes, T. J., Levine, D. K., & Schmitz, J. A. (2008). *Monopoly and the Incentive to Innovate When Adoption Involves Switchover Disruptions*. Minneapolis: Federal Reserve Bank.
- Humm, P. (2011, 29 September). *Merger of T-Mobile and AT&T Will Provide More Benefits for Customers*. Retrieved from The Seattle Times: http://seattletimes.com/html/opinion/2016360598_guest30humm.html
- Jamison, M., & Hauge, J. (2011, August). *Innovation, Resource Constraints, and Mergers in Network Industries*. TPRC.
- K. R. (2007). *Mergers and Acquisitions Typically Disengage Employees but Kenexa Research Institute Finds that Effective Leadership Can Ensure Employee Retention*. Wayne: Kenexa Research Institute.
- Kayne, R. (2012, February 23). *What Is the Difference Between GSM and CDMA?* Retrieved April 2012, 2012, from Wise Geek: <http://www.wisegeek.org/what-is-the-difference-between-gsm-and-cdma.htm>
- Kushnick, B., & Goldman, A. (2009). *The History, Financial Commitments and Outcomes of Fiber Optic Broadband Deployment in America: 1990-2004*. New York: New Networks Institute. Retrieved from <http://www.newnetworks.com/FCCCITBroadband.pdf>
- Lambert, P. (2012, May 23). *Press release: 70% of Operators Believe Now is the Right Time to Launch LTE (4G) Services*. Retrieved from Informa Telecoms and Media: <http://blogs.informatandm.com/4915/press-release-70-of-operators-believe-now-is-the-right-time-to-launch-lte-4g-services/>
- Mayo, A. (2011, July 3). *The Policy Lever*. Retrieved from Blogspot.com: <http://policylever.blogspot.com/2011/07/what-is-policy-lever.html>
- Meeks, G., & Meeks, J. G. (1981). Profitability Measures as Indicators of Post-Merger Efficiency. *The Journal of Industrial Economics*, 335-344.
- Menon, S. (2006). Policy Initiative Dilemmas Surrounding Media Convergence: A Cross National Perspective 1. *Prometheus*, 24(1), 59-80.
- Merriam-Webster. (n.d.). Competition: Definition. Retrieved from Merriam-Webster.com: <http://www.merriam-webster.com/dictionary/competition>
- Mitchell, M. L., & Lehn, K. (1990). Do Bad Bidders Become Good Targets? *Journal of Political Economy*, 98(2), 372-398.
- Murphy, C. (2012, June 6). *5 Critical Tactics in the Wells Fargo-Wachovia Integration*. Retrieved from InformationWeek: <http://www.informationweek.com/global-cio/interviews/5-critical-tactics-in-the-wells-fargo-wa/240001373>
- Pawelec, E. (2011). *Who's Next in the Wireless Tie-Ups?* Delray Beach: Institute for Individual Investors. Retrieved from

- <http://tycoonreport.tycoonresearch.com/articles/204334333/who-s-next-in-wireless-tie-ups>
- Phillips, C. (2008). *Negative Effects of an Acquisition*. Retrieved from eHow Money: http://www.ehow.com/info_10045357_negative-effects-acquisition.html
- Prince, J., & Greenstein, S. M. (2011, November 29). Does Service Bundling Reduce Churn? Indiana University, Kelley School of Business, Department of Business Economics and Public Policy. Retrieved from <http://www.bus.indiana.edu/riharbau/RePEc/iuk/wpaper/bepp2011-05-prince-greenstein.pdf>
- Richards, L. (2008). *The Effects of Merger and Acquisition on Employee Morale*. Retrieved from Chron: <http://smallbusiness.chron.com/effects-merger-acquisition-employee-morale-3196.html>
- Robinson, J. C. (2004). Consolidation And The Transformation Of Competition In Health Insurance. *Health Affairs*, 11-24. Retrieved from <http://content.healthaffairs.org/content/23/6/11.full.pdf>
- Roney, K. (2013, January 11). *Think Strategy Before Partner During Hospital Transactions*. Retrieved from Becker's Hospital Review: <http://www.beckershospitalreview.com/hospital-transactions-and-valuation/think-strategy-before-partner-during-hospital-transactions.html>
- Segan, S. (2013, June 17). *Fastest Mobile Networks 2013*. Retrieved from PCMag: <http://www.pcmag.com/article2/0,2817,2420334,00.asp>
- Sirower, M. L. (1997). They Synergy Trap: How Companies Lose the Acquisition Game. *The Quarterly Journal of Austrian Economics*, 85-86.
- Smith, E. (2011, December 17). *What is the difference between GSM and CDMA?* Retrieved from Wontek: <http://wontek.com/How2/What-is-the-difference-between-GSM-and-CDMA>
- Steel in the Air. (2009). *Negotiating The Cell Site Lease Agreement*. Retrieved from Steel In The Air: www.steelintheair.com/Negotiating-the-Cell-Site-Lease-Agreement.html
- Stewart, T. (2009, April 7). *How How Monopolies Impact Consumer Prices*. Retrieved from Helium: Where Knowledge Rules: <http://useconomy.about.com/od/glossary/g/monopoly.htm>
- Stigler, G. J. (1958). The Economies of Scale. *Journal of Law and Economics*, 54-71.
- Tan, A. (2006, October 20). *Convergence Benefits Operators More*. Retrieved from ZDNet: <http://www.zdnet.com/convergence-benefits-operators-more-2061961212/>
- Telecommunications Act of '96. (1996, February 8). 104-458. Retrieved from <http://transition.fcc.gov/Reports/tcom1996.pdf>
- Tessler, J. (2011, April 7). *FCC Adopts Rules to Drive Wireless Competition*. Retrieved April 22, 2012, from NBC News:

- http://www.msnbc.msn.com/id/42481485/ns/technology_and_science/t/fcc-adopts-rules-drive-wireless-competition/#.UNLjrW9QWS0
- Thormahlen, C. (2011). *Wireless Telecommunications Carriers in the US*. Melbourne, Australia: IBISWorld. Retrieved from http://www.utsainvestmentsociety.com/uploads/5/1/5/1/5151174/51332_wireless_telecommunications_carriers_in_the_us_industry_report_ibis.pdf
- T-Mobile. (2011, August 2). *Q2 2011 Earnings Press Release*. Retrieved from Quarterly Results: <http://phx.corporate-ir.net/External.File?item=UGFyZW50SUQ9MTAyMTM0fENoaWxkSUQ9LTF8VHlwZT0z&t=1>
- T-Mobile. (2013). *T-Mobile 1Q13 Earnings Release*. Bellevue, Washington. Retrieved from <http://phx.corporate-ir.net/External.File?item=UGFyZW50SUQ9MTg0NjA3fENoaWxkSUQ9LTF8VHlwZT0z&t=1>
- Trahan, E. A. (2000). *Mergers and Acquisitions: A Strategic Valuation Approach*. (4th). New York, New York, United States of America: American Management Association.
- Tynan, D. (2012, January 7). *White Spaces: The Next Generation of Wireless Broadband Has Landed*. Retrieved from PCWorld: http://www.pcworld.com/article/248847/white_spaces_the_next_generation_of_wireless_broadband_has_landed.html
- U. N. (2010, February 15). *Robust Demand for Mobile Phone Services Will Continue, UN Agency Predicts*. Retrieved from UN News Centre: <http://www.un.org/apps/news/story.asp?NewsID=33770&Cr=Telecom&Cr1=#.UNM7SG88CS0>
- Unuth, N. (2012, April 9). *VoIP and WiMAX – An Ideal Blend?* Retrieved from About.com: <http://voip.about.com/od/mobilevoip/a/VoIPandWiMAX.htm>
- Wang, G., & Howe, C. (2011). *AT&T/T-Mobile Merger: More Market Concentration, Less Choice, Higher Prices*. Yakee Group Research, Inc. Retrieved from <http://web.yankeegroup.com/rs/yankeegroup/images/2011AT%26T-T-Mobile-Merger-Report.pdf>
- Whitt, R. (2008, May 22). *Larry Page Talks About Google's Vision of "Wi-Fi on Steroids"*. Retrieved from Blogspot: <http://googlepublicpolicy.blogspot.com/2008/05/larry-page-talks-about-googles-vision.html>
- Why The AT&T - T-Mobile Deal is Bad for America. (2011). Retrieved from <http://www.freepress.net/sites/default/files/fp-legacy/ATT-TMobile.pdf>
- Wikipedia. (2013, January 10). *Voice over IP*. Retrieved from Wikipedia: http://en.wikipedia.org/wiki/Voice_over_IP
- WiMax.com Broadband Solutions, Inc. (2012). *What is WiMAX?* Retrieved from WiMAX.com: <http://www.wimax.com/general/what-is-wimax>

Yaylacicegi, U. (2005, August). *The Performance Consequences of Mergers and Acquisitions in the United States Telecommunications Industry*. Dallas, Texas, United States of America: University of Texas at Dallas.

Zain, M. (2008, March 3). *Mergers and Acquisitions: The Rationale and Benefits*. Retrieved from DinarStandard: Growth Strategies for Emerging Muslim Markets:
<http://dinarstandard.com/leadership/mergers-acquisitions-the-rationale-and-benefits/>