GROWTH STRATEGIES FOR WIRELESS MOBILE SERVICE PROVIDERS

by

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ABSTRACT

The wireless service providers are facing an imminent strategic challenge: how to grow their business in the new environment. In the past, service providers chased after scale in subscriber growth to leverage the intensive capital investment in the infrastructure. Recently many service providers have shifted growth focus to cost cutting and customer segmentation. Should the wireless industry focus its growth strategy on profit margin, revenue, cashflow, subscriber base, geographic footprint, or even potential pop? Should the focus change over time? What are some of the important attributes of future winners in this industry? What will be the main drivers of profitable growth in the future? What competencies should a player develop in order to become the ultimate winner?

The industry is under unprecedented competitive pressure as PCS networks and services are being rolled out. The traditional cellular duopoly, for example, will transform into a highly competitive industry as many new market entrants start offering similar products and services. The product "air time", once considered expensive and scarce resource, will become more like a commodity. Will there be enough room for so many companies to share the pie? How should service providers innovate in order to enlarge the pie?

On the demand side, mobile workforce is expected to grow significantly. International travelers are also increasing cross border activities in the ever increasingly global business environment. Technologically, efforts are under way to develop third generation wireless standard to support multimedia services and additional capacity. The dynamic progress of web based technologies can also reshape wireless applications.

This thesis will analyze and propose appropriate upstream and downstream strategies, develop a framework for growth, and apply management science techniques to understand the future dynamics of this industry. Scenario analyses of a few viable growth strategies will be simulated to evaluate their effectiveness of delivering the best shareholder value. Modeling and simulation will be drawn from concepts in system dynamics and game theory.

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Plan of thesis

This thesis is titled "Growth Strategies for Wireless Mobile Service Providers", in which I choose to focus the content on the growth strategies of *domestic* wireless cellular / PCS *network operators*. However, these growth strategies can probably apply to the whole telecom industry, which is facing unprecedented competition due to rapid changes in technology and government regulation; or even any other industries challenged by similar competitive environment. Telecom services generally include local loop, long distance, Internet access and backbone, cable, wireless, satellites or any other voice, data and video transports. As the barriers of telecom services tumble down like the Berlin Wall, how to maintain and develop new sustainable competitive advantage in order to continue growing the business will be critical to avoid the fate of the dinosaurs.

It is apparent that new growth strategies will lead the fittest to survive and strive in this new business environment, as new market entrants rapidly transform the industry from an oligopoly to competition. The wireless service provider industry, as we know today, will be drastically different in the next 12 to 18 months, as player face the "strategic inflection point" now. This industry is becoming increasingly fragmented, and new services continue to roll out. Who will become the biggest winners in this new environment, and what attributes will these winners possess? I sincerely hope that my work on this subject, however shallow and incomplete, will be useful in helping company executives and decision makers shape the future of the industry, and enrich the lives of the people who thoroughly enjoy working in this exciting field.

Throughout the text of this thesis, service providers refer to wireless mobile cellular / PCS service providers who operate their own network infrastructure, such as AT&T Wireless Services, Bell Atlantic Mobile, Sprint PCS, AirTouch, Nextel, BellSouth Mobility, Omnipoint, etc. The handset, for the sake of ease, refers to both types of user hardware portable unit and installed mobile unit. Wireless services, throughout this thesis, refer only to terrestrial two-way cellular / PCS services; they do not include traditional paging, analog trunk radio, or satellite telephone services.

The literature review covers up to date publications on the topics of strategies related to growth, their implementations, and pitfalls. The goal of this thesis, in addition to categorize and evaluate some of these growth strategies that are most relevant to the wireless services industry, is to develop a framework and formulate a model of most relevant growth strategies. The analysis is complemented by my own insights from spending seven years watching and living through the industry dynamics as they progressed.

This thesis will attempt to answer some of these following questions: Should the objectives of growth strategies deployed by service providers change over time as the industry dynamics change? What core competencies will a future winner in this industry possess? What growth strategies should be most emphasized for delivering the best shareholder value? In other words, "what to grow" in setting the objectives and goals of growth, and "how to grow" in finding the important component variables of the best growth strategies. A framework will be developed as a tool to help decision-makers to plan and evaluate their growth paths in order to compete for the future. Each component of this framework will be discussed in detail, with examples both in and outside the telecom service industries. Furthermore, using game theory and system dynamics concepts, an attempt will be made to develop a model to simulate the future dynamics of the industry under a few given circumstances.

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Chapter 1: Literature Review and Discussion -- Growth strategy

1.0 Introduction

"Today as never before...The increased pressure of operating a company, the increasing pace of technological advances, the deluge of change in the socioeconomic environment, increasing competition, the impact of the computer, and many other factors demand the firm...How can the firm survive and grow?[1]*"*

Isay Stemp, 1970

On a first glance, it seems the pressure to grow a business in order to survive is a new problem facing top executives in today's highly competitive business environment. In fact, it is simply not the case. Although this statement by Isay Stemp rings true of the worries of today's managers, they have been dealing with growth strategies for decades. Literature exists on the subject of corporate growth, tackling with issues of reasons, objectives, constraints, formulating and planning of growth. However, after a decade of corporate restructuring focused on cost, there has been profoundly renewed interests on strategies to grow, particularly revenue growth. In this chapter, literatures that connect fields of growth and strategy will be reviewed and discussed. Although there are many theories about growth and strategy, some even down right contradictory, an attempt will be made to summarize and analyze such literature to form the foundation of further frameworks and models that relate to the subject of growth strategies.

1.1 What is Growth and its Importance

Before diving into the question of "what to grow" and "how to grow", it is necessary to understand how growth is defined and why growth is important. C.K. Prahalad, a strategy professor at Michigan Business School and a resource view[2] advocate, defines

[1] Isay Stemp, *Corporate Growth Strategies*, American Management Association, 1970.
[2] Resource view refers to a group of strategists that view core competence as the key driver of strategy. For a detail discussion see "Towards A Dynamic Theory of Strategy", Michael Porter, 1991.

growth as one of the following: inventing new businesses, new sources of profit, and increasing the capacity for leverage and profitability within existing businesses[3]. Today's business leaders may have more broad-ranged views of growth. Many of them strive on growing either sales revenue, gross income, operating margin, or assets; others value growth in earning per share quarter to quarter. These differences represent the diverse views of the objective and focus of growth strategies.

Some Internet startups, for example, have focused growth on the sheer number of subscribers, though subscriptions are often free, or even number of "hits" on their web sites. Wireless service providers used to grow by expanding their covered "pop", the population covered by their license footprint, knowing that market penetration will eventually rise which will naturally increase their subscriber base. Craig McCaw became a billionaire by aggressively deploying this growth strategy while risking a tremendous debt leverage. However, the most popular growth strategy of Corporate America in the past decade has been growing the operating margin. The main lever of this objective has been cutting cost and improving operating efficiency.

After a decade of corporate cost cutting and process automation stimulated by broader use of faster and cheaper computers, productivity in both the manufacturing and service industries has indeed improved dramatically. In fact, the Federal Reserve Chairman Alan Greenspan recently attributed the impressive sustained economic conditions in the U.S. to continuous productivity gains[4]. While many companies have succeeded in playing the cost cutting game, many have failed. Those who fail often experienced "corporate anorexia", which describes the syndromes described in the following paragraph.

Growth in sales of output is important in many ways. First of all, there are organizational implications. Corporate America has embarked on cost cutting and control as the solution to competitiveness. Generally companies trim the workforce as the first step of cost cutting. Workers improve productivity and reduce of the cost of doing business.

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[3] C.K. Prahalad, "Competing for the Future", *Executive Excellence*, January 1998.
[4] "Two Reasons Not to Tinker", *Business Week*, March 9, 1998, page 28.

Without growth in the business, it is inevitable to lay off even more workers as the productivity continues to improve. Pretty soon workers realize this phenomenon, and morale decreases as a result, thus creating a vicious cycle. Conversely, if management made too much labor force reduction, workers become stressed and morale again decreases as a result. Overburdened workers just go through the motions of working. New product ideas languish, risk taking dwindles, and growth ultimately stops. Worse yet, as decreasing morale ultimately reduces competitiveness and productivity, profit margin eventually starts to decline while sales revenue slides.

Since productivity improvements will result in fewer people required to do the same business, growth is rather a requirement for firms wishing to re-deploy their people and skill base, such as core competence based diversification; instead of implementing continuous layoffs. Companies need to work on their visions, on their views of the future and identify the migration path to that future. Furthermore, cost cutting and layoffs create a "death spiral" for employee morale. What would be the motivation of the employees who are working "diligently" in implementing productivity improvements when they know the results of these improvements will be "rewarded" by layoffs? Therefore, pursuing growth and making it an explicit goal of the firm is a prerequisite for the management that emphasize performance and productivity improvements.

C.K. Prahalad has made another observation about why growth is a necessary condition for companies' long term survival. The restructures that are successfully implemented, while avoiding corporate anorexia, are generating a lot of cash. Companies are reducing their debt, building stronger balance sheets, buying back stocks - yet many of them still have significant amount of cash. Suddenly some companies are finding that these extraordinarily new efficiencies are creating an enormous amount of cash. However, if they don't re-deploy that cash into growth opportunities, they will be left with only two choices: to make an acquisition, with all its toxic side effects, or become a takeover target. Prahalad thinks competing for the future is based on a firm's strategies to grow. "Unless you are growing new markets, new businesses, new sources of profit, you will find yourself on a treadmill, always trying to improve the ever-declining margins and

profits from yesterday's businesses."[5]

Michael Porter, a strategy professor at Harvard Business School and a prolific writer of modern market-based strategies, believes strategies should derive from the external environment[6]. He postulates that a firm's profitability is determined primarily by the industry's attractiveness and the company's relative positioning against its competitors, rather than by its internal core competence. Competitive advantage derives from more than just resources, mainly from the proximate environment in which a firm is based. Having scale, scope, optimal degree of integration, further along the learning curve, are some of the important drivers for competitive advantage. Growth, whether in existing businesses or developing new sources of profit[7], will enhance one or more of these drivers of competitive advantage. For example, growth in an existing business will increase scale; and growth into a related business that shares some of the core competence will increase scope. Therefore, growth is a critical component of strategies in Porter's view as well.

In summary, whether from a resource-based or market-based view in the strategy field, growth is not only important but also absolutely necessary for a firm's sustainable competitive advantage and long term survival. One way growth could be best defined to be consistent of past literature reviewed, is as follows. Growth is an attempted action or a set of actions to increase the size of future revenue, in the hope to increase and maximize future profit, either by increasing output in existing businesses, inventing new businesses, or improving productivity and efficiency of existing products[8].

1.2 Myths of Corporate Growth

Dwight Gertz, a noted consultant for corporate growth, discussed how companies can not

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[5] C.K. Prahalad, ibid.
[6] Porter believes the resource-based strategy view is circular at its worst, "Toward a Dynamic Theory of Strategy", *Harvard Business Review*, 1991.
[7] Building new core competence in Prahalad's view.
[8] The focus here is producing more with the same workforce size, rather than downsizing.

"shrink to greatness" in the book "Grow to be Great"[9]. Through research of a thousand U.S. companies, Gertz concluded the following myths NOT supported by historical data. Shattering the myths of corporate growth is a necessary first-step to understand "how to grow" because believing the wrong things can lead to taking the wrong actions. Furthermore, though many of the following myths do not yet exist in the wireless service industry, the lessons from studying these companies will prove to be valuable to service providers that are preparing to compete in the future environment.

1) Growth is common[10].

Half of Fortune 500 companies do not grow more than the rate of inflation. Real double-digit growth is very difficult to achieve, and merely 30% reached this milestone. In the wireless industry, growth in revenues and subscriber base have been common, since penetration has increased steadily and only two carriers in any given market had been there to capture the growth. However, as fierce competition arrives, service providers will find themselves sharing less new potential subscribers into the marketplace as the rate of penetration slows. There will be carriers who fail to capture enough revenue to recoup their investments. In that scenario, some mergers and acquisitions activities may cause a flurry of consolidations.

2) We are ending a short and unusual period of downsizing - "normal" times are ahead.

Sales growth, margins, and return on assets have declined consistently over the last 40 years for Fortune 1000 companies. Managers who are convinced of the value of growth should be aware that growth is not only rare but also becoming rarer. In the wireless industry, many carriers are just now entering a phase of cost cutting. AT&T Wireless recently implement a hiring freeze and reportedly plan to layoff many middle level managers. Sprint PCS restructured its engineering and operations and reduced its technical workforce significantly, instead turning to outsourcing agreements with its infrastructure vendors such as Lucent for engineering expertise. Nextel has also launched a cost cutting and control campaign. It seems like the

[9] Dwight Gertz and Joao Baptista, *Grow to be Great*, the Free Press, 1995.

"reengineering" and "restructuring" has just hit the wireless service providers, and there is value to learn from some of the previously failed cost cutting efforts.

3) It's the economy.

There is no correlation between Gross National Product (GNP) growth and the revenue growth of Fortune 1000 companies. A rising GNP will provide limited help to most individual companies. A good economy would definitely help the penetration rate of wireless mobile services since the new potential subscribers are increasingly more consumers oriented and price sensitive. However, a relatively weak economy does not necessarily slow down the appetite for wireless services, particularly in the emerging markets. In the overseas markets, for example, where Asia's recent economic crisis reduces demand for many industrial and consumer products, wireless mobile subscriber growth rates have continued without a glitch.

4) Big companies can't grow.

There is no correlation between company size and revenue growth rate. Size should not be considered an insurmountable obstacle to growth. Wal-Mart, General Electric, Hewlett Packard and Microsoft are all examples of large companies growing revenues at more than 12% annually[11]. For wireless communications services, bigger companies may even have inherent advantages to grow because of economies of scale and scope, wider distributions, bigger geographic footprints, stronger purchasing power, more recognized brand, and bigger advertising budgets.

5) We're in a dead industry.

Range of growth is very large among companies in the same industry, according to Gertz's study. In fact, the greater variation of growth is between companies within industries, rather than among industries themselves. Evidence indicates little correlation between the growth rates of individual companies and that of their industry. Nonetheless, wireless mobility is far from a dead industry, as growth will

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[10] These myths and statistics are drawn from *Grow to be Great,* page 22-37.
[11] "Corporate Scoreboard", *Business Week*, March 2, 1998

remain strong in the foreseeable future. In the U.S., the current penetration rate for wireless mobile services is about 22%[12]. Analysts forecast the penetration rate will hit 58% by year 2000, and eclipse 60% mark within ten years[13]. There is apparently a lot of growth to be captured still, and analysts have been known to under predict in this industry in the past.

6) Most large company growth is created through acquisition.

As many companies grow without acquisitions. From research data, 69% of revenue growth was generated internally. For companies that pursue acquisitions as a way to grow, 61% of acquisitions in the 1980s failed to earn the cost of capital required for the investment[14]. However, there are also successful cases of growing by acquisitions. Traveler's Group, headed by Sanford Weill, grows by acquisitions to improve distribution, go global, expand products, and increase efficiencies of scale to save on costs[15]. Recently Weill approached John Reed, CEO of Citicorp, and proposed a mega merger of the two companies. The two merged companies will create a financial services giant, with $700 billion in assets[16]. In a recent speech, Reed revealed that the main reason he accepted the merger proposal was for the tremendous future growth opportunities[17].

In the wireless industry, most growth has been generated through internal investment and expansion, though mergers and acquisitions pose as viable growth engines as well. Many mergers and acquisitions have happened in the past few years, from AT&T buying into wireless for growth in 1992, to Alltel's recent acquisition of 360 degree Communications as its growth strategy.

7) Cost cutting sets the stage for growth.

Of the profitable growers in the Fortune 1000 from 1988 to 1993, only 7% were

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[12] As of April 23, 1998, there are about 58,774,000; http://www.wow-com.com provides daily updates.
[13] Donaldson, Lufkin & Jenrette, *The Wireless Communications Industry* report, Fall 1997, page 18.
[14] Tom Copeland, Tim Roller, and Jack Murrin, *Valuation Measuring and Managing the Value of Companies*, John Wiley and Sons, 1993, page 416.
[15] "Many Roads Lead to Top 50", *Business Week*, March 30, 1998, page 202.
[16] Cover Story, *Business Week*, April 20, 1998.

cost cutters[18] in the previous five-year period. The transition from cost cutting to profitable growth is apparently a very difficult and unlikely one. As many service providers going through the cost cutting stage, it is important to remember the potential pitfalls of cost cutting and restructuring, such as the "corporate anorexia" syndrome previously discussed. The ability to develop core competencies in revenue drivers and profit drivers must not be lost through the cost cutting process.

There are of course other myths about growth. One popular growth myth is that there is only one "right" way to grow[19]. However, there are many ways to grow, and many companies achieve profitable growth with different approaches. Furthermore, times have never been better for achieving growth. The cost of capital is low by historical standard, global markets are opening up fueled by privatization in many developing countries, and real income is rising caused by higher wages and low stable inflation. Opportunities to grow are vast and varied. Corporations still in the grip of myths about the limits to growth will lag behind their competition in performance and ultimately, creating shareholder value.

1.3 Ways to Grow

There has been plenty of literature in recent years to suggest that growing by improving productivity or efficiency has limitations and diminishing value, as well as unexpected consequences. Gary Hamel, the co-author of the book "Competing for the Future" and a strategy professor at the London Business School, argued that revenue growth, rather than growth in profit margin, is the main driver of increasing shareholder value[20]. Dwight Gertz, from his research in studying growth performances of the Fortune 1000 companies, urges executives to invest in growth opportunities and break the downsizing cycle. As CEO Wayne Calloway of PepsiCo told Fortune magazine in an interview,

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[17] John Reed, speech at MIT Sloan School of Management, April 15, 1998

[18] Refer to companies that have grown revenues more slowly than their industry, but have grown profits more rapidly, *Grow to Be Great*, page 14.

[19] "Many Roads Lead to Top 50", Ibid.

[20] Gary Hamel, "Strategy Innovation and the Quest for Value", *Sloan Management Review*, winter 1998.

"You can't save your way to prosperity."[21]

If companies were to create shareholder value, or economic value added defined as the net income in excess of the cost of capital, the majority of the added value must come from revenue growth. For example, between 1985 and 1995, the top 40 performing companies of the Fortune 1000 increased their shareholder equity 25% per annum[22]. These companies had compound annual revenue growth of 25%, while operating margin improved at less than 7% per year. The ratio is nearly 3.5 to 1, yet most executives invest more efforts in cost cutting than developing strategies to grow revenues. Unfortunately, the short sighted Wall Street often believes and rewards miracle turn-arounds, with quarterly earnings outshine long term profitable growth.

The criteria of revenue growth, however, is that it must be profitable growth that enhances shareholder value. There are many examples of "go for broke" growth strategies such as acquisitions that destroy value (Quaker Oaks and Snapple), market share price wars that shatter industry profitability (airlines summer of 1992)[23], adding or continuing money losing projects, etc. If growth is thought to be necessary for a firm's chance of survival in facing fierce competition, what are some of the existing growth strategies that companies deploy?

Gertz identifies three growth strategies that are followed by large number of companies trying to achieve profitable growth against tough odds, and these strategies are not mutually exclusive. Each of these three strategies will be described, and they will form the basis of further discussions of growth strategies.

The first growth strategy is *customer franchise management*[24]. Companies that deploy this strategy provide competitively superior customer value to a set of carefully defined and selected groups of customers. Customers are strategically segmented and only those

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[21] Myron Magnet, "Let's go for growth", *Fortune*, March 7, 1994, page 60.
[22] Gary Hamel, ibid.
[23] Adam Brandenburger & Barry Nalebuff, *Co-opetition*, Currency Doubleday, 1996, page 226.
[24] Gertz, ibid., page 46; Gertz refers these strategies as the strategies to achieving growth.

chosen do the companies try to satisfy. Customer franchise management requires a disciplined approach to serving these customers profitably. Learning everything about these segmented customers is critical for companies to develop complementary assets for expanding vertical and horizontal markets. This strategy is best for companies with high customer acquisition and retaining costs, where profitability would be derived more from the customers than the products. With this strategy, market share is not as important as continued business opportunities generated from satisfied customers.

For the wireless service providers, the acquisition cost is relatively high. On average, it takes about ten months for the service provider to break even for each new subscriber acquired. This would suggest that service providers should learn intimately their customer needs, and aggressively and proactively serve them. In the early days of cellular, companies focused on subscriber growth. With little customer segmentation, many new subscribers perceived little value for the convenience of portability, as well as time saving provided by the use of airtime. Some did not stay around long enough for service providers to recoup the cost of acquisition and subsidized handset. Others were infrequent or uneducated users that were inherently unprofitable to serve. Once the customers are strategically segmented, service providers must ensure themselves to have the right core competencies to serve these customers well, or have a plan to develop and acquire the necessary skills or capabilities.

For example, if the customer segment to be attacked is mobile workforce, the service providers must try to serve more needs of mobile workforce than just wireless mobile services. One common mobile workforce, for example, is equipment sales or repair personnel who need to perform queries for price quotes or component availability remotely. Therefore service providers deploying this strategy should also develop competencies in corporate intranet search capabilities or small business database management, and link them to their wireless offerings. Furthermore, they should develop wireless data capabilities and applications that their targeted customer segment would need and benefit from.

The second route to profitable growth is *superior new product development*. New products / services development calls for innovations and creative business and marketing ideas. Innovation can include product and process innovations. The winners of this strategy, however, go much beyond technical skills. They have developed procedures and metrics and have garnered the ability to introduce a steady stream of successful new product or service offerings through their development efforts. They become exceptionally effective at turning development projects into products that offer superior value to customers. With product life cycles shortening for many hi-tech companies, this strategy can be very effective at generating new sources of revenues.

For wireless services, there have not been many new generic product based introductions. The handsets have continuously improved by manufacturers, with larger screen, lighter weight, longer battery life per charge, smaller size and added features such as caller ID, alphanumeric paging, etc. For the service providers, this strategy could be thought of development efforts for "service innovations", rather than the traditional product innovations. For example, many service providers have introduced traffic updates by dialing a number like "*22" followed by the highway route number. However, these traffic updates are cumbersome for roads with no highway numbers.

A service provider may choose to implement voice recognition technology to solve this problem. For example, the customer dials *22 for access the traffic "channel". After connection, the customer say "traffic on Memorial Drive in Cambridge", the database searches for the information and plays back a text-to-speech message of "No traffic on west bound, minor delay on east bound near the Harvard Bridge". Similarly, a service provider may develop, possibly with a content partner, a "weather" channel, a "news" channel, a "sports" channel for score updates, and even a "Dilbert" channel for humor and entertainment. Obviously, the range of service innovations is limitless; but the product development work would not be simple or straight forward. The above example, for instance, will require coordinated efforts for database management, billing software, speech recognition, content retrieval and management, among others.

The third identified growth strategy is *channel management*, which Gertz believes is often overlooked in improving business performance. Entirely new businesses have been built by offering products or services through channels that did not exist before. For example, Virtual Vineyard has built a successful distribution channel for exotic wine through the Internet. Amazon redefined the distribution for books, became both substitute and complement of traditional bookstores[25]. Home shopping networks such as QVC have also set sales records in various consumer goods and collector items through cable television. New and creative ways of distribution allow further growth, both in existing businesses or related businesses.

In the wireless services industry, Sprint PCS has opted to market its wireless services through co-located stores with Radio Shack, a well distributed and strong consumer electronics brand store. Initial results have been encouraging for both parties, as Sprint's wireless products and services draws more store traffic and Radio Shack provides easy and reputable access. The explosion of new distribution channels, whether enabled by technology or not, is rather capable of creating unique opportunities to attack established competitors and to alter the power relationships within any industry.

Interestingly, this strategy for growth may have often been overlooked because the benefit is primarily captured by the lowest cost. For a volume driven, standardized product or service, the low cost service provider eventually prevails with expanded distribution. As wide distribution allows all customers to get the service as easily as anyone else, customers will flock to the low price provider. In the low price game, the edge goes to the low cost provider who has the most latitude for cutting margin.

In any case, creativity is an essence when managing the distribution channel. For example, 89% of wireless mobile subscribers cited security as their top reason for purchasing a wireless handset. If this is the case, a wireless phone could be distributed through AAA bundled with a road side assistance package. Furthermore, possibly insurance agencies could become a sales channel for wireless services since they

[25] For a detail discussion of the case of Amazon.com, please see *Co-opetition*, page 30.

constantly stay in contact with security conscious customers who purchase insurance for security reasons. Subsidizing automobile insurance cost by giving customers discounts when they purchase insurance for new cars, for example, would allow wireless service providers to tap into security conscious consumers.

1.4 What Business Are We In

Arnaldo Hax, a strategy professor at MIT Sloan School of Management, defines strategy as a multidimensional concept that embraces all the critical activities of the firm, providing it with a sense of unity, direction, and purpose, as well as facilitating the necessary changes induced by its environment[26]. There are many schools of thought regarding strategy which can be grouped into the following categories:

- Determine and reveals the organizational purpose in terms of its long term objectives, action programs, and resource allocation priorities.
- Selects the businesses the organization is in, or is to be in.
- Respond to external opportunities and threats and evaluate internal strengths and weaknesses, in order to achieve a sustainable competitive advantage.
- Identify the distinct managerial tasks at the corporate, business, and functional levels.
- A coherent, unifying, and integrative pattern of decisions.
- Define the economic and non-economic contribution the firm intends to make to its shareholders.
- An expression of strategic intent of the organization.
- Strategy as a means to develop the core competencies of the organization.
- Investing selectively in tangible and intangible resources to develop the capabilities that assure a sustainable competitive advantage.

Growth strategy covers an overlap of many of these schools of thought on strategy listed above. In particular, when the external environment changing as the wireless industry is today, it is critical to address the old question "what business are we in?" and its corollary "what business should we be in?" Is the business simply providing bandwidth for voice and data transport, wireless communications solutions, or mobile business and personal applications? The first step to address these questions is to formulate a strategy that the firm is capable of executing for winning the "future game". It is important to recognize

[26] Arnaldo Hax & Nicolax Majluf, *The strategy Concept and Process*, Prentice-Hill, Inc., 1996.

that the future game will be played whether we are ready or not, and those who are most ready are most likely to win. Once is "future game" is determined, the purpose of the strategy is how to get the organization from where it is today to where it needs to be in the future. This is the answer to "what business are we in?" and "what business should we be in?" Then fill the gap by executing the strategy.

The wireless service industry, particularly the cellular industry, has faced many changes in recent years that will shape the future competitive environment. Industry boundaries are no longer clear, with many new PCS entrants entering the market offering many different types of new services. There is no way, in the evolving marketplace, to know exactly who the suppliers, customers, competitors and collaborators will be, as they are bound to change over time. Many companies are direct competitors in the same markets, yet they are also collaborators for roaming agreements, siting regulations and standards consortiums. In this environment, we can be sure that the future game will be significantly different than the current one.

The industry boundaries, which used to be clean, are now merging and overlapping at best. Paging companies are starting to offer two-way voice paging, and cellular companies are giving away text paging as part of the service package. It is no longer clear exactly what the product and service is and where the value creation lies for the customer. There are varying technologies and air interface standards, the deregulation and numerous spectrum auctions, the ever more complicated intermediaries in the marketplace, the commingling of competitors and collaborators. These all pose challenges for the wireless service providers competing for the future. The next section will discuss some of the important attributes that a wireless mobile service provider needs to possess in order to become the ultimate winner.

1.5 What's Relevant to Wireless Service Providers

While formulating a growth strategy, managers must decide what to do now: which new competencies should be built, what new customer groups should be understood, which

new distribution channels should be explored, in order to position the firm to face the new competitive and drastically different industry environment. For the wireless service providers, the following actions are relevant to growth strategies that will be instrumental for winning the future game.

1.5.1 Segmentation by Customer Needs

The essence of segmentation consists of selecting the customers the business units will be serving, and consequently, the competitors they will be facing. Wireless service providers have to segment their customers carefully and select the segments in which their competitive advantages allow them to compete successfully. It is doubly important to segment customers based on their needs, rather than price or volume, as the firm may deploy different growth strategies for each target segment. Understanding customer needs help service providers to strategically target groups of customers with similar value proposition and behaviors.

Customer segmentation also helps service providers to identify inherently unprofitable customers and highly profitable customers, and take appropriate actions necessary to align company's strategic and tactical maneuverings. For example, when a service provider is not capable of increasing network capacity as fast as customers demand, and the high network utility is deteriorating system performance, the service provider may choose to purposely churn a customer segment that is unprofitable.

1.5.2 Investing in New Product Development

For most service providers, product development is an alliance with their chosen infrastructure venders. There are challenges of how to manage this collaboration to strike a balance between time to market and value added features that customers will be willing to pay for. Working with upstream vendors who provide network infrastructure and third party hardware, software, or systems often determine the success of new product development efforts of many service providers. One of the dilemmas is to determine the scope of responsibilities for new product development. At the very minimum, the product development group should have capabilities of a learning organization capable of a "fast follower" strategy. "The ability to learn faster than your competitors may be the

only sustainable competitive advantage", stated A. deGeus.[27]

1.5.3 Developing Creative Distribution Channels

Wireless service providers have traditionally used direct sales force and indirect dealer network for distribution channels. Many other channels have emerged, such as retail stores or even the Internet. Creative distribution channels that either broaden customer access or reduce acquisition cost can be sources of competitive advantage in this ever more competitive marketplace. For example, the Dell Direct model successfully bypasses the retail distribution and acquires a segment of most profitable customers, giving Dell a competitive advantage. Furthermore, strategies that help service providers establish closer ties with their most valued customers, such as the FedEx model, are also important. Becoming part of business process of key customers will increase switching cost, thus reduce churn. This strategy will help understand customer needs as well. With prepaid wireless, for example, retail stores and vending machines at airports may become a new distribution channel.

1.5.4 Expanding Footprint of Usage

A popular measurement of wireless service providers, other than the subscriber base, is the size of "pop", the population that the service provider can cover allowed by the FCC (Federal Communications Commission) licenses. Another related measure, though without a common standard, is "pop" covered by its radio signal coverage. Geographic expansion, therefore, should have a clear directive or purpose. Generally, this growth strategy is consisted of several stages. The first is to expand licensed footprint, through acquisition or spectrum auctions, in order to own the "right" to build infrastructure facilities. The next step is to expand the "covered" footprint, so subscribers can seamlessly access the wireless network. Finally, footprint of "usage" should be expanded to increase coverage of areas where people value access to "airtime". For example, in-building coverage should be strategically engineered with micro-cells or pico-cells to enhance or even replace traditional fixed telephone networks. In fact, Dan Hesse, CEO of AWS, believes developing "intra-premise" complementary office applications and

[27] A. deGeus, "Planning as Learning", *Harvard Business Review*, March/April 1988.

services is an important growth strategy for the largest wireless service provider[28].

Geographic expansion is also important for customers that travel, because they often pay exorbitant roaming charges outside their "home" coverage area. The expansion is not limited to domestic growth. Some wireless service provider place emphasis on expansion overseas, particularly in emerging markets in Asia or South America, in order to capture the growth globally. Globalization is also important strategically for targeting frequent international travelers, as well as building brand recognition.

1.5.5 Bundling Related Telecom Services

As the barriers break down in telecom industry, such as local loop, long distance, Internet access and backbone, video or cable broadcast and on demand, as well as wireless voice and data services, telecom service providers have to become capable of offering multiple services. Because many of these telecom services all mingle together to some degree, bundling of two or more of these services enable cross selling, increase switching cost, and save administrative cost. For example, instead of keeping the subscriber information in multiple databases, bundling helps reduce that to one. Another large customer benefit is one single billing for multiple services, as well as one stop shopping for all their telecom needs. Sprint PCS bundles wireless with long distance, and even local loop, Internet access and cable services in many areas. AT&T, on the other hand, is capable of bundling wireless with AWS, internet services with WorldNet, local access with Teleport, to its traditional long distance business. Bundling is also a powerful marketing tool for advertising and building brand recognition, as well as allowing companies to take advantage of a strong brand trusted by consumers to increase revenues.

1.5.6 Creating Value Through Complementary Products and Services

In the wireless service industry, the simplest complementary product for the handset is airtime, and vice versa holds true. Without the handset, the value of airtime can not be realized. In fact, this is the extreme case of complementary products. A complement of one product or service makes the first one more valuable in the customer's view.

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[28] Dan Hesse, President and CEO of AT&T Wireless Services, talk excerpt at MIT Sloan School of Management, November 19, 1997. Also see "Absolutely AT&T", *Wireless Review*, April 15, 1998.

Computer and printer, French fries and ketchup, cars and gasoline are all complementary products. In wireless services, complementary products may include Personal Digital Assistant (PDA), Email, Voicemail, and even cars. As people spend more time in the car, the value of a wireless access becomes more attractive. In fact, a primary target of customer segment for many service providers is the mobile workforce. Adam Brandenburger, a professor at Harvard Business School, and Barry Nalebuff of Yale School of Management, define "complementor" as follows:

> "A player is your complementor if customers value your product more when they have the other player's product than when they have your product alone." A player is your competitor when the reverse case is true. This concept can be broadened to apply to the suppliers. "A player is your complementor if it's more attractive for a supplier to provide resources to you when it's also supplying the other player than when it's supplying you along."[29]

This concept of complementary products and services will be further applied in the later chapters. For now it is recognized that developing complementary products is one of the growth strategies that can be deployed by wireless service providers.

1.5.7 Strategic Positioning through Mergers and Acquisitions

Since the wireless services industry is rather capital intensive, there is great benefit for service providers to achieve economy of scale. The bigger the subscriber base, the less each customer needs to contribute to the fix cost. There is then no surprise to see a lot of mergers and acquisitions activities in the wireless services industry over the past few years. Bell Atlantic Mobile Services merged with Nynex Mobile prior to their parent companies' merger in 1997. Southwestern Bell Merged with Pacific Bell to form SBC Communications, later acquired SNET and most recently Ameritech. Alltel also recently merged with 360 degree Communications. "The merger of Alltel and 360 creates a new, formidable competitor ideally positioned as one of the leading growth companies in the communications industry," said Joe T. Ford, Alltel chairman and chief executive

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[29] *Co-optition*, ibid.

officer[30]. These activities were important indications of these companies' strategic positioning, such as filling coverage footprint, saving costs, or complementing each other's telecom offerings. The most important issue is that the goals of mergers and acquisitions must synchronize with the company's overall growth strategies.

1.5.8 Building Powerful Brand

Brand, in an ever more competitive environment as wireless communications services, is often the differentiator that gives a firm the ability to demand a premium margin. In a wireless services market, consumers are faced with many choices, each claiming better quality and higher value. In 1993, AT&T acquired then the largest cellular service provider McCaw Cellular for $12.6 billion, partly because AT&T had consistently shown up as the top cellular service provider in consumer surveys, even though AT&T was not a player in that industry. Brand is a powerful competitive advantage, mostly because it is very difficult to build a brand name that customers associate with better quality and higher value. A brand could be easily destroyed, however, and many companies elect not to use a well regarded brand when launching a high risk product[31]. In any case, brand could very well turn out to be the competitive advantage in a crowded marketplace.

1.6 Competing for the Future

Wireless service providers that manage to capture some of the skills and capabilities discussed above, and deploy the proper growth strategies will be better positioned to compete for the future. The starting point is benchmarking the external environment from the perspectives of customers, competitors, and employees. Evaluate the value chain in order to capture value creations that are focused on customer benefits. Identify the core competencies that allow you to create new revenue streams and to succeed in existing businesses; and ask what you can leverage as you move into the future, and what you can do that others find difficult.

The future will not simply be an extrapolation of past history. To plan for the future, a

[30] Press Release, March 16, 1998. For details see www.alltel.com.

service provider must design its infrastructure and organization to be ready for radical changes. Often it takes a crisis, or a perceived one, a sense of urgency that the company's future survival is not inevitable before executives are willing to change. Some executives, such as Intel's CEO Andy Grove, are known to even manufacture a crisis to produce this sense of urgency. "Only the paranoid survive", as Grove is famously quoted[32]. With the new environment facing the wireless service providers, the success recipes from the past may no longer be the success recipes for the future. The sources of competitive advantage in the future are the grow strategies outlined above, and service providers need to identify the ones they find most fit and dedicate resources to deploy them. Successful companies are always looking to change the rules of competition, shifting the paradigms, and challenging assumptions. In the next chapter some of the assumptions will be reviewed for the wireless service industry, and important new trends will be facilitated to help service providers to compete for the future.

[31] For examples see *Co-optition*, ibid.
[32] Andy Grove, this was even the title of his book, *Only the Paranoid Survive*, Currency, 1997.

GROWTH STRATEGIES
FOR WIRELESS MOBILE SERVICE PROVIDERS

Chapter 2: External Environment Scan

2.0 Purpose

The purpose of this chapter is to describe the industry characteristics and dynamics of wireless communications services. Considered one of the fastest growing industry of all time, the cellular mobile services broke the ten percent penetration mark in a short few years, surpassing the marks of television, VCR, fax machine, walkman, and yes, even the plain old telephone. After the formerly duopoly broke open for vast competition with the PCS spectrum auctions in 1995, it is believed that the wireless mobile services industry will experience many fundamental changes. External environment scan introduces a systematic analysis of the industry, and provides insights to players wishing to compete in this new market environment and win the future game.

2.1 Cellular History

The domestic cellular service industry traced its origin to the early 1980s when the FCC gave away two blocks of 20 MHz bandwidth in the 800 MHz frequency range, to what traditionally known as the "A Band" and "B Band" carriers. The geographic areas were divided into either Metropolitan Service Areas (MSA) or Rural Statistical Areas (RSA). The "B Band" carrier was by default the Regional Bell Operating Company (RBOC) in the region. The "A Band" carrier was auctioned off with a lottery procedure[1]. The duopoly environment was intact until Nextel Communications[2] petitioned with the FCC to utilize digital technology to provide two way cellular-like telephony services together with its traditional two-way dispatch services in the 800 MHz Specialized Mobile Radio (SMR) frequency range in 1992. Subsequently other companies revealed plans to offer

[1] For details of the lottery process see the FCC homepage at www.fcc.gov.
[2] Originally known as Fleet Call, founded by Brian McCaully and Morgan O'Brian in 1987 and later renamed Nextel in 1992.

similar services, such as Geotek. In 1994 the FCC decided to use an auction process to sell off six blocks of what later was known as the PCS broadband and narrow-band spectrum in the 1.9 GHz frequency range[3].

As of March 1998, there are as many as seven service operators in a particular area. For example, in Boston, consumers willing to buy cellular services have a choice of any of the following carriers: Cellular One (Southwestern Bell Mobile), Bell Atlantic Mobile, Nextel, AT&T Wireless Services (AWS), Sprint PCS, Omnipoint and Geotek. There are also resellers offering cellular services, as well as a few other PCS networks in the build-out phase. Needless to say, competition has increased to a level never seen in this industry. The following graph shows the history of domestic cellular subscribers, annual service revenue, and the corresponding market penetration rates.

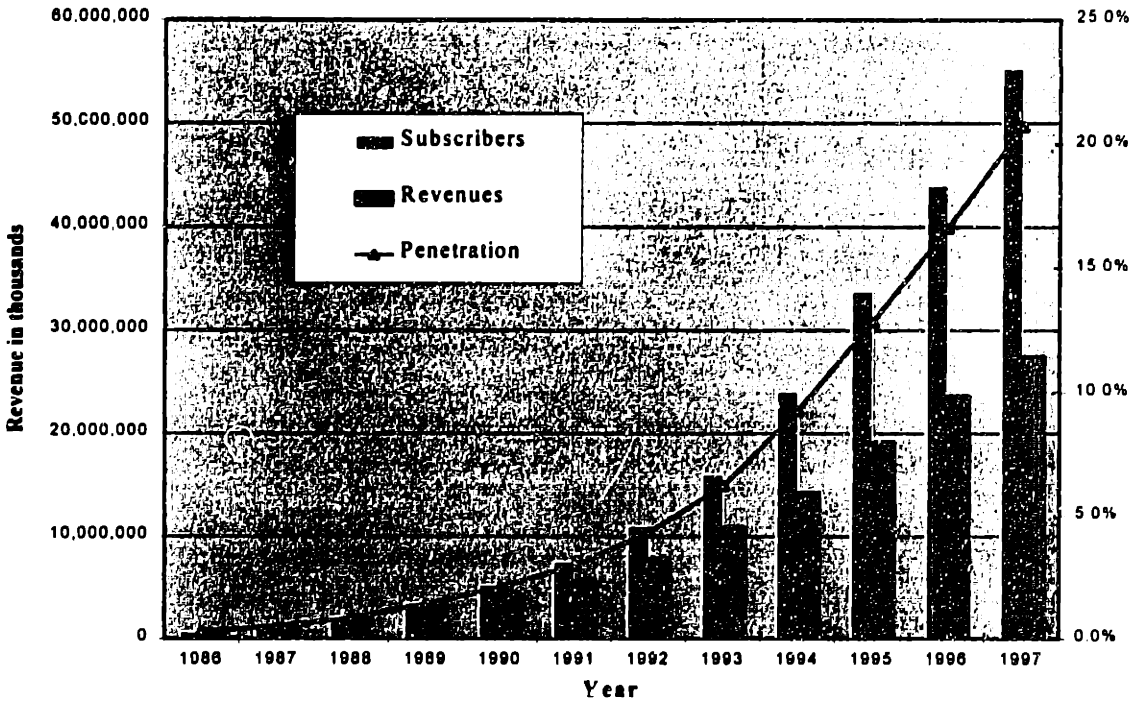

Figure 2.1 - Wireless Subscribers, Annual Revenue, and Penetration Rates[4]

[3] For a detail description of the complete auction process see the FCC Homepage, ibid.
[4] The World of Wireless Communications Homepage, http://www.wow-com.com.

2.2 *Traditional Value Chain*

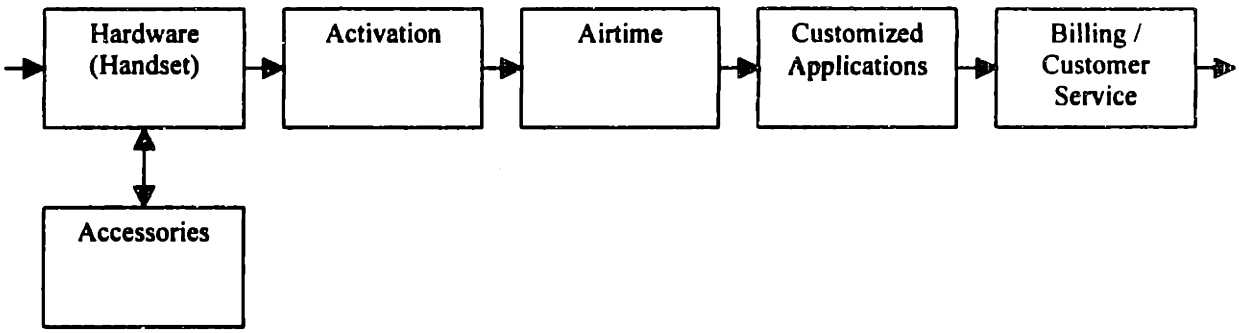

Figure 2.2 - The Traditional Value Chain of the Wireless Service Industry

The traditional value chain in the wireless service industry is shown above. The end users generally choose which handset to purchase, often attracted by advertisements from the service providers. The user may also choose to purchase complementary accessories to accompany the handset, such as extra battery, leather case, and car adapter. With the purchase of the hardware, the account is established with the service provider and the phone is programmed with a phone number to work on the service provider's network. The activation process may also include installation, programming of the phones, roaming agreements, and any post sales support, etc. Once activated, the user is ready to receive the value of the product and service - airtime.

Airtime allows the user to place and receive phone calls remotely, without connecting to a telephone wire. The product thus creates a value of portability, convenience, time to information, or even social status. Additional value can be created by customized applications, such as voicemail, call forward, short messaging service, caller ID, wireless data services, etc. The last part of value chain is billing and customer care services, a user interface typically highly valued by customers. This interface creates value by providing easy to follow billing statements, product education, problem solving and ensuring satisfactory customer relationships.

This traditional value chain is relatively straight forward, especially in the duopoly environment before competition arose from new PCS market entrants. The new

competitive environment also created opportunities for service providers reselling capacity on other providers' network. As evident in the long distance market, service providers can deploy two strategies: own and operate its network, or resell minutes from other network operators. In the wireless industry, only one key industry player, MCI, is choosing the resale option. The down side of reselling airtime is abundant. Inability to customize applications, minimal control over network system performance, limitations of service offerings, and having to compete directly with suppliers can all pose problems for resellers. In addition, the margin can be squeezed if there is not enough excess capacity or if the excess capacity is monopolized. For example, the long distance companies AT&T and MCI both recently disclosed that they are pulling out of the resale local loop business mainly because the excess capacity is still monopolized by the regional bell operating companies. In this case the margin for the resale strategy is not enough to overcome customer acquisition and retaining costs.

For the service providers who operate their own networks, they buy infrastructure equipment (base stations, switch, etc.) from multi-national manufacturers on the upstream supply side, such as Motorola, Ericsson, Nortel and Lucent, etc. The wireless infrastructure market, thanks to the burgeoning subscriber growth, has grown to a $48 billion a year[5] industry. Typically, these infrastructure suppliers also provide equipment financing and turnkey solutions.

On the downstream (distribution) side, the service providers generally have both direct and indirect distribution channels. Direct sales force often act as customers' first contact while encounter service problems. The sales force is often divided into major accounts for large companies, regular accounts that consist of regional businesses and individuals, and in some cases, carrier's own retail stores. Indirect sales include dealers, retailers, etc. that receive a commission for signing up new customers. There are also resellers, such as MCI One, that buy airtime minutes in bulk and resell to the end users. In addition, some PCS carriers whose launched system are immature may also have signed resale agreements with traditional cellular service providers to allow PCS customers to "roam"

[5] Allied Business Intelligence, Oyster Bay, NY, *Wireless Systems Design*, March 1998, page 64.

on the cellular network. For example, Sprint PCS subscribers in the New York area have access to the AWS network (in analog AMPS mode) where Sprint PCS lacks coverage.

2.3 PCS Spectrum Auctions

The U.S. Government brought in more than $10 billion from the auctions of more than 120 MHz block of frequency spectrum from 1994 to 1997. The FCC was given authority by Congress in 1993 to auction off wireless communications licenses, which had previously been given away for free through lotteries. The auction process ensures that these licenses are owned by those who value them the most, and provide the public with a fair return for this valuable public resource. Most importantly, the auction broke the duopoly cellular structure and introduced a few more competitors to offer cellular-like voice and data services, universally termed personal communications services (PCS).

"The broadband PCS (A/B/C) auctions assure that at least five wireless carriers will be initially competing in the commercial mobile radio services market. The D/E/F auction will help increase that number in certain markets", said Michele Farquhar, Chief of the Wireless Telecommunications Bureau[6]. The FCC's licenses auctions helped kick off an entirely new industry. Competition should benefit consumers and businesses and allow them to choose from multiple service providers as consumers will likely receive lower prices and better services as a result.

Block Name	Block Size	Auction Start	Auction End	Licenses Granted
BLOCK A	30 MHz	12/5/94	3/13/95	6/23/95
BLOCK B	30 MHz	12/5/94	3/13/95	6/23/95
BLOCK C	30 MHz	12/18/95	5/6/96	482 out of 493 have been granted as of 1/27/97
BLOCK D	10 MHz	8/26/96	1/14/97	11/25/97
BLOCK E	10 MHz	8/26/96	1/14/97	9/26/97
BLOCK F	10 MHz	8/26/96	1/14/97	483 out of 491 have been granted as of 11/25/97

Table 1, PCS Broadband Spectrum Auction Results[7]

[6] The FCC Homepage, ibid.
[7] The FCC Homepage, ibid.

Figure 2.3, displays the number of pops won by major bidders in the PCS auctions. As shown, Sprint Spectrum, a joint venture[8] with major cable companies TCI, Comcast and Cox and later renamed Sprint PCS, and AWS were the largest winners with 252 and 229 million pops respectively.

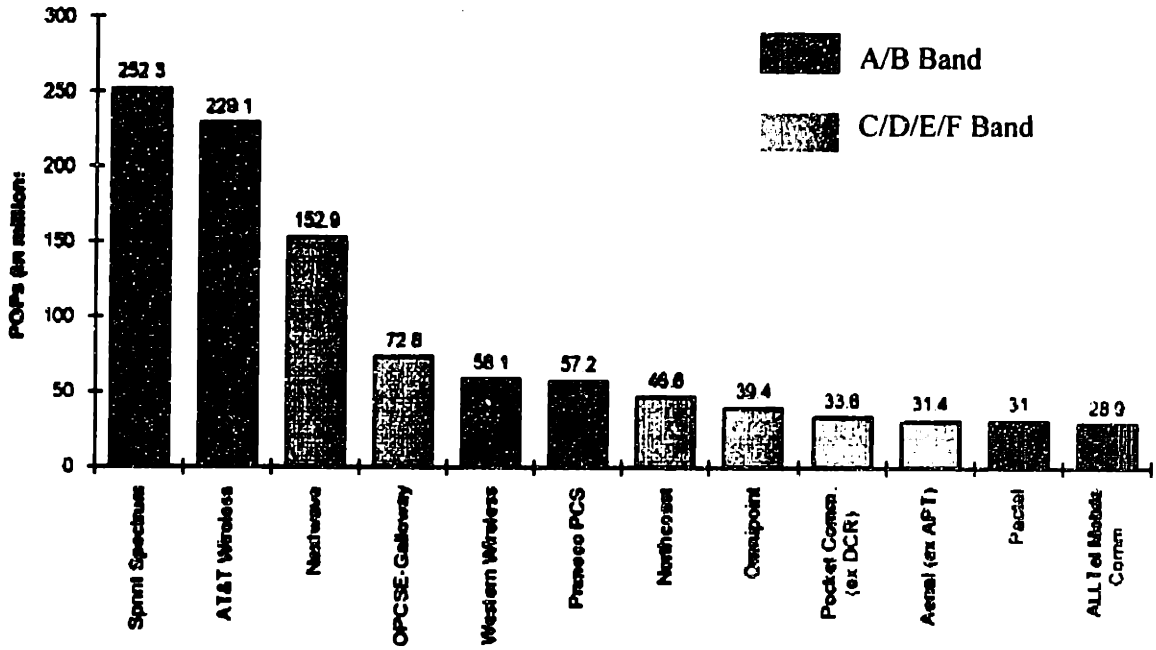

Figure 2.3 - Number of Pops Won by Major Bidders (in millions)[9]

2.4 Telecom Act of 1996

The Telecommunications Act of 1996 is the first major overhaul of telecommunications law in almost 62 years. The goal of this new law is to let any communications businesses compete in each other's markets. However, two years after the law was signed, none of the goals of this act has actually materialized. Nonetheless, it is expected that the Telecom Act of 1996 will eventually help the telecom industry break down barriers and boundaries and promotes cross competition from local service to long distance to cable.

Implications for wireless service providers are that traditional telecom service providers

[8] Sprint PCS is a joint venture of which Sprint owns 40%, TCI 30%, Comcast and Cox with 15% each.
[9] Second Annual CMRS Competition Report, FCC Homepage, Ibid.

may have to offer wireless services, and wireless service providers will attempt to utilize wireless infrastructure to offer other telecom services. This may either promote a flurry of mergers and acquisition activities for telecom service providers to add wireless to their product / service portfolio, or many different telecom services will be sold through wholesale. For example, an RBOC may decide either merge or acquire a long distance carrier to expand into the long distance market, or become a reseller for long distance, buying at wholesale and utilizes its strong distribution to sell to end users. Since many telecom service providers will evolve into full service telecommunications companies, the wholesale distributors will likely be each other's service competitors who find outsourcing capacity less expensive than building out their own.

2.5 Third Generation Digital Wireless (3G) Standard

As the U.S. busy converting old analog first generation systems to second generation digital networks, the rest of world in Japan and Europe have invested tremendous efforts in developing standard for third generation wireless services. As the PCS service providers finish launching their digital systems, the cellular service providers will have fully converted their systems to their chosen digital standard as well. Whether the choice is TDMA, CDMA or GSM, this would put cellular and PCS companies on equal footing. Some companies have mixed cellular/PCS properties to provide seamless coverage footprint, such as AWS. Others like PacTel and Sprint decided to spin off their cellular properties before entering the PCS auctions. The 3G standard is supposed to promote multimedia services and applications for wireless, and soften any capacity constraints.

Wireless service providers will not compete on technology, but instead compete primarily on service quality, pricing structure and brand, as all service providers will imitate each other in terms of features, accessories or other ancillary services. In terms of technology, TDMA based systems may have an easier time to convert to the third generation, as it is capable of a more graceful migration. New technology breakthroughs, such as software definable radio that would easily accommodate multi-band and multi-mode air interface, may make the technology issue relatively irrelevant.

2.6 *Trends*

2.6.1 Multimedia

At the heart of motivation for a third generation wireless standard is the need for multimedia services at 2 Mbps capable of displaying motion video. Display technology is also accelerating to make motion video easy to be integrated into a mobile handheld unit. Wireless service providers, led by AWS, already have wireless data applications that enable web access and wireless email. Furthermore, the popular 3Com Palmpilot platform is attracting thousands of software developers to integrate multimedia capabilities onto the platform. It is inevitable that voice telephony capabilities will be integrated on this multimedia platform. Therefore, a basket of multimedia features and services may be offered by wireless service providers to provide revenue growth opportunities. For the carriers, this may mean expensive network upgrades and radically different customer segments in the near future. Smart software phones are also expected to emerge as niche products capable of downloading Java based applications as a thin client network computer.

2.6.2 Prepaid Wireless

The prepaid long distance industry grew from paltry to become a $1.5 billion market in mere three years[10], and shook the entire industry by redefining the rules of the game. The incumbent carriers, AT&T, MCI and Sprint, all have mostly missed the boat of this tremendous growth. Similarly, many believe the prepaid game can move toward wireless services. The Yankee Group estimates the prepaid wireless market would grow to $2 billion by 2002[11]. As many as 30-40% of new wireless applicants are turned away for bad credit, yet nearly a quarter of these credit deficient customers hold ample cash. In fact, early reports have pointed to a burgeoning growth path for prepaid wireless services. BellSouth, for example, reported its trial for the "Prepaid To Go" service exceeded the company's expectations by 300%[12].

In Italy, one of the fastest growing markets in Europe in recent years, prepaid accounts

[10] Donaldson, Lufkin & Jenrette, *The Wireless Communications Industry* report, Fall 1997, page 26.
[11] "Europe Sets Pace for Prepaid", *Telephony*, March 2, 1998, page 62.

for more than half of its subscriber growth. European carriers have targeted young consumers, such as students, with prepaid services and were met with smashing success. This option is particularly attractive for some emerging markets, such as South America, where nearly 75% of consumers have no credit history. In Argentina, for example, every three people in four have no bank accounts. For prepaid to work in the U.S., however, requires renewed thinking about issues surrounding subsidized handsets and long term contracts which are already diminishing due to the PCS competition.

Some of the reasons why the customers will value prepaid wireless services are related to the convenience and lack of credit. This feature also makes it easy for gift buying from parents to college children away from home and elderly relatives. Another attractive feature of prepaid wireless services is the anonymity that certain professions prefer not to reveal their identities. The service providers, on the other hand, derive significant value from reducing bad debt problems, new customer sources, proliferate creative distribution, and increasing usage on their networks. Furthermore, there may be benefits in lower acquisition costs.

2.6.3 Wireless Local Loop

An important trend in the wireless service industry is the development of technologies and economics to use wireless as a main component of local loop network to bypass the fixed network as a replacement of primary residential or business telephony services. Wireless Local Loop (WLL) has not had a strong impact on the local telephone services that have been monopolistically dominated in the U.S. thus far. However, there has been much enthusiasm for wireless technologies to play a role in providing local telephone services, especially in some emerging markets that have no or inferior fixed network. For example, Qualcomm has recently signed a contract to provide China a local loop network using its CDMA wireless technology[13]. The Local Multipoint Distribution Service (LMDS) spectrum auction by the FCC, which recently consummated, represents the largest amount of spectrum the Commission has auctioned to date. The spectrum is located in the 28 and 31 GHz bands, and gives the new operators potential of being the

[12] "Would you like a Phone With That", *Wireless Review*, March 15, 1998, page 12.

next serious players offering real competition in the local loop.

LMDS is a new fixed, broadband point-to-multipoint microwave service, which, because of the amount of spectrum that will be licensed, will offer more capacity than is currently available from existing wireless services. "LMDS has the flexibility and the potential to promote competition in both the local telephone and cable television marketplaces", said FCC Chairman William E. Kennard, "it may be used, for example, for wireless telephony, data, internet access and video."[14]

2.6.4 Less Regulation

The FCC will soon start to allow the local phone companies to offer long distance, as the Telecom Act of 1996 intended. Once the competition in long distance becomes a reality, a flurry of mergers will ignite a consolidation process in the whole telecommunications industry. AT&T already has announced plan to acquire Teleport in order to get a jump start into the local loop business after unsuccessfully deploying a resale strategy. It is also seriously looking into deploying wireless technologies to offer local services. In addition, voice over IP technologies may mature for long distance over Internet to become a reality, shattering the profit margins of current long distance providers. This will undoubtedly trigger another wave of lobbying by premier long distance carriers, but the government will let the market battle out. The implication is that the long distance market will become very fragmented, forcing traditional carriers to shift focus onto other value added or bundled services as their core business.

2.6.5 Transition to Mass Market

The wireless communications services market, climbing the product life cycle curve, is transitioning into the mass market. In order to attract mass consumers, service providers have tried two radically different pricing strategies: lowering the monthly access fee but charging higher per minute; and offering a flat rate per month package. Some of the PCS companies are particularly aggressive in these two extremes. For example, Ominpoint has offered monthly access fee as low as $9.99 a month. WirelessNorth, a small PCS

[13] Press Release by Qualcomm, March 25, 1998. For details see www.qualcomm.com.
[14] Press Release, FCC Homepage, ibid.

carrier in Minnesota and North Dakota, allows unlimited usage for $75 a month[15]. Before long, service providers with excess capacity may follow suit in selling this kind of "all you can eat" package deals. And overall excess capacity is expected to grow, at least in the near term, as there are too many players in each market offering similar services.

There are a few implications for the wireless service providers as the product life cycle moves into the mass market. First of all, declining usage utility per subscriber will reduce average revenue per subscriber. Service providers are likely to offer value added services in order to boost revenues in wake of lower prices. As service providers utilize more indirect sales channels, such as retail stores and dealers to offer convenient distribution for the mass consumers, customer care activities are bound to increase as mass market consumers are less sophisticated and need more hand holding. This is the primary reason why Dell Computer purposely avoided selling to the consumer to reduce technical support costs. In the wireless market, Nextel seems to have followed Dell's strategy by focusing only on business users.

2.6.6 Airtime to Become Commodity

It is apparent, through the discussions thus far, that the industry dynamics for the wireless service providers will dramatically change in the near term, 12 to 18 months. Lower price, fueled by fierce competition, coupled with higher supply and demand for airtime, will lead to transform the traditional product airtime to become a commodity. This presents players, especially more established cellular carriers, a strategic inflection point as described by Andy Grove. Many service providers, including AT&T's recent announcement, already offer a flat rate price plan for frequent users[16]. Applying game theory, this trend is likely to further expand and continue. Some important characteristics of the commoditization process[17] are:

- Product differentiation becomes difficult.
- Customer loyalty and brand values will be low.
- Sustainable advantage will derive primarily from cost / quality leadership.

[15] "Leading the Charge", *Telephony*, February 2, 1998, page 64.
[16] For details see *Wall Street Journal*, May 8, 1998
[17] Henry Birdseye Weil, "Commoditization of Technology-Based Products and Services", 1996.

What does this mean for the industry players interested in competing for the future? Service providers must re-visit the traditional value chain to find ways to create value around their "commoditizing" product - airtime.

2.7 *The Future Value Net*

Impacted by all of the industry dynamics and future trends previously discussed, the competitive nature of the future game will be substantially different from the one portrayed with the traditional value chain of section 2.2. To illustrate the future value proposition of wireless mobile services and how to reinvent some of the rules for the new game, the new "value net" is created in place of the traditional value chain to help explain the future shift in value creation for the customers in Figure 2.4.

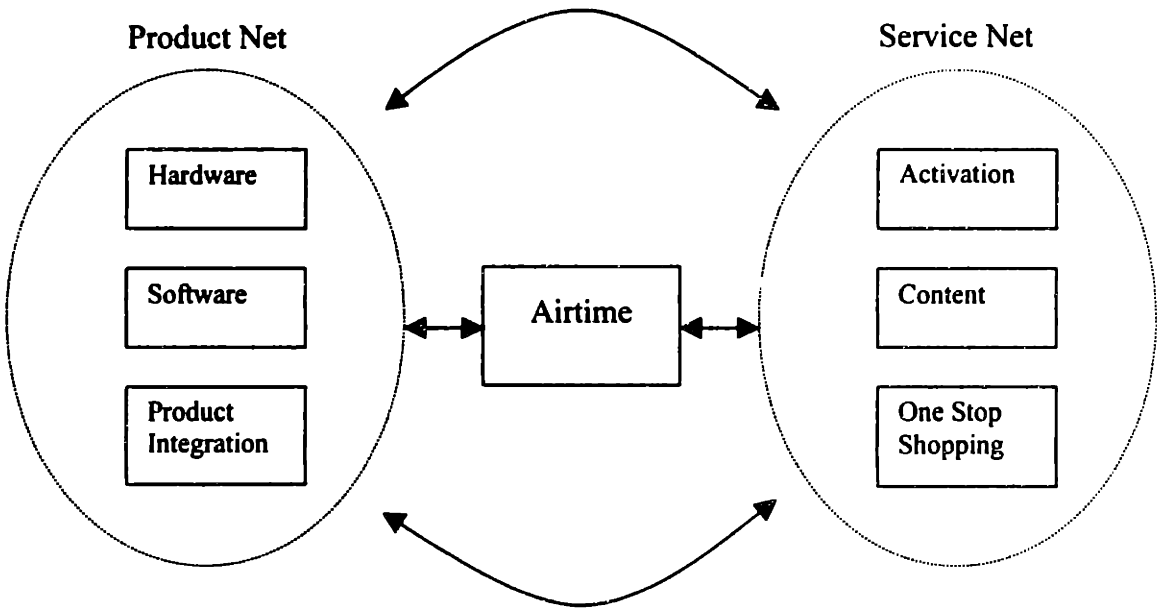

Figure 2.4 - The New Value Net

The new value net consists of three main parts: the product net, airtime, and the service net. It is called a "value net" since the value proposition is no longer linear, but rather circular. Customers will seek value at either entry point from the product net or the service net. The product airtime, now a commoditized service, interconnects the two

individual product and service nets to create the new Value Net.

The product net consists of hardware, software, and product integration. In addition to traditional hardware, the handset will be expected to have software functionalities and capabilities such as re-programmability and artificial intelligence. Similarly, certain software applications will be expected to run on the handset, as well as external memory devices like the SIM card. As important will be some product integration interface, which integrates the hardware or software to a network database, such as the company's Intranet or Extranet. Product integration could also combine other products like PDAs or palm computers, as well as other forms of voice and data convergence. Though the original value creation product "airtime" by itself will become a mere commodity, it does not mean value can not be created around a "commoditized" product in order to shift the value proposition and competition away from price, thus protecting margin.

On the side service net, future value creation may exploit a new activation process, content management, or one stop shopping for all of the customers' telecom needs. The activation process can become more automatic, with over the air activation and pre-paid calling minutes in the development or trial stage. There will also be new content such as customized selection of news, stocks and score updates, and real time location based information or services. There is very little content being provided by wireless service providers today. So far some product offerings such as AWS's PocketNet have provided wireless data capabilities with text based web access, stock quotes and sports scores, etc. in the form of packet data. However, this is still mostly providing a channel for conveyance purpose rather than content. If the service provider manages the content, much like TV stations choose which programs and advertisements to air, based on the end users' requirements and tastes, value creation will become content based. For example, a service provider realizes a Boston based customer enters the New York City service area, it may send out content information for museums or restaurants. There may be new value created in content management for the service providers.

In this new value net, the customer may not necessarily enter the value chain from the

product net, but also the service net. Product based attractions provided by the product net may not suffice as the entry point for customers who value the attributes in the service net more. Furthermore, the customer needs and benefits within the product or the service net are interactive as well. For Example, instead of buying the hardware then look for software that works with this handset, the customer may shop for the desired software package before deciding on the handset model. Similarly a customer may value quick and easy activation process and chooses hardware and software according to which provider offers the best activation process that may include a prepaid option, or even which service provider has the desired content selection capabilities.

Conversely, it is possible that some customers could care less about hardware, software or any other product integration. They just want a single bill and a single customer care contact number to take care of all their problems. Therefore the customer may view the value creation at any point of this new value net, and the service provider must track their customer preferences closely to capture a large portion of the profits enabled by these value creations. This way even though the product "airtime" may have become commoditized, paying attention to the product and service nets and this new Value Net concept will help shape the future direction of business success in the wireless services industry. In addition, this new value net may also form the basis of customer segmentation, as customers needs are neatly defined and their purchasing behaviors can be easily predicted. For each customer segment, a service provider may formulate a different distribution or bundling strategy, for example.

2.8 Strategies of a Few Important Players

In this section, the strategies of a few important players in this newfound competitive environment are summarized from publications such as annual reports or 10K filings. Analyses of these strategies are drawn from these publications and the author's industry knowledge. Three service providers will be studied: AT&T Wireless Services (AWS), Sprint PCS, and Nextel Communications.

AWS is unarguably the largest cellular service provider with more than 8 million subscribers and over $4 billion in service revenue in 1997. With Bell Labs, AWS holds an edge in its ability to innovate. It has the largest development efforts among large service providers, and has a strong record of new product and service introductions. For example, AWS was the first to offer wireless web access through its PocketNet, and first to market text paging (or Email) to any AWS subscribers from the AT&T web site, a service innovation. In addition, AWS is in a powerful position to bundle AT&T's other telecom service offerings and take advantage of its brand prowess. The value statement of AT&T is as follows:

"Build shareowner value by providing universal communications services that put our customers in touch with the people or information they need, whenever want, wherever they are, in the form most useful to them, and at a competitive price."[18]

The main strategies for AWS are:

- **Achieve a competitive cost position.** AWS has the benefit of scale and scope economies. In response to industry trend of lower prices, AWS aims to lower its operations cost. Instead of subscriber growth, AWS has vowed not to add unprofitable customer segments in an effort to reduce costs[19]. Because of the McCaw acquisition, AWS is much further along its network build-out with lower capital expenditure. It has the ability to squeeze other carriers' margins by lowering price for its targeted customers.

- **Continue to innovate.** AWS introduced a Nokia handset with two weeks of standby battery life, will implement a "caller pays" option, and further explore wireless data applications as ways to innovate new sources of revenue.

- **Expand and enhance coverage** for wireless local loop and in-building applications. AWS has dedicated a lot of resources in its Wireless Office Service (WOS) to promote intra-premise wireless PBX applications, such as call forwarding management and 4-digit dialing. This effort incorporates increasing in-building coverage and product integration capabilities.

- **Build "future proof" network architecture.** In order to reduce risk exposure to the 3G standard, AWS has collaborated with other TDMA supporters to increase geographic presence globally and propose TDMA as an alternative standard.

- **Maximize benefit from powerful brand.** AWS has aligned strategically with some

[18] AT&T Annual Report, 1997
[19] Speech excerpt from Dan Hesse, ibid.

smaller PCS carriers who deploy IS-136 TDMA standard to co-brand and take advantage of the AT&T brand.

- **Bundle** with other services such as long distance, local loop, Internet, etc.
- **Expand distribution through retail** channels.

While pursuing some of these strategies, AWS must ensure that it stands to capture the most benefit if a strategy breaks through successfully. For example, if the AWS WLL strategy, aided by technological breakthrough, threatens the local loop incumbents. It would appear AWS would be a winner. However, offering local loop services wirelessly will put tremendous capacity constraints on the network, which is limited by spectrum. PCS carriers, in this case, hold an advantage as they have plenty excess capacity on their networks. This puts Sprint PCS in a very good position to capture the biggest benefit, instead of AWS. In light of this, AWS must ensure its wireless local loop strategy does not backfire. Two things are important: AWS must develop this technology in-house to prevent an infrastructure supplier to offer the same technology to other service providers like Sprint; and ideally for AWS this technology should be inherently based on TDMA technology, since Sprint PCS deploys the incompatible CDMA technology.

Sprint does not seem to provide a clear value statement to the public, however one is derived from its annual report.

"Serve up total communications solutions with speed, responsiveness and simplicity under one brand."[20]

Sprint PCS appears to pursue the following strategies:

- **Push wireless services as consumer product**. Sprint markets its PCS services as alternative to wireline, and is ready to fight for market share with low price. With strong financial backing, Sprint PCS is not expected to be profitable for quite some years. In fact, Sprint lost $600 million on digital service in 1997, and stands to lose more this year.[21]
- **Distribute and bundle services through retail** stores within Radio Shacks to

[20] Sprint Annual Report, 1996
[21] "Why Sprint is on the Block", *Fortune*, February 2, 1998, page 107.

promote "total Sprint Solution", including wireless, long distance, local and Internet access. With its strong strategic alliance with large cable companies, it is likely that cable will also be included in the future.

- **Deploy CDMA as the standard** of current and future technology choice, and outsource engineering to infrastructure venders in order to save staffing and training costs for system design and optimization.

- **Continue to establish it brand** with network and service quality, and protect margin by bundling complete telecom service offerings under one brand.

- **Focus on domestic business**. Partner with France Telecom and Dutch Telecom internationally.

Nextel's value statement is as follows:

"Nextel will offer businesses a high-quality alternative in instant, secure and affordable wireless communications to enhance the way teams of workers communicate."

Nextel Communications' strategies are:

- **Differentiate services** with unique direct connect[22] feature and integrated packages of wireless services in one single handset, capable of cellular, two-way dispatch, text paging and Email, as well as wireless packet data.

- **Focus on business segment** and capture high usage users by targeting businesses that would increase efficiencies and reduce costs by using Nextel's integrated services. This segment also has lower churn rate as the handset becomes a business tool that increases switching cost and dependence.

- **Differentiate through innovative pricing** structure, such as no roaming charges, billing to the second after first minute, one airtime and long distance rate, and aggregate account minutes among multiple units.

- **Expand marketing and distribution** by advertising and geographic expansion to educate customers of its value proposition and to enhance its brand name recognition. Invest in emerging markets to capture global growth.

- **Strategic relationship with Motorola** and continue to deploy a non-standard technology, Motorola iDEN[23], partly due to long term contracts and Motorola's 15% equity investment. In addition, Craig McCaw owns more than 20% of stocks and heads an Operations Committee that more or less controls the formulation of Nextel's business strategies. There are obviously risks associated with deploying a non-

[22] A push to talk, two-way radio feature traditionally used by construction, transportation, delivery, etc.
[23] Integrated Enhanced Dispatch Network, a proprietary system not compatible with other standards.

standard, though at this point the iDEN technology gives Nextel a sustainable service differentiation.

- **Achieve low cost position**. Since Nextel is heavily leveraged (>45%) and has had significant negative cashflow, it does not have financial resources to engage in a price war that will reduce operating margin and overall profitability.

As the strategies of these three companies unfold, it is clear that the overall profitability of this industry will decrease. AWS has a the benefit of scale, scope, further along its capital investment and learning curve, and a powerful brand that people associate with quality and reliability. It has the ability to lure its target customers away from its competitors through pricing. In response, competitors will either have to shift their growth strategies or come up with innovative applications or services. However, Bell Labs will also continue to provide AWS technological direction and innovations of its own. If AWS could manage its cost cutting efforts, something that its parent AT&T has failed to do, it will have to "call the shots" and define the playing rules for itself.

Sprint PCS has a different strategy. By marketing its wireless service as a wireline substitute to build up scale, though it fits Sprint's overall telecom play, it is hard to imagine how and when it will be profitable. In fact, Sprint PCS expects to lose 700 million in 1998[24]. Although this strategy worked for the cellular carriers, airtime is quickly becoming a "commodity" service, and the margin will not make up for its intensive capital investment in the spectrum and infrastructure. The only way for Sprint PCS to be profitable is that its bundle strategy provides lots of volume and higher cross-margin among different offerings in the bundle. For example, Sprint bundles other telecom services with wireless and assumes that this bundling strategy captures a particular customer segment. Even if it gets minimal margin on wireless services, as long as it captures higher margin on the other services within the bundle, Sprint is ahead in this game. Furthermore, Sprint only owns 40% of Sprint PCS. It is OK to lose a small piece of a small pie, as long as it enables to gain a big piece of a much bigger pie.

[24] Ibid., *Fortune*, February 2, 1998

As for Nextel, its only chance is the differentiation that Direct Connect, the two way dispatch feature, continues to give it differentiation and competitive advantage. Nextel will continue to sign up certain industry groups who traditionally use two way dispatch radio. The game will be decided whether Nextel finds ways to attract other customer segments, add and serve them profitably. With a high leverage ratio, less spectrum availability[25], and lack of roaming with the iDEN non-standard, Nextel is most vulnerable to a price war that reduces its ability to add non-traditional two way dispatch users. Furthermore, Motorola's 15% interest in Nextel gives it first right of refusal to a potential merger or acquisition deal that otherwise might have captured long term shareholder value but would hurt Motorola's infrastructure equipment business.

[25]The FCC caps 10 MHz of transmitting spectrum for SMR carriers, such as Nextel, versus 15 MHz for PCS A/B carriers

Chapter 3: A Framework for Growth Strategies

3.0 Introduction of the Framework

After the literature review and discussion of growth strategies in Chapter 1 and the industry external environment analysis in Chapter 2, the next step would be to develop a framework of growth strategies that best suit the wireless mobile service providers. In this chapter this framework will be introduced, and each part of this framework will be thoroughly evaluated. The framework is shown in three dimension graphic form.

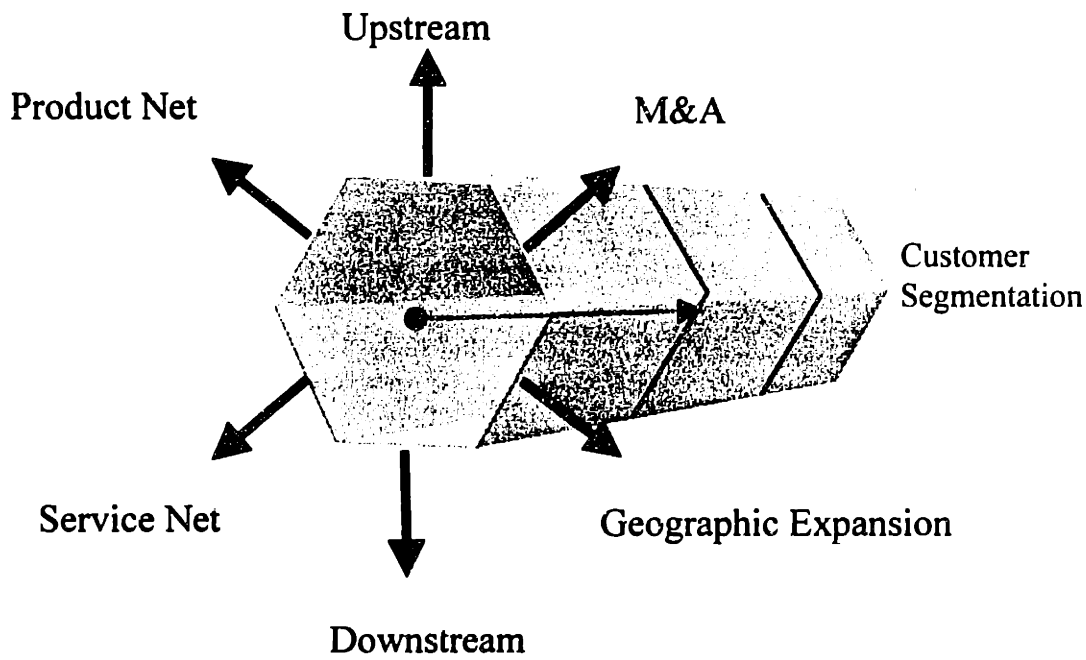

Figure 3.1 Framework of Growth Strategies

3.1 Upstream Strategy

The upstream strategy relates to working with suppliers as well as product development,

since these two tasks are intertwined for the wireless mobile service providers. As previously mentioned, service providers purchase infrastructure equipment that enable many of the features and functionalities on the network from vendors of their choice. Since infrastructure manufacturers are rather large multi-national corporations, and have the technical capabilities and resources to perform new product development, they have traditionally driven the direction and pace of new network features and incremental improvements. In fact, very few wireless service providers have sizable product development staff working on new features and services that might impact their future profitability and survival. They have mostly left that at the mercy of their vendors. Even though service providers could perform comparative shopping and switch venders if necessary, it is a very costly transition that takes extensive planning and customers would still likely be impacted. Just imagine ripping out the central switch, the brain of the whole network, and the base stations; then replace them with another system that your technical staff has little experience with. It will not be an easy task.

Some wireless service providers even went further, by dismantling engineering staffs and contracting infrastructure venders to perform engineering and planning. For example, Sprint PCS in New York recently laid off the majority of its engineering and operations staff and brought in Lucent Technologies to take over all design and performance responsibilities. The pro is that Sprint PCS can use purchase power as leverage to require Lucent to optimize its networks for them, at supposedly much lower cost to Sprint PCS. The con is that Sprint PCS loses control of its technical competence even further. It also leaves some room for manipulation and possibly even "blind leading the blind". First of all, what would be the motivation of the Lucent engineers? Sell more infrastructure equipment, of course! With this "solution", the Lucent engineers will likely solve many types of "problems" by building lots more cell sites that need lots more base stations. What is the core competence of Lucent? Probably not running a network, either. This is definitely not a good approach for an upstream strategy.

Rather, the service providers must build a new product development group capable of leading both product and service innovations. This group should consist of more than

technical personnel, but also marketing experts who thoroughly understand customer needs both currently and in the future. This group must drive future development efforts by their infrastructure venders, not the other way around. Service providers must design metrics collaboratively with their venders to evaluate research, development and engineering projects of the suppliers based on the service providers' objectives and market driven product and service schedules. This is the only way in which customer based downstream feedback can loop back into upstream product development. New product development must be a two way street, with information feeding back and forth, for it to be true innovations that turn into successful and sustainable products.

For wireless service providers, new product development may produce either product innovations or service innovations. Many times it could simply be attempted "fast-follower strategy" - planning and launching products or services that other carriers already have launched, though after a time delay. In any case, it is important to recognize that product development is different in a service industry. For a product, most of the time the innovations, large or small, provide a sustainable competitive advantage. For example, if IBM develops a methodology to manufacture a ultra-thin ThinkPad, it provides IBM with a distinguished sustainable first mover advantage, until another computer maker develops its own methodology that matches or supercedes IBM's. Many product innovations also benefited from patent-type legal protection. Conversely, for most service innovations, competitors can very simply and quickly copy and modify the good ideas; and these service innovations are not likely to be sustainable over time. Service innovations should be strategically managed differently from product innovations.

Additionally, the value proposition for products is often different from services. There is generally a network externality effect for a service standard, while people value a wide selection of product styles and tastes. For example, people value a wide selection of cars, with a choice of performance, styling, size, look and feel. On the other hand, there is a lot more value for the operator directory service to have a seamless 411 number. Even for the case of a classic product innovation video cassette recorder (VCR), people value a choice of brand, functions, features, quality (2 head vs. 4 head), performance (stereo sound), the cute-ness of the remote control, or even the cassette tape standards (VHS vs.

Beta-max). However, while people buy video rental services, the standard game was quickly won by VHS because the video rental stores stocked more of the cheaper VHS cassette tapes. This initial slight edge created a strong network externality effect, and the reinforcing loop helped the VHS growth exponentially. For service innovations, therefore, the importance of the network effect can not be overstated.

Across industries, companies today have realized many potential benefits of collaborative research and development with their alliances. Globalization, escalating R&D expenses, shortening product life cycles, and convergence of technologies are often cited as important factors that contribute to this trend. Buffeted by new competitive pressures from new market entrants as a result of deregulation, rising research and development costs and risks, management's relentless drive for restructuring and downsizing, and accelerated product-development schedules, more and more companies are seeking and identifying the circumstances where collaboration alliances -- even with competitors -- makes sense. The need to shrink time-to-market and the risk-sharing benefits were important factors in the change in attitude, since there were few alternatives. Another was the realization that the market size (or customer demand) could actually be further expanded if competitors form alliances to collaborate on standards.

For example, Citibank, the one that never sleeps, got their slogan from a service innovation - the ATM machines that made it to number one in retail banking in the late 1970s. Citibank launched its network of ATM (automatic teller machines) and thought they had a sustainable competitive advantage. Citibank management thus decided to refuse to collaborate and interconnect with other banks that expressed interests to join its network of ATMs, in order to retain this brand differentiation. The other ATM networks simply got together and developed their own ATM network. In fact, all these other banks, in order to beat the bigger and widely accepted ATM network of Citibank, stuck together and eventually got bigger than the lonely Citibank. Several years after CitiBank came up with a service innovation that revolutionized the banking industry, it announced its plan to abandon its network to join the one that its competitors created.

This is not to suggest always be open hearted in collaboratively working with competitors for new product development, but merely point out that joint development that increase total customer benefit, that will drive up total industry demand, can be a win/win proposition. The are some criteria, of course. One is that the service innovation is not sustainable, easily be copied by the incumbents, and first mover advantage is marginal. The other is that there would be cost and risk sharing benefits for all parties involved. The most important one, though, is the network externality snowball effect.

An example in the wireless service industry involved a text paging service from company web site. AWS introduced a new service innovation in summer 1997. Anyone with a browser can point to the AT&T web site and type in a text message to any of the AWS cellular phones. Since this is no unique technology involved, and a service innovation is not likely be protected by patents, this service feature can be easily copied with a minor time delay. Therefore there was no surprise when Nextel introduced its identical web-based text paging service a few months later.

By recognizing a joint development effort would save cost and add more value for the wireless service customers, these two carriers could have joined forces to development and market this service innovation together to gain recognition and acceptance. For example, a new web page could have been developed, with a convenient name such as WWW.PAGE.COM, that customers can log on the world wide web and send a text page to any other cellular subscribers, without knowing whether they are AWS, Nextel, or Sprint PCS subscribers. Pretty soon other major carriers will want to join in, and the ones that hold out will cause an inconvenience for their customers that do not have the access to send a text page to their business partners and friends. These customers would put pressure to those would-be text page recipients to switch to the carriers included in this PAGE.COM network. AWS, Nextel, and others on this network will benefit from added customer value, which increases switching cost and reduce churn, and net additions in subscribers by taking advantage of the network externality effects. Another example is that service providers should join forces to develop a standard set of input / output interface for the handset, and require their handset manufacturers to comply.

Another important component of the upstream strategy is to develop complementary products and services proactively. This is often called the Intel model, because Intel deploys this strategy in order to add value to its customers around its core product - microprocessors, which are becoming a commodity as demand for faster chips declines. The strategy consists of funding startup companies that develop products or services that would increase the value of faster microprocessor chips - Intel's competitive advantage. In fact, Intel specifically identifies acquisitions and investments in these development startups as an important component of its growth strategy[1]. Wireless service providers can deploy this upstream strategy by proactively identifying and selectively funding startups that develop complementary products or services to match their specific service differentiation strategy, or establish strategic alliances. For example, Nextel could fund developments that take advantage of its unique push to talk capability of its handsets.

3.2 Downstream Strategy

The downstream strategy is mostly related to developing creative distribution channels and using those new channels to further developing new businesses and sources of revenues. Traditionally in the wireless services industry, distribution is divided into direct sales and indirect sales. For the direct sales channel, the company hires a sales force to target a specific segment of customers in a specific geographic area. There is generally a short training program for the sales people to learn the basic technology, jargons, product features and service applications, as well as pricing plans. The high turnover rate of the direct sales force means these training programs are pretty much ongoing, rather than a one-time event. The direct sales force is particularly critical during the initial stages of the service launch, when educating customers is an important responsibility of the sales force.

As for the indirect channel, the company screens and accepts certain dealerships who

[1] Paul Musselman, Manager of New Business Development at Intel; comment during a panel discussion at Harvard Business School Cyberposium on February 21, 1998.

demonstrate either a presence in the industry with good customer relations, or capability of broad reach to potential customers, such as electronics and appliances retail stores. There is generally a different sales commission schedule for direct and indirect sales. The service provider may or may not decide to subsidize the handsets in order to stimulate sales growth and capture more price sensitive customers. It is not uncommon for service providers to offer handsets for free in exchange for a long term service contract. In this scenario, the acquisition cost becomes a very important variable for the overall profitability of the firm, especially when the churn rate of the service provider is high.

Sales, marketing, advertising, fulfillment and certain overhead costs contribute to the cost of acquiring customers, generally referred and tracked by finance department as Cost Per Gross Add (CPGA). As for the companies growing monthly or quarterly sales rate, headcount and spending typically rises with increased sales volume. For every customer added, there is the cost of acquiring the customer, plus the amount of handset subsidized, and the marginal cost of building the network capacity to serve that customer. For example, if the cost per gross add is $400, the service provider subsidize the handset for $200, and assuming the marginal cost[2] for this particular customer is another $100, the total cost of adding and serving this new customer is $700. At average revenue per unit (ARPU) of $70, it would take the service provider ten months to just break even, without considering any ongoing maintenance cost.

If the customer switches to another carrier or leaves the network before these ten months, the service provider would lose money by adding this customer at the first place. However, since the marginal ongoing cost of serving this customer is very small, this customer becomes highly profitable after ten months on the system. With these cost characteristics, it is no wonder why service providers emphasizes on churn as one of the most important operating objectives, along with gross add, ARPU, CPGA and cashflow.

Another creative distribution channel could be enabled by the use of prepaid mechanism

[2] Marginal cost is the total cost of adding capacity (infrastructure, labor, etc.) per new subscriber.

discussed earlier. With prepaid wireless services, handsets could be sold or rented through vending machines. Travelers can simply rent a handset through vending machines with a credit card, or rent as an accessory together with car rentals. There would be no credit check necessary, as usage would be blocked until the prepaid charge is refilled. Conversely, the banking and credit card industry could utilize wireless to create value for its customers. For credit card holders who purchase goods or services without leaving their vehicles, they could call up a 1-800 number that processes the transaction without a credit card imprint. For example, in Finland a car wash service teamed up with the banking industry to accept payment through a cellular call. The caller dials a toll free number and approves the amount charged with a password, without getting off the car. The car wash benefits by speeding up the service time, and value is created for all three parties involved. The customers receive the convenience they value the most, and the credit card company is able to increase transaction volume which increases revenue.

Another downstream strategy that is proven very successful is deployed by Federal Express. An expert of efficient package and document deliverer, Federal Express proactively involves itself with its customers in designing their logistics process. For example, Federal Express provides free consulting services to companies that need professional help in designing their logistics processes, such as packaging, shipping and tracking. By performing analysis and designing Federal Express services within its customers' inherent logistics processes, Federal Express not only was able to learn its customers' needs first hand; but by leveraging its shipping and tracking core competence, it significantly increases the switching cost for its important customers.

Many wireless service providers could follow this FedEx Model to become more closely connected with its important customers. For example, AWS's PocketNet is the most widely used wireless packet data service. AWS could work closely with potential or existing customers to help them integrate this data capability with their corporate Intranet and databases. Similarly Nextel could exploit its core competence of dispatch direct connect and proactively design dispatch capabilities into customers' communications

processes. This strategy requires wireless service providers develop competencies in abilities of working with their customers, learning their communications needs, and creating solutions that build the particular core competence of wireless service providers into the customers' communications requirements. This would not only increase the sales rate, but also reduces the churn rate by increasing the switching cost for the customers.

As mentioned previously, the product life cycle directs service providers to reconsider wholesale and retail strategies. As more mass consumers sign on through retail distribution channels, it is likely that ARPU will drop, more customers will call customer care, and churn rate may increase. Therefore, a service provider should invest in advanced support automation systems that will save operating costs when the retail distribution channel becomes highly successful.

Part of the value creation for service providers is the convenience of one stop shopping. The downstream strategy must take this value seriously and ensure the distribution channels are capable of supporting one stop shopping. Conversely, the distribution channels should be designed to take advantage of cross selling other telecom services whenever possible. AT&T had a strong retail presence with its AT&T stores that used to sell telephone, computer hardware manufactured and long distance service provided by AT&T, though the purposes of the stores became less clear after the three way divestiture in 1996[3]. AWS could easily take advantage of these retail stores by offering customized packages that combine long distance, local loop, Internet access and wireless services for the residential and home office segments. A successful downstream strategy can create value in one or more components in the service net of the overall value net.

The downstream strategy must synchronize hand in hand with the upstream strategy, and together create two way feedback to help the service providers understand the customers' communications needs better and develop products and services to satisfy their needs. The corresponding upstream and downstream strategies are very important links for

[3] AT&T divestiture broke the company into three separate companies; AT&T for telecom services, Lucent Technologies for telecom manufacturing, and NCR Computers for computer hardware and software.

successful growth strategies. Management of these links will set the tone for the following four growth strategies.

3.3 Geographic Expansion

Geographical expansion had been a prerequisite for competition in the wireless services industry in the past. Seamless roaming, complicated billing and lack of scale made it very difficult for small wireless network operators, unless their strategic intent was to be taken over. Scale factors include purchasing through infrastructure and handset suppliers, brand recognition, coverage footprint, advertising, etc. Because of the scale factor, service providers derived many benefits by expanding geographically. Ability to roam was also a big factor. Wireless subscribers by definition travel around. Systems with a small geographic coverage footprint became expensive and inconvenient for cellular subscribers because of high roaming charges and complicated rate plans.

As cellular systems upgraded to second generation digital standards in the U.S., geographical expansion also became important for each standard alliance. Service providers who had chosen TDMA, for example, wanted to have a nation wide footprint. This put pressure for the larger service providers to ensure their chosen technology standards were wide spread enough to compete with competing standards. In the early days of digital deployment, an early start created a network externality effect. The bigger service footprint a technology standard penetrated, the more attractive for other service providers to choose the same air interface standard to deploy. Therefore in order to ensure its chosen standard is persistent, size meant power for the service providers. Those who needed power had to obtain it through geographic expansion.

By the same token, the global standard issue of third generation wireless made geographic footprint an important factor for service providers competing internationally. U.S. wireless service providers, in order to compete with European's GSM platform, had to expand into other parts of the world to ensure a seat for their chosen technology to compete squarely with GSM. Furthermore, high wireless penetration potential spurred

by favorable economic conditions provided growth opportunities in the emerging markets in South America, Asia and Eastern Europe. International geographic expansion was typically achieved by U.S. companies through forming alliances or partnerships with local service carriers, or by entering spectrum auctions. Many countries followed the U.S. lead in auctioning off spectrums, mostly through a privatization process. For example, BellSouth entered the Sao Paulo market by bidding a record $2.5 billion during Brazil's recent efforts in privatizing its telecommunications industry[4].

The globalization efforts by U.S. wireless service providers are important to capture high-end travelers who often travel from or to the U.S. for business. Both domestically and internationally, geographic expansion can solve roaming problems and help capture an ideal segment of business travelers. However, geographic expansion does not have to mean buying spectrum licenses or mergers. In the U.S., for example, some service providers choose to expand their geographic presence through strategic partnerships. AWS has recently announced a couple of deals that allow smaller service operators that deployed TDMA in the PCS spectrum band to use the AT&T brand. This franchise partnership enabled AWS to expand geographically without major investments. Similarly, many PCS operators such as Omnipoint have grouped together to form a GSM alliance to piece together a large enough geographic coverage footprint in order to compete with the dominant standards TDMA and CDMA in the U.S.

Geographic expansion is also a strategy for channel management. Providing similar value proposition with similar operations in a new territory is a straight forward method to grow revenues. In order to transfer the core competence to succeed in the new territory, a service provider must have developed a low cost and efficient operation, climb the learning curve and have the capability to identify and smoothly transfer the best practices. Furthermore, for global expansion, cultural and regulation differences must be well understood and taken into account while setting up operations overseas. Only those who have perfected the essential ingredients of strategy design, execution, organizational alignment and learning transfer will reap the greatest benefits with this growth strategy.

[4] Press Release, July 9, 1997. For details see http://www.bellsouthcorp.com.

3.4 Mergers & Acquisition

Mergers and acquisition is a popular, though sometimes expensive, way to grow. There are many issues that determine the success or failure in corporate marriages. Mergers and acquisition activities in the wireless services industry have been often and plenty. Some have been part of larger mergers in the telecom industry. Bell Atlantic Mobile Systems and Nynex Mobile merged prior to their perspective parent companies merged in 1996[5]. SBC Communications, parent of Southwestern Bell Mobile Systems, merged with Pacific Telesis and later acquired SNET, amassing nearly 90 million pop[6]. US West was merged with AirTouch[7], allowing the AirTouch brand name to cover most states west of the Mississippi and parts of Georgia. Worldcom outbid to acquire MCI for $37 billion, and Alltel recently acquired 360 degrees Communications for 4.2 billion. Most recently and perhaps the most meaning of all, SBC will acquire Ameritech to become the largest telecommunications services company ever, with a deal worth over $60 billion[8]. The list goes on and on, and the success of these deals will be determined by time.

Generally, mergers and acquisitions allow companies to grow by identifying growth opportunities, strategic and operational synergies, lower costs and risks, increased market and purchasing power, etc. that otherwise would be difficult or expensive to develop internally. As the telecom industry barriers crumble, fueled by the Telecom Act of 1996, these recently announced mega mergers are designed to exploit scale and scope advantages that will allow the bigger players to capture a more significant share of the market growth. As this growth strategy gains momentum, game theory would predict that there will be more mergers and acquisitions activities in the future as telecom players look to become full service providers through consolidations and reduce the fear of being left out.

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[5] Bell Atlantic Mobile and NYNEX Mobile merged to become Bell Atlantic NYNEX Mobile in July 1995.
[6] SBC Communications merged with Pacific Telesis on November 5, 1996, in a $16.5 billion deal.
[7] AirTouch and US West began phasing in their merger dating from July 1994.
[8] *World Street Journal*, May 11, 1998

3.5 *Product Net*

As previously discussed, the future value proposition of wireless services will be drastically different and that product profile will need to be versatile enough to attract a diversity of customer segments. The Product Net, consisted of hardware (handset), software, and product integration, attracts customers that value these product based features. In general, developing core competencies in these offerings in the product net are longer term projects, likely takes up to 12 to 18 months of internal development and alliances with chosen infrastructure vendor partners. As wireless features and functions are being incorporated into many types of industrial and consumer products, from automobiles to medical diagnostic instruments, developing these product based core competencies and choosing the right strategic alliances can be a very powerful growth strategy to broaden the use of wireless technologies and services.

Many new technologies are likely to become mature enough to gain synergy with wireless to provide hardware, software, or product integration capabilities through the Product Net. Multimedia applications that will be enabled by the 3G standard, cross platform with PDA operating systems such as Geoworks or Windows CE, thin client Java applets, corporate intranet / extranet integration, speech recognition, real time location based applications and services are all viable technologies to add ancillary value to wireless applications. For example, for a segment of customers that value software features and capabilities, they may enter the value net based on which service provider delivers the best Java applets as they use the handset as a thin client network palm computer. Similarly, users who value wireless Email may choose their service provider by whom offers the largest screen on the handsets to display the Email messages, or which allows them to listen to Emails through text to speech capability.

One important measurement for determining which new technologies would benefit most to the service providers is the complementor / competitor concept defined in section 1.3. Some technologies, while seemingly unrelated, may turn out to be the killer app for wireless packet data, for example. Remote diagnostic analysis and reporting, ranging

from automobile performance and maintenance to personal medical monitoring and emergency notification, is an emerging complementor for wireless data applications.

Wireless service providers must invest in the development and management of the Product Net, and decide its role in their overall growth strategies. It is not uncommon for the service providers to closely work with their infrastructure suppliers, or even competitors, to further develop technological issues described in the Product Net. One suggestion is that in order to increase industry acceptance and consumer demand, there should be one single standard interface for earphone audio for such purposes as hands free operations and artificial intelligence data management assistance such as Wildfire[9].

3.6 Service Net

The Service Net is consisted of activation, content, and bundling (one stop shopping). Value is created through service features rather than products. Ease and level of service during the activation process can often make or break a sale. Content offering, as well as management, may attract a segment of customers hooked with timely information. Examples include news, weather, entertainment, and upstart on-line buddy chat-room type of services. Billing and customer care services also create value for the majority of customers, as they often hold the key to customer satisfaction.

As the airtime becomes commoditized, margin on airtime itself will decline. Squeezed margins on individual products are a major motivation to broaden product and service portfolio and create value by bundling. Cross selling helps telecom service providers capture immediate revenue stream and profit source from someone else's product lines or service offerings. Bundling also enables the benefits of true one stop shopping of all telecom services via one service provider. This is attractive for customers because they simplify their operations by having single point of contact for sales support and customer service, as well as a single bill every month. Furthermore, the customers increase their purchasing power by bundling different telecom needs together.

The Service Net can also help service providers segment their customers. For activation, prepaid wireless offers a new way of doing business that will certainly capture a segment more credit deficient. As for content, service providers may develop strategic relationships with content providers. It is not necessary to merge or acquire companies to offer a complete package of telecom services. With a wholesale (resale) strategy or through strategic alliances, wireless service providers have the ability to supply full telecom services.

3.7 Synchronize Growth Strategies and Communicate

The possible growth strategies discussed in this chapter should follow a higher level strategic plan that lays out the roadmap for the company's future. Each component growth strategy in this framework must not contradict the central strategy theme and work toward the same overwriting objective. Without synchronization, an upstream strategy inconsistent with the Product Net will delay product development, duplicate resources or even cause internal conflicts. Furthermore, a service provider may deploy a different set of growth strategies for each customer segment, though it must be clearly communicated throughout the organization. Many great strategies failed because of botched implementation and failure to communicate is often the culprit.

[9] A voice activated electronic assistance, for details see www.wildfire.com.

GROWTH STRATEGIES FOR WIRELESS MOBILE SERVICE PROVIDERS

Chapter 4: A System Dynamics Model

4.0 Introduction to System Dynamics

As a tool to understand how growth and different approaches to growth will change the market dynamics in tomorrow's wireless mobile services industry, system dynamics and game theory concepts are applied in a model in this chapter. A model is not developed for a specific service provider, though it could easily be modified to represent any of the important players previously mentioned. The results of this model will help identify important variables of growth, simulate future industry behavior and direction, and suggest strategies most likely to meet its strategic objective. System dynamics was founded at MIT, as a unique approach to analyzing and solving complex business problems, and suggest a new way of thinking about causes and effect of strategy dynamics. In this chapter, this model will be described and discussed, to help decision-makers think systematically instead of linearly, and provide insights about some different growth strategies and their likely outcomes.

4.1 Conceptual Model

The model has three main components, including market share, profitability, and attractiveness. In essence, the product attractiveness determines how likely a potential customer will sign up with a specific service provider, thus has a strong direct impact on market share. Market share, in turn, drive certain factors of profitability in this industry, such as cost and scale. Finally, a service provider may choose a number of different approaches to try increasing its product and service attractiveness as compared to its competitors. The system dynamics model will be build with a software package *Vensim*, and it will incorporate the key concepts in the conceptual model shown in Figure 4.1.

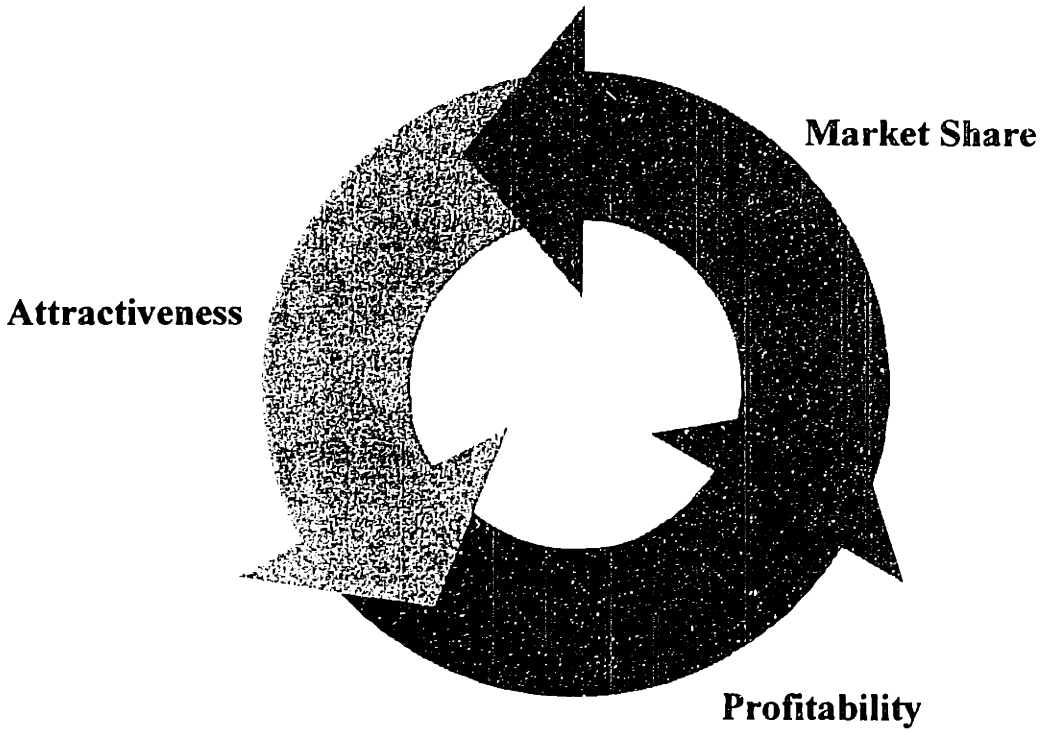

Figure 4.1 - The Conceptual Model of Industry Dynamics

4.2 Stocks and Flows

Stocks and flows, along with causal loop diagrams that will be discussed later, are the central concepts of dynamical systems theory. Stocks are simply accumulations that characterize the state of the system, and give systems inertia and provide them with memory. Flows are the inflows into and outflows out of the stocks. By de-coupling rates of flow, stocks become the source of disequilibrium in systems[1]. For example, a bank balance is a stock, and deposits and withdrawals over a time period are flows.

The stocks and flows that are important in this model, for any given service provider, are the subscriber base, new sign up rate, switch rate, and the churn rate. The stock of the subscriber base is the accumulation of the carrier's subscribers at any given point of time. The inflows, which represent the addition of new subscribers into the stock, include the

new sign up rate and the switch rate. The new sign up rate represents the fraction that the service provider captures from a pool of new potential subscribers, customers that are first time wireless service users. The switch rate, on the other hand, represents the fraction of mobile phone users who switch to this service provider from its competitors. The churn rate is the outflow that represents the rate of subscribers terminating the service, which is determined by the average lifetime of their accounts.

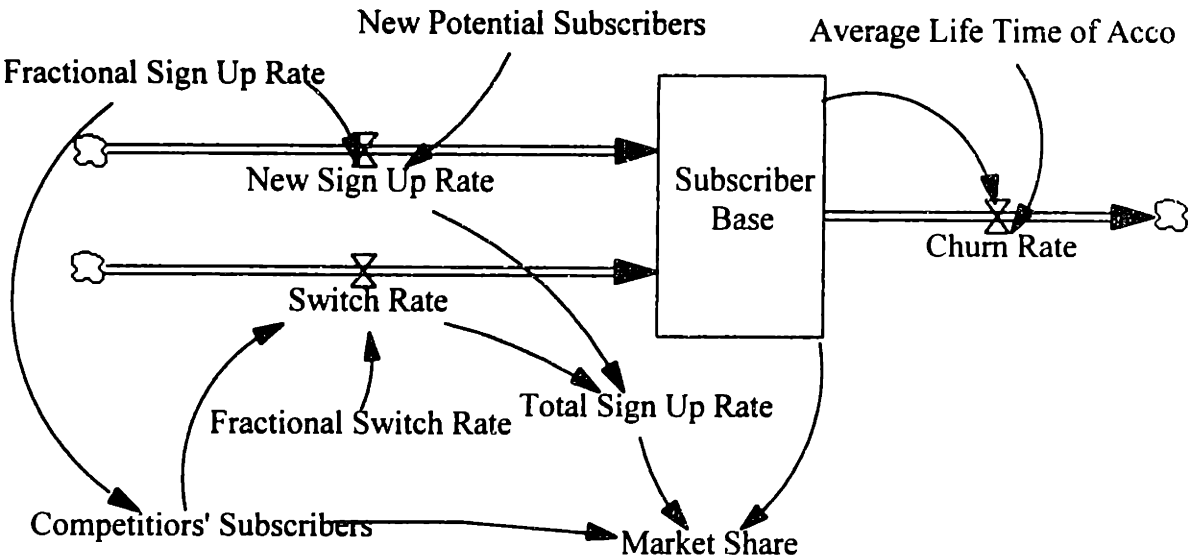

Figure 4.2 - Stock and flows of a wireless mobile service provider

The new sign up rate is determined by the product of total new potential subscribers and the fractional sign up rate, the fraction this particular service provider sign up. The switch rate is similarly the product of the total competitors' subscriber base and the fractional switch rate, the fraction this service provider manages to convince to switch. The total sign up rate is the sum of the new sign up rate and switch rate, represents the gross add for the service provider in a given time period. The churn rate is the subscriber base divided by the average lifetime of customer account, represents the rate of subscribers terminating their services.

[1] John Sterman, Professor at MIT Sloan School of Management, *Business Dynamics*, unpublished.

4.3 Casual Loop - Operating Profit

Feedback is one of the core concepts of system dynamics, and the causal loop diagrams are a simple tool to explicate the feedback structure of systems. A causal loop consists of variables connected by arrows that denote the causal relationships and influences among the variables[2]. The following causal loop depicts the important pricing and operating variables that determine the profitability of wireless mobile service providers.

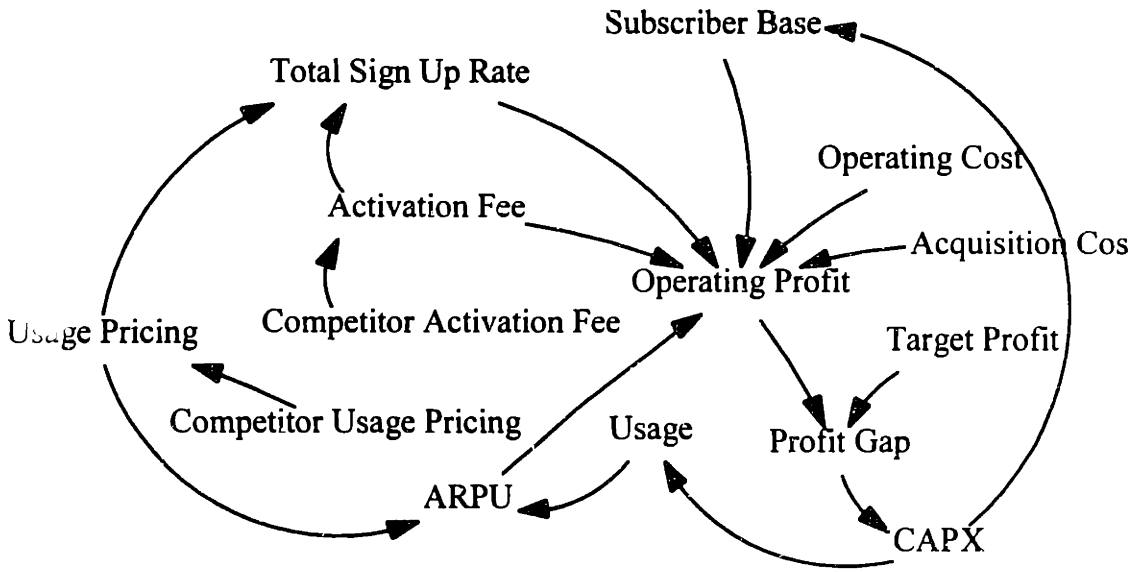

Figure 4.3 - The Profitability Causal Loop Diagram

Figure 4.3 shows the causal influences of pricing strategy and how operating profit is determined for a particular service provider. The operating cost is the per subscriber ongoing cost of providing service for the subscriber base, calculated by the total operating cost in any time period divided by the number of subscribers. The acquisition cost is the total cost associated to acquiring a new subscriber, including sales, marketing, fulfillment and the cost of the handset. The ARPU, average revenue per unit, is driven by the amount of per unit usage and the usage pricing, generally about 30 cents a minute on average. The activation fee includes the price the service providers charge for the handset plus any activation service charge. Oftentimes service providers choose to

subsidize the cost of the handset and waive the activation service charge to lure new customers. This practice is now less popular because customers are dismayed by long-term service contracts that were designed to help service providers recoup this up-front investment.

The pricing strategy, on the most part, is heavily influenced by the actions of the competitors. For new PCS entrants, the prices are by default driven by the cellular service providers. The added value is relatively insignificant since the cellular operators have mostly upgraded their networks to digital technologies that are capable of offering the same or similar types of services the PCS carriers provide. In order to penetrate for market share, PCS companies are forced to price somewhat below the existing players. For the existing players, the pricing strategy is varied. One could choose to price aggressively to make life difficult for new entrants and maintain market share at the expense of lower margin, or maintain the status quo in prices until market share proves to erode too quickly. Then it could be too late to reverse the market trend. This seems like a no-win situation. Game theory suggests the competitive actions are highly dependent on pricing strategies of the incumbents. Therefore, both the activation fee and the usage fee in this model are functions of the competitors' pricing structure and levels.

The somewhat simplified operating cost is calculated, without considering overhead cost, by subtracting all the costs from revenues. The total revenue over any given time period is the product of ARPU and subscriber base, plus the activation fee charged multiply by the gross add (the total sign up rate). Thus total revenue minus total cost is the simplified version of operating profit in this model. It could be compared with the target operating profit, determined by the return-seeking invested capital as well as the management.

4.4 Relative Attractiveness

In this model a very important variable is the total sign up rate, which is consisted of the new sign up rate and the switch rate. This variable determines how fast the service

[2] John Sterman, ibid.

provider can add to its subscriber base, and how profitable these gross adds turn out to be. For example, if the growth strategy is to grow the subscriber base, the service provider is likely to choose a more aggressive pricing scheme and subsidize the handsets. But it must balance the benefit derived from scale (lower operating cost per sub) and the consequences of the lower operating profit. Furthermore, as the rate of penetration slows, the additional revenue derived from new subscribers becomes less while the acquisition cost remains high. This is a less attractive growth strategy compared to increasing the ARPU or reducing the churn. Figure 4.4 shows the determinants of the total sign up rate, where the concept of relative attractiveness of the product or service is introduced.

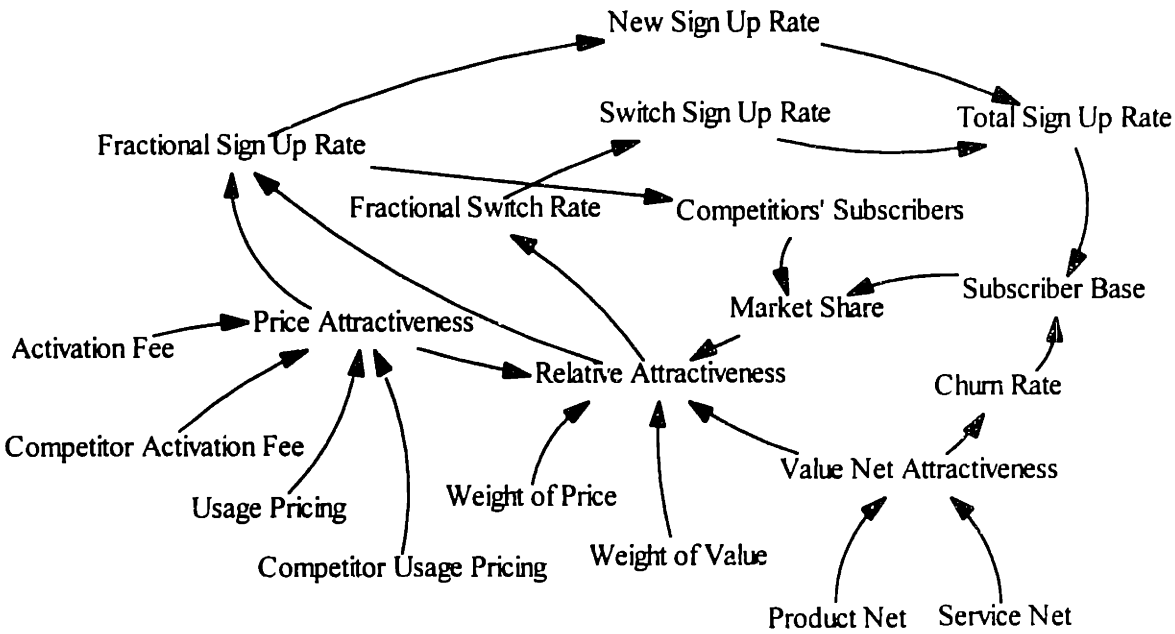

Figure 4.4 - Relative Attractiveness of the Product or Service

The relative attractiveness is determined by three parts in this model, the relative attractiveness of price, the relative attractiveness of the value provided, and the brand and network externality effects induced by market share. The price attractiveness is a weighted comparison of the activation fee and usage prices charged. The value net attractiveness is how much relative value proposition a subscriber perceives, such as the previously discussed product and service value nets of section 2.7.

Each of the three parts of attractiveness then is weighted to derive a composite relative attractiveness measure, and this measure is a major driver of both the new sign up rate and the switch rate. Since the service "airtime" will be commoditized, competitors' subscribers are not likely to switch just for a nominal price difference. The price attractiveness, however, will have some impact on the new sign up rate, as the low price does seduce new subscribers who otherwise might not have signed up for mobile services. Furthermore, the value net attractiveness is also a major driver of reducing churn, since customers who perceive the value creation by the value net will have a higher switching cost and less reason to churn.

4.5 The Complete Model

The complete model incorporates the three key concepts discussed in this chapter. Some of the growth strategies discussed in Chapter 3 are also incorporated into this system dynamics model. The Mergers and Acquisition part is modeled as a pulse switched inflow into the Subscriber Base stock. CAPX drives the development work to increase the effectiveness of the product net and service net. The following is a list of user inputs for this model.

- *Acquisition Cost* - the cost to acquire a new customer, including the cost of subsidizing the handset.
- *Activation Fee* - the total price a new customer needs to pay to start service, including the price of handset and the activation charge, if any.
- *Usage Pricing* - the price of average per minute charge for the use of airtime.
- *Target Operating Profit* - the levels of operating profit desired or expected.
- *Competitor Activation Fee* - what the competitors charge for activation fee on average.
- *Competitor Usage Pricing* - similarly what the competitors charge for per minute usage on average.

As in the conceptual model, the relative attractiveness measure determines the shares of new potential subscribers that will sign up with the subject service provider, as well as the portion of other carriers' subscribers that will switch. The sign up rate, together with the subscriber base information and the churn rate, will determine the profitability of the firm. Finally, how this service provider invests in developing the critical components of the future Value Net, indicates the relative attractiveness as perceived by the customers. Model documentation, which includes all the equations for all the variables, is attached in Exhibit A. The complete model is shown in Figure 4.5 below.

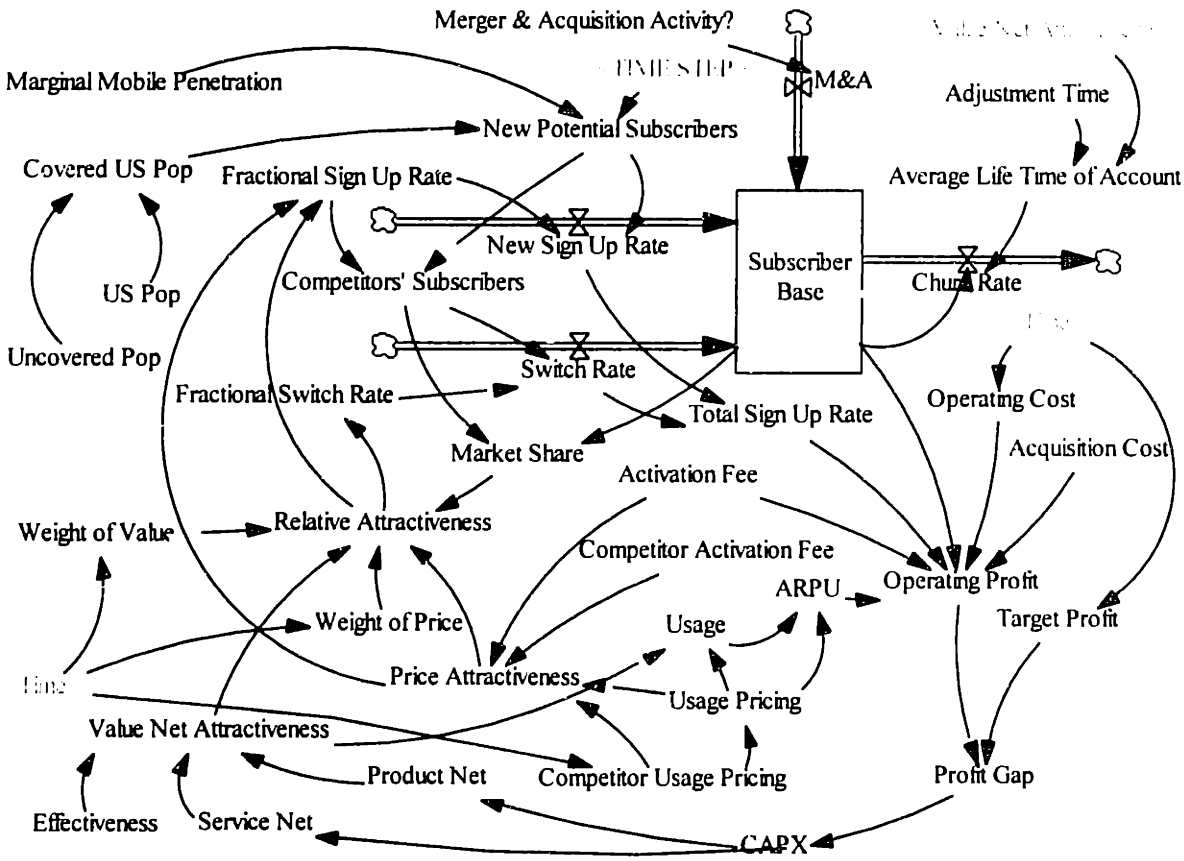

Figure 4.5 - The Complete Model

Chapter 5: Simulations and Scenarios Analyses

5.0 Purpose

In this chapter the system dynamics model will be simulated with four different scenarios, each with a separate strategic objective for increasing shareholder value, and the results will be evaluated and discussed. These four scenarios analyses form the basis for the strategic modeling and enable executives to ask "what if" questions without the risk of actually implementing them. Sensitivity analyses, although would make these scenarios analyses more complete and insightful, will not be part of this chapter due to time and scope. However, they would be part of the suggested future work for those interested in analyzing other scenarios.

5.1 Scenario Analysis

The scenario process involves understanding of the key concepts and relationships in this model, and provides levers to evaluate impacts of major uncertainties and potential risks. In addition, scenario analysis formulates different strategic approaches and predicts the likely outcomes. As problems grow more complex and involve nonlinear relationships, it becomes more difficult for human mental model to grasp. Furthermore, humans are known to be overconfident in estimations and approximations in nonlinear domain. With the use of computers, managers benefit from fast information processing and accuracy.

The four scenarios that will be simulated involve different strategies. The first scenario is the base case, named *Scenario_1*. The activation fee and the usage cost are both set to equal to the average of competitors' pricing strategies, thus producing the price attractiveness to be 0.5. The capital expenditures are set to a level, initially ramps up slowly then ramps down, to produce the relative attractiveness of just below 0.5. The

other important assumptions are that the competitors' total subscriber base stood at 11 million (in 1993, the first year of simulation), and the subject service provider in this model had 400 thousand subscribers. For a detail list of other assumptions and equations, again refer to the model documentation in Exhibit A. Overall, this scenario simulates how a wireless service provider, with a 3.5% market share at the start of the simulation, fares in terms of subscriber growth, gross customer adds, and profitability.

5.2 *Simulation Results - Base Case*

Since the relative attractiveness, at just below industry average of 0.5, drives the fractional sign up rate, the subject carrier will continue to capture a small share of the new potential customers. As shown, the new sign up rate will increase from 420,000 in base year 1993, to 450,000 in 1998.

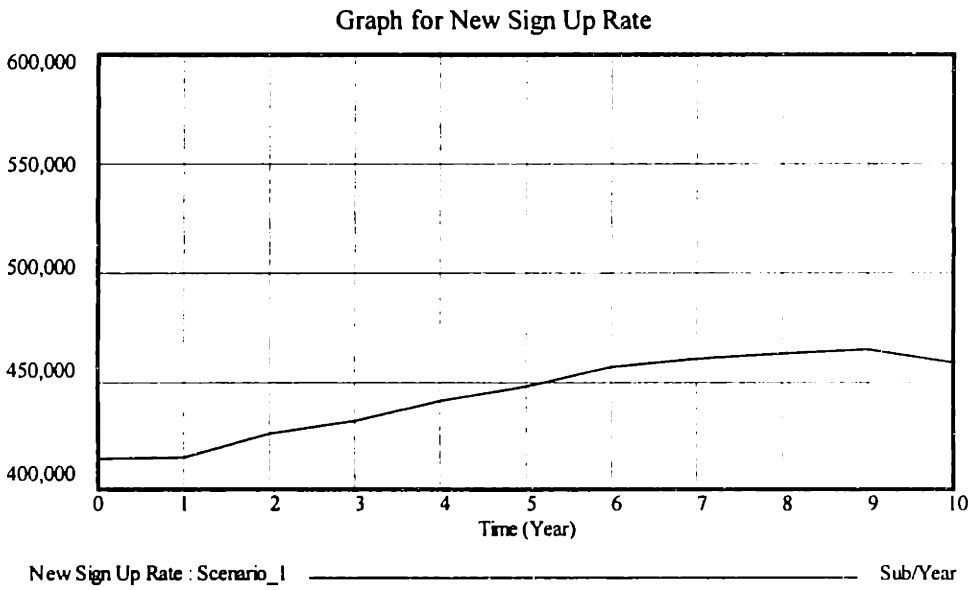

Figure 5.1 - New Sign Up Rate, Scenario 1.

The switch rate tells a slightly different story. A large player with significant geographic presence will be able to grow the subscriber base more from customers that switch from other service providers than from first time users. In fact, this phenomenon is true for the new PCS entrants, who gained more customers from cellular by claiming better digital

quality and lower price. As shown, the switch rate rose from 250,000 a year in 1994 to 1 million a year by year 2000.

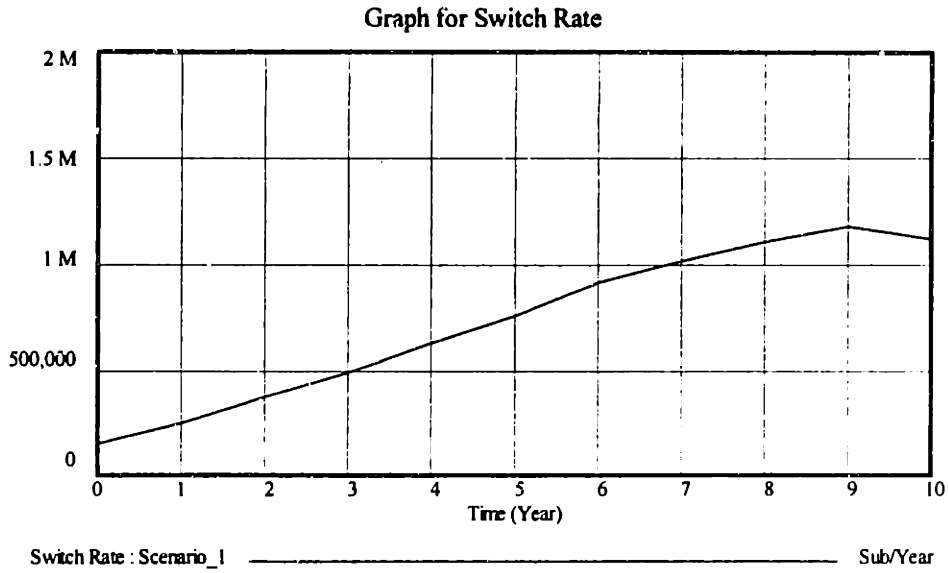

Figure 5.2 - Switch Rate, Scenario 1.

The subscriber base grows from the initial 400,000 to more than 3 million in 1999, to more than 5 million in 2003, the last year of simulation. This pace of growth is evident in service providers such as Nextel, who grew its digital subscriber base from 85,000 in 1995 to 1.27 million in 1997, with the help of a near national coverage footprint.

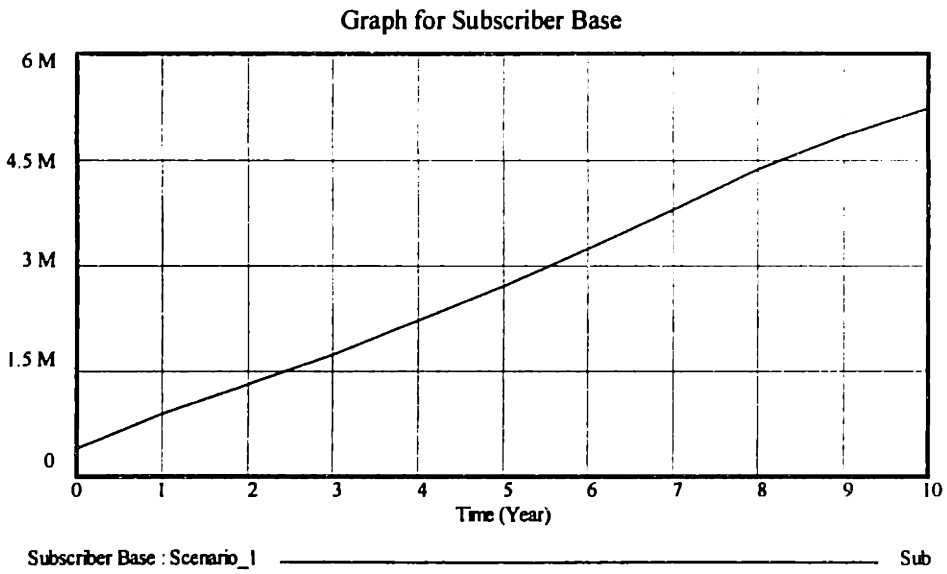

Figure 5.3 - Subscriber Base, Scenario 1.

The operating profit in this model, though without consideration of general overhead and other expenditures, is nonetheless a measurement of profitability. Through this simulation, profitability steadily grew. However, even at 2.5 billion profit a year does not seem a lot for a high risk return on equity for a company this size, depending on the capital invested.

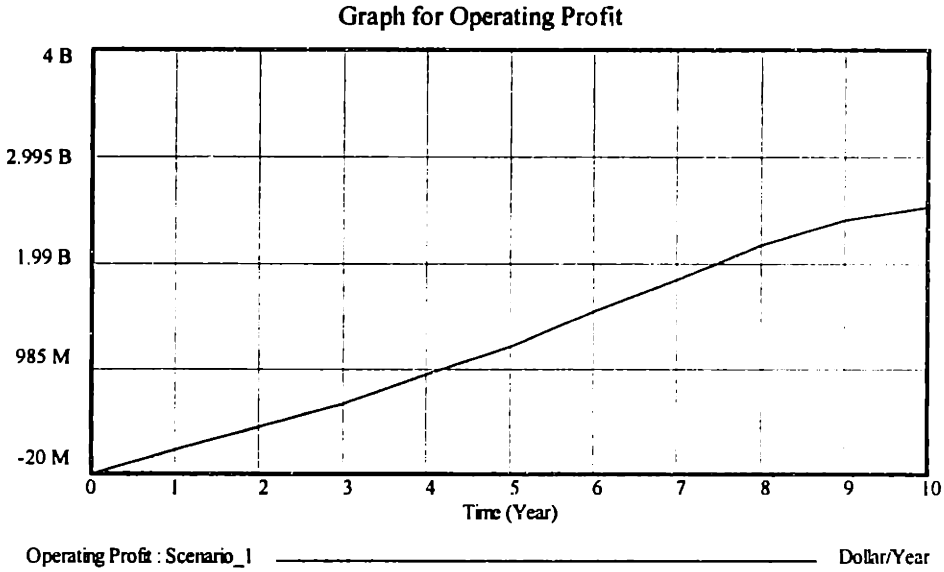

Figure 5.4 - Operating Profit, Scenario 1.

5.3 Growth Strategies Revisited

Some of the growth strategies previously discussed could be applied here for scenario analysis. For example, customer franchise management means deriving customer profitability instead of product, suggesting increasing the customer account lifetime positively impacts the bottom line. Therefore the first scenario analysis *(Scenario_2)* would increase the Value Net Effectiveness by 10%, either through higher CAPX on developing the Product Net and the Service Net, or simply spending the CAPX 10% more efficiently. This growth strategy is also consistent with product development investment in complementary products and services. We would expect, as the result of this parameter change, the Average Life Time of Account to be longer, and the Subscriber Base would be larger.

The second scenario analysis, *Scenario_3*, would simulate cost cutting efforts and the effect of lowering the Acquisition Cost. In this case, the acquisition cost is reduced 20%, from $500 to $400, though the traditional cost restructuring that improves operating cost and overhead, are not taken into consideration. Anyhow, we would expect the Operating Profit to benefit directly from this scenario change.

Finally, the last scenario analysis *(Scenario_4)* considers a popular growth strategy of late in the telecommunications industry - mergers and acquisition. In this case the switch for M&A is turned on, at the top of the complete model, to inject 2 million subscribers into the subscriber base in 1995. With all other parameter held equal to the base case, it would be interesting to see the impacts of this dynamic.

5.4 Simulation Results of Different Scenarios

In this section the results of these scenario analyses are shown and an effort will be made to explain the dynamics. For the subscriber base, reducing the internal acquisition cost should have no impact on the external growth of the customer base, as expected. It is important to point out, however, that even with a merger or acquisition of 2 million new subscribers added to the system does not give sustainable competitive advantage. It is still more powerful to develop internal core competencies that will create value for future customers, as *Scenario_2* gives the best results long term. By investing in the Value Net, thus increasing the Value Net Attractiveness by merely 10%, a service provider could grow the subscriber base and surpass the M&A growth by year 2001. Similarly, profitability also catches on, with a steady strong growth rate, in the year 2000. This is because the Value Net Attractiveness not only impacts the fractional sign up rate for both new potential customers and competitors' subscribers that switch, but also prolonging the average lifetime of customer account thus reducing the churn rate as well. The graph is shown in Figure 5.5 and 5.6.

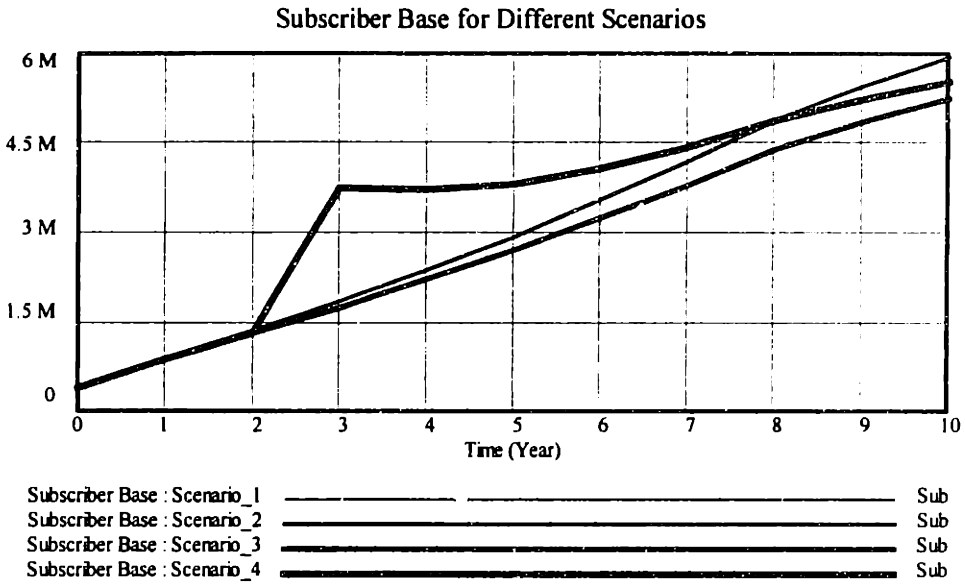

Figure 5.5 - Subscriber Base

The operating profit would be the next result of interest. Reducing the acquisition cost, although has an immediate impact on the operating profit, does not necessarily provide the best long-term benefit. Similarly, the injection of 2 million customers adds to the bottom line strongly, since the operating margin in this business in high and there was no acquisition cost considered in this scenario. Again *Scenario_2* provides the best long-term results, by improving the value proposition in the future marketplace.

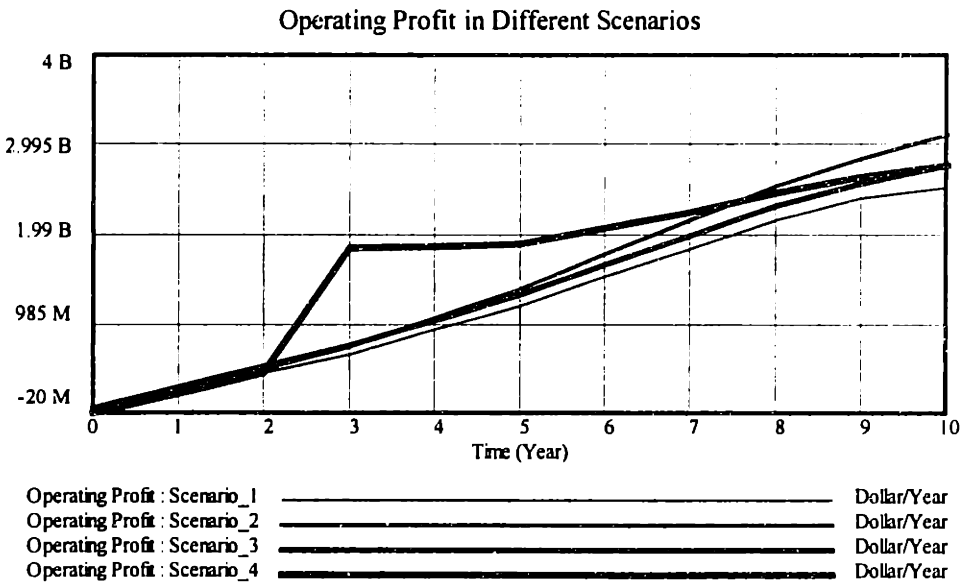

Figure 5.6 - Operating Profit

Chapter 6: Conclusions

6.0 Summary of Results

By developing a system dynamics model, many key concepts and relationships formulated in the future Value Net and the proposed framework have to be rigorously tested and deeply pondered. The model simulates certain scenarios that would otherwise be thought as viable growth strategies, and their effectiveness is shown to have less impact than expected. With the help of the system dynamics model, the long term effectiveness of any growth strategies to whatever the strategic objectives (growth in subscriber base and operating profitability were simulated as examples) can be quantified and the information may form the basis for strategic decision making.

6.1 Conclusions of Growth Strategies

Among the various growth strategies discussed throughout this thesis, one strategy stands out to provide the best shareholder value. It had the best long term impacts in many aspects, such as higher relative attractiveness, higher total sign up rate, lower churn, larger subscriber base, and most importantly, the highest long term operating profit. For service providers that want to compete for the future, and winning the ultimate game, this is one growth strategy that can not be ignored.

6.2 Suggestions for Future Work

There are plenty of directions that could be taken for future work. One could further develop and build upon this model, adjusting key relationships and challenge certain assumptions. Others include adding scenario analyses, and perform certain sensitivity

analyses. Since a system dynamics model has the capability to modify inputs, and key relationships among variables can be changed through equations, many operating metrics or process improvements may also be developed for wireless service providers.

Exhibit A - Model Documentation

(01) Acquisition Cost=
500
Units: Dollar/Sub
The acquisition cost is assumed to be constant at 500 dollars per sub, includes the subsidized handset cost, marketing, advertising and sales costs.

(02) Activation Fee=
80
Units: Dollar/Sub
The average activation fee includes all the cost that a new sub has to pay to get service, such as the handset price and any activation service fee. This is an user input.

(03) Adjustment Time=
0.5
Units: Year
Customers evaluates the value net attractiveness on the average lifetime of acct every 6 months.

(04) ARPU=
Usage*Usage Pricing
Units: Dollar/(Sub*Year)
ARPU, average revenue per unit, is the product of usage and usage pricing.

(05) Average Life Time of Account=
DELAY1I(16*Value Net Attractiveness*Adjustment Time,0.75,5)
Units: Year
Average life time of acct is assumed to be 8 years multiplied by value net attractiveness, if vale net attractiveness is 0.5, then average life time of acct is 4 years, implying a churn of 25% a year. The delay is 9 months.

(06) CAPX=
IF THEN ELSE(Profit Gap>0,(0.5+RAMP(0.05,0,5))*1e+008+(0.5+RAMP(-0.08,6,10))*1e+008,(0.5+RAMP(0.05,0,5))*1e+008+(0.5+RAMP(-0.08,6,10))*1e+008+Profit Gap/10)
Units: Dollar/Year
CAPX ramps up and down over time, also affected by the profit gap. Could be modified based on how subject carrier invests in product and service development.

(07) Churn Rate=

Subscriber Base/Average Life Time of Account
Units: Sub/Year
The churn rate is the sub base divided by the average life time of acct, how many subscribers terminate service each year.

(08) Competitor Activation Fee=
80
Units: Dollar/Sub
This is user input, based on what the competitor charges for activation including the price of the handset.

(09) Competitor Usage Pricing=
0.65/(1+Time/5)
Units: Dollar/Minute
This is user input, declining over time, for what the competitor charges per minute on average. Set initially at 65 cents a minute in 1993 to nearly 20 cents in 10 years (2003).

(10) Competitors' Subscribers= INTEG (
New Potential Subscribers*(1-Fractional Sign Up Rate),1.1e+007)
Units: Sub
The competitors' sub base is the accumulation of the competitors subscribers plus the fraction not captured by the subject's subscriber base, initially set at 11 mil (year 1993).

(11) Covered US Pop=
US Pop-Uncovered Pop
Units: Sub
The Covered US pop is the total US population minus the uncovered population, initially about 245 mil.

(12) Effectiveness=
1
Units: Year/Dollar
Effectiveness of investment for each dollar invested, for normalization and unit match purpose.

(13) FINAL TIME = 10
Units: Year
The final time for the simulation.

(14) Fractional Sign Up Rate=
(Price Attractiveness*2+Relative Attractiveness*1)/30
Units: Dimensionless
The fractional sign up rate is a function of the price attractiveness and relative attractiveness, weighted as price attractiveness twice as important as relative

attractiveness. Capped at 10% in this case, since no US wireless carrier has the market power to sign up more than 10% of potential customers at this point.

(15) Fractional Switch Rate=
Relative Attractiveness*Relative Attractiveness/(10+10*Relative Attractiveness)
Units: Dimensionless
The fractional switch rate is assumed to be between 0 and 5% a year, as defined by the above equation. If relative attractiveness is 1, meaning all other carriers provide NO value to customers, 5% of all competitors' customers will understand and recognize this and switch to the subject carrier each year.

(16) INITIAL TIME = 0
Units: Year
The initial time for the simulation.

(17) "M&A"=
IF THEN ELSE("Merger & Acquisition Activity?"=1,2e+006*PULSE(2,1),0)
Units: Sub/Year
The addition of subs added thru M&A is modeled as a pulse function.

(18) Marginal Mobile Penetration(
[(0,0)-
(10,0.1)],(0,0.03),(1,0.035),(2,0.036),(3,0.038),(4,0.047),(5,0.051),(6,0.05),(7,0.045),(8,0.041),(9,0.037),(10,0.033))
Units: 1/Year
Marginal mobile penetration is the additional penetration the whole wireless mobile industry has or is likely to achieve every year for 10 years, the base year (0) is 1993 in this case.

(19) Market Share=
Subscriber Base/(Subscriber Base+Competitors' Subscribers)
Units: Dimensionless
Market share is sub base divided by total wireless customer base.

(20) "Merger & Acquisition Activity?"=
0
Units: Dimensionless
1 for yes, 0 for no. Answer to whether the sub base instantly increases due to M&A activity.

(21) New Potential Subscribers=
Covered US Pop*Marginal Mobile Penetration(TIME STEP)
Units: Sub/Year
New potential subs for the whole industry are covered pop multiplies marginal mobile penetration.

(22) New Sign Up Rate=
Fractional Sign Up Rate*New Potential Subscribers
Units: Sub/Year
The new sign up rate is the new potential sub times fractional sign up rate.

(23) Operating Cost=
180/(1+Time/10)
Units: Dollar/(Sub*Year)
The average operating cost per sub is initially 180 dollars then declines over time as subscriber base grows.

(24) Operating Profit=
(ARPU-Operating Cost)*Subscriber Base+(Activation Fee-Acquisition Cost)*Total Sign Up Rate
Units: Dollar/Year
The operating profit is the revenue generated - associated costs

(25) Price Attractiveness=
IF THEN ELSE(Competitor Activation Fee>Activation Fee, MIN(0.2,0.2*(Competitor Activation Fee-Activation Fee)/Activation Fee), MAX(-0.2,0.2*(Competitor Activation Fee-Activation Fee)/Activation Fee))+ IF THEN ELSE(Competitor Usage Pricing>Usage Pricing, MIN (0.3,1.2*(Competitor Usage Pricing-Usage Pricing)/Usage Pricing), MAX(-0.3, 1.2*(Competitor Usage Pricing-Usage Pricing)/Usage Pricing))+0.5
Units: Dimensionless
Normalized price attractiveness determines how price is perceived by customers. 1 is perceived by all customers as lowest price, 0 is perceived as highest price by all customers.

(26) Product Net=
MAX(0.01,MIN(0.6,DELAY1I(0.1+MIN(0.5,0.1*CAPX*1e-008),0.75,0.25)))
Units: Dollar/Year
The value effectiveness of the product net is directly related to the CAPX invested in developing the Product Net, such as handset, software, and product integration. The delay is 9 months.

(27) Profit Gap=
Operating Profit-Target Profit
Units: Dollar/Year
Operating profit gap is the difference of operating profit and target profit.

(28) Relative Attractiveness=
MAX(0,Market Share*(1-Weight of Price-Weight of Value)+Value Net Attractiveness*Weight of Value+Price Attractiveness*Weight of Price)
Units: Dimensionless

The relative product or service attractiveness is the weighted combination of market share (brand and network effects), pricing and comparative value as defined by the Value Net.

(29) SAVEPER =
TIME STEP
Units: Year
The frequency with which output is stored.

(30) Service Net=
MAX(0.01,DELAY1I(MIN(0.4,0.1+MIN(0.3,0.15*CAPX*1e-008)),0.5,0.25))
Units: Dollar/Year
The service effectiveness of the service net is directly related to the CAPX invested in the Service Net, including activation, content, and bundling (one stop shopping). The delay is 6 months.

(31) Subscriber Base= INTEG (
+Switch Rate+New Sign Up Rate-Churn Rate+"M&A",
400000)
Units: Sub
The sub base is the accumulation of sign up rate - churn rate. Part of user input to what the initial sub base is. This case is set for 400,000.

(32) Switch Rate=
Competitors' Subscribers*Fractional Switch Rate
Units: Sub/Year
The switch rate is a function of how large the competitor sub base and the fractional switch rate, this is the fraction of new users into the subject sub base from another carrier, not first time user.

(33) Target Profit=
-2e+009+5e+008*Time
Units: Dollar/Year
The target operating profit is related to what the firm expects to return on invested capital over time. Could be modified based on the firm's objectives.

(34) TIME STEP = 1
Units: Year
The time step for the simulation.

(35) Total Sign Up Rate=
New Sign Up Rate+Switch Rate
Units: Sub/Year
Total sign up rate is the sum of switch rate and new sign up rate.

(36) Uncovered Pop= INTEG (

Uncovered Pop*-0.12,1.3e+007)
Units: Sub
Assumes the geographic expansion in the US continues to reduce the uncovered population by 12% a year for 10 years (since 1993).

(37) US Pop= INTEG (
0.01*US Pop, 2.575e+008)
Units: Sub
US population grows at approximately 1% a year for the next 10 years.

(38) Usage=
500*(1+Value Net Attractiveness)/Usage Pricing
Units: Minute/(Sub*Year)
This is the usage per sub per year, partially driven by the value net attractiveness and partially by lower price.

(39) Usage Pricing=
1*Competitor Usage Pricing
Units: Dollar/Minute
The usage pricing is set to be the same as competitors, as pricing strategy is driven by market leaders, declining over time. This could be modified depending on what pricing strategy is undertaken.

(40) Value Net Attractiveness=
(Product Net+Service Net)*Effectiveness
Units: Dimensionless
Some customers value bundling and some value complementary services. The value net attractiveness is a normalized indicator (0 to 1) of how customers perceive value.

(41) Weight of Price=
0.6-0.025*Time
Units: Dimensionless
Price is initially set to 2 times as important as the value of value net, but declines over time. Could be modified based on how soon the commoditization process progresses.

(42) Weight of Value=
0.3+0.025*Time
Units: Dimensionless
Weight of value set initially at 0.3, increasing over time as airtime becomes commoditized.

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