DOWNLOAD PDF NEW TELECOMMUNICATIONS INDUSTRY

Chapter 1 : Telecom News | Latest Telecom Industry News, Information and Update: ET Telecom

The telecommunications sector continues to be a critical force for growth, innovation, and disruption across multiple industries. While the rollout of 5G will be a multiyear journey, the foundations will begin in One of the most anticipated mobile technology platforms, 5G will be the.

Here are some of the top technologies that will help carry communications providers through the next generation. The IoT will become a complete ecosystem that connects everything we do, from the home to the car, to the workplace to the electrical grid. Telecoms are not going to sit back, build the infrastructure for it and watch the world ride piggyback with all the profits like they have in the past 10 years when more agile digital service providers ran roughshod over their business. Building infrastructure will indeed be part of the deal. Massive amounts of M2M data will have to be moved quickly and securely. Not to mention that much of it will be mobile, increasing commitments to 5G and secure carrier-grade WiFi networks. However, telecom companies will also be providing services, and capitalizing on the valuable user data born from IoT devices. Cloud Computing Communications providers are facing some great challenges and opportunities in cloud computing. They can potentially use the cloud to deliver higher quality, more flexible and more scalable enterprise IT services at lower cost than on-premise solutions. For example, the clunky, ugly, and outdated set top boxes STBs that have plagued our living rooms since the 70s might finally be on the way out. This reduces costs for the cable providers by eliminating the need for on-site installations and manufacturing and engineering new STBs every three years. Not to mention that cloud accessibility may help lure back some cord-cutters that long ago retreated to Roku. When it comes to wireless connectivity over short distances, WiFi is hard to beat. The next generation of WiFi will have the same or better reliability as cellular, hence its carrier-grade moniker. And according to Gartner , So how exactly does building all this new infrastructure benefit carriers? Well, all the IoT services they are banking on will not work without it, for one. The consumer revolt that is going to occur when 4G inevitably falls flat would be rather unpleasant as well. With the Amazons, Rokus, and Netflixes of the world snatching up more and more cable customers by the day, it only makes sense that CSPs get into the content game themselves. The strategy of most CSPs seems to be owning the content, so however it is consumed, they still derive revenue from it and user data. As a SaaS content and copywriting specialist, he pulls from his journalistic roots to bring some humanity back into the often robotic tech world. These companies have crushed their competition and built billion-dollar valuations by focusing on recurring revenue models.

Chapter 2 : About - TIA Online

Quartz is a guide to the new global economy for people excited by change. These six forces will disrupt the telecommunications industry by By mchamberlainqz March 6,

Pigeon post had Persian roots, and was later used by the Romans to aid their military. Frontinus said that Julius Caesar used pigeons as messengers in his conquest of Gaul. And in , Paul Julius Reuter started a pigeon service to fly stock prices between Aachen and Brussels , a service that operated for a year until the gap in the telegraph link was closed. Beacon chains suffered the drawback that they could only pass a single bit of information, so the meaning of the message such as "the enemy has been sighted" had to be agreed upon in advance. One notable instance of their use was during the Spanish Armada , when a beacon chain relayed a signal from Plymouth to London. As a result of competition from the electrical telegraph, the last commercial line was abandoned in The first transatlantic telegraph cable was successfully completed on 27 July , allowing transatlantic telecommunication for the first time. Voice and music were demonstrated in and , but had little early success. After the war, commercial radio AM broadcasting began in the s and became an important mass medium for entertainment and news. World War II again accelerated development of radio for the wartime purposes of aircraft and land communication, radio navigation and radar. It formed the basis of experimental broadcasts done by the British Broadcasting Corporation beginning 30 September The first version of such a television to show promise was produced by Philo Farnsworth and demonstrated to his family on 7 September However, already in the s, researchers started to investigate packet switching , a technology that sends a message in portions to its destination asynchronously without passing it through a centralized mainframe. While Internet development was a focus of the Internet Engineering Task Force IETF who published a series of Request for Comment documents, other networking advancement occurred in industrial laboratories , such as the local area network LAN developments of Ethernet and the token ring protocol [citation needed]. Key concepts[edit] Modern telecommunication is founded on a series of key concepts that experienced progressive development and refinement in a period of well over a century. Basic elements[edit] Telecommunication technologies may primarily be divided into wired and wireless methods. Overall though, a basic telecommunication system consists of three main parts that are always present in some form or another: A transmitter that takes information and converts it to a signal. A transmission medium , also called the physical channel that carries the signal. An example of this is the "free space channel". A receiver that takes the signal from the channel and converts it back into usable information for the recipient. Next, the radio receiver is the destination of the radio signal, and this is where it is converted from electricity to sound for people to listen to. Sometimes, telecommunication systems are "duplex" two-way systems with a single box of electronics working as both the transmitter and a receiver, or a transceiver. For example, a cellular telephone is a transceiver. This can be readily explained by the fact that radio transmitters contain power amplifiers that operate with electrical powers measured in watts or kilowatts , but radio receivers deal with radio powers that are measured in the microwatts or nanowatts. Hence, transceivers have to be carefully designed and built to isolate their high-power circuitry and their low-power circuitry from each other, as to not cause interference. Telecommunication over fixed lines is called point-to-point communication because it is between one transmitter and one receiver. Telecommunication through radio broadcasts is called broadcast communication because it is between one powerful transmitter and numerous low-power but sensitive radio receivers. The sharing of physical channels using multiplexing often gives very large reductions in costs. Multiplexed systems are laid out in telecommunication networks, and the multiplexed signals are switched at nodes through to the correct destination terminal receiver. Analog versus digital communications[edit] Communications signals can be sent either by analog signals or digital signals. There are analog communication systems and digital communication systems. For an analog signal, the signal is varied continuously with respect to the information. In a digital signal, the information is encoded as a set of discrete values for example, a set of ones and zeros. During the propagation and reception, the information contained in analog signals will inevitably be degraded by undesirable physical noise. The output of a transmitter is

noise-free for all practical purposes. Commonly, the noise in a communication system can be expressed as adding or subtracting from the desirable signal in a completely random way. This form of noise is called additive noise , with the understanding that the noise can be negative or positive at different instants of time. Noise that is not additive noise is a much more difficult situation to describe or analyze, and these other kinds of noise will be omitted here. On the other hand, unless the additive noise disturbance exceeds a certain threshold, the information contained in digital signals will remain intact. Their resistance to noise represents a key advantage of digital signals over analog signals. Some digital communications networks contain one or more routers that work together to transmit information to the correct user. An analog communications network consists of one or more switches that establish a connection between two or more users. For both types of network, repeaters may be necessary to amplify or recreate the signal when it is being transmitted over long distances. This is to combat attenuation that can render the signal indistinguishable from the noise. Communication channels[edit] The term "channel" has two different meanings. In one meaning, a channel is the physical medium that carries a signal between the transmitter and the receiver. Examples of this include the atmosphere for sound communications, glass optical fibers for some kinds of optical communications , coaxial cables for communications by way of the voltages and electric currents in them, and free space for communications using visible light , infrared waves , ultraviolet light , and radio waves. The various RG designations are used to classify the specific signal transmission applications. The sending of radio waves from one place to another has nothing to do with the presence or absence of an atmosphere between the two. Radio waves travel through a perfect vacuum just as easily as they travel through air, fog, clouds, or any other kind of gas. The other meaning of the term "channel" in telecommunications is seen in the phrase communications channel , which is a subdivision of a transmission medium so that it can be used to send multiple streams of information simultaneously. For example, one radio station can broadcast radio waves into free space at frequencies in the neighborhood of In the example above, the "free space channel" has been divided into communications channels according to frequencies , and each channel is assigned a separate frequency bandwidth in which to broadcast radio waves. This system of dividing the medium into channels according to frequency is called " frequency-division multiplexing ". Another term for the same concept is " wavelength-division multiplexing ", which is more commonly used in optical communications when multiple transmitters share the same physical medium. Another way of dividing a communications medium into channels is to allocate each sender a recurring segment of time a "time slot", for example, 20 milliseconds out of each second , and to allow each sender to send messages only within its own time slot. This method of dividing the medium into communication channels is called " time-division multiplexing " TDM , and is used in optical fiber communication. Modulation[edit] The shaping of a signal to convey information is known as modulation. Modulation can be used to represent a digital message as an analog waveform. This is commonly called "keying" â€” a term derived from the older use of Morse Code in telecommunications â€” and several keying techniques exist these include phase-shift keying , frequency-shift keying , and amplitude-shift keying. The " Bluetooth " system, for example, uses phase-shift keying to exchange information between various devices. Modulation can also be used to transmit the information of low-frequency analog signals at higher frequencies. This is helpful because low-frequency analog signals cannot be effectively transmitted over free space. Hence the information from a low-frequency analog signal must be impressed into a higher-frequency signal known as the " carrier wave " before transmission. There are several different modulation schemes available to achieve this [two of the most basic being amplitude modulation AM and frequency modulation FM]. Society[edit] Telecommunication has a significant social, cultural and economic impact on modern society. Microeconomics[edit] On the microeconomic scale, companies have used telecommunications to help build global business empires. This is self-evident in the case of online retailer Amazon. Even relatively poor communities have been noted to use telecommunication to their advantage. A survey by the International Telecommunication Union ITU revealed that roughly a third of countries have fewer than one mobile subscription for every 20 people and one-third of countries have fewer than one land-line telephone subscription for every 20 people. In terms of Internet access, roughly half of all countries have fewer than one out of 20 people with Internet access. From this information, as well as educational data, the ITU was able to

compile an index that measures the overall ability of citizens to access and use information and communication technologies. Nevertheless, devices like the telephone system were originally advertised with an emphasis on the practical dimensions of the device such as the ability to conduct business or order home services as opposed to the social dimensions. It was not until the late s and s that the social dimensions of the device became a prominent theme in telephone advertisements. In recent years, the popularity of social networking sites has increased dramatically. These sites allow users to communicate with each other as well as post photographs, events and profiles for others to see. In this way, these sites can play important role in everything from organising social engagements to courtship.

Chapter 3 : Telecommunication Market Size, Share, Growth, Trends | Industry Report, Forecast

The Internet of Things (IoT) revolution is creating an enormous volume of data for the telecommunications industry (telcos). Data gathered from in-store beacons, environmental sensors, and mobile devices have the potential to create value in new, unprecedented ways.

Request Report Methodology The global telecommunications market is continually transforming on account of the ongoing innovations and developments taking place consistently and at a fast pace. Carriers are expected to strive for improving their network and offering expanded services to their customers by network densification and making use of small cells. Installing more fiber infrastructure and enhancing spectrum efficiency will also be the target for carriers. There are various factors fueling the growth of the global telecommunication market including, the advanced technology, intense market competition, and high investments in new telecommunication technologies such as wireless communication and satellite. Some of the other factors behind the growth of the market worldwide include: On the other hand, the high cost of value added services may restrict the growth of the market. In addition to this, maintaining security will also pose a challenge. Services provided by key players in the telecommunication market include providing storage area networks, storage products, storage networking services, entry level servers, enterprise networking services, 3G services, calling cards, broadband networks, and application networking services. The growing number of internet users worldwide has been increasing exponentially by the day and thus, within the telecommunications market, the market for internet-based services is currently thriving and is at its peak. Overview As everyday life appears to be increasingly dependent on the use of telecom products and services, the global market for telecommunication is slated to grow at a phenomenal rate over the coming years. Some prominent segments of telecommunication industry are long-distance carriers, wireless communication, domestic telecom services, communications equipment, processing systems and products, and foreign telecom services. The report on global telecommunication market by Transparency Market Research presents detailed analysis of the recent technological developments, growth drivers, opportunities and challenges faced by the market, along with relevant figures, charts, and statistical data. The market shares, business strategies, and product portfolios of the leading vendors have also been discussed in details. Drivers and Restraints Various telecommunication products and services, increased popularity of the Internet of Things IoT , and substantial technological advances are some of the major reasons for the growth of the global telecommunication market. Smart devices such as smartphones, tablets, smart watches, smart meters, sensors, smart buildings, and smart monitoring devices are being increasingly deployed across the globe. The smart cities projects worldwide is one instance where smart devices such as smart sensors and meters are used. The growing popularity of IoT that has enabled machine-to-machine communication, connecting innumerable smart devices such as air conditioners, refrigerators, music systems, food processors, and the like. All this has stoked the demand in the telecommunication market. Factors such as cloud computing, increased coverage of satellites, and the development of 4G and 3G cellular networks are some other prominent growth drivers of the market for telecommunication products and services, worldwide. However, the increasing deployment of intelligent transportation systems ITS is likely to fuel the demand for these services, nullifying the negative effects of these restraints. The telecommunication market can be broadly segmented into internet service providers ISP , telephones, satellites, and cable communication. On the basis of usage, entertainment, point-to-point communication, infotainment, news, internet-enabled services, and critical communication are the major categories. The wireless and broadband markets in North America are showing healthy growth and are poised for further expansion. The massive population base of Asian countries such as China and India is one of the key factors responsible for the growth of the telecommunication market in Asia Pacific. China, being one of the largest mobile operators in the world, is likely to represent a significant portion of the market shares. Japan is expected to become a prominent regional market as foreign investments build up. From the past two decades or so, the telecommunication market in India has been progressing by leaps and bounds, thanks to government policies that are focusing on widespread penetration of telecom services in every nook and corner

of the nation. The monumental growth in the number of smartphone owners and internet users are some of the other prominent drivers propelling the growth of the telecommunication market in this country. Besides the aforementioned emerging economies, the countries in Latin America such as Brazil, Mexico, and Argentina too are slated to present significant opportunities as the degree of penetration of high speed broadband services, 4G services, and the usage of smartphones increases. Major regions analyzed under this research report are:

Chapter 4 : 5 Technology Trends in Telecommunications

Telecommunications - A monthly magazine and that website provides news and analysis on the global telecom industry. The Federal Communications Commission - The U.S. government's telecom.

Noted below are some of the key areas of impact: Telecommunications provides a technological foundation for societal communications. Communication plays a central role in the fundamental operations of a societyâ€"from business to government to families. In fact, communication among people is the essence of what distinguishes an organization, community, or society from a collection of individuals. Communicationâ€"from Web browsing to cell phone calling to instant messagingâ€"has become increasingly integrated into how we work, play, and live. Telecommunications enables participation and development. Telecommunications plays an increasingly vital role in enabling the participation and development of people in communities and nations disadvantaged by geography, whether in rural areas in the United States or in developing nations in the global society and economy. Telecommunications provides vital infrastructure for national security. From natural disaster recovery, to homeland security, to communication of vital intelligence, to continued military superiority, telecommunications plays a pivotal role. When the issue is countering an adversary, it is essential not only to preserve telecommunications capability, but also to have a superior capability. There are potential risks associated with a reliance on overseas sources for innovation, technologies, applications, and services. It is difficult to predict the future impact of telecommunications technologies, services, and applications that have not yet been invented. Telecommunications and the U. Economy The telecommunications industry is a major direct contributor to U. Census Bureau estimates that just over 3 percent of the U. At 3 percent, telecommunications thus represented more than a third of the total fraction of GDI spent on information technology IT; 7. In fact, the fraction attributable to telecommunications is probably larger relative to that of IT than these figures suggest, given that much of the GDI from IT hardware particularly semiconductors could apply to any of several industries computing, telecommunications, media, and electronics, for example. The National Academies Press. Telecommunications is a growth business. Although markedly reduced investment in some parts of the sector following the bubble years of the late s may have given an impression of low growth in the long run, a longer-term view taking into account the need for humans and machines to communicate suggests that telecommunications will continue to grow apace, as evidenced by the ongoing expansion of wireless and broadband access services throughout the world. Telecommunications is also a key enabler of productivity across the U. In the s the U. GDP grew rapidly, and the U. It is widely believed that the Internet economy played a significant role in this success. For the United States to compete in the global marketplaceâ€"across industriesâ€"it needs the productivity that comes from enhancements in telecommunications. If the telecommunications infrastructure in the United States were to fall significantly behind that of the rest of the world, the global competitiveness of all other U. Conversely, the growth in U. Telecommunications has been and likely will continue to be an important foundation for innovative new industries arising in the United States that use telecommunications as a primary technological enabler and foundation. Recent examples of innovative new businesses leveraging telecommunications include Yahoo! Telecom- 4 GDI estimates for from U. Jorgenson and Kevin J. Page 10 Share Cite Suggested Citation: Finally, telecommunications is an important component of the broader IT industry, which is sometimes viewed as having three technology legs: The boundaries between these areas are not very distinct, but this decomposition helps illustrate the breadth of IT and the role that telecommunications plays. Increasingly IT systems must incorporate all three elements to different degrees, 8 and it is increasingly common for companies in any sector of IT to offer products with a communications component, and often with a communications emphasis. Increasing numbers of businesses compete globally. Every company and every industry must assess the segments and niches in which it operates to remain globally competitive. Both Asian and European nations are continuing to pursue strategies that exploit perceived U. Leapfrogging the United States in telecommunications has, in the opinion of the committee, been an explicit and stated strategy for a number of Asian in broadband and wireless and European

in wireless nations for the past decade, with notable success. These efforts have aimed to stimulate the rapid penetration of physical-layer technologies for residential access broadband access, especially in Asia and wireless and mobile access cellular networks, especially in Europe. What Are the Implications Today? Page 11 Share Cite Suggested Citation: The picture is, to be sure, simplifiedâ€"the interactions between the different elements are more complex than can be reasonably characterized by the diagramâ€" but Figure 1. Shown at the top of Figure 1. Level 1 shows the direct results: Researchers conduct exploratory studies, achieving technical breakthroughs and developing their expertise and their basic understanding of the areas studied. Talent is thus nurtured that will be expressed in the future in industry and academia. None of these results of research can be characterized as end benefits. Rather, the development of talent and the achievement of breakthroughs build a capability for later revolutionary advances. At Level 2 the benefits of research begin to become evident. Researchers collaborate, and individual insights and results begin to fit together. The university talent generated in Level 1 develops competenceâ€"not simply low-level job skills that can be easily transported anywhere, but rather the next-generation expertise needed to ensure a skilled U. The United States has access to this skilled workforce first and can thus benefit directly from the talent and knowledge base generated in Level 1 that are fundamental to continuing technological advances and being able to perform in the best future jobs. Also at Level 2 comes the maturing of fundamental breakthroughs and their transition to usable, deployable technology for next-generation telecommunication systems and the development of roadmaps to help guide research investments. Page 12 Share Cite Suggested Citation: Skilled workers, a competence to understand the new technology, the availability of the technology, and shared goals are the ingredients required to create a healthy telecommunications industry and, more broadly, a capable telecommunications infrastructure. Interestingly, not all of the research performed affects telecommunications alone. Because telecommunications touches multiple industries, the technology base it provides also often enables the creation of entirely new industries. The success of the iPod and other portable digital music players, for example, rests in part on earlier telecommunications-inspired work on how to compress audio for efficient transmission over limited-bandwidth channels. At Level 4, an indirect benefit of research is a telecommunications infrastructure that provides advantages to all industries that use telecommunications. There are also end-user or consumer benefits that accrue to having an outstanding infrastructure, such as enhanced education, entertainment, and personal convenience. Finally, new companies also emerge from these new industries. Level 5 aggregates the key benefits of research in broad areas of national concern. Concerning economic impact, the strong telecommunications industry, new spin-off industries, and more competitive industries across the board result in a higher GDP for the country, as well as job creation. Technological leadership and economic strength also help ensure strong leadership and capability in national defense and homeland security. The full benefits of the process depicted in Figure 1. Each step takes time: Investments by both government and industry in research by academia and industry lead to both short- and long-term contributions. Over the years, CSTB studies have documented this phenomenon across multiple areas of information technology and telecommunications research. In closing, it is worth noting the perils of losing leadership in telecommunications. Because of the time lag, the nation may continue to exhibit leadership at Levels 4 and 5 and possibly Level 3 even as it is failing to renew capability at Levels 1 and 2. Since Levels 3 through 5 are most visible to policy makers and the public, there is a potential to perceive the situation as less dire than it really is. If Levels 1 and 2 are left to atrophy, serious problems will occur at Levels 3 through 5. If that happens, then recovery will take a long timeâ€"or even prove impossible. Page 4 Share Cite Suggested Citation:

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Chapter 5 : Regulating the telecommunications sector | Ministry of Business, Innovation and Employment

2 Telecommunications Industry Outlook A new era of connectivity is on the horizon The telecom ecosystem expects IoT to become a critical engine for future growth. One of the most successful IoT applications.

Germain Feb 20, 5: Market analysts are reporting that VoIP services stand poised to displace conventional telecommunications pricing models. Given the success of improved VoIP technology, industry pundits wonder whether traditional telecommunications technology will adapt or be pushed aside. But trend watchers told TechNewsWorld that traditional voice traffic is already being sent using VoIP technologies by the large telephone companies. In this sense, then, a major sea change has already begun, with some VoIP callers not even knowing they are using the technology because of its transparency. All will be offering VoIP-based services. The growth is being driven by better-quality service from new VoIP technology compared to what consumers experienced with the previous generation of VoIP, noted Kevin Mitchell, directing analyst for service provider networks at Infonetics Research. Major investments are being made. She said international use of VoIP has been very active for the last few years. The act set into motion a conflict between haves and have-nots in the telecommunications industry. Traditional telecommunications services are heavily regulated, but the companies that provide them own the established infrastructures. Internet information services are not heavily regulated, noted Mitchell. Recent court decisions have begun to lay a legal foundation for new rules that will guide the integration of VoIP and more traditional telecommunications. Last year, three-year-old upstart Vonage took on the local phone company in Minnesota and won. Packets of Information To understand how VoIP works compared with traditional telecommunications traffic, think of a train traveling between two major cities. The cars represent packets of information. The traditional telephone system is based on circuit-switching technology. With this method, all of the cars on the train must remain connected for the entire trip. All of the cars travel at the same speed, in the same direction, on the same track. If the train is blocked by other trains on the track, all of the cars slow to a halt unless a nearby track allows the train to switch tracks. Then all of the cars can speed up together as they take the new route around the delay, eventually arriving at the planned destination. With new VoIP technology, however, the cars on the train -- the voice packets -- can separate and travel on connecting tracks that can speed up the journey, depending on which route would be most effective. With the cars traveling at their own speed on their own most efficient route, they arrive at the planned destination from different tracks at the same time. Upon arrival, the "track master" -- the VoIP software or hardware -- reassembles the cars and speeds them into the terminal, creating the sound of voice. In the early days of VoIP, the cars -- or data packets -- got lost or mixed up. The result was often poor audio quality, which is one of the reasons the technology only slowly emerged. But the newer VoIP technology prevents the data packets from getting lost or reassembled in the wrong order. With the quality of VoIP systems rivaling traditional communications network -- but with better business and consumer pricing structures -- the future of this field should be interesting indeed.

Chapter 6 : Telecom News | Telecom Companies | Telecom Industry | Fierce Telecom

Industry Changes â€¢ New Players â€¢ Innovation â€¢ Regulation Profitability â€¢ Margins â€¢ Costs vs. Revenues. Telecommunications Industry Number Unit Year.

Strung together by complex networks, telephones, mobile phones and internet-linked PCs, the global system touches nearly all of us. It allows us to speak, share thoughts and do business with nearly anyone, regardless of where in the world they might be. Telecom operating companies make all this happen. Not long ago, the telecommunications industry was comprised of a club of big national and regional operators. Over the past decade, the industry has been swept up in rapid deregulation and innovation. In many countries around the world, government monopolies are now privatized and they face a plethora of new competitors. Traditional markets have been turned upside down, as the growth in mobile services out paces the fixed line and the internet starts to replace voice as the staple business. For more on this process, read State-Run Economies: From Public To Private. Telecom is less about voice and increasingly about text and images. High-speed internet access, which delivers computer-based data applications such as broadband information services and interactive entertainment, is rapidly making its way into homes and businesses around the world. The fastest growth comes from services delivered over mobile networks. Of all the customer markets, residential and small business markets are arguably the toughest. Big corporate customers - concerned mostly about the quality and reliability of their telephone calls and data delivery - are less price-sensitive than residential customers. Large multinationals , for instance, spend heavily on telecom infrastructure to support far-flung operations. They are also happy to pay for premium services like high-security private networks and videoconferencing. Telecom operators also make money by providing network connectivity to other telecom companies that need it, and by wholesaling circuits to heavy network users like internet service providers and large corporations. Interconnected and wholesale markets favor those players with far-reaching networks. The rate at which customers leave for a competitor. Largely due to fierce competition, the telecom industry boasts - or, rather, suffers - the highest customer churn rate of any industry. Strong brand name marketing and service quality tends to mitigate churn. ARPU levels get tougher to sustain competition, and increased churn exerts a downward pressure. ARPU for data services have been slowly increasing. High-speed internet access technology. Enacted by the U. Analyst Insight It is hard to avoid the conclusion that size matters in telecom. It is an expensive business; contenders need to be large enough and produce sufficient cash flow to absorb the costs of expanding networks and services that become obsolete seemingly overnight. Transmission systems need to be replaced as frequently as every two years. By contrast, smaller players must pay for interconnection more often in order to finish the job. For little operators hoping to grow big some day, the financial challenges of keeping up with rapid technological change and depreciation can be monumental. Earnings can be a tricky issue when analyzing telecom companies. Many companies have little or no earnings to speak of. No estimates are involved. The lower the ratio, the better. EBITDA provides a way for investors to gauge the profit performance and operating results of telecom companies with large capital expenses. Companies that have spent heavily on infrastructure will generally report large losses in their earnings statements. EBITDA helps determine whether that new multimillion dollar fiberoptic network, for instance, is making money each month, or losing even more. By stripping away interest, taxes and capital expenses, it allows investors to analyze whether the baseline business is profitable on a regular basis. Investors should be mindful of cash flow. EBITDA gives an indication of profitability, whereas cash flow measures how much money is actually flowing through the telecom operator at any given period of time. Is the company making enough to repay its loans and cover working capital? A telecom company can be recording rising profits year-by-year while its cash flow is ebbing away. Cash flow is the sum of new borrowings plus money from any share issues, plus trading profit, plus any depreciation. Keep an eye on the balance sheet and borrowing. Telecom operators frequently have to ring up substantial debt to finance capital expenditure. Again, the lower the ratio, the more comfortably the operator can handle its debt obligations. It comes as no surprise that in the capital-intensive telecom industry the biggest barrier to entry is access to finance. To cover high fixed costs, serious contenders

typically require a lot of cash. When capital markets are generous, the threat of competitive entrants escalates. When financing opportunities are less readily available, the pace of entry slows. Meanwhile, ownership of a telecom license can represent a huge barrier to entry. There is also a finite amount of "good" radio spectrum that lends itself to mobile voice and data applications. In addition, it is important to remember that solid operating skills and management experience is fairly scarce, making entry even more difficult. At first glance, it might look like telecom equipment suppliers have considerable bargaining power over telecom operators. Indeed, without high-tech broadband switching equipment, fiber-optic cables, mobile handsets and billing software, telecom operators would not be able to do the job of transmitting voice and data from place to place. But there are actually a number of large equipment makers around. There are enough vendors, arguably, to dilute bargaining power. The limited pool of talented managers and engineers, especially those well versed in the latest technologies, places companies in a weak position in terms of hiring and salaries. With increased choice of telecom products and services, the bargaining power of buyers is rising. For the most part, basic services are treated as a commodity. This translates into customers seeking low prices from companies that offer reliable service. At the same time, buyer power can vary somewhat between market segments. While switching costs are relatively low for residential telecom customers, they can get higher for larger business customers, especially those that rely more on customized products and services. Products and services from non-traditional telecom industries pose serious substitution threats. Cable TV and satellite operators now compete for buyers. The cable guys, with their own direct lines into homes, offer broadband internet services, and satellite links can substitute for high-speed business networking needs. Railways and energy utility companies are laying miles of high-capacity telecom network alongside their own track and pipeline assets. Just as worrying for telecom operators is the internet: Competition is "cut throat". The wave of industry deregulation together with the receptive capital markets of the late s paved the way for a rush of new entrants. New technology is prompting a raft of substitute services. Nearly everybody already pays for phone services, so all competitors now must lure customers with lower prices and more exciting services. This tends to drive industry profitability down. In addition to low profits, the telecom industry suffers from high exit barriers, mainly due to its specialized equipment. Networks and billing systems cannot really be used for much else, and their swift obsolescence makes liquidation pretty difficult.

Chapter 7 : Telecommunication - Wikipedia

FierceTelecom covers the latest news on telecom companies, backhaul, ethernet, IPTV, and other trends driving the telecom industry into the future.

These changes have yielded many benefits, including a much broader array of telecommunications services, a more diversified and competitive market, and an environment in which new innovations move more quickly to the marketplace. But they have also led to decreased industry support for long-term telecommunications research and a general shift in research focus from the long term to the short term. As has been observed by many others, there has been an overall downturn in many areas of U. See, for example, Rosenbloom et al. Page 14 Share Cite Suggested Citation: Telecommunications Industry and Effects on Research. The National Academies Press. Chapter 3 examines further some of the implications of curtailed research investment. The chief research and development arm of the Bell System, Bell Laboratories, was created in , following demonstration in of the feasibility of coast-to-coast long-distance service and realization of the importance of a viable research and development laboratory to effective deployment. Successful nationwide implementation of long-distance service required, for example, a device with sufficient gain to offset the signal losses in the mile stretch of the U. The development of the vacuum tube amplifier for use in telephone circuits, which started in the s, took many years of fundamental research and required extremely close cooperation between the research community that had originally invented the vacuum tube technology and the development community that introduced the vacuum tube amplifier into the telephone network. Bell Laboratories relied heavily on managers who understood the benefits to the company and society of fundamental research and were able to provide a work environment that fostered world-class research in virtually every aspect of telecommunications technology. Stable funding for research was provided via a tax levied on the service revenues of most of the Bell operating companies, an approach approved by state regulators. The revenue from the services tax was more than sufficient to fund unfettered investigations over almost 6 decades into almost every aspect of telecommunications, from basic materials and the associated physics and chemistry to large-scale computing and networking platforms and systems. Out of the Bell System research program also came many world-famous innovations, including the transistor, information theory, the laser, the solar cell, communications satellites, and fiber-optic communications. In addition, research in basic science at Bell Labs was recognized by six Nobel prizes for strides in quantum mechanics, solid-state physics, and radio astronomy. A number of other companies were also involved at the time in developing new telecommunications technologies and equipment. Bell Labs also served as an important nucleus for the broader telecommunications research community: Page 15 Share Cite Suggested Citation: For instance, until government actions forced a change, the Bell System prohibited the attachment of third-party equipment on customer premises, which many viewed as stifling innovation. Monopoly status also meant that there were few pressures on the Bell System for rapid innovation in its services, and a number of innovative technologies developed by Bell Labs either were not adopted or were adopted very slowly. Divestiture resulted in the separation of the local Bell System operating companies which provided local telephone service to large regions of the United States from the long-distance parts of the network known as long-lines communications and ended the license fee arrangement through which the regional operating companies supported Bell Labs. Additionally, divestiture marked the beginning of a process of transforming the telecommunications industry in the United States from a vertically organized structure where one body, the Bell System, had control over every aspect of the telecommunications process, from components, to boards, to systems, to services, to operations to a horizontally organized structure where multiple competitors existed at every level of the hierarchy and where no single entity had full responsibility for the network architecture, end-to-end network operations, or long-term fundamental research that would enable the creation of an evolutionary path into the future. As part of this trivestiture a large percentage of the resources of Bell Labs as well as the rights to use of the Bell Labs name went to Lucent Technologies for research and development in support of the creation of new products. Former Bell System entities continued to evolve. Over time Lucent Technologies spun off the

component manufacturing part of the company as Agere Labs and the enterprise business systems part of the company as Avaya Labs. Telcordia was acquired by SAIC and later purchased by two private equity firms. Indeed, figures gathered by Michael Noll showed that the number of former Bell family company researchers grew from about in to in to about in , but then fell off to in It has continued to fund Bell Laboratories at a rate of roughly 1 percent of revenue, further supplemented by some support from government research and development contracts. That allocation of 1 percent, which might be viewed as a best practice for a large equipment vendor, funds a mix of research in basic sciences, exploration of disruptive technologies, and more incremental work for meeting current customer needs. Antennas were placed in advantageous locations e. As cable systems grew in size and number, and in the types of signals or services they provided, a full-fledged, wide-reaching industry began to take shape. In the late s a group of cable company executives formed CableLabs, a nonprofit consortium of cable system operators, to pursue new cable telecommunications technologies, improve the business capabilities of cable operators, and help cable companies develop and take advantage of new technologies. For example, CableLabs was involved in the development and specification of cable modem technology work initially funded by MCNS Holdingsâ€”composed of TCI, Time Warner Cable, Cox, and Comcast , eventually administering the specifications and performing certification and qualification of products. In addition, the early s saw CableLabs involved in developing fiber-optic trunking and work to develop fiber-optic regional rings to link individual municipal cable systems. This work drew on earlier, more fundamental telecommunications research, such as work on fiber-optic communications, that had been developed at such places as Bell Labs. CableLabs work cuts across the layers from device and equipment standards through applications. CableLabsâ€”while not doing fundamental research itselfâ€”continues to play other important roles for the cable industry, such as helping to facilitate specification development, providing testing facilities to ensure quality equipment, and generally serving as a clearinghouse for information on current and prospective technological advances. More recently, CableLabs has been involved in the development of high-definition television systems, VoIP packet networking, interoperable interface specifications for real-time multimedia, and standards to create a common platform for interactive services. As early as , ARPA was sponsoring research into cooperative time-sharing computers and packet switching. A year later, the first nodes in the ARPANET became active, allowing research in host-to-host protocols and how best to utilize network resources. Page 18 Share Cite Suggested Citation: As work progressed on the ARPANET, it became clear that a replacement for the original Network Control Protocol would be needed to address the vision of an open architecture enabling a network of networks, a concept that called for a different approach to disseminating information, ensuring interoperability, and dealing with errors and transmission quality. DARPA not only funded and managed a research portfolio; it also facilitated the development of a vision and served as a convener for industry and academia, notably through the Internet Engineering Task Force. The NSFNet proved very successful. Its upgrade to handle growing demand and other subsequent changes opened the door for the participation of the private sector in the network. NSF support was also critical to the development of the first widely used graphical Web browser, Mosaic, which was developed in by a researcher at the National Center for Supercomputing Applications. The Internet was highly successful in meeting the original vision of enabling computers to communicate across diverse networks and in the face of heterogeneous underlying communications technologies. Page 19 Share Cite Suggested Citation: Cellular and Wireless In the early s, following years of resistance to the idea, the Federal Communications Commission FCC began setting aside a range of radio frequencies for radio telephony. By the early s, the FCC was issuing wireless telephony licenses and setting up metropolitan and rural jurisdictions so-called metropolitan statistical areas and rural service areas , and, by the middle of the decade, first-generation wireless systems were being deployed in the United States. These systems were based on analog cellular technology using the advanced mobile phone system or AMPS technology that had been developed by Bell Labs. Cellular technology was being deployed in other countries, as well, although the technology and standards adopted internationally were very different from those used in the United States. Growing consumer demand and the need to make better use of available spectrum resources fueled the development of a second generation of wireless technologies also commonly referred to as 2G technologies. This second generation marked the transition to a fully digital

technology, providing enhanced quality and enabling better use of spectrum resources. While the European wireless industry settled on global system for mobile communications GSM for its 2G standard, two major wireless standards emerged in the United States: Page 20 Share Cite Suggested Citation:

Chapter 8 : VoIP and the New Telecommunications Industry

5 Tech Trends in Telecommunications It's no secret that the telecom industry is struggling with change and facing disruption. It isn't sitting back watching the world pass it by, though.

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Some prominent segments of telecommunication industry are long-distance carriers, wireless communication, domestic telecom services, communications equipment, processing systems and products, and foreign telecom services.