Good example of the future of wireless modems research paper

Technology, Innovation

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The future of wireless modems

Introduction

Broadband modems allow mobile devices and personal computers to receive internet access. The connection is made possible through mobile broadband technology. It is a simply way of connecting to the internet because there are no cable television lines or telephone lines involved. One can connect their mobile devices and laptops to the internet at almost any location within the reach of wireless signals (Park & Rappaport, 2007). Wireless modems have evolved with the network generation of mobile phones. 1-G modems existed but had very slow dial up connections. Their connection speed could only reach up to 2. 4-kilo bytes in a second. The second generation of wireless modems had speeds of up to 14. 4-kilo bytes per second. The next generation was the HSCSD that used more than one channels of GSM. It could have connectivity speeds of up to 45-kilo bytes per second. All the three generations of wireless modems were supported by dial up internet

service connection. The next generation saw a change in this factor. It was supported by the concept of packet data. This implied that data and voice over the internet could be broken down into discrete pieces. 3 G modems also rely on the same principles but combine different technologies to make the connectivity speed faster than earlier networks. It can provide connection speed of up to 300-kilo bytes per second. The 3 G network further evolved to HSDPA, which has the ability to provide connection speeds of more than 1 megabytes per second. The desire to have even higher speeds does not stop. The manufacturers of wireless modems continue to develop devices of speeds of up to 100 megabytes per second. These latest products are turbo charged to provide even higher connectivity speeds.

Problem

Wireless broadband modems are a great technology, which many people rely on. However, with single access point, the challenge of many users connecting to a network becomes an issue. Single access points mean that users will have to elbow each other in order to gain access at a high speed. Therefore, developers are left to solve the problem by creating multiple access points or ensuring that more than one compliant devices can be able to communicate data through an access point at the same speed. Communication systems also present the challenge of user mobility and path interference. Broadband connections that rely on a combination of communication networks to improve connectivity are known to have connection interference problems. Such challenges need to be addressed by future wireless modems.

The techniques used to develop future modems will focus greatly on performance enhancement. Features such as capacity for real time processing of signals, interference rejection techniques that are based on DSP, device antennas that are adaptive are just but among the features that aim at enhancing performance of future wireless modems. The mobile channels have been identified to have multiple errors related to connectivity. It requires the selection of performance measures to develop solutions for the errors.

Goals, Significance, and relevance of research

The aim of the research is to analyze the future direction to be taken by developers of wireless modems. This is based on the problems currently witnessed by the devices. The problems range widely from speed of connectivity to performance enhancement. This study seeks to evaluate secondary sources of data in order to establish the future of wireless modems. Modems play a significant role in internet coverage.

Technology is always changing. As soon as a revolutionary technology is invented, scientists work hard to improve on it and create variants that are more efficient. The internet created many opportunities for technological advancement. Computer related technology such as processors; memory chips and software have some of the shortest shelf life for any technology. Wireless modems are presently a necessity for the distribution of the current generation of high-speed internet networks.

The earliest analogue mobile internet used 1G connectivity that provided sluggish dial up connections. This was quickly followed by second-generation

2G connections that provided faster connectivity speeds between 9. 6kbit per second to 14. 4 Kbit per second. 2. 5G mobile phones quickly followed 2G networks. The new phones could support the transfer of digital data and voice over several networks simultaneously (Drosos et al, 2004).

The next generation 3G networks have combined the strengths of 2. 5G networks with speeds of over 300 Kbit per second. The internet could also support WLAN connections allowing one user to share internet with several users. Devices such as routers allowed users to share internet on cellular routers. 3. 5G networks that support the transfer of several megabits per second followed 3G network (Drosos, et al, 2004). Major internet network operators also provided wireless modems to allow computer network users to share and access the internet from other users. Wireless modems create mobile hotspots that operate as internet Wi-Fi access points. The new frontier in mobile internet connectivity is high-speed WiMAX wireless internet services (Drosos et al, 2004). WiMAX internet requires wireless modems to connect to the wireless internet from the internet service provider.

Review of research

The survey aimed at giving an in-depth evaluation of the experiential estimations of modem efficacy. The survey findings demonstrated that various approaches of assessing efficiency do not automatically yield dependable results. For instance, the impact of amalgamations on technology effectiveness has not given consistent results. In some cases, mergers led to improvement of the connectivity issues, while in some situations it led to significant gains. In general, depository technology firms

analyzed in this study registered approximately 77 percent. The resemblance in average effectiveness for technology and wireless modem across various frontier models did not have any significant difference with the positions of individual companies by their effectiveness levels across models. “ This suggests that estimates of mean efficiency for an industry may be a more reliable guide for research purposes than are estimated efficiency rankings of firms and that analysis of the causes or correlates of efficiency should be viewed with caution”. Although this study applied multiple approaches in analyzingthe effectiveness of technology firms, it lacked information on the issues that affect effectiveness of technology institutions.

Enur and Arzu applied the DEA methodology in gauging the level of efficacy of conventional national technology institutions that operate in countries with transition economies like Chile, Mexico, Thailand, Indonesia, and Malaysia among others. They also aimed at finding out how policies influence the operations of national modems. The survey indicated that modems that command a huge market share are more effective compared to those that target small markets (Park & Rappaport, 2007). They also revealed that technology institutions operating in nations with vibrant economies tend to be more efficient since they are able to get more deposits that enable them to have a steady liquidity. “ The study revealed that while privatization of state-owned enterprises, enterprise competition, and corporate governance related improvements are important in boosting commercial modem efficiency, the securities market and non-modem technology institutions development hinders the efficiency of modems.” The management practices

and policy goals of a given technology institution affect its capacity to excel in its technology activities. “ This survey reveals some of the efficiency determinants that the UAE technology organizations are likely to experience; they include the level of liquidity, credit risk, capital adequacy, operating expenses management, and modem size”. Internal determinants of technology success are greatly affected by management practices of a technology institution. Management decisions automatically determine the operating outcomes of technology institutions. Outstanding management practices culminate into good performance of a given technology institution. Nonetheless, it is not very easy to examine administration quality directly. Indeed, it is totally presumed that good management practices would be revealed by the operating performance. Consequently, it is not strange to scrutinize the fiscal performance of a modem by assessing its technology variables established in its technology statements such as the balance sheet and revenue reports. Balance sheet records are common pointers of the revenue generation capacity and the cost of technology institutions. “ The determinants that receive most attention in the technology literature are costs, asset and liability composition”. The capital ratio is one of the primary instruments for gauging the modem costs and external determinants mainly involve the microeconomic arena within which a given technology institution operates (Park & Rappaport, 2007).

Finally, the recent international technology crisis had serious ramifications that technology institutions had to grapple with. Specifically, they scrutinized how the crisis influenced the productivity and asset development in various countries that have these two categories of modems. The study showed that

the technology crisis had varying effects on these two technology institutions. Future modems were able to mitigate the ramifications of the crisis while the conventional modems were the hardest hit. In particular, the Technology modems remained stable since they adhered to the Future technology guidelines that barred them from venturing in some of the investment schemes that led to serious losses among conventional modems. Therefore, the global technology crisis acted as a litmus paper for testing the efficiency and resilience of Future modems (Park, Heath, & Rappaport, 2009). The crisis revealed the urgent need to solve important constraints in the Future Technology services. The crisis has further led to greater acknowledgment of the significance of liquidity perils, and the necessity for well-organized modem resolution structure. Therefore, creating a properly performing liquidity administration system is a key priority. Moreover, controllers and quality-managers for Future Modems should make sure that the decision-making and lawful infrastructure, as well as for modem decree, remain pertinent to the fast altering Future technology landscape and international developments. Improvement initiative in this case should be in line with the worldwide restructuring program. Better convergence and coordination of guidelines and products is required to enhance a well-organized and sustainable development of the technology sector.

Wireless modems form an integral part of chipset solutions in the contemporary society. The age of wireless modems is now. This means that the wired world is no longer in existence. Home networks and wireless office networks present new opportunities that help individuals and businesses to develop new products that provide mobility and flexibility advantages.

Harriett (2013) argues that new wireless technologies and products provide easier access to the internet and e-mail without necessarily having to initiate wired connections. Specialized standards such as IEEE 802. 11a and ETSI BRAN HIPERLAN have promoted the production of wireless LAN modems. Data-ready phones and wireless modems are examples of hardware products that have made it easier to access critical information without the need of accessing phone lines. Maham and Ali-Hemmati (2006) projected that efficient implementation of Orthogonal Frequency Division Multiplexing (OFDM) modems was a critical aspect in the future of broadband telecommunication systems and networks driven by the OFDM technology (Maham, and Ali-Hemmati, 2006).

Tang et al (2011) argue that Media Access Control protocols are needed in the development of real networks. Wireless ad hoc networks have helped significantly in military and civil applications. Wireless ad hoc network protocols help in sharing channels, controlling energy, and channel assignment. Other advantages provided by wireless ad hoc networks include the provision of uniform services for the IP layer, implements congestion control, packet transmission, and priority queue functions (Tang et al, 2011). MAC protocols are critical in such situations because they are responsible for the direct control of sending and receiving wireless signals thereby influencing the performance of wireless ad hoc networks.

Heterogeneity helps in the organization of networking problems on master/slave transmission modems. The idea of clustering applies the master node election scheme based on the rotation and competition to strengthen the master/slave heterogeneous characteristics (Tang et al,

2011). Results found from the implementation of master/slave heterogeneous after evaluating the self-organizing network performance and measurement of optimal parameters showed that the MAC protocol performs better in environments characterized by strong energy balance ability, high bandwidth utilization, and fault tolerant ability (Tang et al, 2011).

Design challenges are another fundamental factor that influences the performance of future wireless modems. Design challenges stemming from the mobility of users in the system and time-varying multipath interference and channels make future wireless modems rely on the need of having performance enhancement techniques. Tools for simulation helps designers and researchers to implement accurate prediction of the performance of wireless systems using a variety of conditions. This will help the process of transmitting wireless data services and enhancing mobile communications. Designers and researchers must be able to consider the system-wide and link-level performance aspects in order to overcome challenges related to wireless communications (Krishnamurthy, and Rajashekara, 2011).

Specific metrics is used to evaluate and measure the performance of mobile communication systems. On one part, link metrics are responsible for the provision of objective performance measurements and depend directly on specific radio channels, receiver implementations, and transmitter characteristics. These metrics includes but not limited to bit error rate (BER), outage probability, and average frame error rate (FER). Code Division Multiple Access (CDMA) and USDC IS-95 transmission standards have multiple numbers of bit error patterns that are used to evaluate the performance of mobile networks (Saheb, Bhattacharjee, Dharmasa, and Kar,

2013). On the other hand, system-level performance characteristics are used for determining the performance capacity of wireless networks.

Wireless networking speed is a crucial determinant for determining the components of wireless modems. Modem manufacturers are more likely to compete on aspects relating to the delivery of high-speed wireless components that surpass the current IEEE 802. 11AC routers by up to seven times (Krishnamurthy, and Rajashekara, 2011). Such wireless modems aim to harness the spectrum of 60GHz frequency bands thereby enabling modems to deliver increased bandwidths. Modem manufacturers, to enhance the capability of modems when transmitting multichannel and high quality video and audio channels, are increasingly adopting the development of small and low-power chips. Future wireless modems are more likely to be dominated by WiGig and WirelessHD technology that work on 60GHz transmissions. Another possible development in the future of wireless modems is the entry of tri-band routers. Such tri-band routers will operate on radios that work on 2. 4GHz, 5GHz, and 60GHz frequency bands). This means that wireless modems based on IEEE 802. 11ac standards will no longer be the fastest wireless network technologies (Harriett, 2013).

Conclusion

The future of wireless modems is bright because future internet connectivity will enable faster connections with broader bandwidths. Major internet service providers are already providing 4G internet connectivity. With such broad bandwidths, it should be possible to share internet with ease. Local area networks (LAN) are limiting. However, wireless modems allow more

people to connect onto a central network without using wires. New wireless internet routers can allow connectivity for a range of up to 48km (Drosos et al, 2004).

Wireless modems will remain relevant in the near future because the internet is moving towards wireless technology. All computers related devices such as keypads, mouses, and laptop screen flaps have wireless options. Wireless modems are affordable and easy to use. Wireless modems allow users mobility from one location to another. Laptop users can access the internet quickly from any location where the mobile service provider network is available.

There have been concerns over the safety of wireless modems particularly because of the increased number of users who can connect without wires. It is possible for hackers to tap into such a network, but new modems have strong inbuilt firewalls that require access codes to reinforce privacy and security (Drosos et al, 2004).

The future of technology is moving towards lighter, faster, and more efficient devices than the present. There may be smaller and faster wireless modems in the future, but wireless technology will remain as a common feature. Future devices will have to comply with the requirements of fast wireless internet speeds and allow several users without slowing down the network or affecting other computer functionalities. Internet speeds continue to grow exponentially and so will technologies that allow more people to access these efficient networks without requiring wires or expensive adapters.

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