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### Research Paper

First generation cell phones were the beginning of a new age, were you no longer had to be limited by a cord or plug-in electricity. It was the first steps in mobile communications technologies, and so there were many restrictions that needed to be dealt with and standards that had to be met. The first generations mobile phones had many drawbacks which did not make the item market friendly to the everyday person.

Throughout the 1950s it was all about landline phones, it was all anybody could use. So,



when transitioning to a mobile network it had challenges. “During the development of the first generation (1G) mobile communications technologies, many organizations had not thought about standardizing a mobile communications technology. Due to the fact that a mobile communications market was regional a network was run by a government agency or a monopoly organization” (Seo 54). It was not as simple for a company to just create their own network, because at this time everything that had to do with mobile communication was ran by the government and getting clearance took a lot of time and often ended in denial. “However, an interesting movement came from the Nordic countries (Denmark, Finland, Iceland, Norway, and Sweden), which was standardizing a mobile communications technology later to be known as the Nordic Mobile Telephone (NMT) standard which heavily impacted the history of mobile communications technology standards.” (Seo 54),

This was essentially the birth plan for the mobile phone, the NMT allowed companies to begin their own networks and create first models. “In 1969 the Nordic Mobile Telephone Group (NMT) Group was established. Its purpose was to develop a mobile phone system that unlike the systems being introduced in the US, focused on accessibility” (uSwitch), NMT wanted everyone to have the right to be able to use the mobile telephone service not just those with close government connections.

As you can imagine the first mobile communication devices were not owned by just anyone, they were insanely bulky, and the battery was terrible in todays view essentially non-existent. “The first generation (1G) mobile communications technologies had a limited capacity, serving only niche markets for the military, certain government agencies and users in special industries (loggers, construction foremen, realtors and celebrities)” (Seo 54). Due to the immense



size of the device it was impossible to be carrying this thing around in your pocket, even carrying it in a back pack was absurd. The devices were mounted in motor vehicles and the smallest size that was attainable would be allowed to fit in a briefcase.

“This form of mobile communications was not ready for mass development, because of (1) the limited capacity to service the general population, (2) the limited technology capability to cover large areas, (3) the large size of the mobile device, and (4) the high prices of mobile devices and tariffs.” (Seo 54), the world was just not ready for the huge leap in mobile communications at this moment. Even during the 1970s countries were still focusing on being able to achieve nation-wide landline communications rather than just trying to get a mobile network for the very few that were able to pay for the ridiculous prices. Therefore, in countries

that were more developed and obtained more coverage were starting to break ground on mobile services. However, we still encountered service providers that were government-owned or monopoly companies like AT&T and Motorola were the few allowed technologies to provide mobile services during the 1960s and 1970s which lead them to developing the first gen mobile phones. Ironically, we still see domination in today's current service providers with Verizon and AT&T still controlling the majority users.

“One important thing that differentiated the first-generation mobile communications technologies from previous technologies was the cellular technology. The mobile communications technologies before the 1G era focused on developing a powerful station system



that could send signals as far as possible to cover the large area. The coverage single base station was about 50 miles or more, which was enough to encompass most metropolitan regions at this time.” (Seo 55).

Given the frequency bands in metropolitan areas each signal base was only able to have a very limited number of subscribers who were allowed to use the mobile communications channels at the same time. So, in a very

populated metropolitan area like New York City in the mid-1970s there would only be twelve channels to service 550 subscribers, so most of the users spent large amounts of time just waiting to get a channel to use.

“The cellular concept was a radical idea formulated in 1947, instead of transmitting a signal as far as possible, the cellular concept proposed to deliberately limit the range of a signal transmission. Each limited area would have a base station, called a “cell”. In this way, the same frequencies used in one cell could be used in different cells, so the systems based on this concept would allow frequencies to be reused for more subscribers in a region and this was how the name

“cellular phone” was given.” (Seo 55), it was a huge advancement for there to be more subscribers allowed on the same frequencies freeing up more channels and having more active subscribers. Many years passed before the idea was brought to life due to the necessary technologies (electronic switches, integrated circuit for transistors, and handover technique when a user moves from one cell to another), and the entire structure that supported this concept became the basic mobile communications system architecture.

“However, the history of mobile phones goes back to 1908 when a US Patent was issued in Kentucky for a wireless telephone. Mobile phones were invented as early as the 1940s when engineers working at AT&T developed cells for mobile phone base stations. The first mobile phones were not really mobile phones at all they were two-way radios that allowed people like taxi drivers and the emergency services to communicate” (uSwitch). As previously mentioned the first mobile phone networks involved one very powerful base station that would send signals covering a much wider area, which had its downsides of covering a larger area meant more people on at the same time and also since there is only one base there is a limited number of channels for a large number of subscribers. These early mobile device that where only able to realistically fit under the center console of cars are referred to as the 0G (zero generation) mobile phones.

Mobile telephony has a long history and it first started off with experiments in calls between moving vehicles rather than the handheld devices that are in our pockets. As the development had explosive success and a continually increasing demand for bandwidth to



accompany more users and overall having it be more reliable so that you didn't spend more time waiting for a channel to open than what the conversation actually lasted. Some of the

greatest landmarks in mobile history started from inside the vehicles of first class passengers and celebrities. The first public calls that were ever made happened on a car radiotelephone in Chicago 1946, due to the small amount of radio frequencies the service quickly reached its



capacity and was eventually only used for taxi drivers and emergency service vehicles to communicate with each other. Just a decade later in 1956 the first automated mobile phone system for private vehicles launched in Sweden, the device installed in the car used vacuum tube technology with rotary dial and weighed 40kg. The device weighed as much as a grown child but we were getting somewhere, beginning to develop private channels for the high paying consumers.

“The first mobile phone call was made over 40 years ago, on April 3, 1973, by Motorola employee Martin Cooper. Using a prototype of what would become the Motorola DynaTac 8000x, the world’s first commercial cell phone... in New York City and placed a call to the headquarters of Bell Labs in New Jersey” (Seward). Although the phone was still a prototype it was a giant step in the developments for mobile technology to come and to come it was. It took another decade of the DynaTAC to become available to average consumers and then twenty more years for cell phones to overtake land lines in worldwide usage. The DynaTac is also not something that you just slip in your pocket like your average smart phones, to give comparison apples first iPhone that launched in 2007 was a little over five inches tall and had a screen density of around 200 pixels and our 1983 DynaTAC was a whopping fourteen inches tall and had a screen density less than 100 pixels, its safe to say that we came a very long way.

“Motorola DynaTAC had twenty large buttons, a long rubber antenna and a talk time of



just thirty minutes, before needing to be recharged for 10 hours. Despite its whopping four thousand dollar price tag and nick name “the brick,” it proved to be a resounding success and kicked-off the cellular age.” (Borgobello), it

was the first of its kind and that’s what made the item something that you just had to get your hands on. The device weighed two and a half pounds and could only be used for an average of thirty minutes before it died and needed a ten-hour long break so that it could charge back up and be used again for another half hour. It did not fit the needs of the average person, but it did make some works in business and in construction more convenient, with the purpose of having a small conversation about certain supply’s or agreements, good luck trying to have an argument over the phone with the misses maybe you would be glad when the phone died after all.

The first gen phones simply did not meet the needs of the consumers for the price that it was being sold at. The only unique thing about the DynaTAC was that is was not connected to a long wire, but it might as well have been since the battery would die very quickly and you had to return it back to charge. It was more convenient for you to go in the car and use the radio to try and reach someone than it was trying to converse with them on the mobile telephone. With the battery issues, the fact that it was as big as a shoe box, and that you were still being limited on who you could talk to (distance). Made this an item that was not going to be sustainable on a competitive market. During this time, we had many advancements in the technology for cell towers and battery life so with little time the DynaTAC fell out of popularity and eventually replaced by all the new.

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