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The Internet Of Things is coming.

For those of us who remember the days when we did everything on paper, had secretaries typing letters for us and had to go to the bank and the post office all the time, our current mobile world seems pretty fantastic. We hold a device in our hands that weighs less than half a pound with vastly more computing power than the Apollo spacecraft of our youth, and with it do all kinds of things faster, more easily and (probably) cheaper than we did even ten years ago. What seems even more fantastic is that few people predicted what our current reality would be like even as the basic technology was being invented. It seems that every week we run across an app that does something that we never even thought of, let alone knew we needed. It is a dream world in many respects, and hard to imagine something even better.

If you are paying attention to the futurists, you already know that something better is coming. Our current 4G wireless technology is expected to be supplanted in the next few years by a vastly superior 5G communications protocol that should increase data speeds by up to 100 times. 5G, or Fifth Generation is actually known as 5G NR, and the NR stands for New Radio. The new radio technology involved in 5G uses a much higher radio frequency than existing 4G networks, and the reason for this is that higher frequency radio signals can carry much more information.

To give you an idea of how radio technology has progressed over the decades, think back to your first little AM transistor radio that you used to listen to the Beatles back in the '60s. That radio received a signal with a frequency of about 500 – 1,600 kilohertz (a kilohertz is 1,000 cycles per second), and had difficulty carrying enough information to give you decent sound quality. FM radio came along at frequencies of 88 to 108 megahertz (millions of cycles per second), and the higher frequency gave us benefits such as stereo broadcasting.

Current 4G technology uses frequencies of about 700 megahertz, and while this seems to have enough capacity and speed for things like mobile banking and internet searching, it lacks the speed needed to enable real-time communications between devices that have to make instantaneous decisions. The example being used most often today is that of the self-driving car, which will need to interact with other cars on the road in order to remain at a safe distance from them and navigate its route. The 5G frequencies being discussed for the standard range from 6 to 100 gigahertz (a billion cycles per second).

These higher frequencies seem perfect for the task, but in reality they come with one big drawback. The laws of physics often intrude on our sometimes science fiction-like thinking, and gigahertz radio technology is not immune from them. Higher frequency radio waves travel shorter distances than lower frequency ones, so a communications system based on them will require a much larger number of more closely spaced radio transmitters, perhaps as many as 100 times the number deployed in our current 4G system. In order to do this, the nation's wireless carriers will need to install lots of boxes the size of a small backpack in loads of new locations.

Potential applications for the emerging 5G technology can best be described as “The Internet of Things”, or IoT for short. Inexpensive low power digital processors coupled with the expanded capability of the 5G wireless network mean that we can imagine and make all kinds of objects that are able to communicate with each other in real time. Thermostats, TVs, lightbulbs, smartwatches, even clothing with sensors are all considered to be IoT devices, and it is hard to imagine all of the possibilities that exist for this technology. Imagine having a jacket that senses when you are getting too warm and opens up vents to cool you off – and you set it up with your phone.

It is also hard to imagine what some of the challenges will be for the vast expansion of devices that can talk to each other. Devices that contain important personal information or allow snooping can be hacked. A camera on your smart TV set that allows you to make video calls to your grandson in Alaska can also be made to spy on your movements in your home. California has just passed a cybersecurity law that requires all manufacturers of IoT devices to implement “reasonable security features”. While well-intentioned, it probably fails to address situations that we can’t even anticipate today.

Investors will inevitably ask how to take advantage of the emerging trends of 5G and the Internet of Things. The most obvious place to look for opportunities is in the technology sector, particularly with the companies that are involved in developing the basic elements of these two technologies. Semiconductor manufacturers, particularly wireless chip makers will be the ones to make all of those tiny and cheap chips we need for our jacket or toaster, and many are already announcing products.

All of those devices require software to make each device do the nifty little tasks, so the makers of the devices themselves will be important to IoT’s implementation. Makers of smartphones are a logical place to start looking, but as devices broaden in scope many other technology leaders will be worth looking at (think of wireless home assistants as one example).

Getting all of these devices to talk to the internet will require lots of those backpack-sized boxes, and wireless telecommunications carriers should play a dominant role in the construction of the expanded 5G network. It is worth noting that the speed of 5G could be faster than the typical wire-based internet service to our homes. We might end up cutting all of the cords and using wireless service for our internet needs everywhere.

Many of the companies working on 5G and IoT are the technology and telecom giants, and for them, it is still only a portion of their overall business. It may be hard at first to see results specifically attributed to 5G and IoT when you look at how they generate profits from everything they do. Smaller companies that have a greater focus on a specific area of 5G or IoT could produce better long term gains, but come with the risk that their approach or product may not be adopted or sell well, or they might not have the heft to push their strategy on the whole wireless industry. This is a common trade-off in investing in new societal trends.

It is possible that your current holdings may give you enough exposure to this emerging trend, so it is worth checking out what your mutual funds are invested in. After all, it is a hot topic these days, and many companies (and countries, like China) are already on board. You may be able to profit from 5G and IoT even as you learn to deal with (and enjoy) using it in your daily life.

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