
INTEROFFICE MEMORANDUM

TO: JENNIFER FRITZSCHE
FROM: JOHN MCCARTHY
SUBJECT: TWENTY GOOD QUESTIONS
DATE: FEBRUARY 20, 2021
CC:

1. What is the biggest technological change in telecoms in recent years?

The shift away from POTS (“Plain Old Telecom Service”) to data consumption. This is true on both the wired and wireless side.

2. Is 5G a revolutionary change or an evolutionary change?

Revolutionary...will be larger and much more transformational than any prior “G” (generation) upgrade. Although the infrastructure has to lead the way to enable it and this may be the longest pole in the tent.

I think that 5G will be much more of a driver of change on the enterprise vs. the consumer side. One of the things people under estimate is the impact it will have to areas like machine learning. Put simply, for this industry 5G will move machine learning from tasks that are repetitive to tasks that are creative and offer cognitive work. This in and of itself will have ripple impacts on many other businesses.

3. The long standing Federal policy of urban areas subsidizing rural areas: has it generally been a success and should it continue?

If so – I do not believe it has been a success. The bar for speed was set very low there (25 Mbps downlink / 10 Mbps uplink). One lesson learned with COVID has been that speed very much matters for the users of the broadband pipe. Fiber to the home (FTTH) has attracted a significant amount of private capital toward the rural sector in the past 12 months. This will be interesting trend to watch. My belief is this private sector investment will move the needle more than the government programs have.

4. Telecom is viewed as a capital intense industry. Is this true and if so, will this continue to be so?

Yes, it is a very capital intensive industry. The best example of this may be the recent C-Band spectrum auction – which fetched \$95B+ (2-3x most analysts' estimates). This spectrum is not worth much unless infrastructure (think: macro towers, small cells, fiber, etc.) are built to support it. This build adds another layer of costs. Wireless capx numbers are often understated as most do not include spectrum acquisitions given the timing of these auctions remain unknown and are almost considered 'special situations' expenses.

5. If you owned all of AT&T, what growth rate would you assume for capital expenditures in digital infrastructure?

High single / low double digit percentage growth rate is likely fair assumption for capx growth over the next few years. 6 months ago I would have erred on the lower side but given its impending divorce from media (after only getting married" 3 yrs ago...), AT&T has again refocused on being a connectivity company. The hard part of that is AT&T will never break it out the specific components of its capital spend (having following it for 15+ years – I can say with certainty that disclosure is not their strong suit). But AT&T has a long 'To Do' list in terms of network spend. Topping this list is fiber push out (currently have plans to build out fiber to 30MM homes out of a footprint of ~ 60MM homes) and wireless spend (note: AT&T spent just under \$28B in the recent C-Band spectrum auction and is expected to spend the most in the 3.45GHz – 3.45GHz spectrum auction).

6. If you owned Amazon Web Services, what kind of infrastructure assets would you want more of?

The obvious answer is data centers. However, the caveat here is that AWS historically has not relied on third party data center owners. But its competitors do! So as AWS continues to see huge growth (which I would expect) – expect Azure (owned by Microsoft), Google and other CSPs (cloud service providers) to continue to invest. These players have typically relied on outside 3rd party data center companies. Names on this list include: Digital Realty (DLR), Equinix (EQIX), CyrusOne (CONE), Coresite (COR), etc. Private capital is also aggressively investing in this space. Blackstone's purchase and take-private of QTS for \$10B in the Summer of 2021 offers tangible example of this.

Other parts of the infrastructure which are positioned well for AWS and other CSPs' future spend are fiber owners (Lumen, DigitalBridge) and those players that can do mobile edge compute (AT&T and Verizon could play here).

7. In the USA, is the supply of cell towers and wireless spectrum sufficient to accommodate current demand in the USA?

I think we will need more of both! For towers – the \$95B+ spent on C-Band spectrum with shorter propagation will drive the need for more infilling of coverage and further network densification (small cells will also be critical).

In terms of spectrum – it is a lot like money – you never have enough! In South Korea data consumption of 5G users is 2.8x that of 4G users. In the US we have hardly scratched the surface of 5G (or the infrastructure buildout needed to support it) – even with the freeing up of 380MHz of midband spectrum we are still way behind many other countries. We would expect spectrum to remain a top priority of the FCC. The challenge is there is not much free and clear spectrum left to offer (which is one of main factors that make C-Band so attractive...). So likely future spectrum will have some sharing component to it (which is what the 3.45-3.55GHz auction has).

8. What is “net neutrality” in your view, and will we see some steps toward it?

Net Neutrality is a term that is currently applicable to just the ISPs and means the ISPs may not

- block access to content,
- throttle traffic other than for network management purposes
- offer paid priority deals

Hard to say where it goes from here. We do believe it will be an issue the FCC considers but consider the fact that the FCC is still tied 2-2 – 9+ months after a new Democrat president was elected and the Democratic Chair is only an “Acting Chair” whose own term expires in a few months. So more wood to chop there before we can make an assessment as to where this goes but FCC needs to get its house in order before it can tackle tough issues and net neutrality (and don’t forget the “fun” Title 2) top that list.

9. Is Cable TV a weak technology? Is it shrinking or growing?

Cable TV (meaning linear video) is indeed a declining business....that train already left the station pre-COVID and only has accelerated in the wake of the pandemic. However, this is not all bad news. The margin on video revenue (~ 20%) for cable providers is significantly lower than broadband revenue (~ 80% margin) given that cable MSOs need to pay the content players for the right to carry that content. For broadband revenue – cable essentially owns the all-important “pipe.” Importantly, if a customer cuts the cord of video, then the cable provider typically charges a higher price (making the margins even higher). Put simply, this is a trade the cable operators welcome!

10. Which company has a brighter future: Malone legacy assets (AT&T) or Roberts legacy assets (Comcast)?

I am calling a very close match. Normally I would have to say Roberts wins the trophy!! It seems like everything AT&T has touched in the M&A world has been the *opposite* of the Midas Touch (much to the dismay of investors). But when AT&T made the announcement to exit the media business that was a big moment. It reminds me of some great advice my grandfather always said: “If you are in a hole – stop digging.” AT&T put the shovel down. AT&T still has a lot to prove and invest in....and cable’s shareholder return track record is a lot better than AT&T’s but.....

Now cable is feeling the heat as telecoms focus on fiber. 2 key questions to watch for Roberts & Co: 1) do they need to be in wireless in a more “real” way (they just sat out of two spectrum auctions). And 2) how much capx do they need to go fiber deep and protect their broadband turf. Both these answers will have a significant impact on Free Cash Flow (FCF) which cable investors love!

11. What are some of the big developments in satellites for communications? For example, does Elon Musk’s Starlink have a bright future?

I think the satellite industry actually may do the most heavy lifting in closing the true digital divide in rural America. The broadband speeds which satellite has the ability to provide do not compare well with that fiber, but they do vs. DSL. Both Amazon and Musk have strong ambitions here (one of the factors driving Bezos exit from Amazon was to focus on space and he is definitely walking the walk as evidenced by his recent “journeys”). I would not count either out.

12. Does the market generally produce tools for data security, or will data security breaches increase?

I think (unfortunately) we are in the very early stages of what we are going to see in terms of the degree of damages data breaches will continue to cause. I have been surprised how LITTLE news coverage things such as the Solarwinds and firewall vendor Accellion have had. I think there is not an urgent understanding as to what the implications of these violations can be. There is so much work that needs to be done here....it feels to me we were chasing our tail a bit – which is quite concerning.

13. Will China produce more vital, and innovative, communications technology than the USA?

I believe China has a significant lead in 5G. The C-Band spectrum auction was a large step to narrowing the gap in terms of freeing up more spectrum in the all-important midband space. But China is ahead on spectrum availability, infrastructure and global standards. We have much work to do to catch up....(politics aside) it will be interesting to see if Biden has as much “5G FOMA” as Trump clearly did.

14. Will bandwidth usage per capita continue to grow as it has in recent years?

I am not sure we will see it spike higher as it has been during the COVID pandemic as the reopening happens (and more kids go back to school) but I do think the normal consumption will continue to grow as more streaming video applications and cord cutting take place. Streaming momentum will only continue to build as more platforms emerge (note: Disney+ reached 100MM users in less than 15 months).

An interesting data point – prior to the pandemic Comcast said their “power users” were using ~ 600GB / Month. History has shown that the non-power users typically follow the consumption trends of the power users in ~ 15 months. We believe COVID likely only shortens this timeframe.

15. Will broadband become more available in rural America?

I believe a large priority of the Biden Administration will be to close not just the digital divide but also the homework divide. One of the many fallouts of COVID was how significant gaps of broadband coverage existed even in some urban cores. While rural will also be important – as mentioned above I believe private capital investment will drive this coverage more than government subsidies will. FTTH has been a significant focus for much private equity investment funds in the past 12 months. The proposed Infrastructure Bill has \$45B+ in spending for broadband.....that is 2.8x more capital than the last largest broadband stimulus bill. Once and if that becomes available there will be many new business models (watch open networks!) vying to get their mitts on that capital!

16. If you could own all of Netflix or Spotify, which would you own?

I am not the expert here (as I never followed either when an analyst) but I would not bet against Netflix. I believe Netflix has significant pricing leverage – and its position has only gotten stronger in wake of COVID. For Spotify while they have an edge vs. Apple in terms of the curated playlists (which I prefer in my music choice), the moat around that business is not as thick as that of Netflix (I think Apple would have to buy a significant content company to get deeper in that space and no stand-alone content company has a deep of a catalogue as Netflix in my view). I also think the jury is still out if Spotify will see a return on their expensive bet on exclusive Podcasts.

17. Consider Facebook, Amazon, Google, and Microsoft. In your view, which one has the most anti-trust problems and why?

Google and Facebook. In my view, Microsoft has already done the antitrust dance but I believe Google touches too much of the ecosystem to continue to fly under the radar (Youtube, maps, email, etc.). Facebook has its own issues that only were heightened post the Presidential Election and more recently in terms of Congress's interest in Instagram. I highly recommend the Netflix movie *Social Dilemma* for anyone who questions the role Big Tech is having on all our lives.

18. It seems the USA is moving toward more electrification. Is this a good thing?

PLEAD THE 5TH HERE -

19. What hallmarks of “good governance” should an average shareholder seek?

Companies not taking the diversity mantra seriously will run into trouble. This is no longer just a talking point. Both the Nasdaq and some states (namely California) are mandating that boards must have female representation. Diversity of any kind (beyond gender) is a key factor to consider when evaluating a company. It cannot be forced but it brings a diversity of thought to decisions which is a key factor in how a company will do in the long term.

20. You have been a “Wall Street Top Analyst”. Why are there not more women here, and do you see this changing?

This may be the hardest question! I don't have a great answer – other than it is an all-encompassing job during key periods (namely earnings) and requires much travel (in normal times). This is not easy for moms. You have seen similar patterns play out in other industries such as investment banking, consulting, etc. I was lucky enough to have a huge support system that included my husband, my parents and a wonderful boss (of 19 yrs) (also O'Hare was a huge help!). It does indeed take a village and I was very lucky to have one!

I hope it changes – but I am not sure it will. One of the many sad things about COVID is how hard it has hit the female worker. I think there are also questions about the direction of the industry overall. While so much capital moving to passive funds....there is more pressure on active managers. These are main clients of sell-side. If they are in troubled waters that does not bode well for longer term business trends for the sell-side. This was one of my “worry factors” in my decision to leave the industry.