Reactions on 5G Phone, Cable, and Broadband Internet Preceding *X*

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Abstract

Finalizing a report on the findings of my Twitter research study effectively documented how recipients of a poll survey reacted to questions about 5G. Reactions in the form of emoji likes and comments are only a minutia of social media's reach. The research question I used was: in what ways has 5G service affected your perception of cell phone carriers, cable, and internet providers since its inception? To answer that question accurate data had to be found utilizing a methodology known as sentiment analysis. As in any good academic research proposal, technical communication research methods must evolve to incorporate both machine learning and organic approaches. I hypothesized that by conducting manual Twitter polls to elicit responses it would provide enough organic information to rival the most robust AI-based sentiment analysis on how 5G was being branded in the marketplace for social media users. To fulfill my goal, I wanted to find out several important changes that had occurred since 2017; cell phone manufacturers' production; cell phone buyers' habits toward the same products; and the behaviors of customers who bought 5G concerning the older 4Glte band of phones or internet. Triangulation of Twitter data and sampling a general community, including using mixed research methods, would give enough empirical data. Between the strong opinions and lesser ones, seeing where there was parity in the research results codified a ubiquitous classification system needing modification.

Keywords: cultural studies, digital rhetoric, new literacies, technical communication, Twitter, X.com

The literature review on my topic was geared mostly toward examining communities on a

Twitter interaction base (before its acquisition and the enaction of *X.com*), and by documenting large social media populations on Twitter. It also addressed topics such as mediation, publicity, and the demographic of target groups in the case of Presidential election campaigns (Jungherr, 2015, pp. 74-79). In the case of systematic reviews of Twitter health-based research, it was noted that over half of the studies were mined by studying tweets and their written content (Sinnenberg, 2017). Something that my research study benefitted from was acknowledging the ways machine learning could be hampered by only relying on written responses and not including polls by a statistical organization to gather opinions more directly. A case of trending hashtag topics is a familiar ploy to draw in more participants if needed. What many researchers have come up with is new taxonomies of criteria to view the Twitter-sphere. To make my research work at a much smaller scale meant acquiring a pre-made checklist of topics based on the culture of the new 5G phone, cable, and internet wave. And also, because social media users are notoriously on their cell phones and interacting with the app, most general respondents would be ideal samples. The sample size, however, left a bit to be desired, though the popularity of most 5G services could remain accurate and I wanted initial opinions from the people interested in the topic. Also, the constraints and limits of viewing Twitter as an isolated microblog were highlighted by researchers for being unable to identify accurate search terms.

Another purpose for my research on 5G was to determine what 5G terminology was most effective at getting a response from survey takers and to incur their behavioral cues. These in turn would also allow me to make a new taxonomy based on 5G sentiments. Thus, we arrive at another important measure my study was poised to answer, and it is based on another popular research methodology in the literature review. It is called Twitter "sentiment analysis" and is a big research topic. It builds on the previous example of developing new taxonomies in specific fields like elections or healthcare but instead draws in larger sampling techniques. TSA (Twitter Sentiment Analysis) techniques were made to create large datasets based on quality distinctions in words. The tweets may be limited to 140 characters, but the messages are full of more meaning most of the time. Opinion Mining (OP) likewise is a viable new research field that is growing in interest (Crestani, 2016, p. 28). The microblogging style of Twitter in addition to local media platforms such as FourSquare, LinkedIn, Tumblr, and Google+ offers more engagement through sharing and replies and is what my study used to get sentiment responses from people involved in the research questionnaire. The networking ability of these suites of services is a thorough example of why Elon Musk purchased Twitter for over 40 billion dollars and remains one of its most popular users. Other studies did research on 5G like myself by examining the TSA of fifth-generation technology in Indonesia by utilizing lexicon frequency and probability frequencies to make decisions on tweets (Aryadinata, 2021, p. 23). And while the big research on 5G I propose is not region specific it asks a set of questions about 5G advancement in cities around the United States and world countries that utilize technical paradigms such as the atomic frequencies you find in global positioning systems. To further prove the efficacy of these kinds of practices, my methodology drew upon the literature review as an inspiration and produced distinctive poll questionnaires to do a new TSA and regular empirical survey method for both quantitative and qualitative information.

Twitter became the primary method of disseminating surveys to a sample size of up to 50 people for each question. More detailed studies would benefit from targeting specific lists of people to get answers from set demographics or groups but for me, the responses from general takers were enough. In the questions, I hoped to identify a few various nodes of research data to fulfill my empirical data aim and to identify differences in the answers. In turn that would allow me to create new groups myself to examine in the results and discussion. More on that will be available in my results and discussion sections. And it would align with what researchers have already said about creating new taxonomies of study. However, to advance the study meant creating 10 questions to assess the habits and behaviors of internet and cell phone users with 5G. Also, it was pertinent that the questions define the emotional resonance of 5G from the answers. Some of the questions were poised to adopt an opinion-based response on topics such as cities and countries and to make predictions on the future of 5G development that would help manufacturers and the 5G community plan in advance for them. In all, my methodology had to begin a research process that would identify what 5G has been like since it was introduced and where it is going.

Triangulating for rigor in this project meant I had to rely on 3 nodes of information. And they were: answers to my questions, written tweet responses, and the literature review on my topic. The first step to it all was tasking questions, 10 of them about 5G and social media users' responses to them. Defining the problem of 5G was not enough. The problem had to be fully explicated in my Likert scale and regular survey poll questions. It would be unique to have the subjects select themselves, so to speak, rather than assigning some sample group. By doing this I would be able to get the polarized opinions from people most interested and apt to vote on my Twitter polls. By now accepting I would have good answers by vote and responses, I could move on to placing my study within the literature on Twitter. TSA was the primary method of not machine learning but my research analysis of those tweeted thoughts. Now that we have our subjects and triangulation for rigor, it would be possible to analyze my data for empirical explanations of where 5G is situated in people's minds.

Another benefit of Twitter and other social media platforms is the interaction happening from popular posts. 5G has gained popularity but in my responses, I could discern if it was real organic sentiment or if it was mostly marketing. What we all really needed was "insider knowledge" from the point of view of the poll recipient or subject. The planning and testing in advance of 5G were being done with the cell phone, television, and internet products already out there. Would people share my posts and polls? Some did by retweeting and liking. It was about seeing if there were trends between TSA and the popularity of real 5G and phones. Yet, the systematic use of a written batch of field notes that ethnographic studies love was important here. I did not conduct oral interviews but much of those TSA tactics were being applied to behaviors relayed on the Twitter platform. For example, the AT&T #YOUWILL campaign from 1993 was made to inspire ideas about what the future would look like technology-wise, but those technologies were not around just yet for people. And to understand it we must go back even further to the 1980s. It was when ideas about telecommunications and travel or tourism became synonymous with the metaphorical "superhighway" of information (Naisbitt, 1994, p. 406). AT&T made commercials in 1993

that predicted the information revolution akin to the 5G revolution poised to overtake cell phones in the present day, but all its engagement was happening through television commercials and not social media as we know it today. Word of mouth, field notes, and ethnographic studies would take over in those instances to create a base of general subjects.

The earliest examples of technologies of the information and digital age that came to be were Apple's Newton computing; the synthesis of phones, television, and computer internet; a global business of collaborators in the technology and human-computer-interaction industry; and new personal devices commonplace in the twenty-first century. For my study on 5G verifying my conclusions meant I had to find what products to put in my Likert scale questions and regular poll questions to get an answer. In effect, I too had to predict my respondents' answers to get the right options put into my polls. What were these questions? They are listed below:

1. Regarding cell phone carriers, please classify your emotional state regarding the rollout of 5G?
2. Of the cell phone carriers, whose service has the best, most reliable nationwide coverage?
3. Of these 5G home internet providers, which are you most familiar with?
4. Of the cell phone manufacturers, which is your phone made by?
5. Of the cell phone carriers, which is your network plan with?
6. Now that #5G is here, which of these cell phones are you most excited to see?
7. Of these U.S. cities, which do you anticipate will adopt the best live studio, in-person, or online/T.V. viewing service (CNN, ESPN, Times Square, etc.) with the rise of 5G simultaneously?
8. Of these nations, which has the most potential to overtake the others in terms of 5G production and development?
9. On a scale of 1 to 5 with 1 being poor and 5 being excellent, how would you rate the download speed of 5G service?
10. Regarding mobile phone carriers, the top brands provide quality service.

An ability to classify answers to the above questions frequently resulted in trends in brand identification. Not only were the subjects in the sample group able to rate the top brands such as Verizon, AT&T, or Apple among others, highly, but a similar phenomenon was a recurring theme in emotional identification and classification. I predicted that positive and neutral sentiments would be more adept at getting votes over options such as "disgust" on the 5G trend. While the topic of methodology is still in full focus, my preparation for creating the above ten question-and-answer polls and questionnaires was made with all of those options in mind. The methods were also mixed. Technical communication research uses quantitative and qualitative data and for me, the votes I was planning to receive should represent the wider 5G thoughts because of their poignant opinions that reflect common TSA of other studies on 5G or popular brands. And if it varied or provided outliers in responses than what was expected out of the top brands or was contentious to 5G I would note those responses as I did especially with the written tweet responses. Overall attitudes toward 5G had to be discernable with my empirical data from Twitter and I ensured its availability by providing those intense questions.

Results from my findings had some commonalities and varied also in some places but as in

my visual presentation, charts are just one way to show my work to others. What I want to do in the following section is to provide the numerical figures and percentages of my Twitter poll questions. My study found a strong correlation between brand identification and 5G awareness, in addition to TSA, sentiment behaviors, and attitudes toward them. I will outline them in the following section. While my hypothesis about Twitter and the subjects in the sample size being enough to give empirical data was correct, there was some feedback in the results that tells me there was still some missing data. The initial findings on Twitter were enough for me to get adequate views on 5G, but there were a few missing classifications and open-ended questions that at least for now, were not conclusive to confirm what the beliefs were because we are still so early in the 5G rollout phase. To come to a more decisive answer would mean doing follow-up studies in the same manner, but with years of experience well beyond the 2017 to 2022 threshold of information.

A question, "regarding cell phone carriers, please classify your emotional state regarding the rollout of 5G?" became the primary example of citing emotional responses about 5G service. And in the results, I was able to successfully count over 30 votes with most in favor of one point. It was "neutral." The other options were then excitement, surprise, happiness, and disgust (below neutral). Because of the pervasiveness of positive answers in Likert responses from some studies, I put mostly encouraging options and left disgust among only a few other answers which were an example of "anger" and "sadness," but neither of those got any votes. And despite "neutral" with the majority of votes, it seems representative of a larger sample size because if I had kept it up for more time and participation the percentage of the answers would have increased. If by seeing my pie chart presentation one may notice that neutrality regarding 5G was 59% of the total vote. So, in that instance, it was just over half of the total votes. This shows us neither favorable nor unfavorable sentiments about 5G and suggests that either something is missing, or people have not yet decided on what they definitively want out of the new network bandwidth. Our next highest vote in this category was "excitement" which falls in line with what may result in higher votes as time goes on, or neutral would remain in the top spot. Happiness had the next greatest votes. So, between the top three answers, there was neutral at 59% (22 votes), excitement at 19% (7 votes), and happiness at 11% (4 votes). This distribution suggests that maybe sentiments were anticipatory of 5G all along and that "surprise," which had only 2 votes and 1 vote for "other" and "disgust" were hard to generate.

Next up I asked, "of the cell phone carriers, whose service has the best, most reliable nationwide overage?" And two answers pretty much shared the top though one vote was all it took to have that answer take top place. In the top place with 15 votes and 37% of the share was Verizon. Verizon is a popular network provider and because it was in the top spot may have done much 5G marketing, like AT&T, which was mentioned earlier in getting brand awareness and the customer satisfaction part out of the way. Yet, Verizon was not alone and had challengers in the runner-up spot that went to T-Mobile with 14 votes and 34% of the share. Rounding out the top three and four spots was AT&T who garnered 6 votes or 15% of the pie and Boost Mobile who received 5 votes and 12% of the share. The other category to receive votes was Xfinity at only 1 vote. The top 5G carriers also, according to the

respondents, offer the best nationwide coverage and also explain why they might have been exposed to them and answered so readily. I anticipate a larger sample size would also generate the same abundance of support for the top three brands of Verizon, T-Mobile, and AT&T. The three are poised to break out big in the few years coming up, as too will Boost Mobile. In my own experience, Xfinity has been on the fringe uses for internet, phone, and cable, so it is not surprising to see it only get one vote. However other answer options such as Sprint, Mint Mobile, and other carriers did not get any votes. What that means is Sprint, Mint Mobile and some other carriers may be on the way out or are losing pace with the other manufacturers of 5G networks. As of mid-2020, Sprint did merge with T-Mobile to complete a telecommunication giant mashup to tie in what was the fourth-largest mobile network in the United States.

I also asked, "of these 5G home internet providers, which are you most familiar with?" to get more feedback related to not just cell phone usage. Incorporating thoughts about the internet, for example, is a great way of examining the reach of some brands that are more focused on just providing cell phone 5G services. As time goes on it will become apparent that 5G infrastructure will play a large role in getting other services off the ground too aside from fiber optic lines and the like. Most contemporary analysts will say that there are only four main internet providers of 5G services which include: Verizon, T-Mobile, Starry, and Ultra. It has comparable download speeds of 100 to 300 megabits per second and from my results, we may infer who out of these four might have the fastest speeds if there is such a correlation. The top answer for this survey question was Verizon. And it shows that Verizon has taken preference over other 5G providers in responses and so in my discussion, it will get more attention, plus more. Again, Verizon received 10 votes and received 6 votes placing them in close alignment, but T-Mobile did not get the top spot. T-Mobile also was a runner-up in the previous question, which proved my sample size was enough to present common patterns in data for getting empirical proof saying T-Mobile is acting second to Verizon according to the market and a survey of social media, and internet and cell phone 5G users or respondents.

Moving away a bit from 5G service, I wanted to ask a question about hardware or in this case the actual mobile phones people are anticipating seeing and buying in the future. And there is historical relevance to phones with the most cache for subjects in our survey. And available to answer from, subjects were able to select the Apple iPhone 15 or 15 Pro, Google Pixel 7, Nokia X50, and Samsung Galaxy S23. The less popular options were the Xiaomi 12T and 12T Pro, the Huawei Mate X3, and the One Plus 11 Pro. Apple was the top-rated phone to see in the future and according to my sample survey, Apple accounted for 76% of the votes which was 10 total votes. The Samsung Galaxy line of phones, more specifically the Samsung Galaxy S23, garnered 15% of the vote or only 2 votes compared to 10 for Apple's iPhone 15. The Google Pixel got a good 7% of the vote despite only registering 1 vote out of the total, but again with such a small sample size, I was able to make use of the percentages to get a better understanding of what a larger survey could accomplish. As it stands, Apple's huge share of the TSA meant that people were anticipating seeing the phone but was not a guarantee that they would purchase it. Due to this, it is clear that while popular, Apple's phones are not holding a monopoly over cell phones as this survey might suggest but rather,

they are so sought after it is hard to ignore the iPhone as a product worth having. Historical accuracy too would mean Apple has been building this kind of relationship with consumers for a long time since Apple and its founders Steve Jobs and the like made computing power a reality in the hands of the world's citizens in 2007. Samsung's Galaxy brand of phones was released a couple of years following in 2009 and affirms its lag behind Apple in terms of anticipation and product value for cell phone buyers. The final form phone in this group is the Google Pixel. The Pixel software or OS (operating system) was introduced into the Google Chrome Book in 2013, but the Pixel phone did not reach the market until 2016 affirms what respondents were saying by only giving it 1, or the equivalent of 7% of the voting distribution for what phones people wanted to see in the future.

Following my question about future phone anticipation, I wanted to know about present-moment phones that my general sample group owned and operated personally. The question was: "of the cell phone manufacturers, which is your phone made by?" My answers generally fell in line with my previous question about whose phone were they to buy next. The three standouts were the same Apple, Samsung, Google Pixel, and a newcomer to the survey at least, Motorola. The distribution for these questions stood a little fairer in terms of a share of the percentage for votes. Apple came out top again but with 57% of the total or 36 votes. Samsung was not far behind with 38% or 24 votes to Apple's 36. In this way, the actual anticipation for Apple cell phones was much higher than the number of owners of the iPhone product and it is clear that Samsung has risen in the ranks as a leading manufacturer. Also, the adoption of 5G means that Apple would be a great option for anyone who wants or is hoping to get a phone that has 5G enabled and works well. Some manufacturers favor prepaid options for purchase, and it is why phone carriers such as Motorola have fewer vocal owners. Motorola and Google Pixel each had a 2% share of the vote. And in a shocking reveal, Motorola has been making mobile phones since the 1970s when the big block phones were coming out. As the oldest manufacturer on this list, they are a surely noted outlier in terms of production while Apple has been making many things outside of phones, namely computers as their phone ran into the iPhone came later. And again, Google Pixel's small influence on the world of cell phones has yet to surpass the other older ones who are being bought because even Motorola still holds an advantage on par with it as this study and survey shows, each with 3 votes between Motorola and the Pixel/HTC cell phone.

Returning to 5G network plans, I asked the question, "of the cell phone carriers, which is your network plan with?" Similar to when we introduce the hardware of cell phones, we want to envision how 5G will be bought and applied to those same phones. So, who did the sample size survey say gave them a network plan? Verizon had gotten 16 votes or 32% while AT&T pushed ahead of T-Mobile. AT&T is an impressive package that in the votes had 30% and 15 votes over T-Mobile's 28% and 14 votes. In reality, the two AT&T and T-Mobile were closely tied in terms of who consumers said their network coverage was by. Boost Mobile which is a popular brand for getting prepaid options has only 10% of the vote 5 respondents but has a nice showing amid Sprint's departure and merger with T-Mobile not long ago. The finality of presentism with Verizon gaining the top spot left something to be desired versus other questions that had to find out what future service they were interested in. So, while I asked

about both current and future phone hardware that people had adopted or wanted, I only asked in the questionnaire about their current use of 5G network plans, or at least regular cellular networks. The services that got no response and were left at 0 were Mint Mobile, Xfinity, and other network plans which seem to get left out of the conversation about mobile carriers mostly for whatever reason. And if we did a new in-depth study, we might be able to discover where some of these other network offerings could find a spot for reasons to celebrate who had signed on.

At home, domestic 5G networks are some of the strongest in the world. I asked subjects about it with the question, "of these U.S. cities, which do you anticipate will adopt the best live studio, in-person, or online/T.V. viewing service (CNN, ESPN, Times Square, etc.) with the rise of 5G simultaneously?" Three standouts, as per usual, were given but the survey gave four city options. What were those cities people voted for? Two of them wound up tying for the top place and it resulted in Los Angeles Metro and New York City/Washington D.C. becoming preferred as the 5G hotspot in the U.S. At 37% each, we notice a drop in popularity once we get to the third option. Atlanta Metro accounted for 25% of the total and although there were more options, one of them being Houston, it was clear that those three cities were the most popular. Previous research was highly favorable of populous places but for entertainment purposes, the best cities won out. The sample size on this question was very small but to do it justice would have had to earn thousands or more in votes to replicate the opinion of so many people, just like the cities we were surveying. And determining who has the most clout in terms of 5G advantages between L.A. and N.Y.C., would take more respondents to answer.

Similarly, the next question built on my documentation of cities, but it wanted to address nations around the world. My question was, "of these nations, which has the most potential to overtake the others in terms of 5G production and development?" Three top answers resulted in votes while one had only 0. Placing demography and ethnographic studies into already noted city centers was important for me. The questionnaire placed it into a larger statistical group of known countries that are working to build sustainable 5G. Spain, Italy, and Germany are poised to reap benefits from already notable technology environments. The culture of technology in places like Germany rivals Silicon Valley. Spain and Italy are updating infrastructures at a rapid pace as well. The leader for voters in my general sample survey was Spain at 57% or 4 votes. Next was Italy at 29% or 2 votes. Germany had only 1 vote and 14%. Britain and Saudi Arabia did not receive any votes in my survey. If I could do this at a larger level, it would make targets of the sample size a choice to identify where people are answering from. If we want to compare the domestic and international sources, the highest-voted results are heavily leaning toward Latino community engagement historically. Atlanta and Germany are the less voted-on options and pertain to those communities as well. Overtaking current cities in the U.S. is not likely outside of the top markets though internationally the variability is higher, and Spain is likely getting an influx of new social media popularity with people moving there from war-torn areas such as Ukraine or away from Ireland due to political fallout and disagreement, for example with Italy's recent election.

Services, broadly defined, are often catalysts for polarized opinions about how people are responding to their treatment. TSA is often not good enough at deciphering the ways people are thinking about treatment or product performance without detailed surveys such as what I had proposed and shared on Twitter. Likert scales are great at delineating between emotions and other topics that necessitate a scale. My question was, "on a scale of 1 to 5 with 1 being poor and 5 being excellent, how would you rate the download speed of 5G service?" 47% of the voters said that it should be rated 4 or 5, the highest rating. 26% said that it should be rated at 3. And equal 13% parts for 1 and 2 were given. If one notices, a declination is evenly distributed in a decrease as the performance slows. In other words, most people agreed that 5G performed on par with the top 4 or 5 levels available this survey was promoting.   But where, if any, could we locate the negative consequences of such 5G speeds? Did people disagree at all with 5G in terms of product performance? The following question answers it.

My final question to think about was, "regarding mobile phone carriers, the top brands provide quality customer service." This question was more of an assertion or claim that on a Likert scale, the general sample size was supposed to answer. 41% disagreed that their customer service was high quality. That is the majority of the opinion. 29% strongly agreed that quality customer service was available, but it was still outweighed by the disagreement. As I have been a proponent of, polarized topics give great results. An additional 19% agreed with quality service but again it would trend back to the disagreeable side making up another 9% of the vote. And if we were to split them in half, we would get 48% in agreement and 50% in disagreement. It is not that wide of a margin, but enough to show that 5G if assumed to contribute to people's thoughts about it, has a way to go before it can be considered the best choice for buyers. There is then, as my presentation reiterated a gap between development technologies that even by the time they reach the public, fail to get the same humanistic or personnel attention that it deserves. Maybe the speed of customer relations and quality service will catch up to 5G download speeds in the future. However, it is likely that 5G will again outpace our efforts at offering the best physical support teams when 5G gives way to 6G or call centers are no longer effective.

In discussing the final points about 5G, I want to take time to think about its ubiquitous use, or not-so-ubiquitous use, as a unifier of both rural and disadvantaged people who need more access to it. Getting satisfaction from 5G was supposed to promote nationwide coverage ability the same way Verizon and other networks have been promoting. Fifth-generation networks are built on a platform that began with 1G as early as 1991 (Crotty, 2020). And ever since, it has been growing its reach to cover as much space as possible. Standardizing 5G practice, as in making mobility networks match across states was just the first step at getting it into as many homes and people's hands as designers were able. However, disparities remain, inevitably, between 5G's affordability and the satisfaction of customers receiving service in the form of personal communication. These two topics make up the most of discussions especially when we include topics like infrastructure and even TSA on social media. The limitations of my study were made evident in previous research that used machine learning to find answers to what people were at the time thinking about its rollout by analyzing tweets from people around the world. My study was not unlike it but did less to get

to the problem of algorithms and showed how phone brands such as Apple and Samsung carried the brunt of 5G service and also have the most expensive cell phones. The future of phones available and the future of cities on 5G are all about opening up the urban ecological potential for sustainability (Lehtinen, 20l22) which also means bringing in more users to the platform and places. 5G was supposed to be the epitome of progress though as some statistics reiterate it inhibits it, despite the technological advancement. Some individuals with the ability to choose to go without 5G are also able to leave urban areas that have poverty levels underscored by city living.

By examining the responses to my polls, I was ultimately able to contribute to what TSA has been doing the past few years, without the machine algorithms, however. Instead, I looked at key terms or themes that the tweet mentioned. Satisfaction was at an all-time low as one person said that 5G's rollout was "incredibly pointless right now." That same person also reiterated that it was not "necessary for the average person" to tout my ubiquitous 5G theme leveled in the previous paragraph. To surmise, the banality of carriers based in the United States also means topographic studies and ethnographic research in the future may have to de-generalize the biases of *ubiquitous* 5G and think about what local 5G means to people. Another tweet mentioned that "surprisingly Cricket has been amazing in Mexico and Canada," showing that brand awareness is not the same everywhere, as is the phraseology of thoughts such as "I want to switch to Verizon" as a catchphrase for it or AT&T, or other top carriers. Instead, in overseas places such as Mexico and Canada, it may turn into: I want to switch to Cricket. The implementation of 6G and new digital networking platforms like *X.com* in the future will ultimately define new taxonomies. We will move toward sentiment analysis and political lexis within a transhumanist algorithm, not a machine one, uniting our disparities in cultural preservation and development.

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