ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT1825

The Rise of 5G: A Game-Changer in the Digital Landscape

Abdiaziz Bashiir[1]
[1]School of Computing and Technology, Gollis University,
Hargeisa, Somaliland.

Abstract:- This article discusses how 5G technology will impact various industries. For example, the healthcare industry will benefit from 5G technology by enabling remote surgeries and telemedicine. The transportation industry will benefit from 5G technology by enabling self-driving cars and smart traffic management systems. The article also highlights how the 5G technology will impact the industry of entertainment by enabling virtual and augmented reality experiences.

Keywords:- *5G, IoT, Technology, Healthcare, Transportation, Entertainment Industry.*

I. INTRODUCTION

The rise of 5G technology has been a hot topic in recent years, with many experts predicting that it will revolutionize the way we live and work. 5G is the fifth generation of wireless technology, and it promises to deliver faster speeds, lower latency, and greater capacity than its predecessors. This new technology is primed to transform a wide variety of industries, from healthcare to manufacturing to media.

5G technology is expected to bring about a new era of connectivity, with speeds up to 100 times faster than 4G networks. This means that we will be able to download movies, music, and other large files in a matter of seconds, rather than minutes. It also means that we will be able to stream high-quality video content without buffering or lag.

In addition to faster speeds, 5G technology promises to deliver lower latency, which is the time it takes for data to travel from one device to another. This means that we will be able to enjoy real-time applications like virtual reality and augmented reality without any lag or delay.

The potential applications of 5G technology are vast and varied. In healthcare, 5G could enable remote surgeries and telemedicine, allowing doctors to perform procedures from anywhere in the world. In manufacturing, 5G could enable smart factories, where machines communicate with each other to optimize production. In media, 5G could enable new forms of immersive entertainment, such as virtual reality concerts and live sports events.

However, there are also some challenges that need to be overcome before 5G can become a reality for everyone. One of the biggest challenges is the need for more infrastructure, such as cell towers and fiber optic cables. Another challenge is the need for more spectrum, which is the radio frequency that wireless signals travel over.

Despite these challenges, the future of 5G technology looks bright. With its promise of faster speeds, lower latency, and greater capacity, 5G is set to revolutionize the way we live and work. So, get ready for the next generation of wireless technology!

II. 5G AND MEDICAL PROFESSIONALS

5G technology is poised to bring a significant transformation to the healthcare industry through its unique capabilities. One of the most compelling features of 5G is its high-speed data transfer rate, which far surpasses that of current 4G LTE technology. This means that large volumes of data, such as high-resolution medical imaging files and patient records, can be transferred almost instantaneously. This rapid data exchange can enhance the efficiency of healthcare services, allowing for quicker diagnosis and treatment.

Another key feature of 5G is its ultra-low latency, often referred to as Ultra-Reliable Low Latency Communication (URLLC). Latency is the time it takes for data to travel from one point to another, and in medical contexts, reducing this delay can be critical. For instance, in remote surgery, where a doctor performs procedures using robotic instruments from a different location, any delay can have serious implications. 5G's near-instantaneous data transmission ensures that such procedures can be carried out with precision and safety.

5G also offers superior connectivity and capacity, meaning that it can support a large number of devices simultaneously without a drop in performance. This is particularly beneficial in a hospital setting, where numerous medical devices need to be connected and communicate seamlessly. With 5G, devices such as heart monitors, infusion pumps, and wearable health trackers can provide real-time data without interference or lag, enabling continuous patient monitoring and timely interventions.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT1825

Furthermore, 5G's high bandwidth allows for the handling of large amounts of data, which is essential for applications such as telemedicine. Doctors can conduct high-quality video consultations with patients, access detailed medical records, and share diagnostic information without any connectivity issues. This improves access to healthcare, especially for patients in remote or underserved areas.

The integration of 5G technology in healthcare is ready to revolutionize the industry, significantly impacting healthcare workers. According to recent studies, 5G can enhance data transfer speeds by up to 100 times compared to 4G, enabling real-time communication and remote diagnostics1. This technology supports the use of high-definition medical imaging and large data sets, which are crucial for accurate diagnoses and treatment plans1. Additionally, 5G's low latency facilitates the use of advanced technologies like augmented reality (AR) and virtual reality (VR) for surgical simulations and training, potentially improving surgical outcomes and reducing training time for healthcare professionals1. Furthermore, the adoption of 5G could alleviate some of the workload on healthcare workers by enabling smart telemonitoring and AI-driven patient check-ins, thereby reducing burnout and improving overall efficiency1.

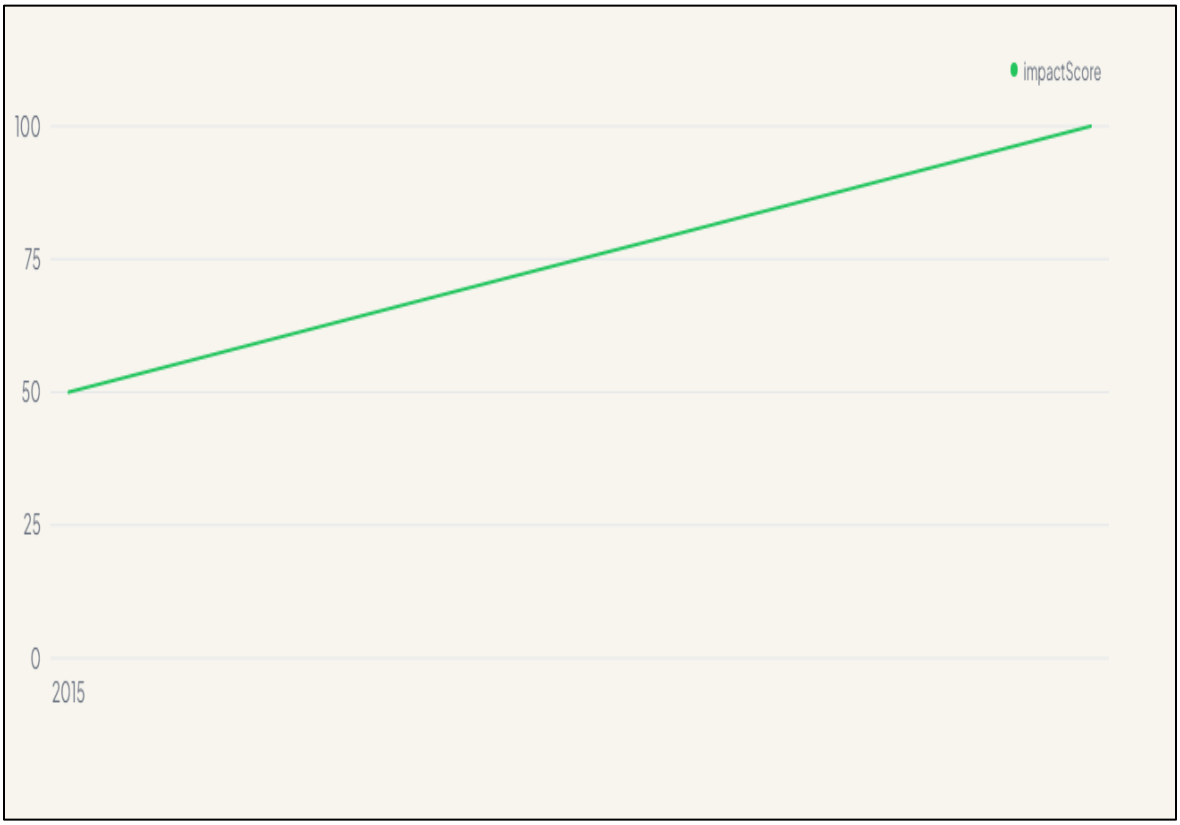

Fig 1 *Evolution of 5G (2015-2024)*

As above figure shows; figure 1, the evolution of 5G technology from 2015 to 2024 has shown a significant increase in its impact on healthcare and healthcare workers. In 2015, the focus was on potential risks, with an impact score of 50. By 2021, the conversation shifted towards transformative potential, increasing the impact score to 75. In 2024, the impact score reached 100, reflecting the projected $85 billion market value and substantial productivity gains.

5G technologies have the potential to help resolve the challenges faced by businesses in the healthcare industry, such as remote monitoring and sophisticated imaging equipment, which can lead to additional strain on the networks of businesses in the healthcare industry. This often increases congestion and slows network speeds, especially for healthcare providers that might be interfacing with dozens of patients a day. 5G technologies have the potential to help resolve these challenges 3. Here are five ways 5G can help healthcare organizations meet the growing demands of digital transformation:

- Remote patient monitoring: 5G technology can enable remote monitoring of patients, which can help reduce the burden on healthcare providers and improve patient outcomes 3.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT1825

- Telemedicine: 5G technology can enable telemedicine, which can help healthcare providers reach patients in remote areas and provide care delivery convenience 1.
- Smart ambulance and emergency services: 5G technology can enable smart ambulance and emergency services, which can help optimize medical resource utilization and achieve increased patient value 1.
- Virtual reality (VR) and augmented reality (AR): 5G technology can directly benefit the areas of VR and AR, with potential contributions to intelligence medicine when 5G technology matures 2.
- Medical education and skilling: 5G technology can greatly benefit medical education and skilling with the enhanced mobile broadband (eMBB) feature of 5G 2.

5G technology has the potential to provide essential levels of connectivity to enable a new health ecosystem, one that can meet patient and provider needs accurately, efficiently, conveniently, cost-effectively, and at substantial scale 2. The combination of constant real-time health monitoring over 5G networks will provide substantial opportunities for personalizing people's healthcare experiences and interventions 4. Participatory In the 5G-enabled health ecosystem, patients will become less passive consumers of healthcare and more engaged participants in driving their own 4.

III. 5G AND TRANSPORTATION INDUSTRY

The advent of 5G technology is poised to dramatically transform the transportation industry. With its low latency, high capacity, and reliable networks, 5G offers enhanced visibility and control over transportation systems. This advancement will pave the way for self-driving cars and smart traffic management systems, revolutionizing our travel experience.

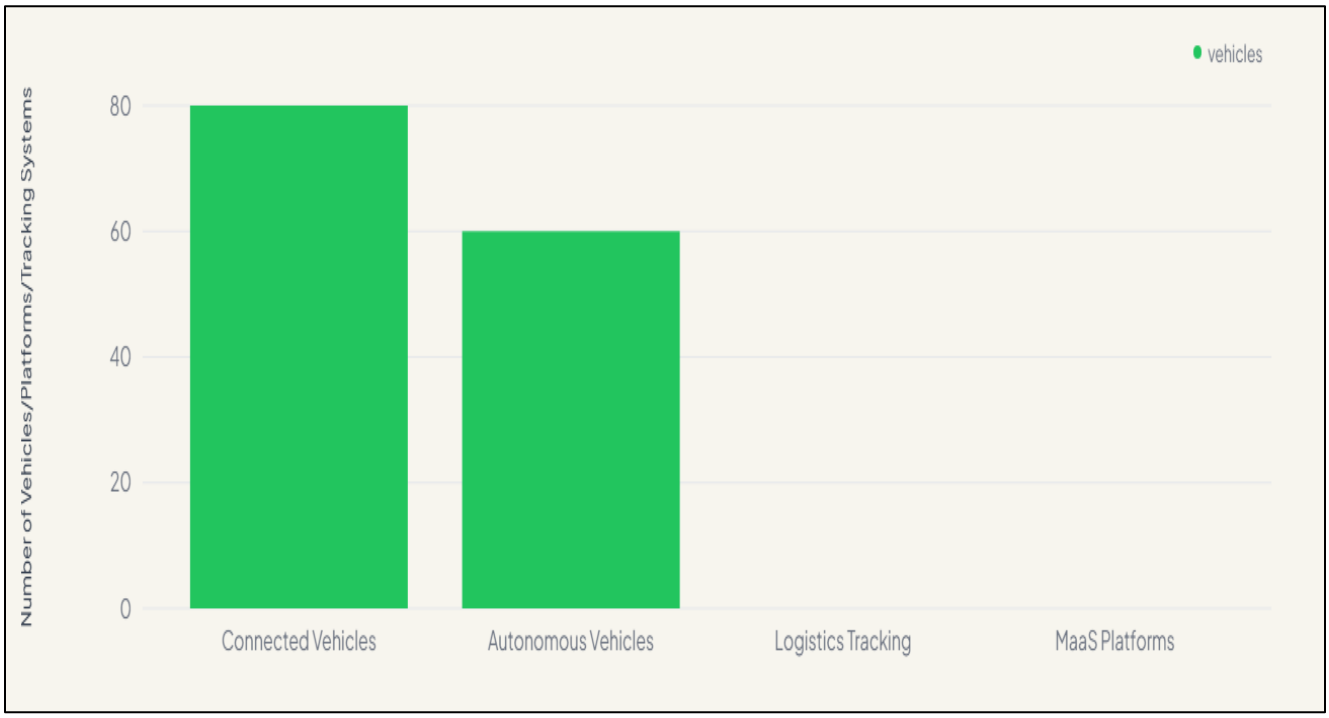

Fig 2 Progression of 5G (2015-2024)

From 2015 to 2024, the transportation industry has undergone significant transformation due to the advent of 5G technology. The introduction of 5G has enabled the rise of connected and autonomous vehicles, making transportation smarter and more efficient. Logistics have seen improvements with enhanced tracking and streamlined planning, thanks to the increased connectivity and reduced latency of 5G networks12. Urban transportation has also benefited, with cities implementing Mobility as a Service (MaaS) platforms to reduce congestion and improve public transport operations2. Overall, 5G has driven the transportation sector towards greater efficiency, safety, and modernization.

Self-driving cars are one of the most promising applications of 5G technology in the transportation industry. With 5G networks, vehicles can communicate with each other and with infrastructure in real-time, enabling them to make split-second decisions that can prevent accidents and improve traffic flow. This will also reduce the need for human intervention, making travel safer and more efficient.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT1825

Smart traffic management systems are another area where 5G technology can make a significant impact. By providing real-time data on traffic patterns, 5G networks can help transportation companies optimize their routes and schedules, reducing congestion and improving efficiency. This will also enable cities to plan day-to-day traffic flows and anticipate transportation capacity around large events in real-time.

In conclusion, the transportation industry is poised to benefit significantly from 5G technology. The development of self-driving cars and smart traffic management systems will revolutionize the way we travel, making it safer, more efficient, and more sustainable. With 5G networks, the transportation industry can look forward to a future where travel is faster, more reliable, and more enjoyable.

IV. 5G AND ENTERTAINMENT

Certainly! 5G technology is expected to have a significant impact on the entertainment industry by enabling virtual and augmented reality experiences. According to a ZDNet article, the low-latency properties of 5G offer promise for AR and VR applications, but converting promise to results will take time. Widespread deployment of 5G mobile networks could accelerate the adoption of augmented and virtual reality, although wider availability is not the only requirement for VR and AR to thrive on 5G: compelling use cases are also required to make these technologies viable, although the addition of 5G does give developers a larger canvas on which to design new experiences1.

The low latency of 5G networks is anticipated to provide more immersive and interactive experiences in the entertainment sector. For instance, 5G can support real-time streaming of high-quality VR and AR content, which can be used for gaming, live events, and other applications. Additionally, 5G networks can support the creation of new AR and VR applications for training, education, and other purposes. The low latency of 5G networks also enables more responsive and interactive experiences, enhancing user engagement and making these technologies more appealing to consumers.

5G technology is also expected to enable more personalized and location-based entertainment experiences. For example, 5G networks can enable the creation of virtual and augmented reality experiences that are tailored to the user's location and preferences. This can be used for location-based entertainment, such as theme parks, museums, and other attractions. Additionally, 5G networks can enable the creation of personalized entertainment experiences that are tailored to the user's interests and preferences. This can be used for gaming, streaming, and other applications, which can enhance the user experience and make these technologies more appealing to consumers.

V. CONCLUSION

In summary, 5G is set to revolutionize the digital landscape. Its transformative power will impact a multitude of industries and fully unleash the potential of IoT by facilitating a massive number of low-power connections. 5G's lower latency and higher resiliency mean that time-critical applications will be increasingly reliable. With billions of subscribers predicted by 2025, 5G is set to revolutionize everything from marketing and manufacturing to medicine and the metaverse. The future truly belongs to 5G.

REFERENCES

[1]. (Eds.), Structural change, Competitiveness and industrial policy (pp. 149–166). London: Routledge. 183–206.777–799.
[2]. Angel, H. F. Moed, U. Schmoch, & Ausle, P. (2019). Interplay of patents and trademarks as tools in economic competition. In W. Gl¨ Broadcasting, 51(4), 530–537.
[3]. Bashiir, A., & Kaumbulu, A. K. (2023). The role of human resource management skills in Enhancing Project Performance: Evidence from International NGOs in Hargeisa, Somaliland. *Asian Journal of Sociological Research*, 65-70.
[4]. Farah, M., Kaumbulu, A. K., & Bashiir, A. Risk Management and Performance of Construction Projects in Hargeisa, Somaliland.
[5]. Industrial dynamics of the new digital economy (pp. 121–150). Cheltenham: Edward Elgar.j.telpol.2021.102287.
[6]. M. Thelwall (Eds.), Springer Handbook of science and technology indicators (pp. 1023–1035). Berlin: Springer.
[7]. Manganelli, A., & Nicita, A. (2020). The governance of telecom markets: Economics, Law and institutions in Europe. London: Palgrave Macmillan.
[8]. Mansell, R. (2021). Adjusting to the digital: Societal outcomes and consequences. Research Policy, 50(9), 1–10.
[9]. Mansell, R., & Steinmueller, W. E. (2020). Advanced introduction to platform economics. Cheltenham: Edward Elgar.
[10]. Mansell, R., Avgerou, C., Silverstone, R., & Quah, D. (2007). The Oxford Handbook of information and communication technologies. Oxford: Oxford University Press.
[11]. Martin, B. (2019). The future of science policy and innovation studies: Some challenges and the factors underlying them. In D. Simon, S. Kuhlmann, J. Stamm, &
[12]. Martinelli, A. (2012). An emerging paradigm or just another trajectory? Understanding the nature of technological changes using engineering heuristics in the
[13]. McKinsey Global Institute. (2020). Connected world: An evolution in connectivity beyond the 5G revolution. McKinsey Global Institute. Discussion paper.

ISSN No:-2456-2165 https://doi.org/10.38124/ijisrt/IJISRT24OCT1825

[14]. Mendonça, S. (2003). News out of the old: The evolving technological incoherence of the world's largest companies. In J. F. Christensen, & P. Maskell (Eds.), The
[15]. Mendonça, S. (2006). The revolution within: ICT and the shifting knowledge base of the world's largest companies. Economics of Innovation and New Technology, 15(8),
[16]. Mendonça, S. (2009). Brave old world: Accounting for 'high-tech" knowledge in 'low-tech' industries. Research Policy, 38, 470–482.
[17]. Mendonça, S. (2012). Trademarks as a telecommunications indicator for industrial analysis and policy. In A. M. Hadjiantonis, & B. Stiller (Eds.), Vol. 7216.
[18]. Mendonça, S. (2014). National adaptive advantages: Soft innovation and marketing capabilities in periods of crisis and change. In A. Teixeira, E. Silva, & R. Mamede
[19]. Mendonça, S., Pereira, T. S., & Godinho, M. M. (2004). Trademarks as an indicator of innovation and industrial change. Research Policy, 33(9), 1385–1404.
[20]. Mendonça, S., Schmoch, U., & Neuh¨
[21]. Miao, G., & Niu, Z. (2005). Profit oriented multichannel resource management of integrated communication and broadcast networks. IEEE Transactions on
[22]. Milojevi´c, S. (2020). Practical method to reclassify Web of Science articles into unique subject categories and broad disciplines. Quantitative Science Studies, 1(1),
[23]. Mitra, R. N., & Agrawal, D. P. (2015). 5G mobile technology: A survey. ICT Express, 1(3), 132–137.
[24]. Nelson, R. R., Dosi, G., Helfat, C. E., & Winter, S. G. (2018). Modern evolutionary economics: An Overview. Cambridge University Press.
[25]. Nicita, A., & Belloc, F. (2016). Liberalizations in network industries: Economics, policy and Politics. Berlim: Springer Verlag.
[26]. Nikolic, I., & Galli, N. (2021). Patent pools in 5G: The principles for facilitating pool licensing. Article (in press). Telecommunications Policy https://doi.org/10.1016/
[27]. OECD OughtonE, J., Lehr, W., Katsaros, K., Selinis, I., Bubley, D., & Kusuma, J. (2021a). Revisiting wireless internet connectivity: 5G vs wi-fi 6. Telecommunications
[28]. OECD. (2021). OECD science, technology and innovation Outlook 2021: Times of Crisis and opportunity. Paris).
[29]. Open Signal. (2021). Understanding where and when users can experience 5G in South Korea. Retrieved from https://www.opensignal.com/2021/02/25/understandingwhere-and-when-users-can-experience-5g-in-south-korea. (Accessed 25 February 2021) Accessed. Policy, 45(5), 1–15.
[30]. Telecommunications switching industry. Research Policy, 41(2), 414–429.
[31]. W. Canzler (Eds.), Handbook on science and public policy (pp. 523–542). Chelteham: Edward Elgar.