Has the technology industry narrowed or widened the gap between opportunities available to citizens of rich and poor nations?

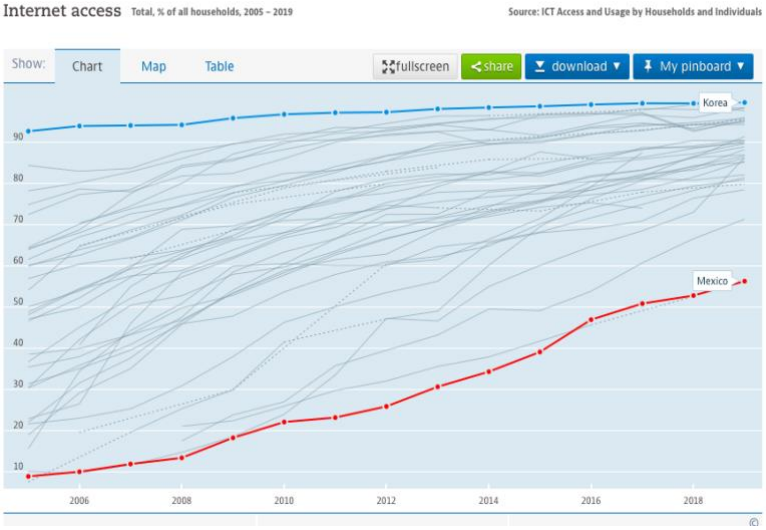
Introduction

Technology, as defined by the Cambridge Dictionary, is "(the study and knowledge of) the practical, especially industrial, use of scientific discoveries". Nowadays, the technology industry is thought of solely as digital technology but in reality many more things are considered as technology under this definition. Therefore, using this alongside the Cambridge Dictionary definition of 'industry', the technology industry is: 'the companies and activities involved in the process of producing technology for sale, especially in a factory or special area'. The question addresses opportunities created by the technology industry and the definition of an opportunity in the Cambridge Dictionary is "an occasion or situation that makes it possible to do something that you want to do or have to do, or the possibility of doing something". The final part of the question is harder to define as there are many varying views on what wealth is, but for the purpose of this question GDP per capita can be used to indicate the wealth of a country.

Taking these definitions for the technology industry and an opportunity, and GDP per capita as a representation of a country's wealth, it is possible to explore the impact of the technology industry on rich and poor nations. This can be done by looking separately at its effect on sectors such as education, climate change and national economies.

Disparity created by the use of technology in the COVID-19 pandemic

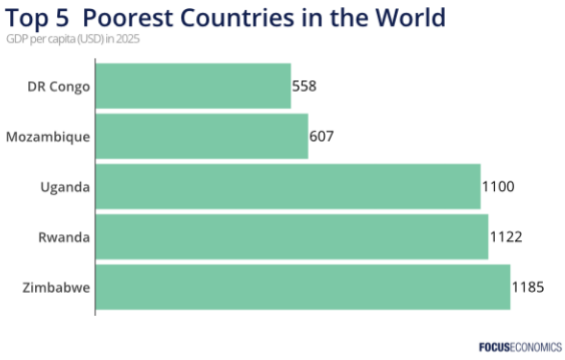
One way that the technology industry has widened the gap between rich and poor nations is the disparity that it has created in countries' abilities to be able to transition to online learning when schools had to be closed to prevent the spread of COVID-19. Although having technology at home has been very beneficial to those living in richer nations as they have been able to continue with their education, albeit online, the lack of students' access to the internet and devices in other countries has meant that only richer countries have continued schooling and less well-off nations have not been able to do this. Therefore, what was an already large gap between the quality of and access to education for students in developed and developing nations has been made far greater over the last year because only students in some countries have missed out on the learning time.



The graph shows the difference in the percentage of households that have internet access in the 37 countries that are members of the OECD: Korea has the highest percentage with over 90% of households there having access to the internet and Mexico has the lowest with under 60% of households having access to the internet [1]. Obviously when countries had to close on-site education to slow the spread of COVID-19, the

people and countries with limited or no access to the internet were most affected as they could not continue learning online so missed out on education for weeks and in some cases even months.

Students in sub-Saharan Africa were among those most affected by the transition to online learning as almost 90% of them do not have household computers and 82% are not able to get online. Furthermore, roughly 56 million of them live in areas that are not served by mobile networks [2]. The 5 poorest countries by GDP per capita globally are all from sub-Saharan Africa and they are DR Congo, Mozambique, Uganda, Rwanda and Zimbabwe [3] which shows that the poorest nations are those with opportunities most negatively affected by the technology industry.



1.6 billion children in 195 countries worldwide have not been able to use their classrooms because of Coronavirus [4], therefore the lack of internet access in developing nations has led to students there being the least able to continue their education during the pandemic. Education is a merit good, which means that it is under-consumed and has positive externalities (in consumption) so is not only beneficial to those who receive it, but is also beneficial to future employers and others in society, so the opportunities lost through missing out on education due to poorer nations' lack of access to technology are very large. Poor under-18 education can lead students to be unable to go to university, be unable to get a good job with a high salary and ultimately be unable to break out of the cycle of poverty.

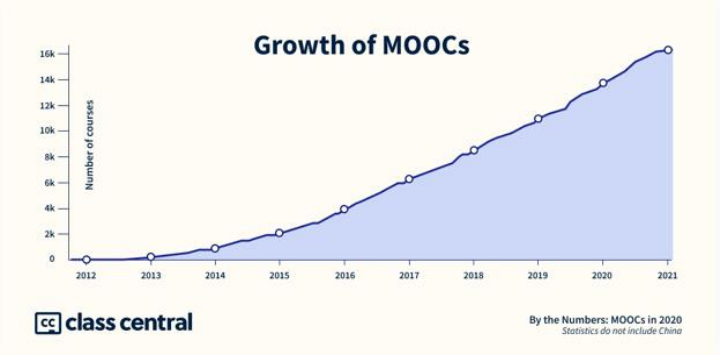
Opportunities online

Despite the problems caused by using only online resources for education in recent months due to the Coronavirus pandemic, there are many websites and courses online which can be very beneficial to students and anyone trying to learn new skills without leaving their bedroom.

A 'massive open online course' (abbreviated to 'MOOC') is, according to the Cambridge Dictionary, "a course of study that is made available over the internet and that can be followed by a large number of people" and the name was thought up in 2008 by Dave Cormier, University of Prince Edward Island, and Bryan Alexander, National Institute for Technology in Liberal Education after an online course had been created by George Siemens and Stephen Downes [5].

Since then these MOOCs have been ever growing and at the end of 2020 there were 16,300 courses and 180 million students [6].

This graph shows how quickly the number of MOOCs have been growing in the past few years. One doesn't need much or any prior knowledge in order to take part in a MOOC which makes them accessible to so many people. The growing number of courses has provided and will continue to provide many opportunities for people to learn things they would not otherwise have been able to due to geographical immobility, lack of funding and other reasons.



However, the issue of a lack of internet access currently facing numerous developing countries means that even though these courses are very informative and useful, the people living in poor nations who could benefit a lot from them are not even able to access them. Furthermore, another major problem for MOOCs being accessed by people in developing countries is awareness. In a survey of people between the ages of 18 and 35 in Colombia, the Philippines, and South Africa conducted in 2016, the reason for 79% of the non MOOC users not having done any is that they had never heard of them [7]. This lack of awareness could stem from a lack of technology available to people in these nations as without technology they do not have access to advertising for MOOCs that would be done on websites including social media. There are many other useful resources for learning and connecting with people who could provide one with great opportunities online such as YouTube, Zoom, and Spotify (Spotify has 299 podcast listeners and many educational podcasts) [8]. Unfortunately, the same problem still remains for these resources as they cannot be accessed without the internet.

Job Creation by the technology industry

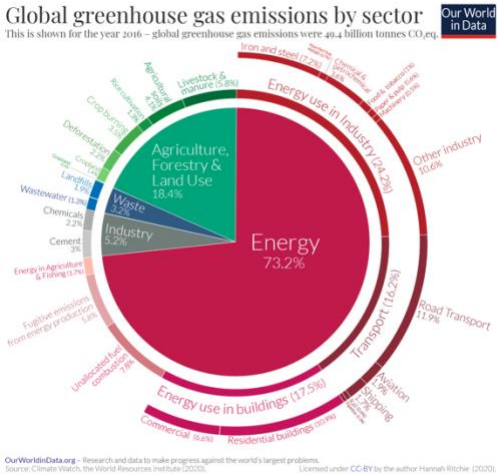
The technology industry has provided lots of jobs to people in developing countries because companies from developed nations have been able to send work abroad for both software production and also the physical processes involved in the manufacturing of the technology. The evidence shows that this has been beneficial for people in poorer countries, but overall it will not have narrowed the gap between rich and poor nations as the whole purpose of the process is so that companies in developed nations can make a profit. It is difficult to tell the overall impact of this but it will either be neutral, or a net gain for citizens of developed nations as they are able to make more money which they will then be able to invest or use to raise their standard of living.

Software production is a key part of the technology industry and a way that this has been done recently is through outsourcing. Information technology outsourcing is the concept of "hiring resources outside of an organization to handle certain information technology functions" [9]. The word resources could refer to any of the factors of production, specifically labour as it is more profitable for developing countries to outsource to developing nations where the labour is cheaper. Outsourcing provides citizens of developing countries many opportunities, such as the opportunity to get well paid jobs that they would not have been given otherwise. The benefit of these jobs for the people who are given them is not only the pay, but also the opportunity for more, potentially better, employment in the future as they climb up the career ladder. In the Philippines alone there are over 500,000 people employed by business process outsourcing (BPO) [10].

There are some upsides to the jobs that the technology industry creates through outsourcing, but the poor working conditions and the unacceptable way that the employees are often treated when hired to work on the physical aspects of the technology manufacturing process majorly outweigh them. Many of the minerals used in our technology are mined in developing countries including Malaysia and Russia. Because there is so much demand for these minerals, the extraction process is very intense as companies want to get as much done as quickly as possible so it often violates human rights laws, for example when an illegal gold mine in Indonesia collapsed which killed 13 people and trapped 100 inside [11]. After the minerals are extracted, they are sent to more developing countries such as Brazil and India to be assembled. Supply chains are very long and products travel to many corners of the world before coming to shops to be sold which means that it is hard for consumers and even companies to track the treatment of all the people involved in the process. Plus, firms' main aim is to maximise profit so it is often in their best interest to not ask too many questions about the supply of products if it means that the industrial process can be as cheap as possible.

Although the technology industry has created jobs for people in developing countries, many have been and will continue to be replaced by robots. It is predicted that 47% of jobs will be eradicated and the low skilled ones, often held by people in developing countries, are the ones most at risk [12]. We could start to see the impact of this in the very near future as around 40% of businesses are planning to use virtual assistants in 2021 and it has been predicted that Artificial Intelligence (AI) based chatbots will facilitate 90% of customer interactions in 2022. Robots are already in use though as over 23% of customer service organisations use AI powered chatbots [13]. The main people that these chatbots are replacing are those working in call centres and, due to outsourcing, developing countries (notably India and the Philippines [14]) hold most of the call centres globally. Therefore, people in developing countries working in call centres will be stripped of their jobs and have no way of providing for themselves and their families which will take away a lot of their opportunities.

How technology has had an impact on climate change



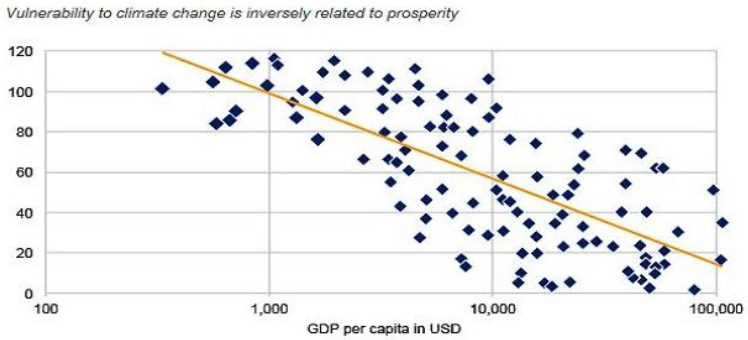
Another area in which technology has widened the gap between the opportunities available to citizens of rich and poor nations is climate change. In 2015, the technology industry used 3-5% of the world's electricity [15], and electricity is part of the largest sector of greenhouse gas emissions: energy [16]. Bitcoin, a cryptocurrency, is part of the technology industry and uses more energy than Argentina [17] as the 'mining' process involves many computer calculations. However, many other parts of the technology industry also contribute to its impact on the environment.

It is estimated that there are 50 metric tons of e-waste generated each year, and for a single smartphone, an average of 28.6kg of raw materials are extracted, transported, processed in the form of components, taken to the assembling plants and made into a smartphone which then needs to be further transported to distribution centres and retail stores [11]. All of these individual steps are bad for the environment and so the whole process is bad for the environment and it is made even worse by the amount of times it has to be repeated to create the 1,589,200,000 smartphones that are

currently sold worldwide each year [18]. The ways that the greenhouse emissions cause climate change are widely known, yet what is less known is the ways that climate change disproportionately affects citizens of poorer nations.

There is a correlation between a country's GDP per capita and their vulnerability to climate change, the three main reasons for this are: the difficulty of recovering from natural disasters due to the economic state of the countries, their reliance on sectors that are sensitive to the climate such as agriculture, and their geographical location as many developing nations are in low latitude areas where it is said that 80% of the damage of climate change will be concentrated [19].

If jobs in agriculture in developing nations begin to be effected by climate change then many citizens will lose their jobs, but if climate it developing nations badly then people living there will lose out on the many more opportunities that come from simply being healthy.



Source: Standard and Poor's, 2014

As well as poorer nations struggling to deal with the consequences of the climate change that has been partly caused by the technology industry, they also do not have access to technologies to prevent or slow down the impact of climate change. Some of the technologies that could help slow down climate change are solar panels, wind turbines, batteries for electric vehicles, and carbon capture and storage [20]. Developed countries such as Nigeria have a lot of sun, but since solar panels are so expensive (about £300-£500 for one panel [21]) they cannot make use of this by converting it into solar powered energy.

Conclusion

The technology industry has widened the gap between opportunities available to citizens of rich and poor nations through the use of devices for distance learning in education during the lockdowns caused by the Coronavirus pandemic, the maltreatment of employees in of tech companies in developing nations and their contribution to the climate change crisis. However with amazing opportunities online such as MOOCs on the rise and the technology industry being able to combat climate change there is hope that in the future the gap could be narrowed.

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