Does the Fourth Industrial Revolution hold the key to sustainable human progress?

One of the founding principles of the Fourth Industrial Revolution is to drive sustainable and equitable social and economic development on a global scale. As organisations come under increasing pressure to achieve meaningful Environmental, Social, and Governance (ESG) targets, can new and emerging technologies help to further human progress towards this goal?

As we discussed in our last blog, taking a broader view of an organisation's social and environmental impact allows resources to be focused on areas that provide the greatest sustainability benefits in the shortest amount of time. Similarly, taking a more comprehensive approach to the development of new technologies can be massively beneficial.

The negative impact of new technology

The industrial and technological advances of the past often progressed faster than society's ability to cope with any negative social impact. These negative externalities – the cost to a third party of the production or consumption of a product – often affect public health or the environment, in forms such as noise and air pollution, traffic congestion or antibiotic resistance.

The Fourth Industrial Revolution offers the opportunity to engineer wider benefits into the way technology is developed and deployed – not only for the Western world, but also for developing countries that have historically tended not to benefit from technological advancements.

Taking this approach not only helps to make sure that technology developments have a broader positive impact on society, but may also deliver solutions to some of the big world problems such as hunger, poverty and disease.

IoT and sustainable agricultural growth

The use of the Internet of Things (IoT) in food production is an example of how this can work in practice.

As the human population grows, global agriculture production needs to increase by about 60-70% to meet the increased food demand in 2050[1].

In many areas of the developing world, the traditional challenges of agriculture are hard to overcome because boosting food production requires significant investment of human resources and capital. This keeps many farmers trapped in a cycle of subsistence farming,

[1] Feeding the world in 2050 and beyond, George Silva, Michigan State University, Dec 2018

hampering social and economic development. If technology companies work to make IoT technology more affordable and accessible, however, these challenges could be reduced.

IoT technology helps to increase crop yields and reduce cost and waste by gathering information from sensors to inform more precise and localised decision-making.

Smart irrigation sensors in fields, for example, cut the amount of water used, while drones gather image data that can be automatically analysed to identify where there are problems such as pests, differences in soil quality or irrigation issues.

AI to support social policy

Similarly, AI shows great promise for helping to tackle complex issues such as modern slavery.

By integrating and processing huge, complex and diverse sets of data, AI-driven analytics can provide holistic and meaningful insights to improve social policy. It can help to identify, for example, populations most at risk of exploitation, recognise trafficking earlier on when it occurs, and spot 'tipping points' where intervention may prevent exploitation.

UK centre of excellence N/Lab, for example, used mobile phone data from Dar es Salaam to predict the prevalence of forced labour in different areas. AI models showed that the areas with the highest use of mobile money have lower incidences of forced labour.

Edge computing for faster data cycles

The increased use of connected sensors and other devices raises the question of how best to handle the vast quantities of data they generate. Creating value from this data is dependent on acquiring, analysing and acting on it at speed (often known as the data cycle), and this is where edge computing comes into play.

By moving compute resources closer to where data is created, analysed and consumed, it's possible to dramatically accelerate the data cycle. This is vital for initiatives such as smart cities which rely on time-sensitive applications such as traffic management systems to reduce congestion.

Similarly, smart power management – which reduces energy waste through

smart meters, smart grids and intelligent supply and demand management – relies on near-real-time operational insights.

Blockchain and data flow

So far, the focus on blockchain has been as an enabler of cryptocurrency transactions, but its potential value goes far beyond that.

As stakeholders increasingly demand that ESG initiatives generate benefits that are actively measurable, there is a greater need for a smoother flow of data coming from the organisational supply chain.

The question of who controls centralised information platforms has tended to create a barrier to customers, partners and suppliers collaborating in these kinds of initiatives. As a decentralised platform, blockchain eliminates this problem. It also improves the speed and efficiency of data sharing by removing intermediaries and enabling greater automation of data handling.

This provides the foundation for organisations to gain a transparent, quantitative view of their ESG impact, particularly in terms of supply chain visibility, and informs better decision-making.

Foundations of advanced networking

None of the potential benefits of this new technological wave can be realised without building a robust communications infrastructure to underpin it. While many organisations are focusing on the rollout of 5G, improving the underlying infrastructure that enables new and emerging technologies is a much broader topic.

A smart city, for example, consists of a wide variety of connected devices and sensors across the infrastructure and the population in that location. These devices and people are connected together in a kind of neural network consisting of a combination of machine to machine and machine to person communications.

These elements need to be able to communicate in a far more seamless fashion than has been possible in the past, with as much automated decision-making as possible, since the quantity of decisions that need to be made in a smart city is monumental.

This is why we're seeing significant investment in network infrastructures that are intelligent, highly automated and extremely accessible: to enable the sustainable transformation of the systems and processes that have the heaviest social and environmental impact.

To do better, we need to work together

By making these technologies more affordable and helping to overcome the barriers to their deployment in areas of the world that are less well-developed, then, technology companies can make a real contribution to improving social equity.

However, since these organisations operate within a complex ecosystem, they cannot do so alone. In our next blog, we'll look at why partnerships are vital to creating sustainable human progress.