**THE LIVERPOOL-MANCHESTER LINE AND BLOCKCHAIN TECHNOLOGY**

Tamir Agmon\*

The impact of really innovative technology is hard to predict. Yet, it is important to understand the path by which innovative technology may develop. Looking at the history of transformational technologies provides us with useful insights. Blockchain technology is still in an early phase, but it has a transformational potential. The early development of the steam powered railway in England provides relevant information of the way that transformational technologies like the blockchain technology may develop.

The introduction of the steam powered railways in the United Kingdom at the beginning of the 19th century was a game changer in many ways. Prior to the introduction of the steam powered train people hardly travel farther than 10 miles from the place in which they were born. Yet, the development of the steam powered train was initiated with the purpose of transporting coal and other goods in a more efficient way.

The steam engine developed in 1776 was adopted to transportation over thirty years between 1784 were the first prototype steam locomotive was built and the first public steam railway the 25 miles long Stockton-Darlington built to transport coal. The unique and innovative aspect of the steam powered train was speed. Rails, turnpikes and other improvements of roads have begun before the 19th century, but they were dependent on the speed of horses. The average speed of a stagecoach on the turnpikes in 1830 was about 9 mph; the steam powered train was much faster by 1911 the average speed of the steam locomotive railway was 40 mph. The transformational change came not from the technology to transport coal and other goods faster, but from the unexpected use, travel of people. In 1830 the Liverpool-Manchester line was open with the purpose of transporting cotton and cotton goods from the port of Liverpool to Manchester and back. Unlike the Stockton-Darlington line the Liverpool Manchester line connects two large cities. The result was that a large number of people took the train and a whole new business of people travel has begun. Very quickly passengers became a major part of the business. In 1840 there were 20 million. passenger’s journeys per year by trains in England. This represents 0.65 journeys per head per year. In 1911 there were 1.3 billion. passenger’s journeys by train per year representing 32 journeys per head per year and 65% of the revenues of the railways in England came from passengers. Yet, where the steam powered train technology was developed none of the developers and the financial supporters thought about a market of passengers for the services of the trains. It is interesting to note that a small railway line of 30 miles between Liverpool and Manchester that was planned specifically to reduce the transport cost associated with the import and export of cotton and cotton goods changed in the focus of the new railway technology in England from cargo to passengers. The Stockton-Darlington line was the first step in establishing a new standard of the technology of transportation, the Liverpool to Manchester line started a process that changed the way that people live by adding long distance travel as an important component of consumption.

The blockchain technology began with the development and the introduction of the Bitcoin. The Bitcoin was developed as a replacement for fiat money as single and universal medium of exchange. The motivation was to replace trust based on governments and banks with a built-in moral hazard by a “trustless” distributed technology. The jury on the success of the Bitcoin as a replacement for fiat money is still out, but the Bitcoin proved that the blockchain technology is working. The availability of the blockchain innovative technology brought about a number of applications for a variety of potential uses. The “trains for passengers” of the blockchain technology are not here as yet, but the technology is here and it is likely that major application of blockchain technology that will increase welfare substantially will emerge.

Two insights are arising from the early development of the steam powered railway in England at the beginning of the 19th century; first, a necessary condition for an innovative potentially transformational technology to succeed is that it works as promised. The Bitcoin proved that the blockchain technology does work. Substantial contribution to the welfare of the world depends on new applications, often unexpected by the initial developers and financial supporters of the initial technology. The rapid development of trains for passengers that answered a real need by the people and opened new horizons that could not be realized prior to having an appropriate technology, indicates that we may observe unexpected new major markets for the blockchain technology.

Tamir Agmon is a Professor of Finance (Emeritus) at Tel Aviv University and a Visiting professor of Finance at the School of Business, Economics and Law, Gothenburg University, Sweden. He is also a Founder of Seamless Logic Software Ltd. A blockchain development company