

# I'm not a spaceman (regular man) ...

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**F**ifty years ago, in the night of July 20 to 21 1969, as a 9-year-old boy, I was glued to the black and white TV: Apollo 11 landed on the moon. Neil Armstrong and Buzz Aldrin set their first steps on the moon. The third astronaut - Michael Collins - stayed in the Apollo. Armstrong spoke the historical words "that's one small step for man, one giant leap for mankind". On board they had the new world (9th) symphony by Antonin Dvorak. My favourite symphony, the one I used to play to death on my parents' record player. Such a boyhood dream that got even better when a few years later my interest in pop music was awakened by the beautiful David Bowie hit-single Space Oddity...

Nothing is what it seems. Although 1969 is still associated with the astronauts and their moon landing, in that year another event would have far greater consequences for humanity: the internet became operational (called the ARPA network). The inventor and big man behind it was a psychologist: J.C.R. Licklider. Not an astronaut, composer or rock star, but a psychologist. In 1962 he devised the internet, and in 1969 the internet connected large computer mainframes of American universities to each other via a kind of "hub" (Honeywell computers, each the size of a refrigerator). Another 20 years later, Tim Berners-Lee invented the world wide web. Only in the last 15 to 20 years has it become more general and transformed the world into the smart and interconnected world as we know it today. Two aspects here are related to themes that I regularly return to: 1. The fundamental unpredictability of the future and 2. The importance of relative outsiders in getting real progress.

With regard to the latter, it is of course nice to see that psychologists have made essential contributions in the invention of (neuronal) networks, machine learning and artificial intelligence. However, many students, managers and politicians associate psychology with the professional domain of the psychiatrist. This is an all too one-sided association, although it cannot be denied that psychologists also played a fundamental role in psychiatry. Back to the first aspect. Two pairs of concepts from the work of the mathematician/biologist Stuart Kauffman are important here: (1) local adaptations versus long jumps and (2) entropy versus negative entropy. With regard to the first pair, local adaptations versus long jumps is as evolution versus revolution, or as continuous versus discontinuous, as playing by the books versus dissident science, as lean versus serendipity, or, referring to my column of a few weeks ago, as rule-guided behaviour versus rule-breaking behaviour. Local adaptations can be predicted. They realise optimisation. In contrast, long jumps are unpredictable, for example, they are the consequences of catastrophes.

Although the effects of long jumps are unpredictable, they can be both entropic (with chaos as a result), and - conversely - non-entropic. Suppose a tsunami destroys a whole part of the country. After three years, one hamlet has become a ghost town, while after only 3 weeks, in a town hardly any trace of the devastation is still visible. In retrospect, we can "explain" this: a hamlet that was already partly abandoned (no more stores, no more labor) will be left behind when the insurance payed out because of the destroyed houses. In contrast, a place where many people work and live will be rebuilt. But that's hindsight. The hamlet is subject to entropy (structural coherence is replaced by chaos). The rapid reconstruction and perhaps even improvement in the town is non-entropic, in line with the idea of Nietzsche: "What does not kill you makes you stronger". The mathematician Nassim Taleb speaks of fragile and anti-fragile (coming out of the battle stronger).

In 1969, the real revolution (internet) was in disguise. It looked like an evolution. Even now, Licklider is hardly known. A regular man. And the revolutionary-looking spacemen of yore, turned out to be part of an evolution. Already in the 17th and 18th centuries people dreamed of a journey to the moon. In retrospect, it's easy to say that 1969 was the year that the Internet was created and that of course it would radically change humanity. However, at that moment it was impossible to foresee the impact of the web. Keep on space dreaming. (To be continued.)