



DOI: 10.18427/iri-2017-0062

# **The Role of Innovation in Formation of the Future Economy**

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Nowadays every domain is interwoven with the technology explosion. This situation demands constant adjustment from the employees. It means a challenge especially for the elderly employees to keep up the pace with the technological achievements. The European Agency for Safety and Health at Work (EU-OSHA) stood up a prognosis meaning: according to the demographic changes, until 2030 every third active worker would belong to the generation of 55-64 ages.

Today lifelong studying plays an outstanding role. We cannot be satisfied with our qualification and degree. In accordance with the trend researches, the continuous training and specialisation helps employees to keep being marketable. The Model T is the symbolisation of all these, where the hat of the T means the general expertise, however the stem is the deep, special knowledge, which makes the employee special, promotes him from the crowd to be able to fill the given field of work.

Participant countries of the European Union are moving towards the tendency of pushing the retirement limit to the age of 70 years. The youth who step into the world of work at the age of 20-25 would have to change workplace and employment several times during 45-50 years. Futurist Thomas Frey set up a conception of the developing spheres of work. According to his opinion, it is conceivable that today's biologists and doctors in the future would be occupied with revival of extinct animals, genetic modification, body modification, designing a super-baby, or even printing organs and body parts for injured, ill or unsatisfied people, or by any chance erase memories from the brain. IT specialists in a few decades would become simulation expertise, backlash minimalists, avatar connection managers, computer-aided personality designers, intelligent network developers or time-brokers. Today we can only meet these professions in books or movies, but in the near future they may become real.

Institute for Future Insights prepared its analysis upon year 2016, in which was stated, that future economy would be affected by 65 different tendencies ranked in 6 megatrend categories.

The technological trends quoted upwards, which stand out in industrial production, mention several times 3D printing. This expression infiltrated

into today's vocabulary. But what do we really mean under this expression? 3D printing and an up-to-date construction system is counted as one of the Key Enabling Technologies.

For good quality process, it is necessary to develop new materials, which help to 3D print in better quality. The goal of this new technology is to get settled and be able to produce big quantity of end-product. For now, 3D printers are used for demonstration of prototypes, for testing, for manufacturing unique products, but producing end-products with this technology is also starting to spread. The goal of the future is to make possible fast, cost-efficient mass series-production, and gain comparative advantage for Europe.

3D printing uses CAD data which are produced by designer engineers. During production, professional knowledge is a fundamental requirement. Designing cycle may get faster and products can end on the market sooner, which explains why this technology was a success for prototypes and unique spare parts, small series-production only. Its reason is that if the designed piece was not suitable, it was a faster solution to re-design and produce again. 3D printing allows a wide range of design possibilities than the previous methods. Although we should count on disadvantages. Production with a 3D printer claims a one-time big investment; the price of a professional machine now is very high. Investment into basic commodity may cause outstanding cost, however single items do not have huge material necessity. The technology is not settled yet, printers are under development.

We should stress the importance of 3D printing, which is a green production method; its operation consumes far less energy than a traditional milling machine or lathe. There is no need for cooling water, of which the diversion and cleaning also mean environmental risks. In contrary of subtractive producing methods there is no loose waste arisen. The area of use of 3D technology is quite extensive:

- Production: manufacturing prototypes, unique products relatively economically
- Architecture: the consumer gets a tangible picture of his future house office,  
and design of cityscape is also available in 3D
- Space research: the first printer was developed, which can print by zero gravity. It makes possible to develop a complete space station, which they do not have to construct it on the Earth and then forward it to different planets. In case of malfunction of a spaceship astronauts would be able to print the breakdown component according to plans of engineers on the Earth.
- Hobby: with printers of lower capacity – of which the prize is around a few hundred thousand forints – simple items are possible to be produced at home, like the broken handle of a pan, battery holder of a remote control, mobile phone cover, unique key-

holder, simple spare parts to cars, etc. We do not have to be engineers to print at home, on the internet there are files with '.stl' extensions, which are used for printing. Later on, it may be possible that manufacturers themselves would make these files available, with spare parts would be replaceable in their products.

- Garment trade: confection sizes would not be needed, everyone would be able

to print each clothing item to their build. Of course this time has not yet arrived, however the first spare pieces are finished.

- Medical science, caring: it is a huge opportunity in medical science. It would

not be necessary to put a broken limb to a plaster. They would only have to scan the injured limb with a 3D scanner and then to produce a unique, light, not completely closed brace for it. They have already produced a jaw, gullet, ear, nose, cranial implant, dentil and artificial limb. These are known as unique so they fit better and so optimize the quality of life. Researchers are printing nowadays internal organs. They predict to print skin to injured people in ten years.

The use of Key Enabling Technologies serves as a token of sustainable development in processing industry. It is necessary to invest in new technologies, so due to flexible production, pure processes and developed manufacturing processes, the competitiveness of the industry may increase in more maintainable and energy-saving ways.

For a corporation, to rise above the other competitive with similar conditions, it is important to prepare a long-term strategy. The Hype Cycle created by Gartner Market Research Company may provide help. Since 1995 the Gartner publishes its analysis every year divided by branches of industry. It surveys the market interests, the ideal pace of introducing new techniques, and the expected returns. The Gartner Cycle shows every year the phases of development on a diagram and sorts them into five categories.

- Technology Trigger: a considerable interest follows this section, using a new

technology can pick the innovative company out of the other corporations with similar conditions. The prize of the product is definitely high, and may hide many construction faults.

- Peak of Inflated Expectations: the prize of the new product is leading a

downward trend, its reliability and popularity rises, the application gets common in a broader circle. Those, who waited until this time, start their investment in this section.

- Trough of Disillusionment: the lifecycle turns to a negative direction, because

the new technology – however developers work continuously on eliminating the upcoming technological and software problems – is not mature yet, and so it is not able to satisfy the requirements maximally and constantly.

- Slope of Enlightenment: due to the additional improvements and the significant

decrease of the prizes, the technology arrives to its increasing section, getting available for the broader layer.

- Plateau of Productivity: arriving to the mature section, usage of the technology becomes a part of everyday life.

Gartner has placed the lifecycle of 2000 technologies, and stated certain principles which – followed year by year – may lead to certainly right conclusions of the time of the optimal introduction of new technologies, considering the efficient operation and appropriate price level.

They tag the different technologies according to the expected number of years until reaching the phase of a mature product: under two years, two-to-five years, five-to-ten years, or the product gets out of date before even reaching this phase.

3D printing showed up in Gartner's diagram in 2007 for the first time, and until 2011 it did not even move from the first, increasing section. At that time they prognosticated the success of this technology in five-to-ten years. In 2012 3D printing reached the top of the diagram, and in the increasing section 3D scanning and bio printing appeared. In 2013 they disrupted the 3D printing. 3D printing used by entrepreneurs stepped into the fourth section; however, 3D printing used by customers reached its top point. On the 2<sup>nd</sup> and 3<sup>rd</sup> illustration the lifecycle curve of the two years is clearly comparable. It can be stated, that bio printing as a new technology is nowadays placed in the uprising section. Classroom 3d printing is counted also as a novelty, it is spreading increasingly, but it would only get to the section of maturity after ten years. Industrial printing is making a good progress clearly but very slowly to the top of expectations. 3D scanning is moving forward to the section of maturity and would reach it in two-to-five years.

In conclusion, for an employee or – for a broader spectrum – an employing company to successfully cope on the market in the future, it is indispensable to study the prognosis of the forthcoming times. Nowadays futurist guesses may sound fictional; however, there are certain trends, which can serve as a compass for the seemingly unpredictable future. It seems like today 3D technology represents a unique area, which plays a decisive role in the future economy. Accordingly, it is the interest of corporations, to by all means include in their plans the investment of 3D printers. It should be equally as stressed to train engineers who can use this technique. It means that reparations to the challenges of the future can begin today. The question is, if we dare to take the first step on the road of success.