Summary

The current habilitation thesis approaches the subject of knowledge workers in the Knowledge Economy. It's objective is to present the way knowledge workers can be educated in order to meet the requirements of the modern labor market. Tech jobs and tech companies are currently disrupting both the labor market and the economic activity in general. The old fundamental assumptions of the industrial civilization are being questioned by new paradigms that are a consequence of the technological evolution.

It is estimated that approximately 65% of today's children will have jobs that were not yet invented. They will work as knowledge workers in a world based on cyber-physical systems. This is the reason why old educational methods need to be updated. The current thesis approaches the subject of finding educational methods in order to train the next generations for a labor market where most of the jobs were not yet invented.

A knowledge worker is opposed to the classical industrial task worker. A knowledge worker is supposed to solve problems that do not have a predefined procedure. A knowledge worker must be creative and he/she must quickly adapt to new situations. Working with complex non-structured data is part of a knowledge worker's daily activities. This thesis has been written starting from the assumption that the new generations will be largely knowledge workers and they must be educated in a different way. The thesis provides results that are useful in educating knowledge workers for the Knowledge Economy.

The knowledge economy is an economic system where the main asset is knowledge. Unlike the old industrial system which was based on capital and natural resources, the new economic system is based on knowledge. Knowledge is stored in the brain of the people. This is why training knowledge workers is becoming a key component of the process of evolving from an industrial society to a Knowledge Economy.

The current habilitation thesis is a cumulative one. It is the accumulation of previous research that I conducted in the field of the knowledge economy. The first part of the thesis combines the methodological approach and the results of a number of articles that were published during my research activities conducted between 2007 and 2017.

The thesis has also a mongraphical section which describes the future research activities that I intend to pursue in the next years. My career plans and scheduled future research is available in the second section where I describe the theoretical framework that i am currently building based on the current research activities. The framework describes the a way for communities to use technology in order to succeed in the Knowledge Economy.

The thesis contains five sections, each of them corresponding to a stage of my research over the last 11 years of activity. The sections of the thesis are the following:

a) Knowledge management and organizational learning processes in the Knowledge Economy;

b) Future of labour market in Information & Communication Technology (ICT) in the context of the Knowledge Economy;
c) University governance systems for the Knowledge Economy;
d) Digital fluency and creative learning for educating Knowledge Workers;
e) A process for curricular reform in the universities of the Knowledge Economy.

All the sections of the thesis have in common the fact the focus on knowledge workers as the most important assets of the Knowledge Economy. The thesis focuses on the subject of educating knowledge workers and proposes both methods to educate young students for the knowledge economy and statitiscal results that demonstrate the need for a large scale education of knowledge workers.

The first section focuses on organizational learning networks and presents a case study that describes the way learning networks can be applied to communities of practice. The results are important because they prove that appropriate usage of knowledge management inside communities of practices accelerates the process of knowledge sharing. The section includes both a theoretical background and a section with results that confirm the hypothesis of the research.

The second part of the thesis proposes a model for estimating the demand of ICT experts in the context of the fourth industrial revolution. The section includes both statistical data about the situation in the European Union and Romania and provides a model for making estimations of the deficit of human resources on the current labour market. An in-depth analysis of the situation of the ICT sector in Romania is also available.

The third section focuses on university governance systems in the context of Knowledge Economy. The research brings valuable conclusions about how a proper university governance system should be designed and run. The results are valuable for understanding the complex issue of creating university governance software ecosystems. The research described in this part has been financed from a project of the European union that was implemented over a period of three years.

The fourth part approaches the area of digital fluency, creative learning and computational thinking. In order to educate knowledge workers one must train children properly from an early age in disciplines that provide computational thinking. Children must become able to use computers and cyber-physical devices creatively. This part studies the way modern diagrammatical programming environments can be efficiently used to provide basic elements of computational thinking to children that are set to become knowledge workers in the Knowledge Economy.

The fifth part describes a process for introducing technical subjects such as cloud computing, big data, social networks, mobile programming and cybersecurity to the curricula of non-technical universities. Knowledge workers will have to be able to use the aforementioned technologies even if they do not follow technical academic processes. Students in business and finance will need to know the as well. The process was designed and tested during a project financed by the European union. The data presented in this section has been gathered over a period of four years.

The last part describes my future research plans. Here I descibe the way I intend to continue my research. The main focus on my future research will be on Internet of Things, adaptive learning, artificial; intelligence, makerspaces and 3D printing. This is a continuation of my previous research as all these technologies are going to continue to shape the current economic system.

By putting together the section of the thesis I have provided valuable results for those trying to reform the educational systems in order to train Knowledge workers capable to work in the Knowledge Economy. The skills that the future generations will need to have are closely linked to Information Technology. This is why ensuring a proper usage of knowledge management techniques, a modern university governance, understanding the labour market, providing computational thinking to children and designing efficient curricular reform processes are all key elements of building a Knowledge Economy based on knowledge workers. This habilitation thesis brings a small contribution to the body of knowledge of computer science, knowledge management, economics of labour market and educational sciences.