

## Chapter 13

# An Approach to Improvement of Master's and PhD Studies in Data Processing and Management Systems

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### ABSTRACT

*To make Master's and PhD theses more influential on the evolution of the software industry, and to make them even more effective and successful, the authors propose that they be directed towards developing cognitive systems and expanding the functionality of integrated big data platforms. Within this field, the authors propose that their themes be organized in the form of the following dual model: for each thesis that develops an emerging new cognitive component inside a core big data platform, there is another thesis that develops a corresponding cognitive component/module within the application layer that uses that component of the core big data platform.*

## INTRODUCTION

In the segment of software industry that deals with the development of business applications, there is a clear trend towards the adoption of new and innovative approaches to business processes. IoT, Blockchain, methods of AI, Big Data analytics, and the use of social media data – all have a significant impact on certain business functions and all, in some cases, transform business models completely.

Universities play a major role in the process of the development and integration of innovative solutions. The enterprise software market is growing by about 6-8 percent annually (Gartner, 2017a; Pang, 2016; Allied Market Research, 2015). The accelerating dynamics will be preserved if more universities, those which were not previously known for their breakthroughs or for outstanding alumni, could take leading positions in modern research and in professional training. In this paper, the authors offer a general approach to these challenges in the area of Data Processing and Management Systems.

If the authors are to take a look at Ph.D. programs, then it becomes evident that the majority of time is spent on research, preparing papers, and preparing the thesis, which ends with the defense. It exceeds the amount of time spent studying various courses, engaged in one's teaching practice, etc. Examples demonstrating such proportions are given in (University of Minnesota, 2017; Massachusetts Institute of Technology, 2017). For Ph.D. programs, such proportions are reasonable—but the same is true, to a large extent, for master's programs. This is because during the two-year term, students are involved in scientific work, prepare publications, and gather practical experience; thereby gathering the material for the thesis and writing the thesis itself. In other words, the execution of a research project, the preparation of papers, and the preparation of the thesis plays a key role in the quality of the professional education of the student. Herewith, the authors mean the quality of professional education as a tolerably-limited set of student indicators:

- The possession of knowledge about a set of interrelated disciplines that are present in the educational program;
- The ability to use existing knowledge to solve professional problems;
- The ability to solve professional problems;
- The ability to learn within the problem-solving process;
- The ability to conduct research in a specific professional field;
- The possession of a set of knowledge, skills, experience, and aptitudes that employers find attractive.

To increase the quality of education, topics of theses must be formulated in such a way that the research is conducted on the most relevant topics within the software industry and modern science. Only then will they have the necessary rationale and lie at the forefront of scientific novelty. Successful identification of such topics for theses requires high qualification, wide professional erudition, and some intuition regarding how things are going to be progressing. One of the signs of the relevance of the topics is if it belongs to the Innovation Trigger area of the Gartner Hype Cycle for Emerging Technologies (Gartner, 2016).

Meanwhile, despite the novelty, all of these theses' topics must be such that Master's and Ph.D. students could finish their research in a specified or reasonable amount of time.

In this paper, the authors aim to offer a certain approach for forming master's and Ph.D. thesis topics in the Data Processing and Management Systems area for universities at various stages of educational maturity, which would allow them to enter new heights on the world stage.

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