

## OPPONENT'S OPINION ON DISSERTATION THESIS

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PhD student: Ing. Majid Ziaei Nafchi

Topic: Industry 4.0 and Preparing Companies for Implementing It

Advisor: doc. Ing. Hana Mohelská, Ph.D.

Opponent: prof. Ing. Marek Vochozka, MBA, Ph.D.

A dissertation thesis with the title "Industry 4.0 and Preparing Companies for Implementing It" in the extent of 94 including registers and attachments has been presented to me for review. The dissertation thesis includes Introduction, Analysis of the current state of the subject of the proposed dissertation, Defining the objectives of the dissertation based on the analysis of the current state, Results, Discussion and Conclusion. The author also added a list of literary resources used, a list of his publications on the topic, a list of tables, and an attachment.

The dissertation thesis is divided into six chapters including the Introduction and the Conclusion chapters. The structure of the text corresponds to the requirements of scientific papers.

<b><i>Assessed aspect</i></b>	<b><i>Assessment</i></b>
<i>Topicality</i>	Currently, Industry 4.0 is literally seen as a synonym for the Fourth Industrial Revolution. It is generally assumed that the implementation of Industry 4.0 will result not only in increasing the productivity of production units, but also in changes in the national economy of individual countries, in the business environment, and particularly in changes of social links. Industry 4.0 is thus considered a tool to sustain a long-term economic growth (especially today's developed economies). The concept will ensure the competitive advantage of the individual companies in the market or at least keep such companies, and thus also the entire national economy, competitive. On the other hand, we are all aware that the role of man and human capital is being redefined in such an economy. This brings about changes of social links, which is understood not only by scientists but also business owners and managers (especially those who seek competitive advantage for their businesses or want to keep their business competitive in comparison with the world

	<p>leaders). In the Czech Republic, this refers e.g. to the Technology Agency of the Czech Republic, which supports the projects implementing Industry 4.0 elements. The dissertation thesis submitted also deals with an aspect of Industry 4.0 implementation that has been neglected so far – human capital, worker, corporate culture.</p> <p>It can be stated that the topic of the dissertation is current and currently really needed.</p>
<p><i>Overview of referenced literature</i></p>	<p>In the chapter called Analysis of the current state of the proposed dissertation, the student focused of five issues: information management, knowledge management, organizational culture, Industry 4.0 and management approaches and methods. In the introduction of his dissertation thesis, the author points out that the topic has not been addressed significantly, and therefore, he does not have corresponding literary sources for the research at his disposal. However, despite the lack of literature dealing with corporate culture in general and its modification for the implementation of Industry 4.0, the author proved to have high level of knowledge of Industry 4.0 (its definition, importance, and potential), as well as knowledge of creation, importance and impact of corporate culture for long-term positive management of a business. This is put into the context of information management and knowledge management. At the end of the research the author takes into consideration also management methods and approaches.</p> <p>The extent of the literary research is 45 pages of the entire text. The author used 62 sources to make the research, using scientific texts from journals indexed in the Web of Science, and citing texts taken from conferences proceedings. The student demonstrates his knowledge of the issue by the list of his publications, which was also used for the purpose of the literary research to the thesis. The literary resources used correspond to the topic being addressed and strive to show a current state of the issue in sufficient detail. The student confronts the views of the individual authors cited and at the same times also shows his view on the individual</p>

	<p>partial topic. In my opinion, the research is at the required level.</p>
<p><i>Objective of the thesis and hypotheses</i></p>	<p>The main objective of the thesis is “examine the level of organizational culture in organizations in the Czech Republic and to seek appropriate managerial approaches and methods for the development of organizational culture in a manner that could support the environment for innovation in the organization, in order to facilitate entrepreneurship in the industry 4.0 concept.” Furthermore, the author sets three partial objectives:</p> <p>O1: To explore and present the concept of Industry 4.0 in relationship with the use of suitable managerial approaches for the development of an organizational culture that is supporting to the process of innovation in organizations.</p> <p>O2: To analyse the level of organizational culture in organizations in the Czech Republic based on the organizational culture index.</p> <p>O3: To argue and formulate recommendations in order to reinforce organizational culture that is supporting Industry 4.0 based on the findings.</p> <p>Based on the main objective and partial objectives, the author set three research questions:</p> <p>RQ1: Does organizational culture in organizations in the Czech Republic support the introduction of the Industry 4.0 concept?</p> <p>RQ2: Which determinants of organizational culture motivate an organization to implement Industry 4.0?</p> <p>RQ3: What is the difference in organizational culture according to the organizational culture index in 2013, 2015 and 2017?</p> <p>At the same time, the author formulated two hypotheses:</p> <p>H1: The innovative organizational culture according to the index of organizational culture corresponds/depends/ correlates with the size of an organization in question.</p> <p>H2: The innovative organizational culture according to the index of organizational culture corresponds/depends/</p>

	<p>correlates with the kind of an organization in question (domestic, international, transnational, state/state-funded).</p> <p>In the subchapter 3.1 Objectives, the author describes four basic steps to achieve the main and partial objectives of the thesis.</p> <p>The main objective was selected very appropriately regarding the topic of the thesis. Similarly, the partial objectives assume the achievement of the main objective. The research questions are aimed at achieving of the thesis objective. I especially appreciate the research questions 1 and 2. I see that primarily the responses to these questions may be the bearers of the value added of the dissertation thesis. I even presume that they may be a source of subsequent scientific response to the author's work.</p> <p>Similarly, the two hypotheses formulated are in full conformity with both the objective of the thesis and the research questions.</p>
<i>Selected methods</i>	<p>I consider the methods of the dissertation thesis to be appropriately chosen.</p> <p>The data was obtained by means of a questionnaire survey. Both qualitative and quantitative research was implemented.</p> <p>In the introductory part of subchapter 3.3 Research methods, possible quantitative methods are listed. The student decided for Dr Wallach's questionnaire consisting of four parts, with a focus on demographic data, characteristics of a business, added the translation of Wallach questionnaire (Organizational Culture Index) with the aim to describe corporate culture of a company, and included a Czech version of "Job Satisfaction Questionnaire". Subsequently, the author describes the procedure of verifying the hypotheses. He chooses suitable statistical methods (Mann-Whitney U-Test, ANOVA, Kruskal-Wallis One-Way Analysis of Variance, Brown-Forsythe Test, Cronbach's alpha, and others) and clearly describes their application. There is also a continuous description of possible interpretation of the results.</p>
<i>Results and benefits for theory and</i>	<p>In the first part of the Chapter 4 the author describes the results achieved. He evaluates demographic</p>

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characteristics of the respondents and describes the examined sample of businesses that took part in the survey. In total, 1476 respondents took part in the questionnaire in the years 2013, 2015, and 2017. In the subchapter 4.2, the author deals with the Organizational Cultural Index. He investigates three types of organizational culture: bureaucratic, innovative, and supporting, focusing also e.g. on the relation between organizational culture and size of enterprise, or the relation between organizational culture and operating on the national or international market.

Subsequently the author deals with the hypotheses formulated:

H1 was not confirmed. The author stated that there was no correlation between company size and corporate culture.

H2 was confirmed. Innovative organization culture depends on the type of organization.

Within the chapter 5 Discussion, the author deals with comparing Czech business environment and the structure of businesses with the other states of the European Union. He finds out that in the Czech Republic there is a large number of enterprises compared to other EU states, and even a higher number of enterprises per capita than in other EU states. Therefore, he tries to put the results of his research into the European context (by the size and type of enterprises). By means of Organizational Cultural Index, he subsequently shows the differences between a bureaucratic, innovative, and supporting culture.

The author also describes the benefits of his thesis:

- Possibility of application for research.
- Application in practice aiming to improve the business environment (or economics).
- Application in practice at the level of individual enterprises.

Finally, the author evaluates the limitations of his work (relative socio-economic homogeneity of the Czech Republic, the level of respondents' education, interviewers, etc.).

	<p>However, he concludes that the limitations given above are not critical for the thesis objectives.</p> <p>In the Conclusion, the author summarizes the work as a whole. He declares the achievement of the objectives, answering the research questions, and confirmation / refuting of the hypotheses.</p> <p>I consider this part of the thesis being above standard.</p>
<i>Structure and formal layout of the text</i>	<p>The structure and the formal layout of the dissertation thesis are at the required level. The language used is clear and correct.</p> <p>Although there were several minor formal mistakes (e.g. typos), I can state that the aforementioned minor deficiencies did not affect the overall high level and quality of the dissertation thesis.</p>
<i>Questions for discussion</i>	<ol style="list-style-type: none"> <li>1. The concept of Industry 4.0 deals mainly with smart technologies (“manufacturing by utilizing cyber-physical systems“). What is the role of the person – employee, worker in a company – who is implementing or has implemented the concept of Industry 4.0?</li> <li>2. On page 9, you address the issue of relation of small and medium-sized enterprises and Industry 4.0. In your opinion, to what extent you consider it necessary for such enterprises to implement the concept of Industry 4.0?</li> <li>3. In terms of their culture, which businesses do you consider suitable for the implementation of the Industry 4.0 elements?</li> <li>4. On page 75, you assess the enterprises in terms of the innovative culture. You consider the international enterprises to be very innovative, the Czech companies slightly backward, and the state enterprises as very backward. How would you explain such results, especially in the case of the state companies?</li> </ol>

**The presented dissertation thesis of Ing. Majid Ziaei Nafchi is a quality text. The author proved his knowledge of the issue chosen as well as his ability to**

use the theoretical background for practical research and analysis of the outputs, which I personally consider beneficial and inspiring. The author proved his ability to work independently and met the requirements of a dissertation thesis.

I therefore recommend the thesis to be presented to the relevant committee. After its successful defence, I recommend to grant the author the academic degree of a Doctor ("philosophiae doctor" – abbreviation "Ph.D.").

In České Budějovice, 18 May 2019

A handwritten signature in blue ink, consisting of several fluid, connected loops and strokes, representing the name Marek Vochozka.

prof. Ing. Marek Vochozka, MBA, Ph.D.