SUPERVISOR'S OPINION OF THE FINAL THESIS

I. IDENTIFICATION DATA

Thesis name:	Price of charging definition supported by Blockchain application
Author's name:	Bc. Vojtěch Svoboda
Type of thesis:	master
Faculty/Institute:	Faculty of Electrical Engineering (FEE)
Department:	Department of Economics, Management and Humanities
Thesis supervisor:	Mgr. Zdeněk Pekárek, Ph.D.
Supervisor's department:	Inven Capital, SICAV, a.s.

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment	**Considerably challenging**
Evaluation of thesis difficulty of assignment.	

The difficulty of the assignment was considerable, since it encompasses three major industrial sectors: electricity, mobility, and financial transaction services. Each of them undergoes rapid digital transformation in an environment with ambitious commercial competition and claims. That creates significant difficulties in sourcing unbiased information fit for academic research and evaluation.

Satisfaction of assignment	**Fulfilled**
Assess that handed thesis meets assignment. Present points of assignment that fell short or were extended. Try to assess importance, impact or cause of each shortcoming.	

The student fulfilled the points of the assignment. The scope and focus of the thesis had to reflect the rapidly evolving situation within the relevant ecosystems. That does not include only the progress of relevant technology and economics, but implicitly also the financial regulation which limits the use of blockchain applications. Academic work in such circumstances is particularly challenging and Bc. Svoboda was able to overcome the obstacles.

Activity and independence when creating final thesis	**A - excellent**
Assess that student had positive approach, time limits were met, conception was regularly consulted and was well prepared for consultations. Assess student's ability to work independently.	

For the most part, Bc. Svoboda worked on the thesis independently and systematically, incorporated feedback and designed its structure despite the challenges of the topic. Furthermore, he was able to respond to initial findings, proposing and implementing an updated concept. Bc. Svoboda was always well prepared for consultations and regularly shared new sections of the text as the thesis progressed.

Technical level	**A - excellent**
Assess level of thesis specialty, use of knowledge gained by study and by expert literature, use of sources and data gained by experience.	

The student performed a broad research of the relevant literature in several fields of applied science. Given the rapidly developing situation particularly in transaction solutions (blockchain), his effort is commendable. The combination with research towards mobility and electricity system applications compounded the challenge, which Bc. Svoboda overcame.

Formal and language level, scope of thesis	B - commendable
Assess correctness of usage of formal notation. Assess typographical and language arrangement of thesis.	
The notation used in the thesis is correct in general. There are minor document formatting issues but nothing of significance. The language could be improved. It should be noted that the choice of the language (English) was also driven by the lack of established Czech terms for blockchain technology. The process of establishing correct Czech equivalents would far exceed the scope of the thesis.	

Selection of sources, citation correctness	A - excellent
Present your opinion to student's activity when obtaining and using study materials for thesis creation. Characterize selection of sources. Assess that student used all relevant sources. Verify that all used elements are correctly distinguished from own results and thoughts. Assess that citation ethics has not been breached and that all bibliographic citations are complete and in accordance with citation convention and standards.	
The broad scope of the three industries (electricity, mobility, payments) required a focus on elements which support individual hypotheses. The student was able to derive interim conclusions from his initial findings regarding blockchain applications and to extend the hypotheses and research into the other two industries. Citations meet the expected standards.	

Additional commentary and evaluation
Present your opinion to achieved primary goals of thesis, e.g. level of theoretical results, level and functionality of technical or software conception, publication performance, experimental dexterity etc.
Academic research should explore emerging phenomena with major potential. Use cases of blockchain, which Bc. Svoboda pursued out of his intrinsic interest, certain meet those criteria. Although the "hype" surrounding this technology has subsided since the thesis was assigned, the technology continues its adoption behind the scenes. That is illustrated by actions of Ministries of Finance or Economy and central banks of the EU, China, Japan or companies such as IBM, Microsoft, or Facebook. The thesis implicitly opened the topic of secure, seamless transactions among machines and human users. Future research might build on it as the technology evolves.

III. OVERALL EVALUATION, QUESTIONS FOR DEFENSE, CLASSIFICATION SUGGESTION

Summarize thesis aspects that swayed your final evaluation.

Bc. Svoboda's work was ambitious from the beginning, aiming to apply the modern concepts of decentralized financial transactions (popularly known as blockchain) to mobility and electricity. Although the adoption of blockchain technology is currently limited by the financial regulation, it will continue to mature and create a transaction layer for Artificial Intelligence and Internet of Things.

Bc. Svoboda was able to respond to the stage of maturity of the technology during his research and proceeded with a perspective on charging of electric vehicles. The formulas he outlined might support a future implementation combining AI, blockchain, and IoT.

Two questions for the defense: Could you provide examples of carmakers and utilities cooperating on V2G? Could you outline the rationale of carmakers testing the use cases of blockchain?

I evaluate the thesis with classification grade **A - excellent**.

Date: **30.1.2020**   **Signature**: Zdenek Pekarek