# Review report of a final thesis

**Czech Technical University in Prague** **Faculty of Information Technology**

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| **Student:** | Bc. Barbora Hornáčková |
| **Reviewer:** | Dr. Ir. Steven J H van Kervel |
| **Thesis title:** | Using Blockchain Smart Contracts in the DEMO Methodology |
| **Branch of the study:** | Web and Software Engineering |

**Date:** 18. 1. 2018

| *Evaluation criterion:* | *The evaluation scale: 1 to 5.* |
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| **1. Difficulty and other comments on the assignment** | ***1 = extremely challenging assignment,***<br>*2 = rather difficult assignment,*<br>*3 = assignment of average difficulty,*<br>*4 = easier, but still sufficient assignment,*<br>*5 = insufficient assignment* |

*Criteria description:*
*Characterize this final thesis in detail and its relationships to previous or current projects. Comment what is difficult about this thesis (in case of a more difficult thesis, you may overlook some shortcomings that you would not in case of an easy assignment, and on the contrary, with an easy assignment those shortcomings should be evaluated more strictly.)*

*Comments:*
Justification of the difficulty of this assignment:
it involves two quite new paradigms; the blockchain theorie ( cryptography based ) technology and the DEMO enterprise ontology,
it involves conceptual mapping of domain ontologies, which is by its nature difficult.
This must be addressed using foundational ontologies theory, of which UFO is most likely the best available.
The notions provided by the industry of Smart Contracts are not well defined, informal and sloppy language is used by the financial experts who do not really understand commitments and communication paradigm.
The relevance of this research is high, given the potentially large impact on society if blockchain is widely applied.

| *Evaluation criterion:* | *The evaluation scale: 1 to 4.* |
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| **2. Fulfilment of the assignment** | ***1 = assignment fulfilled,***<br>*2 = assignment fulfilled with minor objections,*<br>*3 = assignment fulfilled with major objections,*<br>*4 = assignment not fulfilled* |

*Criteria description:*
Assess whether the thesis meets the assignment statement. In Comments indicate parts of the assignment that have not been fulfilled, completely or partially, or extensions of the thesis beyond the original assignment. If the assignment was not completely fulfilled, try to assess the importance, impact, and possibly also the reason of the insufficiencies.

*Comments:*
Within the scope of a Master thesis significant results are obtained which justify the qualification of a fulfilled assignment.
In the assessment of the thesis provided by the reviewer several important fields of further research have been identified.

| *Evaluation criterion:* | *The evaluation scale: 1 to 4.* |
|---|---|
| **3. Size of the main written part** | ***1 = meets the criteria,***<br>*2 = meets the criteria with minor objections,*<br>*3 = meets the criteria with major objections,*<br>*4 = does not meet the criteria* |

*Criteria description:*
Evaluate the adequacy of the extent of the final thesis, considering its content and the size of the written part, i.e. that all parts of the thesis are rich on information and the text does not contain unnecessary parts.

*Comments:*
The thesis is in general well written, concise, coherent, not always comprehensive but this is not well possible within the current scope.
The thesis provides an adequate answer to the research question.
Therefor the criteria can be considered to be met.

| *Evaluation criterion:* | *The evaluation scale: 0 to 100 points (grade A to F).* |
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| **4. Factual and logical level of the thesis** | *80 (B)* |

*Criteria description:*
Assess whether the thesis is correct as to the facts or if there are factual errors and inaccuracies. Evaluate further the logical structure of the thesis, links among the chapters, and the comprehensibility of the text for a reader.

*Comments:*
The structure of the thesis is considered good and logical.
In general, the thesis is well written and well readable.
The critical comments provided by the reviewer do not affect this rating.

| *Evaluation criterion:* | *The evaluation scale: 0 to 100 points (grade A to F).* |
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| **5. Formal level of the thesis** | *80 (B)* |

*Criteria description:*
Assess the correctness of formalisms used in the thesis, the typographical and linguistic aspect s, see Dean's Directive No. 26/2017, Article 3.

*Comments:*
In general, the formal level of the thesis is considered "good".
Several critical remarks, notably on conceptual issues, have been made that need, in the eyes of the reviewer, further scrutiny.
However, as stated before, these may exceed the scope of a master's thesis.

*Evaluation criterion:* *The evaluation scale: 0 to 100 points (grade A to F).*

**6. Bibliography** *80 (B)*

*Criteria description:*
Evaluate the student's activity in acquisition and use of studying materials in his thesis. Characterize the choice of the sources. Discuss whether the student used all relevant sources, or whether he tried to solve problems that were already solved. Verify that all elements taken from other sources are properly differentiated from his own results and contributions. Comment if there was a possible violation of the citation ethics and if the bibliographical references are complete and in compliance with citation standards.

*Comments:*
The bibliography captures the applied subject quite well and from several angles. For this "wide" subject this is well done.
Though, much more literature is available.
It is believed that the provided references have been studied and applied well in the thesis.

*Evaluation criterion:* *The evaluation scale: 0 to 100 points (grade A to F).*

**7. Evaluation of results, publication outputs and awards** *80 (B)*

*Criteria description:*
Comment on the achieved level of major results of the thesis and indicate whether the main results of the thesis extend published state-of-the-art results and/or bring completely new findings. Assess the quality and functionality of hardware or software solutions. Alternatively, evaluate whether the software or source code that was not created by the student himself was used in accordance with the license terms and copyright. Comment on possible publication output or awards related to the thesis.

*Comments:*
The results argue and make it reasonable that the application of DEMO is well suited for the application of blockchain-based smart contracts.
In this sense the research question is quite well answered, though much more work would be required.
This subject is certainly worthy of a substantial number of publications. For the first publication the list of comments provided by the reviewer should be addressed.

Core comment and todo issues for future research:
1) conceptual alignment of DEMO and BC;
this includes UFO, D-act ontology (Almeida) and the DEO / enterprise engineering theories.
addressing and resolving the sloppy language used by the current experts in this field.
2) application of a modeling methodology for SC's using DEMO; and
3) DEMO model software execution on an automated system.

A version of the thesis with a 1 page management summary can be sent to various professional organizations such as banks, insurance etc.
Potential benefits must be mentioned. maybe support from that direction can be found.

*Evaluation criterion:* *No evaluation scale.*

**8. Applicability of the results**

*Criteria description:*
Indicate the potential of using the results of the thesis in practice.

*Comments:*
The results of this thesis are highly relevant for society and well applicable.
The reviewer thinks that:
The application of DEMO to design business procedures based on blockchain has been shown.
The proposed approach enables the application of blockchain in society for many domains, including finance, government and innovative small business.
Society - not only major corporations - may benefit much.

*Evaluation criterion:* *No evaluation scale.*

**9. Questions for the defence**

*Criteria description:*
Formulate any question(s) that the student should answer to the committee during the defence (use a bullet list).

*Questions:*
* With respect to Ethereum, does the Ethereum community provide a good conceptualization of a smart contract in such a way that guaranteed shared agreement exists between stakeholders?
* Does the Ethereum concept of a "message" capture concepts such as "commitments, sincerity, truthfulness, authority"?
* Does the Ethereum concept of a "message" capture concepts such as "act", the sending of a message, and resulting fact "the message has been sent and has some future impact on the world"?
* Is a thorough conceptual analysis of the Ethereum concept of :message" needed at all?
* Does the candidate agree, or not, that until the conceptual foundations of notably Ethereum have been well defined, proper operation of smart contracts is very difficult, error prone, and resource demanding, based on trial and error?

*Evaluation criterion:* *The evaluation scale: 0 to 100 points (grade A to F).*

**10. The overall evaluation** *85 (B)*

*Criteria description:*
Summarize the parts of the thesis that had major impact on your evaluation. The overall evaluation **does not** have to be the arithmetic mean or any other formula with the values from the previous evaluation criteria 1 to 9.

*Comments:*
The thesis is well written. It is a "big" subject, with potentially big impact on society.
It is also a difficult subject, as described.
Sufficient progress has been made by the candidate and the research question has been well addressed.
Some parts are questionable, but this is absolutely fine. Subject of further discussion and scientific progress to be made.
A detailed evaluation document has been sent to the candidate, for which not yet a reply has been received.
It is a good thesis.

Signature of the reviewer: