
Signers:

| <i>Name</i> | <i>Method</i> | <i>Date</i> |
|---------------------|---------------|------------------|
| Clausen, Ivar Munch | BANKID_MOBILE | 2021-05-19 21:35 |

**This document package contains:**

- Front page (this page)
- The original document(s)
- The electronic signatures. These are not visible in the document, but are electronically integrated.



This file is sealed with a digital signature.
The seal is a guarantee for the authenticity
of the document.

OPPONENT'S REVIEW OF MASTER'S THESIS

Name of student: Tiric Amar

Thesis title: Use of Blockchain for Guarantees of Origin

Reviewer : Ivar Munch Clausen

Thesis objective: Thesis aims to analyze the prospects of utilizing blockchain technology for the Guarantees of Origin tracking instrument

| Criteria required for evaluation | Evaluation scale (grade) | | | | | |
|---|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|--------------------------|--------------------------|
| | A | B | C | D | E | F |
| Content relevant to the field of study | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Setting and meeting objectives | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Treating theoretical aspects of the topic | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Treating practical aspects of the topic | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Adequacy of applied methods and their use | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Depth and accuracy of implemented analysis | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Dealing with literature sources | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Logical structure and composition of the thesis | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Language and terminology | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Formal layout | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Student's contribution | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Practical applicability of results | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Comments to results of anti-plagiarism check:

I have been informed that the anti-plagiarism check indicates no issues with potential plagiarism

Comments and recommendations:

The thesis gives a good overview of the Guarantees of Origin field and of the existing Blockchain initiatives in this field.

The thesis is somewhat flawed by an unprecise "research question" resulting in a rather general approach. The conclusion is better and more to the point than one would expect given the introduction.

The thesis is lacking in structure – resulting in very long subsections, often without a clear conclusion on how this influences the overall conclusion. This is very prominent in subchapters under 4.1. and 4.2. The thesis would have benefitted clearly from linking the different technical aspects to the field of Guarantees of Origin. Now it came across more as a long listing of different aspects of different blockchain technologies – without relating it to the intended use case.

The concept of "Smart Contracts" is still unclear to me – This concept may be crystal clear to the candidate and others in the Blockchain sphere. Given these "contract's" central role in the Prototype a clear definition/explanation of this concept would have been useful.

The candidate has done a good job in trying to find balanced information on the subject. However, the available literature/texts are quite heavily leaning towards Blockchain. In the conclusion the candidate brings objections into the discussions – I would have liked to see some of these introduced earlier in the thesis so that they could have been discussed when presenting the different technologies and solutions.

The candidate discusses privacy issues in a good manner, this is clearly a potential issue with applying this technology in a market where such transparency will give away market shares and supplier/customer relationships.

The integration between the physical and the virtual world is to my experience one key issue with applying Blockchain technologies on the GoO area. The collection of meter values from the production devices and the validation of these values are an integrated part of the power markets and a job that requires a lot of quality control and possibilities for error correction.

Overall assessment and reasons for the final grade:

The thesis is a good thesis – but not a very original one. I fail to see an original contribution from the candidate.

The thesis lacks a concrete research question. The thesis could also benefit from more structure.

The candidate scratches the surface of some of the potential big issues with the suggested technologies, without being able to go into any depth. In order to be a candidate for a higher mark the candidate should for example have explored the issue of transaction limitations on some of the technologies presented. The candidate argues that a potential upside to the BC technology is to allow smaller producers into the GoO market – A consequence of this is that the transactions would be much smaller than today and that the numbers of transactions would be much higher than today.

I lack the competence to fairly assess the candidate's efforts and results on the prototype. To me this seems like a rather limited PoC, on a concept that has been done by quite a few others. If I am mistaken about this, and that the work related to the PoC is extensive and impressive it should of course influence the grade in positive direction.

Questions for oral defence:

- More elaboration on the "Smart Contract" concept
- Possibilities for integration/coexistence of current model and BC model.
- Claim of potential cost savings is not very well supported. Especially when the understanding that national systems will need to coexist and integrate to the BC solution.

I recommend the thesis for oral defence.

Suggested final grade: C

Oslo, 19/05/2021



signature

210519 - IMC Review - Posudek vysokoškolské závěrečné kvalifikační práce


Name

Clausen, Ivar Munch

Date

2021-05-19

Identification

 bankID
PŘI MOBIL Clausen, Ivar Munch



This document contains electronic signatures using EU-compliant PAdES - PDF Advanced Electronic Signatures (Regulation (EU) No 910/2014 (eIDAS))