SCIENTIFIC OPINION

by Assoc. Dr. Dimitar MinchevBurgas Free University

on the dissertation of

Rachel Menda Shabbat topic:

"The Impact of Regulation (EU) 2019/881 (Cybersecurity Act) on the Expansion of Cybersecurity Certifications"

for the award of the educational and scientific degree "Doctor" professional field 4.6 "Informatics and Computer Science"

EVALUATION OF RESULTS AND CONTRIBUTIONS

The dissertation is dedicated to extremely topical and significant scientific and applied issues – the impact of the European regulatory framework on the development of cybersecurity certification schemes, with a special focus on the role of private conformity assessment bodies (CABs) and certification of IoT devices.

CONTRIBUTIONS WITH AN ELEMENT OF NOVELTY TO SCIENCE

1. An integrated Micro–Macro model (PSF–PSS) **has been developed**, which combines predictive analysis of the market acceptance of certification schemes with a CAB selection tool via fuzzy logic.
2. The Private Scheme Forecasting Model (PSF) **is presented** – an innovative model based on morphological analysis, probabilistic modeling and scenario forecasting, allowing an assessment of the future development of certification ecosystems.
3. A Private Scheme Selection Model (PSS) **has been developed** using Fuzzy AHP/FPM, which formalizes the CAB selection process under uncertainty and human subjectivity.

CONTRIBUTIONS TO THE ENRICHMENT OF EXISTING KNOWLEDGE

1. A systematic analysis of the European regulatory framework (CSA, RED, CRA) **and its role in the transformation of certification processes** has been carried out.
2. A **classification and benchmarking analysis of cybersecurity standards**, including their applicability, assessment methodologies and regulatory status, is presented.
3. The theoretical aspects of **the legitimacy, trust, quality and effectiveness of private certification schemes are examined**.

CONTRIBUTIONS WITH PRACTICAL APPLICATION AND ECONOMIC EFFECT

1. Experimental validation was carried **out on real IoT products (Flash memory, Smart Grid, IP cameras),** which showed a significantly higher level of security in certified devices.
2. It has been proven that **certification does not lead to a statistically significant deterioration in productivity**, which has direct economic significance for the industry.
3. The developed models provide **a decision-making tool** for manufacturers, regulators and CABs, with a potential effect on market efficiency and risk reduction.

CRITICAL NOTES

1. The empirical part, although well structured, is based on a limited number of experimental cases (three categories of devices), which limits statistical representativeness.

2. The PSF and PSS models are complex and require significant expert input and data, which can make their widespread practical implementation difficult.
3. The dissertation lacks a more in-depth analysis of **the geopolitical context and the global mutual recognition** of certification schemes outside the EU.

RECOMMENDATIONS

1. To expand the experimental base with more industrial scenarios and real-world deployments.
2. To develop **a software tool (e.g. SaaS)** for automation of the PSS model.
3. To investigate the applicability of the proposed models in other regulatory environments (e.g. USA, Asia).

ASSESSMENT OF THE IMPACT OF THE REMARKS

These remarks **do not diminish the scientific value of the dissertation**, but rather outline guidelines for future development and expansion of the research.

OPINION ON PLAGIARISM

After an in-depth analysis of the content of the dissertation, the sources used and the way of citation, I believe that:

There is a clear distinction between author's ideas and cited sources.

The analyses, models and experimental results are of **an original nature**.

No signs of plagiarism were found in the dissertation.

CONCLUSION

Racheli Menda Shabbat's dissertation is a **complete, in-depth and original scientific research** that contains significant theoretical and applied contributions in the field of cybersecurity, certification and information technology.

The work meets the requirements of the Law on the Development of the Academic Staff in the Republic of Bulgaria and the criteria for awarding the educational and scientific degree "Doctor".

I propose to the respected scientific jury to award the educational and scientific degree of "Doctor" to the author of the dissertation.

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