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Review of the Dissertation Thesis

Title: Protection of Privacy Information in e-Government
Author: Hemin Akram Muhammad
Reviewer: prof. Ing. Zdeněk Dvořák, PhD.
Study field: Engineering Informatics

Summary

This review was prepared in response to the appointment as an opponent by the Dean of FAI UTB in Zlín on April 18, 2024. The reviewed thesis consists of 172 pages of text. The entire text is written in a professional style in English and is understandable.

Relevance of the Dissertation Topic

After reviewing the text of the dissertation thesis, I can confirm a high degree of relevance of the chosen topic. Developed countries began to build the foundations of e-Government just before the turn of the millennium. After 2000, UNESCO began to regularly organize the "World Summit on the Information Society", creating a global platform where states around the world cooperate in the context of process informatization. In parallel, technical standards have been developed that guide technical and process aspects of informatization at the global level.

Fulfilment of the Objectives Set in the Dissertation Thesis

The main objective is defined on page 24: "*To design an e-Government Model based on personal data protection in developing countries*". To achieve this, a total of 7 sub-objectives were defined. Overall, I can state that the dissertation thesis contains suitably defined objectives, the content of the work is directed towards their fulfilment, and I also confirm the successful verification of the proposed model.

Procedure for Solving the Problem and Results of the Dissertation Thesis (Specific Contribution of the PhD Candidate)

The entire dissertation thesis has standard content, appropriately used sources (a total of 79 sources used), the work is divided into six chapters, each of which contains a partial conclusion, appendices appropriately included from page 155 to page 170. The main result of the work is presented in Chapter 5, where the factors of successful personal data protection are first presented. Further, the model proposal, which is based on the calculation presented on pages 112-113. The evaluation of the proposed model is presented in Chapter 6. From a methodological point of view, the SOAR and AHP methods are used here. By combining the

mentioned methods, the author on pages 124-138 came to the confirmation of the correctness of his solution.

Significance for Practice or Development of the Scientific Field

The e-Government Model based on personal data protection is significant for practical use in the author's country. The application of SOAR and AHP methods provides a real basis for meeting current challenges - improving accessibility, efficiency and accountability in developing countries. The fundamental difference lies in the approach, where in the last decade the focus has been primarily on ICT company offerings and the technological aspect.

Formal Structure of the Dissertation Thesis and Its Language Level

From a formal point of view, I can state several minor shortcomings, e.g. the missing conclusion in the contents of the work, the word chapter twice on page 20, different font sizes in the list of references.

Questions to the Content of the Dissertation Thesis

1. How is it possible to realistically implement the model you have proposed into practice?
2. Which personal data are the most problematic from the point of view of e-Government?
3. Do you have real feedback from practice?

Publication Activity of the PhD Candidate

To this obligatory question in the review, I state that he currently has one record in the Web of science database and a total of 9 articles and a total of 14 citations in the Google scholar database.

Conclusion of the Review

On the basis of the above, I can state that the dissertation thesis:

- is up-to-date,
- fulfilled the set goal,
- contains the author's own creative contribution.

Conclusion

In conclusion, I recommend the dissertation for defence, and after a success defence, I propose to award the academic degree of Doctor of Philosophy (Ph.D.) in the field of Computer Science to Hemin Akram Muhammad.

Date: May 7, 2024

Zdeněk Dvořák, v.r.

ASSESSMENT OF THE DOCTORAL DISSERTATION

Faculty of Applied Informatics, Tomas Bata University in Zlín

Author: Hemin Muhammad, MSc.

Degree programme: P3902 / Engineering Informatics

Degree course: 3902V023 / Engineering Informatics

Dissertation title: Protection of Privacy Information in E-Government

Supervisor: Assoc. Prof. Dr. Martin Hromada

Dissertation Opponent: Prof. Dr. Roman Jašek, DBA

Dissertation "Protection of Privacy Information in E-Government" makes a significant contribution to this field, especially for developing countries. The strengths of the research are the focus on citizen privacy and the development of a citizen-centered e-governance model. The proposed six-step model, which addresses the legal, social, organizational and technical aspects of data protection, offers a valuable framework for implementation.

The dissertation recognizes the unique challenges that developing countries face in implementing e-government initiatives. Accounting for resource constraints and cultural context strengthens the applicability of the model. The inclusion of legal, social, organizational and technical aspects provides a comprehensive approach to data protection. The use of SOAR and AHP techniques demonstrates a thoughtful approach to evaluating the proposed model.

Some areas for further exploration could strengthen the overall impact. While the dissertation acknowledges resource limitations, a more detailed exploration of cost-effective implementation strategies for developing countries would be beneficial. The dissertation emphasizes the importance of citizens' trust. Further research into strategies for building trust in e-government systems could be explored, particularly in relation to findings on citizens' concerns about data privacy. Finally, the dissertation recognizes the evolving threat landscape. A discussion of how the model can be adapted to future technological advances and security threats would strengthen the long-term viability of the model.

The conclusions of the work proved that the model is suitable for practical applications, is a usable and suitable choice for building e-government in developing countries.

Overall, this dissertation effectively addresses a critical issue in e-government. By addressing the aforementioned areas for further investigation, the author could further enhance the impact and applicability of their research.

The thesis is comprehensibly and clearly processed, the knowledge gained is, in my opinion, connected with applied research, has a good theoretical basis and clearly develops the researched area.

The work fulfills the conditions of creative scientific work, it demonstrates the author's ability to systematically and synergistically use and develop new knowledge in the field of research in a creative way and pass it on at an appropriate level.

Defense questions

1. The dissertation recognizes resource constraints in developing countries. How can the proposed six-step model be implemented in a cost-effective manner, taking into account the legal, social, organizational and technical aspects outlined for data protection?
2. The research emphasizes the importance of citizens' trust in electronic public administration services. The model suggests measures to improve the security of personal data. But how can this model be further developed to specifically address the concerns of citizens in the Kurdistan Region regarding the lack of data protection regulations and the need for strong legislation to protect their personal data?

Final statement

The submitted work meets the requirements for a doctoral dissertation. I recommend her for a defense before the relevant committee and, in the case of a successful defense, also the award of the Ph.D.

In Zlín: 2.5. 2024

Prof. Dr. Roman Jašek, DBA

Opponent's review

Doctoral Thesis: Protection of Privacy Information in E-Government

Author: Hemin Muhammad

Degree programme: P3902 / Engineering Informatics

Degree course: 3902V023 / Engineering Informatics

Supervisor: Assoc. Prof. Martin Hromada, Ph.D.

The actuality of the topic of the doctoral thesis

Protecting personal data and privacy confidentiality plays a significant role in guaranteeing user trust in government information system. Privacy issues obstruct the progress of the e-government system and cause citizens to lose reliance on public e-services. Adopting and using electronic government services in developing countries is still challenging. In the countries of the European Union, these issues have already been resolved. In Europe, a regulation in European law called the General Data Protection Regulation (GDPR) obligates all European governments to protect their citizens' data. Personal information is a critical requirement for e-government implementation. The e-government will play a significant role in providing services to the public and governance in the future of developing countries. However, in developing countries, this topic is very topical.

Fulfilment of the goals set in the doctoral thesis

The main goal of this doctoral thesis was to propose an e-government staged model of electronic public administration based on privacy protection in developing countries.

To achieve this primary goal, the author chose the following sub-goals:

- Assessing existing e-government models in terms of personal data security.
- Evaluating e-government websites in terms of privacy principles.
- Identifying security requirements for e-government services.
- Investigating threats on personal information within e-government processes.
- Proposing a security model for protecting privacy information in government organizations.
- Proposing an e-government stage model for protecting privacy information.
- Verification of the proposed e-government stage model.

As the author correctly states, the e-government model of developing countries must consider personal data protection in all stages (law, technical, organizational and social).

The author gradually fulfilled the individual sub-goals, which gave him the prerequisites for fulfilling the primary goal.

The procedure for solving the problem and the results of the doctoral thesis, indicating the specific contribution of the doctoral student

This doctoral-qualified paper is focused on developing an e-government model based on privacy protection.

This doctoral-qualified paper consists of six interconnected chapters. Each chapter addresses explicitly a problem related to the goals and objectives of this study. The first chapter discusses various concepts of e-government and its organization. It describes how e-government and e-business are related. In the second chapter, the author analyses and summarizes different e-government models. In the third chapter, the author discusses information protection and privacy in electronic public administration. It also lists some examples of personal data leaks. In a case study, the author describes the Iraq region of Kurdistan to identify the current circumstance of personal data protection. At the end of this chapter, the author analysed the current state of personal data protection. In the fourth chapter, he describes the scientific methods used by the author to fulfil the objectives of the doctoral thesis.

I found the main contribution of the doctoral thesis **in the fifth and sixth chapters. In the fifth chapter**, the author proposed an e-government model based on the information found in the previous chapters. **In the sixth chapter**, he evaluated the proposed e-government model using SOAR. It also discusses different approaches to evaluation that could be applied to evaluating the e-government system. The idea of AHP and its calculation method are described.

Significance for practice or the development of a scientific or artistic field

I found the main contribution of the doctoral thesis in the fifth and sixth chapters.

In the **fifth chapter**, the author proposed an e-government phase model based on the main factors of personal data security (Law, Social, Organizational and Technical factors). The model consists of six phases, which consist of the main requirements with a projection into the current situation in developing countries. The stages of the regimes measured the four factors above of impact on personal data protection. The model covers the requirement for personal data security at each stage and provides an improvement plan, policies, procedures, and compliance indicators.

In the **sixth chapter**, the author evaluates the phase model of electronic public administration, which the author proposed in the fifth chapter based on the protection of personal data in developing countries. In evaluating the model, the author uses SOAR (Strengths, Opportunities, Aspirations, and Results) analysis to evaluate the phases and combines it with the Analytic Hierarchy Process (AHP) to determine the feasibility of the model. The evaluation results show that the model is acceptable and suitable for adoption. According to the results, this model is feasible for introducing electronic public administration in developing countries.

Formal editing of the doctoral thesis and its language level

The doctoral thesis fully covers the required scope of the specified content for the preparation of the dissertation. Processed images and attachments are graphically readable and understandable. The chosen form and concept of written expression, graphic design, linguistic expression, and professional value of the content are at a high level.

The doctoral thesis is prepared in full compliance with the faculty's requirements.

Publication activity of a doctoral student

The author has published in three journals as the first author.

The author wrote one chapter in the book as the first author.

The author presents three presentations at conferences, two of them as the first author.

The author mainly published the main results of his doctoral thesis in a journal in 2023.

The author participated in the solution of one project.

Based on the above, the author meets the requirements for publication activity.

The doctoral thesis **"I RECOMMEND FOR DEFENSE"**.

Brno, 2024/05/17

COL Assoc. Prof. Ing. Petr Hřůza, Ph.D.

