

UNIVERSITI TEKNOLOGI MARA

**RISK ASSESSMENT OF
MALAYSIAN E-PASSPORT PKI
BASED ON ISO 27000 SERIES
INTERNATIONAL STANDARDS**

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ABSTRACT

Malaysia was the 1st country in the world to issue biometric passports (e-Passport) in 1998. Recent years, a number of vulnerabilities in e-Passport have been identified in the first and second generation of e-Passports. These vulnerabilities can lead to security issues such as cloning, spoofing, skimming, eavesdropping and identity theft crimes. Countries in European Union (EU) had taken steps to rectify the issues and enhance their e-Passport security features. However, there is lack of case studies conducted to review the Malaysian e-Passport security risk assessment according to International Standards. The objectives of this study are to identify the security risk in Malaysian e-Passport PKI and to recommend the feasible solution for future enhancement. A qualitative method was used in this study where a set of interview questions prepared and interviews been conducted to four participants. The data been analysed using Thematic Analysis and presented based on risk assessment methodology in ISO 27000 series International Standards. The risk assessment consists of two approaches; risk analysis and risk evaluation. The risk analysis identified resource identification and valuation, risk identification and risk measurement of Malaysian e-Passport PKI. While in risk evaluation, it focuses on risk mitigation and prioritizing protection activities for future enhancement. The results reveal that the Cloning, Man in the Middle, Spoofing and server related issues are the risk of Malaysian e-Passport. For recommendation, the result is to implement Password Authenticated Connection Establishment (PACE) and follow ICAO standards. The significance of this research will help policy-makers to make decision on the future direction of Malaysian e-Passport and ensure Malaysian citizens having secured e-Passport technologies for travelling overseas.

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CHAPTER ONE

INTRODUCTION

1.1 Introduction

Chapter one provides the introduction of background for this research. It discusses the problems that led to this research including the research background, the problem statement, research questions, objectives and scope of this research, and also the significance of this research. As overall, this chapter is about the understanding on what this research is all about.

1.2 Research Background

Malaysia is the first country that issued electronic passports beginning from year 1998, ahead the standard published by International Civil Aviation Organization (ICAO), in which developing on the standards. The first ICAO compliant passport, known as e-Passport, was issued in Belgium in 2004 (Avoine et al.,2016).

Historically, passports with RFID enabled was implemented by Malaysia in year 1998 is the first in the world (Nithyanand, 2009). Nevertheless, these passports were unsuccessful to maintain basic security requirements until year 2002, due to the passport holder information was not encrypted. Until that time, digital signature was the only security measure implemented on all the e-Passport data to ensure that content could not be altered by attackers. This action was fundamentally insufficient because it cannot avoid passports from illegally data gathering, or cloned, or passport skimming.

In a research by Juels et al. (2005), titled 'Security and Privacy Issues in e-Passport', there are evidence that Malaysian passports have included a chip comprising an image of the passport holder's thumbprint since year 1998. Subsequently, in year 2003, a new generation (second generation) of e-Passports rolled out that comprises extracted fingerprint information only. A Malaysian citizen