

CHAPTER 2

**Commerce and Economic Development Bureau
Hongkong Post**

**Administration of the
Hongkong Post Certification Authority**

**Audit Commission
Hong Kong
25 October 2007**

This audit review was carried out under a set of guidelines tabled in the Provisional Legislative Council by the Chairman of the Public Accounts Committee on 11 February 1998. The guidelines were agreed between the Public Accounts Committee and the Director of Audit and accepted by the Government of the Hong Kong Special Administrative Region.

Report No. 49 of the Director of Audit contains 12 Chapters which are available on our website at <http://www.aud.gov.hk>.

Audit Commission
26th floor, Immigration Tower
7 Gloucester Road
Wan Chai
Hong Kong

Tel : (852) 2829 4210
Fax : (852) 2824 2087
E-mail : enquiry@aud.gov.hk

ADMINISTRATION OF THE HONGKONG POST CERTIFICATION AUTHORITY

Contents

	Paragraph
PART 1: INTRODUCTION	1.1
Background	1.2 – 1.8
Management framework of the Hongkong Post Certification Authority	1.9 – 1.10
Financial results of the e-Cert operation	1.11
Director of Audit’s Report No. 36	1.12 – 1.13
Audit review	1.14 – 1.15
General response from the Administration	1.16
Acknowledgement	1.17
PART 2: SUSTAINABILITY OF THE E-CERT OPERATION	2.1
Planning for the establishment of the Hongkong Post Certification Authority	2.2 – 2.9
<i>Audit observations</i>	2.10 – 2.11
<i>Audit recommendation</i>	2.12
Response from the Administration	2.13
Review of the financial sustainability of the e-Cert operation	2.14 – 2.18
<i>Audit observations</i>	2.19 – 2.22
<i>Audit recommendations</i>	2.23
Response from the Administration	2.24
PART 3: ISSUING OF FREE E-CERTS TO THE GENERAL PUBLIC	3.1
Embedding e-Certs in smart identity cards	3.2 – 3.3

	Paragraph
<i>Audit observations</i>	3.4 – 3.6
<i>Audit recommendation</i>	3.7
Response from the Administration	3.8
Target and actual demand for free e-Certs embedded in smart identity cards	3.9 – 3.10
<i>Audit observations</i>	3.11
<i>Audit recommendation</i>	3.12
Response from the Administration	3.13
PART 4: MONITORING OF THE E-CERT OPERATION	4.1
Requirements of the framework agreements	4.2 – 4.3
<i>Audit observations</i>	4.4 – 4.5
<i>Audit recommendations</i>	4.6
Response from the Administration	4.7 – 4.8
Liaison meetings for monitoring the e-Cert operation	4.9
<i>Audit observations</i>	4.10 – 4.12
<i>Audit recommendations</i>	4.13
Response from the Administration	4.14
Utilisation of the computer system for e-Cert operation	4.15 – 4.16
<i>Audit observations</i>	4.17 – 4.18
<i>Audit recommendations</i>	4.19
Response from the Administration	4.20
PART 5: OUTSOURCING OF THE E-CERT OPERATION	5.1
Private sector participation	5.2 – 5.4
<i>Audit observations</i>	5.5 – 5.14
<i>Audit recommendations</i>	5.15
Response from the Administration	5.16 – 5.17

	Page
Appendices	
A : Chronology of key events relating to the e-Cert operation from November 1997 to April 2007	36 – 38
B : Projection of the number of digital certificates to be issued in the Hongkong Post business study of May 1999	39
C : Financial projection of the certification authority project in the Hongkong Post business study of May 1999	40
D : Opt-in rate of free e-Certs embedded in smart identity cards for the years 2003-04 to 2006-07	41
E : The Hongkong Post financial projection on the e-Cert operation for the years 2001-02 to 2005-06	42
F : Acronyms and abbreviations	43

PART 1: INTRODUCTION

1.1 This PART describes the background to the audit and outlines the audit scope and objectives.

Background

1.2 In the 1998 Policy Address, the Government stated the importance of using information technology (IT) to help Hong Kong retain its competitive edge and drive its economic expansion. By taking the lead in the use of IT, the Government aimed to drive the wider adoption of electronic business (e-business) in the private sector, thus raising the overall competitiveness of Hong Kong.

1.3 As part of the strategy to make Hong Kong a leading digital city, the Government undertook to establish a legal framework to provide certainty in the conduct of electronic transactions (e-transactions) and to spearhead the development of a public key infrastructure (PKI — Note 1) in Hong Kong. In June 1998, the then Information Technology and Broadcasting Bureau (ITBB — Note 2) invited the Hongkong Post (HKP) to set up a public certification authority (CA) in support of the implementation of the Electronic Service Delivery (ESD) Scheme and the further development of electronic commerce (e-commerce) in Hong Kong.

1.4 In January 2000, the Electronic Transactions Ordinance (ETO — Cap. 553) was enacted. The ETO has two primary functions:

- (a) it gives electronic records and digital signatures used in e-transactions the same legal status as that of their paper-based counterparts; and

Note 1: *A PKI refers to the set of hardware, software, people, policies and procedures needed to create, manage, store, distribute, and revoke digital certificates based on public key cryptography and the operation of a certification authority. Public key cryptography involves the use of a private key and a public key. A message that is encrypted with a public key can only be decrypted with its corresponding private key, and vice versa.*

Note 2: *The then Economic Services Bureau (ESB) had been responsible for the HKP's postal service since 1995. The ITBB had been responsible for the HKP's CA service since the inception of the CA service in January 2000. In July 2002, both the ESB and the ITBB were dissolved. The roles and responsibilities of the ESB regarding the postal service were transferred to the then Economic Development and Labour Bureau (EDLB). The roles and responsibilities of the ITBB regarding the CA service were transferred to the then Commerce, Industry and Technology Bureau (CITB). In July 2007, the EDLB and the CITB were dissolved. Policy oversight of the postal and CA service was transferred to the Commerce and Economic Development Bureau (CEDB).*

- (b) it provides a legal framework for the operation of CAs in order to build up a local PKI and a secure and trustworthy environment for the conduct of e-transactions.

1.5 Following the enactment of the ETO, the Hongkong Post Certification Authority (HKPCA) was established in January 2000, as a commercial venture under the HKP's trading fund operation, to offer public CA service. As a recognised CA under the ETO, the HKPCA is, among other things, required to:

- (a) use a trustworthy system in performing its CA service;
- (b) ensure the correctness of information contained in the digital certificates issued;
- (c) publish the digital certificates issued in a repository; and
- (d) submit an assessment report prepared by an independent qualified party at least once every 12 months.

1.6 Since its establishment, the HKPCA has been issuing digital certificates, under the brand name "e-Cert", to individuals and organisations. These e-Certs (totalling 1.54 million) are accepted for close to 70 types of electronic government (e-government) services (e.g. electronic filing of tax returns, online application for renewal of driving and vehicle licences, electronic tendering and electronic stamping), and over 20 types of e-commerce services (e.g. online banking, online securities trading, corporate secure data transmission and electronic trade declarations). Table 1 shows the number and the types of e-Certs issued by the HKPCA.

Table 1

**E-Certs issued by the HKPCA
(January 2000 to 31 March 2007)**

Type	E-Certs issued	
	Number (’000)	Percentage
Personal	1,411.5	91.4%
Organisational	106.9	6.9%
Bank	22.1	1.4%
Encipherment	2.3	0.2%
Server	1.3	0.1%
Mobile	0.1	0%
Total	1,544.2	100%

Source: HKP records

1.7 In mid-2005, the then CITB (see Note 2 in para. 1.3) completed a business review of the e-Cert scheme and the HKPCA operation. The review concluded that the e-Cert operation, which required substantial funding support from the Government and the HKP’s cross-subsidisation from its postal services, was not sustainable in the longer term. In October 2006, the Government awarded a contract for outsourcing the e-Cert operation to a company in the private sector (Contractor A — see PART 5).

1.8 Appendix A shows a chronology of key events relating to the HKP’s e-Cert operation from November 1997 to April 2007.

Management framework of the Hongkong Post Certification Authority

1.9 In January 2000, a framework agreement was signed between the HKP and the ITBB governing the relationship between the HKP and the ITBB on the provision of services to support e-commerce (hereinafter referred to as the e-commerce framework agreement). Among other things, the framework agreement stipulates that the HKP shall maintain a separate part in its annual business plans and medium range corporate plans to account for its services to support e-commerce.

1.10 The staff of the HKPCA are grouped into three categories, namely, managerial staff, technical staff and operational staff. Table 2 shows the number of staff as at 31 March for the years from 2000 to 2007.

Table 2
Number of HKPCA staff from 2000 to 2007
(as at 31 March)

	2000	2001	2002	2003	2004	2005	2006	2007
Managerial staff	6	11	10	12	11	9	7	3
Technical staff	2	3	7	9	9	8	8	8
Operational staff	6	12	17	15	64	65	42	10
Total	14	26	34	36	84	82	57	21

Source: HKP records

Financial results of the e-Cert operation

1.11 Since its launch in January 2000, the e-Cert operation had incurred a cumulative operating deficit of \$195.2 million up to March 2007. Table 3 shows the summarised financial results.

Table 3

**Financial results of the e-Cert operation
(January 2000 to March 2007)**

	1999-2000 (\$ m)	2000-01 (\$ m)	2001-02 (\$ m)	2002-03 (\$ m)	2003-04 (\$ m)	2004-05 (\$ m)	2005-06 (\$ m)	2006-07 (\$ m)	Total (\$ m)
Revenue (a)	0.0	1.9	7.3	6.9	8.3	9.6	9.0	9.4	52.4
Operating cost	2.0	37.1	34.8	32.3	28.6	43.4	32.5	17.2	227.9 (Note 1)
System upgrading cost	—	—	—	2.0	17.1	0.3	0.1	0.2	19.7 (Note 2)
Total cost (b)	2.0	37.1	34.8	34.3	45.7	43.7	32.6	17.4	247.6
Operating deficit (a) - (b)	(2.0)	(35.2)	(27.5)	(27.4)	(37.4)	(34.1)	(23.6)	(8.0)	(195.2)

Source: HKP records

Note 1: Of the \$227.9 million operating cost, \$212.9 million was funded by the Post Office Trading Fund, and \$15 million was funded by the Government.

Note 2: The \$19.7 million system upgrading cost was fully funded by the Government.

Director of Audit's Report No. 36

1.12 In the Director of Audit's Report No. 36 of March 2001, the Audit Commission (Audit) reported the results of the Government's efforts to promote e-business in Hong Kong, including the operation of the HKPCA. In its report of July 2001, the Public Accounts Committee (PAC) of the Legislative Council (LegCo) noted that:

- (a) there was a significant variance between the estimated and actual number of e-Certs issued; and
- (b) although the e-Cert operation was intended to be financially self-sufficient, it was in fact operating at a significant loss.

1.13 The PAC recommended, among other things, that the HKP should:

- (a) closely monitor the usage level of e-Certs and make vigorous efforts to promote the wider use of the CA service; and

- (b) keep the size of the HKPCA operation under constant review, so as to minimise the recurrent cost and operating loss.

Audit review

1.14 Audit has recently completed a review of the administration of the HKPCA. The audit focused on the following areas:

- (a) sustainability of the e-Cert operation (PART 2);
- (b) issuing of free e-Certs to the general public (PART 3);
- (c) monitoring of the e-Cert operation (PART 4); and
- (d) outsourcing of the e-Cert operation (PART 5).

1.15 Audit has identified areas where there is room for improvement and lessons to be learned. A number of audit recommendations have been made to address the issues.

General response from the Administration

1.16 In their consolidated reply, the **Secretary for Commerce and Economic Development** and the **Postmaster General** have said that the Administration welcomes this value for money audit on the operation of e-Cert services, which should help the future management and development of this very important PKI of Hong Kong, and agrees with the audit recommendations. They have also said that:

- (a) the Administration recognises the need to regularly review the product, service, promotion, partnering and funding strategies in line with developments. This has been done over the years and the Administration will continue to do so rigorously;
- (b) putting in place a legal framework including a PKI to promote competitiveness and economic growth was promulgated as part of the 1998 Policy Address. The same policy was reiterated in the 1998 Digital 21 Strategy, which envisaged the HKP to perform the role of a CA;
- (c) e-Cert was a novel and ground-breaking endeavour when it was first conceived in the late 1990s. The Government then had limited knowledge to draw upon from other jurisdictions;

- (d) when the Government formulated the plan back in 1998-99 to establish a public CA, it genuinely believed in the potential market demand and the business case of CA service which indicated that HKPCA services could be provided on a self-sustainable basis in the longer term. As global events unfolded and with the bursting of the Internet bubble worldwide, the projected PKI usage did not materialise; and
- (e) the e-Cert operation should be seen as an information infrastructure to support e-commerce and e-government development in Hong Kong. The financial aspect was not the single or the most important consideration in deciding whether a public CA should be established. Wider economic gains arising from Hong Kong's role as a leading digital economy as supported by the CA establishment should also be considered.

Acknowledgement

1.17 Audit would like to acknowledge with gratitude the full cooperation of the staff of the HKP and the CEDB during the audit.

PART 2: SUSTAINABILITY OF THE E-CERT OPERATION

2.1 This PART examines the studies carried out by the Government to evaluate the sustainability of the e-Cert operation, and the actions taken by the HKP and the CITB consequent upon the completion of these studies.

Planning for the establishment of the Hongkong Post Certification Authority

Scoping study completed by the Efficiency Unit in May 1998

2.2 In order to formulate a strategy on the provision of CA service in Hong Kong, the Government commissioned the Efficiency Unit (EU) to conduct a scoping study in November 1997. The study, which was completed in May 1998, found that:

- (a) it was desirable to have the presence of local CAs in Hong Kong;
- (b) **the local market was still limited, and the business viability might not be there yet;**
- (c) the activities of a CA could be divided into registration authority and issuing authority functions (Note 3). The registration authority was a low cost set-up providing registration services whereas the issuing authority was a costly set-up requiring high technology backup; and
- (d) most of the large-scale overseas issuing authorities provided their services through either a close working relationship or a joint venture arrangement with private sector CA companies.

2.3 While the study of the EU was in progress, the HKP indicated its strong interest in becoming a CA. The EU considered that the business case was comparatively weak if the HKP took up at the same time both the registration authority and issuing authority functions. **The EU suggested that as a pragmatic approach, the HKP should consider becoming a local registration authority.** A feasible option would be for the HKP to come into a partnership agreement with a third party to operate as an issuing authority.

Note 3: *The registration authority mainly provides clerical services in collecting and checking the information used for digital certificate application. The issuing authority is responsible for providing security and technical services for the creation and issuing of digital certificates.*

Hongkong Post invited to assume registration responsibility

2.4 In June 1998, the ITBB invited the HKP to set up a public CA. The ITBB stated in the invitation letter that, having regard to the financial investment, technical expertise and security requirements involved, a feasible option would be for the HKP to assume the registration responsibility only. The issuing responsibility could be carried out by a third party operating in partnership with the HKP, thereby keeping the operational cost to be borne by the HKP low. The ITBB also mentioned that there was a good business case for HKP to set up a local public CA which would support the timely implementation of the ESD Scheme and the further development of e-commerce in Hong Kong.

Market survey completed by a local university in October 1998

2.5 After receiving the invitation from the ITBB, the HKP commenced a business study in August 1998. As part of the study, a local university was commissioned to conduct a market survey on the demand and acceptability of CA service in Hong Kong. The market survey was completed in October 1998. Its salient findings were as follows:

- (a) it was important for the Government to take the lead in setting up a local CA, and the HKP was viewed as a trusted neutral organisation suitable to provide CA service;
- (b) **the use of Internet for e-commerce in Hong Kong was low.** Of the companies which had responded to the survey, only 0.8% allowed their clients to pay for products/services online;
- (c) 86% of the companies surveyed had no idea or only a vague idea of what a CA was. However, 44% wanted to use CA service either immediately or within a year if CA service was available;
- (d) **46% of the companies surveyed said that they would not pay anything for server digital certificates, and 32% said that they would pay nothing for client digital certificates; and**
- (e) educating the public and businesses on the benefits of e-commerce and digital certificates was the key for e-commerce to take off. There was much room for growth and there was a great need for local CA service which was needed for interactive e-commerce applications. As more and more applications were available and people began to see the benefits of digital certificates, public attitude would change.

2.6 Based on the above findings, the survey concluded that as part of the promotion and education programme, **digital certificates should ideally be free** just like identity (ID) cards. **The CA service should not be aimed at breaking even in a short time or making money. The payback should come from economic growth for Hong Kong.**

Business study completed by the HKP in May 1999

2.7 In May 1999, the HKP completed its own business study on the CA service. The study found that:

- (a) most overseas PKIs were targeted for specific applications and there were difficulties for extending them to other applications;
- (b) **most overseas PKIs were not making money. PKIs were still more a hype than reality and there were more failures than success stories;**
- (c) overseas experience confirmed that the success of a CA business would depend on the ability of developing and provision of “killer” e-commerce applications (Note 4);
- (d) there were rising aspirations from individual markets, including financial, banking, retail, trading and public services, to rely on the electronic means as an improved and efficient channel of service deliveries; and
- (e) the decline of physical mail was hurting the revenue of the HKP. There was a need to develop new revenue streams and electronic services offered good potential.

2.8 The HKP business study projected that:

- (a) the CA service could be launched in December 1999;

Note 4: *A killer application is an application that is so useful that people feel they must have it.*

- (b) the number of digital certificates to be issued would grow from about 550,000 in 2000-01 to 3,172,000 in 2004-05 (representing an average annual growth rate of about 55% — see Note 5). About 9 million digital certificates would be issued by 2004-05 (see Appendix B); and
- (c) the CA business would break even in 2000-01 and accumulate profits of about \$321 million by 2004-05 (see Appendix C).

2.9 The HKP's business study concluded that the CA business would be profitable and that the HKP should assume both the responsibilities for registration and issuing of digital certificates.

Audit observations

Business study conducted by the HKP

2.10 Audit noted that the conclusion made by the HKP in its business study of May 1999 was inconsistent with the advice of the EU and the ITBB that the HKP should consider becoming a local registration authority only (see paras. 2.3 and 2.4). Moreover, the projections made by the HKP in the study on the financial results of the CA service were not supported by its own findings (see para. 2.7(b)) and those of the EU and the local university studies (see paras. 2.2 and 2.5 respectively). Table 4 summarises the audit findings.

Note 5: *The average annual growth rate (α) is calculated as follows:*

Number of digital certificates issued in 2000-01 $\times (1 + \alpha\%)^4$
 = *Number of digital certificates issued in 2004-05*

$$550,100 \times (1 + \alpha\%)^4 = 3,172,000$$

$$\alpha = \underline{55\%}$$

Table 4

**Difference between projections made by the HKP
in its 1999 business study and the findings of other studies**

Key area	Findings of studies	Projections made by the HKP
Demand for digital certificates	<ul style="list-style-type: none"> • The local market was still limited (para. 2.2(b)). • Use of Internet for e-commerce in Hong Kong was low (para. 2.5(b)). 	<ul style="list-style-type: none"> • About 550,000 digital certificates would be issued in 2000-01 (para. 2.8(b)). • By 2004-05, the total digital certificates issued would be about 9 million (para. 2.8(b)). • Average annual growth rate of the digital certificates issued would be about 55% (Note 5 in para. 2.8(b)).
Pricing for digital certificates	<ul style="list-style-type: none"> • 46% of companies surveyed said that they would not pay anything for server digital certificates and 32% said that they would pay nothing for client digital certificates (para. 2.5(d)). • Digital certificates should ideally be free (para. 2.6). 	<ul style="list-style-type: none"> • Digital certificates would be issued at prices ranging from \$10 to \$1,500 a year (Appendix B).
Financial viability	<ul style="list-style-type: none"> • The business viability might not be there yet (para. 2.2(b)). • The CA service should not be aimed at breaking even in a short time or making money (para. 2.6). 	<ul style="list-style-type: none"> • The CA business would break even in 2000-01 and accumulate profits of about \$321 million by 2004-05 (para. 2.8(c)).

Source: HKP records and Audit analysis

2.11 Audit could not find any records showing the basis used by the HKP in projecting the high demand for digital certificates. Hence, Audit was unable to assess the reasonableness of the HKP's projections which appeared to be optimistic.

Audit recommendation

2.12 **Audit has recommended that, for future projects, the Administration should ensure that the basis for making financial projections is properly documented.**

Response from the Administration

2.13 In their consolidated reply, the **Secretary for Commerce and Economic Development** and the **Postmaster General** have said that they agree with the audit recommendation. They have also said that:

- (a) while they acknowledge that the projections made in 1999 on the adoption rate of e-Certs did not materialise, the business case was compiled with best efforts by the HKP at the time and had taken into account assessments from IT professionals and business analysts of various sectors (including banking, finance, telecommunications, health, trading, entertainment and education sectors);
- (b) the private sector expressed keen interest in developing PKI-based applications at the time, when the business community in general was very bullish about Internet/e-commerce development; and
- (c) the objective of establishing a PKI and the HKPCA was to provide a strategic information infrastructure for building confidence in e-commerce and e-government. The CA service was also required to support the timely launch of the ESD scheme in January 2000. The financial aspect was not the single or most important consideration in deciding whether a public CA should be established. It was pointed out in the scoping study conducted by the EU in early 1998 and the survey study conducted by a local university in late 1998 that there should be a public policy to establish a PKI in Hong Kong.

Review of the financial sustainability of the e-Cert operation

Consultancy study conducted in 2001

2.14 Following the publication of the PAC report (see paras. 1.12 and 1.13), the then Secretary for Information Technology and Broadcasting undertook to review the Government's strategy for funding the operation of the HKPCA in order to resolve any conflict between the Government's financial objective (i.e. self-sufficiency of the e-Cert operation) and its broader objective of promoting e-business in Hong Kong.

2.15 In May 2001, the HKP commissioned a consultant to conduct a strategic review of the e-Cert operation. **In February 2002, the consultant reported that the business**

model of the e-Cert operation was unlikely to be financially sustainable and recommended that the HKP should review the appropriateness of the business model of the e-Cert operation and consider other revenue models. The consultant commented that:

- (a) a PKI would not be the preferred means of authentication for many consumer-based electronic service applications where the risk and value involved were considered low. For business to business commerce involving large transaction value or high risk, a PKI was likely to be the preferred means for managing authentication and non-repudiation;
- (b) **the need for a general purpose CA was questionable.** The global trends suggested that likely successful CAs were those aligned with an industry-based PKI initiative or those aligned with a particular application; and
- (c) **the HKPCA should refine its revenue model to encourage the adoption of e-Cert usage and share the risks and rewards of e-Cert usage with third parties deploying e-Cert enabled applications. Fees should be charged on usage rather than certificate issuance.**

Review of funding strategy by the CITB in 2002

2.16 In October 2002, the CITB commenced the review of the funding strategy for the e-Cert operation (see para. 2.14). In July 2003, the CITB reported the findings of the review to the LegCo Panel on Information Technology and Broadcasting (ITB Panel) that:

- (a) digital certificates were an indispensable part of the infrastructure for the further development of e-business. The Government should take the leading role in establishing and sustaining this basic infrastructure for e-business to prosper;
- (b) the adoption of e-Certs would pick up with the offer of one year's free use of e-Certs embedded in smart ID cards (see paras. 3.2 and 3.3) and the new applications to be launched by the business sector;
- (c) based on the projections of revenue from the issuing of e-Certs and income from other e-Cert related services, the HKP expected that the e-Cert business would break even in 2006-07, and the cumulative operating loss would be paid back by 2010-11; and
- (d) while the e-Cert operation had been operating at a loss, it should be financially self-sufficient in the longer term. The Administration had no plan to change the funding strategy for the e-Cert operation at that stage.

Low number of e-Certs issued from January 2000 to June 2003

2.17 As at end June 2003, the HKPCA only issued over 130,000 e-Certs, whereas it had been estimated that over half a million e-Certs would be issued in 2000-01 (see para. 2.8(b)). Although the average number of e-Certs issued per month had been growing from 493 in 2000, 3,452 in 2001 and 4,179 in 2002 to 5,440 in 2003 (as at June), the following points were noted:

- (a) as at 3 January 2003, of the about 100,000 e-Certs issued, only about 45,000 (45%) were valid. The other 55,000 (55%) had already expired and were not renewed; and
- (b) the significant increase in the number of e-Certs issued during the years 2001-02 and 2002-03 was mainly due to the free e-Cert programme for tertiary students (see para. 3.9(a)). Of the about 33,000 personal e-Certs issued in 2002-03, about 17,000 (52%) were free e-Certs.

Earlier studies indicated low demand for e-Certs

2.18 Before the CITB made its report to LegCo in July 2003, more studies and surveys had been carried out which also suggested that the local demand for e-Certs would be on the low side:

- (a) ***2001 consultancy review.*** According to the consultancy review commissioned by the HKP in 2001, the need for a general purpose CA was questionable and that the HKPCA's business model was unlikely to be financially sustainable (see para. 2.15);
- (b) ***Adoption of e-Certs by the community.*** According to the survey findings released by the Census and Statistics Department in December 2002 (Note 6), among those 3 million persons aged 15 and over who had knowledge of using personal computers, only 3.3% had digital certificates;
- (c) ***Surveys commissioned by the HKP in 2001.*** The first survey was carried out from March to April 2001 by a market research company covering the community at large. This survey found that about 30% of the respondents were aware of the e-Cert service, and only 3% of them had used it before. The second survey was carried out in November 2001 by a local university on fee-paying e-Cert holders, which found that 36% of personal e-Cert holders and 51% of organisational e-Cert holders had not used their e-Certs; and

Note 6: *Information Technology Usage and Penetration, Thematic Household Survey Report No. 10.*

- (d) ***Relaxation of the e-Cert requirement under the ESD Scheme.*** A review carried out in September 2002 found that the usage rate of the ESD services that required the use of e-Certs was below 1%. In order to improve the usage rate of the ESD services, the Government requested departments in November 2002 to consider the feasibility of relaxing the requirement of using e-Certs for the ESD services they provided (Note 7).

Furthermore, overseas experiences at the time indicated that the business of issuing digital certificates was not commercially viable. The Australia Post ceased its business of issuing digital certificates in 1999 and became a registration authority in 2001. The UK Royal Mail and the US Postal Services also ceased their CA service in 2002.

Audit observations

Assessment of the financial viability of the e-Cert project

2.19 Audit noted that while the operation results and the studies carried out before July 2003 indicated that the **actual and projected demand** for e-Certs would be low, the CITB was optimistic and in July 2003 reported to the ITB Panel that the e-Cert business would break even in 2006-07 and that it should be “financially self-sufficient in the longer term”. The CITB’s premise was based on the **projections** made by the HKP in 2002-03 that a critical mass of e-Cert users would emerge following the free e-Cert embedding exercise, despite the low number of e-Certs issued previously. In the event, the expected number of e-Cert users did not materialise.

Actions taken to re-examine the e-Cert project

2.20 In October 2003, the HKP informed the CITB that based on the actual opt-in figures, it had revised the target opt-in rate for the free e-Cert embedding exercise from 60% (see para. 3.9(a)) to 30%. In May 2004, the HKP also revised downward significantly the financial projections of the e-Cert operation in its medium range corporate plan for the period 2004-05 to 2008-09. The revised financial projections are shown in Table 5.

Note 7: *Audit noted that as at August 2007, of the 210 e-government services under the ESD Scheme, only 14 required e-Certs for authentication.*

Table 5
Revised financial projections made by the HKP
in its corporate plan of May 2004

	2004-05 (\$ m)	2005-06 (\$ m)	2006-07 (\$ m)	2007-08 (\$ m)	2008-09 (\$ m)
<i>Expected revenue</i>					
In 2003 funding strategy review	21.9	35.1	48.7	62.1	66.9
In 2004 corporate plan	6.6	10.1	12.7	12.9	14.2
Change	(15.3)	(25.0)	(36.0)	(49.2)	(52.7)
<i>Expected expenditure</i>					
In 2003 funding strategy review	40.6	39.5	38.4	32.3	30.7
In 2004 corporate plan	26.9	26.9	24.7	17.3	18.7
Change	(13.7)	(12.6)	(13.7)	(15.0)	(12.0)
<i>Expected profit/(loss)</i>					
In 2003 funding strategy review	(18.7)	(4.4)	10.3	29.8	36.2
In 2004 corporate plan	(20.3)	(16.8)	(12.0)	(4.4)	(4.5)
Change	(1.6)	(12.4)	(22.3)	(34.2)	(40.7)

Source: HKP records and Audit analysis

2.21 The Financial Services and the Treasury Bureau (FSTB) noted the HKP's revised financial projections for the e-Cert operation. In July 2004, the FSTB suggested the CITB and the HKP should reopen discussion on the funding strategy for the e-Cert operation. In response to Audit's enquiry, the CEDB and the HKP informed Audit in October 2007 that:

- (a) the HKP conducted a review of the business strategy of CA service in January 2004, following the soft launch of the free e-Cert embedding services to selected groups in June 2003 and the launch of the community-wide free e-Cert embedding exercise in September 2003;
- (b) the Office of the Government Chief Information Officer (OGCIO)/CITB conducted a review on the future of the HKPCA in October 2004. A task force was set up by the CITB and the HKP in November 2004 to further pursue initiatives to promote the adoption of e-Certs in the community; and

- (c) after the above reviews and promotional efforts, the CITB conducted a business case review study on e-Cert operation in 2005. The ITB Panel was informed of the results of the review in December 2005.

2.22 In Audit's view, the CITB and the HKP should have taken earlier action to re-examine the e-Cert project and the Government's funding strategy when the low opt-in rate for the free e-Certs was known in October 2003 (see para. 2.20).

Audit recommendations

2.23 *Audit has recommended that, for future projects, the Administration should:*

- (a) **make reference to the latest available figures in making projection of potential users and adopt a prudent approach in the assessment of financial viability;**
- (b) **where the bases and financial projections are inconsistent with the actual results and findings of other studies/surveys carried out by the Government, provide full justifications for adopting these bases and financial projections when reporting project progress to LegCo; and**
- (c) **take earlier action to review the financial projections and viability of a project if the actual out-turn deviates significantly from the original estimate.**

Response from the Administration

2.24 In their consolidated reply, the **Secretary for Commerce and Economic Development** and the **Postmaster General** have said that they agree with the audit recommendations. They have also said that:

- (a) in-depth reviews should have been conducted more expeditiously so that any change of market situation and deviation of actual business performance from financial projections can be detected as early as possible to facilitate change management and reporting to the ITB Panel;
- (b) the projections adopted in the 2003 funding strategy review took into account the critical mass of users to be built up by the free embedding exercise whereas such change had not been envisaged or taken into account in the studies on e-Cert demand completed in 2001 and 2002; and
- (c) the Administration was satisfied with the financial projection that the HKPCA would be financially sufficient in the longer term at the time when the CITB reported to the ITB Panel in July 2003. In retrospect the projections on the adoption of e-Certs did not materialise.

PART 3: ISSUING OF FREE E-CERTS TO THE GENERAL PUBLIC

3.1 This PART reviews the actions taken by the Administration to issue free e-Certs to the general public.

Embedding e-Certs in smart identity cards

3.2 Soon after the establishment of the HKPCA, the Government decided in October 2000 to adopt smart cards with multi-application capacity as the new generation of ID cards in the forthcoming ID card replacement programme. In addition to immigration-related applications, the smart ID cards would be used for other applications, such as library card application and e-Cert application.

3.3 In December 2001, the ITBB informed the LegCo ITB Panel and the LegCo Panel on Security, that in order to promote e-Certs and to facilitate the development of e-business in Hong Kong, the HKP would offer the public an option to embed an e-Cert, with one year's free use (Note 8), in their new smart ID cards. The Panels were informed that:

- (a) the main hindrances to the widespread usage of e-Certs were the lack of applications to attract users and the absence of a critical mass to drive the development of applications;
- (b) the introduction of smart ID cards offered a unique opportunity that should be taken to distribute free e-Certs to all ID card holders so as to create a critical mass of e-Cert holders;
- (c) with a critical mass of users, the market would respond with new applications, which in turn would sustain the momentum for use and take-up of e-Certs outside the free e-Cert period; and
- (d) the estimated one-off non-recurrent cost for upgrading the HKP's computer system would be less than \$10 million.

The issue of free e-Certs embedded in smart ID cards commenced in June 2003 and ended in March 2007.

Note 8: *The HKP had subsequently extended the free use period several times. Eventually, the free use period for all smart ID e-Certs issued on or before 31 March 2007 was extended to three years.*

Audit observations

Estimated cost for the e-Cert embedding exercise

3.4 Audit noted that the Administration did not provide complete information to the two LegCo Panels in December 2001 about the non-recurrent computer system improvement cost. Two projects (i.e. one for upgrading the back-end computer system and one for providing the computer system for a one-stop interface) were required for making necessary improvements to the HKP's computer system, each amounting to around \$10 million. However, the two Panels were only informed of the project for upgrading the back-end system.

3.5 Audit also noted that, other than the system improvement cost, the marketing and other miscellaneous cost for the free e-Cert exercise amounted to \$29 million.

3.6 **Audit considers that the ITBB should have informed the relevant panels of LegCo the full financial implications of the proposal to distribute free e-Certs in the ID card replacement programme. Full records should also have been kept for tracking the cost of distributing the free e-Certs.**

Audit recommendation

3.7 **Audit has recommended that, for future projects, the Administration should apprise relevant LegCo Panels of the full financial implications involved in the projects.**

Response from the Administration

3.8 In their consolidated reply, the **Secretary for Commerce and Economic Development** and the **Postmaster General** have said that they agree with the audit recommendation. They have also said that:

- (a) the then ITBB should have apprised the LegCo ITB Panel of the full financial implications. The Administration will do so for future projects;
- (b) the two projects, each amounting to around \$10 million, were approved under the Head 710 Computerisation Block Vote in 2002. Applications for funds under the Block Vote were dealt with by the OGCI0 under delegated authority in accordance with the established mechanism of the Administrative Computer Projects Committee; and

- (c) when the Administration briefed the ITB and Security Panels of the smart ID card project in December 2001, the Panels were only informed of the project on the upgrading of the back-end system. Subsequently, the Administration had reported both projects and their full costs in 2002 and 2003 when the Administration submitted, as a standing practice, the full list of all the items funded under the Head 710 Computerisation Block Vote to the LegCo Secretariat.

Target and actual demand for free e-Certs embedded in smart identity cards

3.9 When the proposal of distributing free e-Certs in the ID card replacement programme was being discussed, the ITBB and the HKP made the projection in October 2001 that the e-Cert operation would break even in 2007-08 if the proposal was pursued. The ITBB and the HKP considered that Internet users were very likely to be willing to have an e-Cert embedded in their smart ID cards if it was provided free and conveniently. The following projections were made:

- (a) 60% (or about 4 million) of the ID card holders would opt to have an e-Cert embedded in their smart ID cards. This was based on a study of the Office of the Telecommunications Authority which found that the percentage of Hong Kong's population aged 11 or above who were Internet users would increase from 56% in 2003 to 73% in 2008. Moreover, under a pilot programme of the HKP to distribute free e-Certs to tertiary students, about 60% to 80% of the respondents registered for the free e-Certs; and
- (b) the renewal rate would be 15% for the first time renewals and 100% for further renewals in subsequent years. This was based on the fact that the then average e-Cert renewal rate for fee-paying e-Certs was about 20%.

3.10 Audit examination of the HKP's records revealed that:

- (a) during the ID card replacement programme, the actual average opt-in rate for free e-Certs was 17.5% (see Appendix D); and
- (b) the renewal rate for the free e-Certs embedded in smart ID cards as at March 2007 was 0.3%.

Audit observations

3.11 Audit considers that the assumptions used by the ITBB and the HKP for making the estimates reported in paragraph 3.9 were questionable. Audit noted that the HKP used the percentage of Hong Kong's population aged 11 or above who were Internet users

(increasing from 56% in 2003 to 73% in 2008), and the opt-in rate of tertiary students for free e-Certs (60% to 80%) as the bases for estimating that 60% of the population would opt for free e-Certs (see para. 3.9(a)). This would result in an overestimate for the following reasons:

- (a) not all Internet users would need an e-Cert. Hence, the opt-in rate for free e-Certs of 60% of all ID card holders (see para. 3.9(a)) was on the high side; and
- (b) in general, the opt-in rate for the population would be lower than that for tertiary students.

Audit recommendation

3.12 **Audit has *recommended* that, for future projects, the Administration should take into account all relevant information and use reasonable assumptions in estimating the demand for the services provided by the projects.**

Response from the Administration

3.13 **The Secretary for Commerce and Economic Development** agrees with the audit recommendation. He has said that:

- (a) the Administration will take into account relevant information and adopt a prudent approach in projecting demand in future projects; and
- (b) the Administration made the projections in good faith at the time. It was anticipated that a critical mass of e-Cert holders would emerge following the free e-Cert embedding exercise which would encourage more business applications to be developed, and in turn push up the usage and the renewal rate of the e-Certs. In retrospect, the estimates did not materialise.

PART 4: MONITORING OF THE E-CERT OPERATION

4.1 This PART examines the effectiveness of the HKP and the ITBB/CITB in monitoring the e-Cert operation.

Requirements of the framework agreements

4.2 In 1995, a framework agreement (hereinafter referred to as the postal service framework agreement) was signed between the ESB (see Note 2 in para.1.3) and the HKP for the management and the operation of the postal services to be provided on a financially autonomous basis. According to the postal service framework agreement, the HKP is required to prepare each year a medium range corporate plan and an annual business plan.

4.3 In January 2000, the ITBB and the HKP signed the e-commerce framework agreement (see para. 1.9). Under the agreement, the HKP is required to maintain a separate part in its annual business plans and medium range corporate plans to account for its e-Cert operation.

Audit observations

4.4 Audit examination of the annual business plans and medium range corporate plans submitted by the HKP during the period January 2000 to March 2007 revealed that:

- (a) **the annual business plans and medium range corporate plans were often submitted late.** Audit noted that, except for the years 2006-07 and 2007-08, the HKP submitted the plans either after or very close to the commencement of the financial years concerned. The submission dates of these plans are shown in Table 6;

Table 6

**Submission dates of the Hongkong Post's
annual business plans and medium range corporate plans**

Year	Date of submission
2000-01	7/6/2000
2001-02	3/4/2001
2002-03	25/5/2002
2003-04	9/5/2003
2004-05	8/5/2004
2005-06	29/3/2005
2006-07	4/3/2006
2007-08	27/2/2007

Source: HKP records

- (b) **details of the projections made about the e-Cert operation in the annual business plans and medium range corporate plans were limited.** Audit notes that, as required under the ETO, detailed financial projections about the e-Cert operation (e.g. the number and types of e-Certs to be issued and assumptions made for projections on revenue) are assessed by an external auditor annually and disclosed in the audit reports submitted to the Certification Authority Recognition Office (CARO — Note 9). However, such financial information as well as the assessment report prepared by the external auditor were not included in the annual business plans and medium range corporate plans prepared by the HKP. The plans only showed the actual and estimated revenue/expenditure for the e-Cert operation;

Note 9: *The CARO was established in the then Information Technology Services Department in February 2000 to process applications for recognition and for renewal of recognition of CAs, monitor compliance by recognised CAs with the ETO and the Code of Practice for recognised CAs.*

- (c) there were significant variances between the actual and expected revenue/expenditure projected by the HKP in the annual business plans for the years from 2001-02 to 2005-06. Details are shown at Appendix E; and
- (d) there was limited information for those business arrangements with adverse impact on the e-Cert operation. For example, although the business agreement for mobile e-Certs (Note 10) signed between the HKP and its business partner was terminated in March 2004, the HKP did not highlight this event in the annual business plan for 2004-05 submitted in May 2004.

4.5 To facilitate an effective review of the business plans and corporate plans by the Government, Audit considers that the HKP should have taken action to ensure that the annual business plans and medium range corporate plans:

- (a) were submitted in a timely manner to ensure that the plans would be approved before the commencement of the financial years they covered; and
- (b) contained detailed financial information (e.g. financial forecast of the e-Cert operation and the auditor's assessment submitted to the CARO) and information about major events that might have a significant impact on the e-Cert operation.

Audit recommendations

4.6 **Audit has recommended that, for future projects, the Administration should take action to ensure that the project plans prepared should:**

- (a) **be submitted in a timely manner; and**
- (b) **contain sufficient information, including detailed financial forecast and major events that might affect the projects, to facilitate review by interested parties and stakeholders.**

Note 10: *Mobile e-Certs are used to support secure transactions using mobile devices, such as mobile phone and personal digital assistant. The HKP originally expected the mobile e-Certs to be a major application which would generate a total revenue of about \$54 million by 2010-11.*

Response from the Administration

4.7 The **Secretary for Financial Services and the Treasury** agrees with the audit recommendations. He has said that the annual business plans and medium range corporate plans should be submitted in a timely manner and detailed financial information should be provided in the plans for major operations of the HKP.

4.8 The **Postmaster General** agrees with the audit recommendation that the business plan should be submitted in a timely manner. He has said that:

- (a) the HKP has strived to speed up the preparation and submission of the annual business plans and medium range corporate plans. For the 2007-08 business plan, the HKP submitted the business plan to the EDLB and the FSTB on 27 February 2007, well before the commencement of the relevant financial year;
- (b) due to the diversity of postal services and the fact that the HKP has over 30 major services, the extent of coverage for each service and product in the business plan will depend on its financial and business impacts on the HKP's overall financial viability; and
- (c) while there is no extensive coverage of financial information about e-Certs in the HKP's annual business plans, the HKP prepared supplementary budget information on the e-Cert operation to facilitate the review of the annual business plan, and disclosed details of events with adverse impact to stakeholders through different channels.

Liaison meetings for monitoring the e-Cert operation

4.9 Liaison meetings, chaired by the then Secretary for Information Technology and Broadcasting (Note 11) and attended by the Postmaster General and other senior staff of the ITBB (and subsequently the CITB) and the HKP, had been held to discuss the e-Cert operation since November 1999. Matters discussed included the promotion activities for e-Certs and the development of applications using e-Certs. It was agreed among members at the first meeting that these liaison meetings should be held monthly, on the Monday of the third week in each month.

Note 11: *The then Permanent Secretary for Commerce, Industry and Technology (Information Technology and Broadcasting) became the chairman of the meetings in July 2002, when the CITB took over the responsibilities of the ITBB in overseeing the e-Cert operation. In July 2003, the Permanent Secretary for Commerce, Industry and Technology (Information Technology and Broadcasting) was retitled the Permanent Secretary for Commerce, Industry and Technology (Communications and Technology).*

Audit observations

4.10 Audit examination of the records of the liaison meetings revealed that:

- (a) the terms of reference of the meetings were not documented;
- (b) meetings were not held monthly as scheduled. The number of meetings not held ranged from 4 in 2000-01 to 12 in 2006-07;
- (c) no meetings were held since February 2006; and
- (d) there was no documentation on the formal cessation of the meetings.

The audit findings are summarised in Table 7.

Table 7
Holding of monthly liaison meetings
(1999-2000 to 2006-07)

Year	Number of meetings held	Number of meetings not held	Remarks
1999-2000 (from November)	5	0	The first meeting was held in November 1999.
2000-01	8	4	—
2001-02	8	4	—
2002-03	7	5	—
2003-04	4	8	—
2004-05	3	9	—
2005-06	4	8	The last meeting was held in February 2006.
2006-07	0	12	—
Total	39	50	—

Source: HKP records

4.11 Apart from the regular liaison meetings, other meetings were held between policy bureaux and the HKP to discuss e-Cert related matters. According to the CEDB records, a total of 91 meetings (including the 39 liaison meetings shown in Table 7) had been held between 1999-2000 and 2006-07.

4.12 Audit considers that the e-Cert project was risky in nature because it involved substantial upfront investment, and was a new venture with uncertain demand. To ensure the timely and successful implementation of the project, the CEDB and the HKP should have regularly monitored its progress and development. The monthly liaison meetings would have been useful as a monitoring mechanism.

Audit recommendations

- 4.13 **Audit has recommended that, for future projects, the Administration should:**
- (a) **take action to ensure that the provision and implementation of new services would be subject to regular review; and**
 - (b) **ensure that regular meetings between the policy bureaux and the departments responsible for the new services are held to monitor the progress and development of the new services.**

Response from the Administration

4.14 In their consolidated reply, the **Secretary for Commerce and Economic Development** and the **Postmaster General** have said that they agree with the audit recommendations. They have also said that:

- (a) proper documentation should be kept on the formal cessation of the liaison meetings between the CITB and the HKP, any change in meeting frequency and any other forms of communication amongst the stakeholders. The Administration will ensure that such practices be adopted for future projects; and
- (b) the CITB (and its predecessors) and the HKP had been in close liaison to monitor and review the progress and development of the e-Cert project. Apart from those meetings mentioned in paragraph 4.11, the OGCIO had maintained very frequent day-to-day contacts with the HKP and reported e-Cert issues to the Permanent Secretary for Commerce, Industry and Technology (Communications and Technology) regularly.

Utilisation of the computer system for e-Cert operation

4.15 When the e-Cert operation was launched in January 2000, the computer system installed by the HKP had a capacity of handling 500,000 e-Certs. In December 2001, the Administration decided to distribute free e-Certs in the ID card replacement programme (see para. 3.3). The HKP expected that 4 million new e-Certs would be issued during the replacement programme, and that about 15% of the free e-Cert holders would renew their e-Certs upon the expiry of the free-use period (see paras. 3.9(a) and (b)).

4.16 In order to cater for the additional workload, the HKP considered that, although the old e-Cert computer system was still underutilised (Note 12), there was a need to upgrade the system. In October 2002, the HKP obtained approval to upgrade the e-Cert computer system. A new e-Cert computer system, in addition to the old system, became operative in June 2003. According to the HKP, the old system was still in service until March 2005 for supporting the e-Certs originally issued by the old system.

Audit observations

4.17 Audit noted that the HKP had issued a total of about 1.3 million (as against the original estimate of 4 million) free e-Certs when the ID card replacement programme ended in March 2007. Of the about 258,000 e-Certs which expired by March 2007, only about 800 were renewed. The actual renewal rate was about 0.3% (original estimate was 15%). According to the HKP's records, the average utilisation of the central processing unit of the e-Cert computer system was below 5% (Note 13). Audit considers that the overestimation of the number of e-Cert users and the renewal rate had resulted in significant underutilisation of the computer facilities.

4.18 Audit also noted that the old e-Cert computer system had been left idle since March 2005. Up to August 2007, no action had been taken by the HKP to dispose of the old system.

Note 12: *According to the HKP's records, about 65,000 e-Certs were issued as at May 2002. This represented a utilisation rate of about 13% of the old e-Cert computer system which was designed to cater for 500,000 e-Certs.*

Note 13: *The HKP assessed the utilisation of the central processing unit of the e-Cert computer system in December 2004 and April 2006. The HKP found that the average utilisation rate was about 4.7% in December 2004 and 3.7% in April 2006.*

Audit recommendations

4.19 **Audit has recommended that the Administration should, in future upgrading of a computer system, ensure that:**

- (a) **the expected usage of the new computer system is estimated based on prudent assumptions; and**
- (b) **follow-up actions are taken in a timely manner to dispose of old computer systems that are no longer needed.**

Response from the Administration

4.20 In their consolidated reply, the **Secretary for Commerce and Economic Development** and the **Postmaster General** have said that they agree with the audit recommendations. They have also said that:

- (a) disposal of the old e-Cert computer system is being arranged and the HKP will strive to speed up the process;
- (b) the e-Cert computer system upgrade was based on the workload projections made in good faith at that time, with a view to meeting the essential requirements for supporting the peak workload and the complexity of embedding e-Certs in the smart ID cards, and complying with the stringent trustworthy requirements under the ETO; and
- (c) the average utilisation of the central processing unit is not the single factor in assessing the effectiveness of the system because other factors such as peak workloads, resilience, security, reliability and performance should also be considered.

PART 5: OUTSOURCING OF THE E-CERT OPERATION

5.1 This PART examines the outsourcing of the e-Cert operation.

Private sector participation

5.2 In mid-2005, the CITB completed a business review of the e-Cert operation, which concluded that the operation was not sustainable in the longer term (see para. 1.7). The review found that the low utilisation of e-Certs by the general public was mainly due to:

- (a) *mismatch of security/authentication requirements.* For the majority of business to consumer e-transactions and Government to citizen e-transactions, there was no absolute need to use digital certificates for meeting the security and authentication requirements; and
- (b) *lack of killer applications.* There was not yet a killer application (see Note 4 in para. 2.7(c)) that could drive the adoption of e-Certs by the general public. Authentication for Internet banking was once thought to be a promising killer application in view of the increasing risks of fraudulent websites, and the introduction of the “two-factor authentication” requirement (Note 14) by the Hong Kong Monetary Authority. However, some major banks had chosen other means to satisfy the two-factor authentication requirement.

5.3 The CITB considered that possible synergy with the private sector should be explored by inviting the private sector to participate in running the e-Cert operation and to come up with new value-added services/businesses that could engender a self-financing CA operation.

5.4 The HKP conducted an open tendering exercise in mid-2006 to invite tender proposals. In October 2006, the Government Logistics Department Tender Board approved the acceptance of the tender proposal by Contractor A to run the e-Cert operation at a nominal contractual sum of \$1 (payable to Contractor A) for a contractual period from April 2007 to March 2011.

Note 14: *Two-factor authentication is a security measure recognised by the information security industry to combat Internet banking frauds. In addition to the normal login ID and password, a customer needs a second factor which is in his or her physical possession for additional ID verification. This second factor should be difficult to be stolen together with the customer's login ID and password by fraudsters over the Internet.*

Audit observations

Meetings of the Steering Committee and the Management Committee

5.5 A memorandum of understanding (MOU) on the outsourcing of the operation of the HKPCA was agreed between the CITB and the HKP in April 2006. Among other things, the MOU states that a Steering Committee (SC) and a Management Committee (MC) should be established. The SC is to give policy directives and provide steer to the MC and Contractor A for maintaining a smooth e-Cert operation. The MC is to monitor the performance of Contractor A in running the e-Cert operation.

5.6 According to the terms of reference of the SC and the MC, the SC should meet every three months or as and when necessary and the MC should meet every two months or as and when necessary. **Audit noted that, since the signing of the outsourcing contract in October 2006 and up to July 2007, the SC and the MC had each held only two meetings.**

Time taken to issue non-personal e-Certs

5.7 Audit notes that the outsourcing contract stipulates that Contractor A should complete e-Cert issuing procedures within three working days upon the receipt of an application. An audit examination of the monthly management report submitted by Contractor A for April 2007 revealed that Contractor A adopted a standard of ten working days for processing non-personal e-Cert applications. Table 8 shows the audit findings.

Table 8

Performance standards adopted by Contractor A for processing e-Cert applications

Type	Standard processing time	
	stated in the contract	adopted by Contractor A
Personal	} 3 working days	3 working days
Organisational		} 10 working days
Encipherment		
Server		

Source: HKP records

5.8 The monthly management report for April 2007 did not provide any information about the actual time taken to process different types of e-Cert applications. Audit was therefore unable to ascertain whether the actual processing time for e-Cert applications exceeded the standard of three working days required in the contract. **Audit considers that the HKP needs to request Contractor A to report, for each type of e-Certs, the average time taken to process the applications.**

Late payments by Contractor A

5.9 According to the contract, Contractor A should pay the HKP about \$330,000 monthly for the use of the HKP's CA centre, disaster recovery site and storage facilities for the initial 12-month period from April 2007 to March 2008 (Note 15). The HKP would issue invoice to Contractor A within seven days from the first day of the month to which the charges apply. Contractor A should make payment within seven days after the invoice date. **Audit noted that payment made by Contractor A for May to July 2007 was late.** Table 9 shows the audit findings.

Table 9

**Settlement of payment invoices for the use of the CA facilities
(from April to July 2007)**

Monthly invoice	Issue date	Due date	Payment date
April	3/5/2007	10/5/2007	9/5/2007
May	7/5/2007	14/5/2007	28/6/2007
June	7/6/2007	14/6/2007	18/7/2007
July	7/7/2007	14/7/2007	22/8/2007

Source: HKP records

Note 15: *It is stated in the outsourcing contract that the monthly rate of about \$330,000 is subject to further review at the end of 2007-08.*

5.10 **Audit considers that the HKP needs to ensure that Contractor A would settle the invoices by the due dates in future.**

Monitoring the performance of Contractor A

5.11 At the liaison meeting (see para. 4.9) held in February 2006, it was agreed that the cost of monitoring the performance of Contractor A would be met by the budget of the OGCIO. In May 2006, the HKP estimated that about 2.5 persons would be needed for monitoring the performance of Contractor A. The annual staff cost would be about \$2 million. The OGCIO considered that the HKP's estimate was **slightly on the high side**, but still acceptable.

5.12 Audit noted that, as at July 2007, the CA Monitoring Section of the HKP, which was established in April 2007 to monitor the performance of Contractor A, had an establishment of six posts which were all filled. The total annual staff cost was about \$4.8 million. **The number of monitoring staff and the cost involved significantly exceeded the May 2006 manpower estimate accepted by the OGCIO.**

5.13 The HKP advised Audit in September 2007 that the monitoring resources required were higher during the initial six-month to one-year transition period. The HKP expected that the resources needed would gradually drop after the transition period, and it would review the manpower requirements in consultation with the OGCIO.

Risk assessment and contingency plan

5.14 According to the General Guide to Outsourcing and the User Guide to Contract Management issued by the EU, a government department considering outsourcing its services must undertake an objective assessment of the risks involved and consider necessary contingency planning that will be required to ensure the management of such risks. A contingency plan needs to be put in place to ensure the continuous delivery of quality services at all times. **Up to July 2007, the HKP had not drawn up any contingency plan.**

Audit recommendations

5.15 **Audit has recommended that the Postmaster General should:**

- (a) **ensure that meetings of the SC and the MC are regularly held;**
- (b) **ensure that Contractor A would:**

- (i) **comply with the standard processing time requirement as stated in the outsourcing contract in processing e-Cert applications; and**
- (ii) **make payments to the HKP for the use of the CA facilities on time;**
- (c) **re-examine the manpower required for monitoring the performance of Contractor A, seeking approval from the CEDB and the OGCIO for the posts required where appropriate; and**
- (d) **consider drawing up a contingency plan for the outsourced CA operation.**

Response from the Administration

5.16 The **Secretary for Commerce and Economic Development** agrees with the audit recommendations that meetings of the SC and MC should be held regularly. He has said that given the government re-organisation in July 2007 and that the new management in the CEDB needed to pay immediate attention to some other areas, coupled with the fact that there are no upcoming issues related to the e-Cert project which requires discussion at this stage, the time for the next SC meeting has not yet been fixed. The CEDB will convene another SC meeting in the near future.

5.17 The **Postmaster General** agrees with the audit recommendations. He has said that Contractor A has been requested to report on the average time taken to process the applications and issue the e-Certs in the monthly management report. The HKP will:

- (a) ensure timely settlement of future invoices by Contractor A;
- (b) review the manpower resources required in consultation with the OGCIO; and
- (c) prepare a contingency plan for the outsourcing contract.

**Chronology of key events relating to the e-Cert operation
from November 1997 to April 2007**

Date	Event
November 1997	The EU was commissioned to conduct a scoping study on the CA service.
May 1998	The EU completed the scoping study on the CA service.
June 1998	The ITBB invited the HKP to set up a public CA.
August 1998	The HKP commenced a business study on the proposed CA service.
October 1998	A local university completed a survey on the demand and acceptability of the CA service in Hong Kong.
May 1999	The HKP completed the business study. The study projected that the CA service would accumulate significant profits.
November 1999	The first monthly liaison meeting between the ITBB and the HKP was held.
January 2000	The ETO was enacted.
	The e-commerce framework agreement was signed between the ITBB and the HKP.
	The e-Cert service was launched.
October 2000	The Government decided to adopt smart cards with multi-application capacity for the ID card replacement programme.
January 2001	The ESD scheme was launched.
March 2001	Audit reported the results of the Government's efforts to promote e-business in Hong Kong, including the e-Cert operation, in the Director of Audit's Report No. 36.
April 2001	Survey by a market research company found that only 3% of the respondents, who were aware of the e-Cert service, had used e-Certs before.
May 2001	The HKP commissioned a consultant to conduct a strategic review of the e-Cert operation.
July 2001	Report of the PAC on the Director of Audit's Report No. 36 was issued.
	A private company became the second recognised CA in Hong Kong.

Appendix A
(Cont'd)
(para. 1.8 refers)

Date	Event
October 2001	The ITBB and the HKP projected that: (a) the opt-in rate of free e-Certs would be 60%; (b) the renewal rate would be 15%; and (c) the e-Cert operation would break even in 2007-08.
November 2001	A survey by a local university found that 36% of personal e-Cert holders and 51% of organisational e-Cert holders had not used their e-Certs.
December 2001	The ITBB informed the LegCo ITB Panel and the LegCo Panel on Security that the HKP would offer the public an option to embed an e-Cert, with one year's free use, in their new smart ID cards.
February 2002	The consultant commissioned by the HKP in May 2001 reported that the CA's business model was unlikely to be financially sustainable.
April 2002	E-Certs were used to support the Government's confidential mail system.
	Two private companies became the third and fourth recognised CAs in Hong Kong.
October 2002	The CITB commenced a review of the funding strategy for the CA business.
November 2002	The Government requested departments to consider the feasibility of relaxing the requirement of using e-Certs for the ESD services they provided.
June 2003	Issue of free e-Certs embedded in smart ID cards commenced.
July 2003	The CITB reported to the ITB Panel results of the review of the funding strategy for the e-Cert operation. The CITB considered that the e-Cert operation should be financially self-sufficient in the longer term. The Administration had no plan to change the funding strategy.
September 2003	One of the three private CAs ceased to be a recognised CA in Hong Kong.
October 2003	The HKP revised the target opt-in rate for the free e-Cert to 30% from 60% that it had previously estimated.
March 2004	The business agreement for mobile e-Certs was terminated.
July 2004	In the medium range corporate plan for 2004-05 to 2008-09, the HKP revised downward the financial projections significantly. The FSTB suggested the HKP to reopen discussion with the CITB on the funding strategy for the e-Cert operation.

Appendix A
(Cont'd)
(para. 1.8 refers)

Date	Event
December 2005	The CITB briefed the ITB Panel on the latest business review of the HKPCA completed in mid-2005.
February 2006	The last liaison meeting between the CITB and the HKP was held.
April 2006	The CITB and the HKP signed the MOU on the outsourcing of the operation of the e-Certs.
June 2006	The HKP invited tender for outsourcing the e-Cert operation.
October 2006	The Government Logistics Department Tender Board approved the acceptance of the tender proposal of Contractor A to run the e-Cert operation at a nominal contractual sum of \$1 for a contractual period from April 2007 to March 2011.
March 2007	The ID card replacement programme ended. The opt-in rate for free e-Certs embedded in smart ID cards was 17.5% and the renewal rate as at 31 March 2007 was 0.3%.
April 2007	Contractor A took over the HKPCA operation.
	The HKP established the CA Monitoring Section to monitor the performance of Contractor A.
	Another private CA terminated its CA service.

Source: HKP records and Audit research

**Projection of the number of digital certificates to be issued
in the Hongkong Post business study of May 1999**

Type	Annual fee \$	Number of e-Certs to be issued						
		1999-2000 (Note)	2000-01	2001-02	2002-03	2003-04	2004-05	Total
Personal	100	5,000	150,000	200,000	220,000	240,000	250,000	1,065,000
Stock Exchange	50	1,000	50,000	150,000	200,000	250,000	300,000	951,000
Bank	50	1,000	50,000	150,000	200,000	250,000	300,000	951,000
Mobile phone	50	1,000	50,000	200,000	300,000	400,000	500,000	1,451,000
Health	200	500	2,000	20,000	25,000	30,000	35,000	112,500
Postal application	100	500	1,000	10,000	50,000	75,000	100,000	236,500
Other retail	50	500	2,000	3,000	5,000	6,000	7,000	23,500
Tradelink	20	1,000	70,000	100,000	101,000	102,000	103,000	477,000
Other value-added networks	50	2,000	50,000	60,000	70,000	80,000	90,000	352,000
Electronic Tendering System	200	500	20,000	40,000	45,000	50,000	60,000	215,500
Enterprise CA	50	500	5,000	10,000	15,000	20,000	25,000	75,500
China enterprise	20	500	50,000	100,000	200,000	300,000	400,000	1,050,500
Electronic Product Catalogue	10	500	50,000	150,000	300,000	500,000	1,000,000	2,000,500
Secure sockets layer	1,500	10	100	500	1,000	1,500	2,000	5,110
Total		14,510	550,100	1,193,500	1,732,000	2,304,500	3,172,000	8,966,610

Source: HKP records

Note: The HKP assumed that the CA project would be operational in December 1999.

**Financial projection of the certification authority project
in the Hongkong Post business study of May 1999**

	1998-99 (\$ m)	1999-00 (\$ m)	2000-01 (\$ m)	2001-02 (\$ m)	2002-03 (\$ m)	2003-04 (\$ m)	2004-05 (\$ m)
Revenue from:							
Digital certificates	0	1.1	32.9	67.9	91.0	113.1	138.1
Others (e.g. provision of services and facilities)	0	0.6	2.2	3.5	4.5	5.5	6.5
Total revenue	0	1.7	35.1	71.4	95.5	118.6	144.6
Total expenditure	4.0	45.2	19.9	19.4	19.3	19.2	19.2
Profit/(loss)	(4.0)	(43.5)	15.2	52.0	76.2	99.4	125.4
Cumulative profit/(loss)	(4.0)	(47.5)	(32.3)	19.7	95.9	195.3	320.7

Source: HKP records

**Opt-in rate of free e-Certs embedded in smart identity cards
for the years 2003-04 to 2006-07**

Year	Number of free e-Certs embedded in smart ID card (a) (million)	Number of smart ID cards issued (b) (million)	Opt-in rate (c) = (a)/(b) × 100%
2003-04	0.26	1.08	24.1%
2004-05	0.58	1.96	29.6%
2005-06	0.41	2.04	20.1%
2006-07	0.01	2.12	0.5%
Overall	1.26	7.20	17.5%

Source: HKP and OGCI/O records

**The Hongkong Post financial projection
on the e-Cert operation for the years 2001-02 to 2005-06**

	2001-02 (\$ m)	2002-03 (\$ m)	2003-04 (\$ m)	2004-05 (\$ m)	2005-06 (\$ m)
<i>Revenue</i>					
Estimate	52.4	13.0	9.6	6.6	5.3
Actual	7.3	6.9	8.3	9.6	9.0
Variance	(86%)	(47%)	(14%)	45%	70%
<i>Expenditure</i>					
Estimate	51.4	42.3	40.8	26.9	32.4
Actual	34.8	32.3	28.6	43.4	32.5
Variance	(32%)	(24%)	(30%)	61%	0.3%
<i>Profit/(loss)</i>					
Estimate	1.0	(29.3)	(31.2)	(20.3)	(27.1)
Actual	(27.5)	(25.4)	(20.3)	(33.8)	(23.5)
Variance	(2850%)	13%	35%	(67%)	13%

Source: HKP records and Audit analysis

Remarks: No financial projection on the e-Cert operation was made in the annual business plans for 2000-01 and 2006-07.

Acronyms and abbreviations

Audit	Audit Commission
CA	Certification authority
CARO	Certification Authority Recognition Office
CEDB	Commerce and Economic Development Bureau
CITB	Commerce, Industry and Technology Bureau
e-business	Electronic business
e-commerce	Electronic commerce
e-government	Electronic government
e-transactions	Electronic transactions
EDLB	Economic Development and Labour Bureau
ESB	Economic Services Bureau
ESD	Electronic Service Delivery
ETO	Electronic Transactions Ordinance
EU	Efficiency Unit
FSTB	Financial Services and the Treasury Bureau
HKP	Hongkong Post
HKPCA	Hongkong Post Certification Authority
ID	Identity
IT	Information technology
ITBB	Information Technology and Broadcasting Bureau
ITB Panel	Panel on Information Technology and Broadcasting
LegCo	Legislative Council
MC	Management Committee
MOU	Memorandum of understanding
OGCIO	Office of the Government Chief Information Officer
PAC	Public Accounts Committee
PKI	Public key infrastructure
SC	Steering Committee