CHAPTER 4

Innovation and Technology Bureau
Administration Wing of the
Chief Secretary for Administration's Office
Office of the
Government Chief Information Officer
Efficiency Office
Commerce and Economic Development Bureau
Marine Department
Rating and Valuation Department

Government's efforts in implementing electronic recordkeeping system

Audit Commission
Hong Kong
2 April 2020

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. 74 of the Director of Audit contains 8 Chapters which are available on our website at https://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

GOVERNMENT'S EFFORTS IN IMPLEMENTING ELECTRONIC RECORDKEEPING SYSTEM

Contents

	Paragraph
EXECUTIVE SUMMARY	
PART 1: INTRODUCTION	1.1 – 1.13
Audit review	1.14
Acknowledgement	1.15
PART 2: PLANNING FOR THE SERVICE-WIDE IMPLEMENTATION OF ELECTRONIC RECORDKEEPING SYSTEM	2.1 – 2.5
Submission of implementation plans by bureaux and departments	2.6 – 2.10
Audit recommendations	2.11
Response from the Government	2.12
Other planning issues	2.13 – 2.22
Audit recommendations	2.23
Response from the Government	2.24 – 2.26
PART 3: IMPLEMENTATION OF ELECTRONIC RECORDKEEPING SYSTEM PILOT PROGRAMME	3.1
System development	3.2 – 3.25

	Paragraph
Audit recommendations	3.26 – 3.30
Response from the Government	3.31 – 3.36
System operation	3.37 – 3.38
Audit recommendations	3.39 – 3.40
Response from the Government	3.41 – 3.42
Migration to central electronic recordkeeping system	3.43 – 3.45
Audit recommendation	3.46
Response from the Government	3.47
PART 4: ARCHIVING OF ELECTRONIC RECORDS	4.1
Long-term preservation of electronic records	4.2 – 4.15
Archiving of government records on websites and social media platforms	4.16 – 4.19
Audit recommendations	4.20
Response from the Government	4.21

Appendices	**Page**
A : Government Records Service: Organisation chart (extract) (31 December 2019)	80
B : Governance structure of the Government's Electronic Information Management Programme (31 December 2019)	81
C : Acronyms and abbreviations	82

GOVERNMENT'S EFFORTS IN IMPLEMENTING ELECTRONIC RECORDKEEPING SYSTEM

Executive Summary

1. Records are valuable resources of the Government to support evidence-based decision-making and meet operational and regulatory requirements, and are essential for an open and accountable government. Development of information technology (IT) and the widespread use of network computers to conduct government business have resulted in an exponential growth of electronic records (an increase of 224% from 2015 to 2018), which have a vulnerable nature (e.g. fragility of storing media and ease of manipulation) and present unique challenges for bureaux/departments (B/Ds) in managing them. The implementation of electronic recordkeeping system (ERKS) is a Government initiative to pursue electronic records management. ERKS is an information/computer system to electronically collect, organise, classify and control the creation, storage, retrieval, distribution, maintenance and use, disposal and preservation of records throughout the life cycle of records.

2. In 2009, an Electronic Information Management (EIM) Steering Group comprising senior officials from the Office of the Government Chief Information Officer (OGCIO), the Administration Wing of the Chief Secretary for Administration's Office, and the Efficiency Office (EffO) was established to steer the government-wide EIM strategy and implementation. According to the EIM Strategy and Framework promulgated by OGCIO in 2011, all B/Ds should adopt an ERKS which complies with the functional requirements developed by the Government Records Service (GRS) under the Administration Wing. Up to March 2019, 11 B/Ds (with about 5,500 users) had fully or partially implemented ERKS under an ERKS pilot programme. In early 2019, GRS, EffO and OGCIO jointly completed a review which confirmed that the adoption of ERKS could bring about intangible benefits (e.g. reduce risk of inadvertent loss of records) and financial benefits (e.g. reduced need for storage space for paper files). In October 2019, the Policy Address Supplement announced the Government's decision to roll out ERKS to all government B/Ds by end-2025 to enhance efficiency in preserving and managing government records. The

Audit Commission (Audit) has recently conducted a review to examine the Government's efforts in implementing ERKS.

Planning for the service-wide implementation of electronic recordkeeping system

3. The service-wide implementation of ERKS from mid-2021 to end-2025 will cover 75 B/Ds. They were required to submit to OGCIO their implementation plans by end-December 2019, including a timetable for adoption of ERKS. In planning the service-wide implementation of ERKS, a number of planning issues need to be taken into consideration (paras. 2.2, 2.4 and 2.13).

4. ***Submission of implementation plans by B/Ds.*** To ensure that adequate and timely support is provided to all B/Ds, OGCIO will review individual plans with the concerned B/Ds and adjust the timetable as necessary so that an average of around 15 B/Ds will implement ERKS each year (para. 2.4). Audit examination on the submission of implementation plans has revealed the following areas for improvement:

(a) ***Delay in submission of implementation plans.*** In August 2019, the EIM Programme Management Office (which comprised members from OGCIO, GRS and EffO) under the EIM Steering Group invited all bureaux to coordinate the ERKS implementation plans for submission by end-December 2019. However, up to 6 February 2020, 17 (23%) of 75 B/Ds had not submitted their implementation plans (paras. 1.9, 2.6 and 2.7);

(b) ***Need to review implementation plans with B/Ds.*** For the implementation plans submitted by the 58 B/Ds, Audit found that: (i) one B/D reported that full rollout by 2025 would not be achievable; and (ii) the implementation work for the B/Ds would not be spread out evenly over the period from mid-2021 to end-2025. There would be a large number of B/Ds (i.e. some 80% of the B/Ds) commencing ERKS implementation from 2022 to 2024 (around 16 B/Ds each year) and a small number of B/Ds commencing ERKS implementation in mid-2021 (2 B/Ds) or in 2025 (10 B/Ds) (para. 2.8); and

(c) ***Need to enhance management oversight by B/Ds to support ERKS implementation.*** ERKS implementation requires strong commitment from the top management of B/Ds. According to the EIM Strategy and Framework, an EIM coordinator at directorate level should be appointed in each B/D to liaise with the EIM Steering Group via the EIM Programme Management Office on policy issues and matters of EIM. Audit found that: (i) 10 (13%) of 75 B/Ds involved in the service-wide implementation of ERKS had appointed non-directorate level staff as their sole EIM coordinators; and (ii) 59 (70%) of 84 EIM coordinators for the 75 B/Ds had not attended in person the briefing sessions on ERKS implementation for directorate staff in July and August 2019 (paras. 2.9 and 2.10).

5. ***Issues involved in planning service-wide implementation of ERKS.*** In the course of examining the implementation work of ERKS, Audit has identified the following issues which should be taken into consideration in planning the service-wide implementation of ERKS (para. 2.13):

(a) ***Electronic management of personnel records.*** A number of B/Ds do not have dedicated IT systems to manage their human resources processes and need to keep personnel records on papers. According to GRS, personnel records should best be handled by the Government Human Resources Management Services (GovHRMS), which is a central IT system developed by OGCIO to handle human resources management operations. In view of a number of practical issues, GRS advised B/Ds with ERKS to continue to manage their personnel records in paper files pending the full implementation of GovHRMS. However, Audit has noted that GovHRMS is only for adoption by B/Ds on a voluntary basis (i.e. no plan of full implementation in all B/Ds). There is a need to consider the way forward for the electronic management of personnel records by B/Ds (paras. 2.15 and 2.16);

(b) ***Remote access to confidential records.*** While ERKS supports the capturing of confidential records, it does not support remote access to confidential records in light of the requirements stipulated in the Government Security Regulations (i.e. a user can only retrieve confidential records in ERKS when connected to government network in government offices). In Audit's view, supporting remote access to ERKS records at confidential level will facilitate easy retrieval of confidential records by staff when working at

locations other than in government offices with connection to government network (e.g. working from home when warranted by special circumstances). There is a need to critically evaluate the feasibility of providing remote access to confidential records for the service-wide implementation of ERKS (paras. 2.17 and 2.18);

(c) ***Replacement of government e-mail system.*** According to GRS guidelines, it is a mandatory requirement that ERKS must enable integration with an e-mail system to facilitate record capturing. In this connection, a new e-mail system for 24 B/Ds in the Central Government Offices and their sub-offices has been scheduled for implementation by December 2020. As the service-wide implementation of ERKS will commence in mid-2021, ERKS will be integrated with the new e-mail system for the 24 B/Ds. For the remaining departments, the implementation plan for the new e-mail system is being planned and ERKS will be integrated with the existing e-mail systems first. To avoid duplication of efforts, it is more desirable if the implementation of ERKS and the new e-mail system can be synchronised as far as practicable (paras. 2.19 and 2.21); and

(d) ***Manual data input efforts in using ERKS.*** As the e-mail system is integrated with ERKS, most metadata of records (e.g. time and date, title, sender and recipients of an e-mail) can be automatically captured. For records other than e-mails, users are required to input most metadata of records into ERKS manually. Such manual data input efforts are prone to omissions and errors. There is a need to take measures to reduce the extent of manual efforts required to input data into ERKS, including: (i) promoting the wider use of workflow functions in ERKS, which are optional requirements of an ERKS to facilitate the automation of records management activities; and (ii) keeping in view the latest technological development in electronic records management (para. 2.22).

Implementation of electronic recordkeeping system pilot programme

System development

6. ***ERKS pilot programme.*** The ERKS pilot programme included 11 B/Ds (see para. 2), comprising five early adopters (EffO, GRS, the Communications and Creative Industries Branch (CCIB) of the Commerce and Economic Development

Bureau (CEDB), the Drainage Services Department, and the Rating and Valuation Department (RVD)) and six next-stage adopters (the Administration Wing, the Civil Engineering and Development Department (CEDD), the Intellectual Property Department, the Architectural Services Department (ArchSD), the Marine Department (MD), and OGCIO). The five early adopters procured commercial off-the-shelf software packages with certain customisation work for ERKS implementation while the six next-stage adopters implemented ERKS by way of a common/shared service platform managed by OGCIO. Audit noted that there were delays in 8 out of the 11 projects under the ERKS pilot programme. Among the five early adopters, with implementation completed, CCIB of CEDB had the longest delay (18 months), mainly due to longer time taken for resolving technical problems. For the six next-stage adopters, as of December 2019, implementation had been completed except the one for MD, which was anticipated to be completed in June 2021. Audit selected the MD's ERKS implementation for review (paras. 3.2, 3.4 and 3.10).

7. ***Delay in implementation of ERKS common base system and system deployment for MD.*** In November 2015, OGCIO awarded a contract at a total cost of $36.3 million for implementing the ERKS base system and system deployment for MD (and also ArchSD) to a contractor (the Contractor). The common base system was planned to be ready for deployment to MD in May 2016. In order to speed up progress, in June 2017, OGCIO approved the Contractor's proposal of dividing the common base system functions into core functions and remaining functions. In September 2017, the common base system was deployed to MD for testing when the core functions of the system were ready. In August 2019, the whole common base system was completed when all the core and remaining functions were ready for use. For MD's system deployment, it comprised 4 batches involving different user sections/units. As of February 2020, only Batch 1 had been implemented. As compared with the target completion date of January 2018, Batch 1 system deployment was only completed in August 2019 with a delay of 19 months. As of December 2019, the completion of the whole system deployment was planned to be completed in June 2021 (paras. 3.6 and 3.10 to 3.12).

8. ***Lessons to be learnt to improve future service-wide ERKS implementation.*** Audit examination revealed that the main reason for delay in implementing the common base system and the subsequent system deployment to MD was the unsatisfactory performance of the Contractor. According to MD, a premature base system was deployed for testing by MD, as evidenced by the substantial number of errors identified in the user acceptance test and the large number of errors which took a long time to fix. According to OGCIO, it had closely monitored the Contractor's

progress in developing the system and rectifying identified issues. From September 2016 to June 2017, OGCIO issued seven warning letters to the Contractor on its unsatisfactory performance including severe schedule slippage, loose management and inadequate staff resources (para. 3.13). Audit examination has revealed the following areas for improvement:

(a) ***Need to seek legal advice about imposing liquidated damages.*** According to the contract provision, liquidated damages can only be imposed if the Contractor fails to supply and deliver the System in Ready for Use condition (i.e. put into live-run) by the completion date. Audit noted that when OGCIO endorsed the extension of the target completion date of the whole system to June 2021, OGCIO had not imposed liquidated damages on the Contractor. While having sought the Department of Justice's advice on the termination of contract and the consequence of accepting a revised implementation plan, OGCIO (as the contract administrator) did not seek specific legal advice about imposing liquidated damages ($2 million) before approving the extension of completion date, despite the unsatisfactory performance of the Contractor (para. 3.15);

(b) ***Inadequacies in monitoring project progress.*** There were inadequacies in project monitoring by OGCIO and MD: (i) OGCIO has set up a two-tier project governance structure comprising a Project Steering Committee (PSC) and a Project Team to oversee the common base system development of ArchSD and MD. However, only two OGCIO PSC meetings (in December 2015 and June 2016) had been held. From July 2016 to August 2019, no PSC meetings had been conducted to provide timely strategic guidance on project implementation issues including the termination of contract or imposition of liquidated damages; and (ii) MD adopted a three-tier project governance structure, comprising a PSC, a Project Assurance Team (PAT) and a Project Team, to oversee the implementation of system deployment of the ERKS Project. Since January 2017, PSC and PAT had only held one meeting in August 2019 for endorsing the revised rollout date of Batch 1 system deployment (paras. 3.16 and 3.17); and

(c) ***Long time taken in fixing errors identified in critical test incidents reports (TIRs).*** When errors were found in the testing of the common base system and system deployment, they were recorded in TIRs for subsequent rectification by the Contractor as a quality assurance. For the user acceptance test and training stage of Batch 1 of system deployment from

September 2017 to October 2019, there were a total of 765 TIRs identified by MD. To expedite the rectification of TIRs, MD and the Contractor agreed to tackle critical TIRs (i.e. urgent and high-priority cases) first. Audit analysis revealed that among the 479 TIRs (111 (urgent) + 368 (high priority)) having been classified as urgent/high priority, the Contractor took 92.4 days (ranging from 0.6 to 518.5 days), on average, to fix the errors identified in the TIRs. Furthermore, out of the 765 TIRs, 246 (32%) failed the required testing one or more times, ranging from 1 to 14 times. As of February 2020:

(i) the total number of outstanding TIRs for the common base system was 191, including 7 urgent/high-priority cases and 184 normal/low-priority cases; and

(ii) the total number of outstanding TIRs for MD's system deployment was 78, including 2 urgent/high-priority cases and 76 normal/low-priority cases (para. 3.13(b)).

9. ***Inadequacies in preparing and submitting Post Implementation Departmental Returns (PIDRs).*** B/Ds are required to submit PIDRs to OGCIO six months after the projects are in operation. As of January 2020, PIDRs of 10 completed projects were due for submission. Of the 10 PIDRs, despite the issue of monthly reminders by OGCIO, 8 were submitted late or still outstanding. The delay ranged from 1 to 23 months. Moreover, Audit found that all B/Ds reported in PIDRs that savings in paper/printing costs had been or would be realised. However, as the time needed to dispense with the print-and-file practice (see para. 10) varied, some B/Ds had not yet dispensed with the print-and-file practice at the time of submitting PIDRs (paras. 3.9, 3.18 and 3.19).

10. ***Long time taken in dispensing with print-and-file practice.*** B/Ds which have fully implemented a proper ERKS should seek the prior approval of GRS before dispensing with the practice of print-and-file of e-mail records as required by General Circular No. 2/2009. As of December 2019, 4 of the 11 B/Ds under the ERKS pilot programme had not yet dispensed with the print-and-file practice. While ArchSD and MD only launched ERKS recently, CCIB of CEDB and RVD rolled out ERKS in 2014 and have been adopting a parallel run of ERKS and print-and-file practice for over five years. The prolonged parallel run created additional workload to users in managing records and resulted in omission in filing. Audit found that the prolonged

parallel run was mainly attributable to technical problems encountered after the system rollout. The two B/Ds should work closely with GRS to dispense with the print-and-file practice (paras. 1.7, 3.20, 3.22 and 3.25).

System operation and migration to central electronic recordkeeping system

11. Audit selected four B/Ds under the ERKS pilot programme (GRS, CCIB of CEDB, OGCIO and CEDD) for examining the records management functionalities and practices in ERKS environment and found the following areas for improvement (para. 3.37):

(a) ***Failure to provide Audit with access rights to ERKS.*** Audit was able to obtain read-only access rights to ERKS in all selected B/Ds except OGCIO because such requirement (i.e. creating accounts with read-only access rights for non-OGCIO users) had not been taken into account when designing the user profiles of OGCIO's ERKS. In Audit's view, the design of user profiles of OGCIO's ERKS does not meet audit requirements regarding obtaining reliable audit evidence efficiently through the system (para. 3.38(a));

(b) ***Users with low usage.*** Low usage of some users was generally observed in all four B/Ds. For example, as of January 2020, 306 (30%) of 1,025 ERKS users in OGCIO were found not using ERKS for over one year (para. 3.38(b));

(c) ***No guidelines on time limit for capturing records into ERKS.*** All four B/Ds did not specify in their departmental guidelines the time limit to capture a record into ERKS. Audit analysis of the filing dates of e-mails in ERKS revealed that some e-mails were only captured into ERKS over three months after the sent/received date. For example, in 2019, 7,747 (22%) of 35,567 e-mail records in OGCIO and 3,792 (17%) of 22,700 e-mail records in CCIB of CEDB were captured over three months after the sent/received date (para. 3.38(c)); and

(d) ***Need to consider migration to central ERKS in due course.*** In the service-wide implementation, to achieve economies of scale on software licences, and implementation and support costs, a single ERKS software solution will be adopted to develop the central ERKS for deployment. The

annual recurrent cost for each ERKS user is estimated to be about $1,500. In contrast, the annual operating expenditure per ERKS user for the pilot projects in 2018-19 ranged from $1,667 to $35,714. B/Ds under the ERKS pilot programme should keep in view the merits of migrating to the central ERKS when their ERKSs are due for replacement in future (para. 3.45).

Archiving of electronic records

12. According to GRS, long-term preservation of electronic records is necessary to ensure that electronic records are authentic, complete, accessible, identifiable, understandable and usable for as long as they are required to serve legal, regulatory, business and archival requirements. To achieve that, it is necessary to formulate government-wide policy and strategies for preserving electronic records over time (para. 4.3). Audit found the following areas for improvement:

(a) ***Slow progress in conducting comprehensive study.*** In January 2013, GRS and OGCIO completed a preliminary study to, among others, define the scope of a comprehensive study on long-term preservation of electronic records. According to the original plan submitted to the EIM Steering Group in 2011, the comprehensive study was scheduled for completion in December 2014. However, as of October 2019, the revised target completion date was May 2021, representing a delay of about 6 years. Given that 11 B/Ds have implemented ERKS since 2010, the need for transfer of electronic records with archival value from B/Ds to GRS for permanent retention will arise in the near future. There is a need to step up efforts to avoid further delay (paras. 4.4 and 4.5);

(b) ***Need to ascertain progress made by B/Ds in improving preservation of electronic records.*** In 2012, GRS and OGCIO jointly conducted a survey (covering 74 B/Ds and offices) to gauge the need for preservation of electronic records in B/Ds and assess the effectiveness of current preservation measures adopted by B/Ds. The survey found that: (i) only 27 (36%) B/Ds and offices had conducted file format migration for their electronic records in the past seven years; and (ii) of 49 B/Ds and offices that had managed and/or stored electronic records in offline storage media, only 15 (31%) of them had conducted media renewal and/or media migration. While GRS promulgated a guideline in July 2013 setting out good practices and measures to preserve electronic records for reference by B/Ds, it did not regularly ascertain the progress made by B/Ds in improving

their measures and practices in preserving electronic records (paras. 4.13 to 4.15); and

(c) ***Need to formulate long-term strategy for web archiving and promulgate relevant guidelines.*** All B/Ds have set up their own websites for dissemination of information. Senior government officials and B/Ds are also using social media to disseminate information and interact with members of the public. However, Audit noted that there was a lack of guidelines on management and archiving of records in government websites or social media platforms. Audit research has revealed that: (i) web archiving initiatives have been implemented in some overseas jurisdictions for quite some time (e.g. the United Kingdom in 2003 and Singapore in 2006); and (ii) the related archived government websites and/or social media accounts are usually accessible by the public through dedicated websites. Up to February 2020, the Government had yet to formulate a long-term strategy for web archiving and did not have a centralised web archive of all government websites and/or official social media accounts, similar to the ones in overseas jurisdictions (paras. 4.16 to 4.19).

Audit recommendations

13. **Audit recommendations are made in the respective sections of this Audit Report. Only the key ones are highlighted in this Executive Summary. Audit has *recommended* that the Government Chief Information Officer, the Director of Administration and the Commissioner for Efficiency should:**

(a) **take further actions to follow up with B/Ds on outstanding ERKS implementation plans (para. 2.11(a));**

(b) **review B/Ds' ERKS implementation plans to ensure that the workload over the period from mid-2021 to end-2025 is evenly spread out as far as practicable, and liaise with and provide necessary support to those which have indicated difficulties in meeting the target of service-wide implementation of ERKS by end-2025 (para. 2.11(b));**

(c) **remind B/Ds to provide stronger management oversight on the service-wide implementation of ERKS (para. 2.11(c));**

(d) **consider the way forward for the electronic management of personnel records by B/Ds (para. 2.23(a));**

(e) **in consultation with the Security Bureau, critically evaluate the feasibility of providing remote access to confidential records in ERKS (para. 2.23(b));**

(f) **in implementing ERKS in the remaining B/Ds in future, take into account the implementation plan of the new e-mail system as far as practicable (para. 2.23(c));**

(g) **take measures to reduce the extent of manual data input efforts required to capture records into ERKS (para. 2.23(d));**

(h) **set up a mechanism to measure B/Ds' savings in paper/printing costs upon the cessation of the print-and-file practice (para. 3.28(a)); and**

(i) **remind the 11 B/Ds under the ERKS pilot programme to keep in view the merits of migrating to the central ERKS when their ERKSs are due for replacement in future (para. 3.46).**

14. **Regarding the system development of ERKS, Audit has *recommended* that the Government Chief Information Officer should:**

(a) **draw lessons from the implementation of common base system to improve the monitoring of contractors in the service-wide implementation of ERKS, including:**

(i) **holding regular PSC meetings to provide strategic direction on project implementation (para. 3.26(a)(i)); and**

(ii) **in granting extension of time of target completion dates in ERKS projects for the remaining B/Ds in future, seeking the Department of Justice's advice on whether liquidated damages should be imposed, having regard to the contractor's performance and the loss to the Government arising from the project delay (para. 3.26(a)(ii));**

(b) **closely monitor the Contractor's progress to ensure that ERKS for MD can be completed by the revised completion date of June 2021 and the errors identified are rectified as soon as possible (para. 3.26(b));**

(c) **take effective measures to ensure PIDRs of ERKS projects are submitted in a timely manner (para. 3.26(c)); and**

(d) **remind B/Ds to fully take into account audit requirements in designing their ERKSs in the service-wide implementation of ERKS (para. 3.39(a)).**

15. **Regarding the system operation of ERKS and archiving of electronic records, Audit has *recommended* that the Director of Administration should:**

(a) **remind B/Ds with ERKS to identify users with low usage and investigate the reasons for taking appropriate action, and formulate guidelines on the time limit for filing records into ERKS (para. 3.40);**

(b) **step up efforts to complete the comprehensive study on long-term preservation of electronic records (para. 4.20(a));**

(c) **consider setting up a mechanism to regularly monitor B/Ds' practices in preserving electronic records (para. 4.20(b)); and**

(d) **formulate a long-term strategy for web archiving in the Government and promulgate guidelines on management of electronic records in web environment (para. 4.20(c)).**

16. **Audit has also *recommended* that:**

(a) **the Director of Marine should strengthen the monitoring of ERKS project progress and hold regular PSC and PAT meetings to oversee the Contractor's performance (para. 3.27(a)); and**

(b) **the Secretary for Commerce and Economic Development and the Commissioner of Rating and Valuation should work closely with GRS to dispense with the print-and-file practice (paras. 3.29 and 3.30).**

Response from the Government

17. The Government generally agrees with the audit recommendations.

PART 1: INTRODUCTION

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

Background

1.2 ***Government records management.*** Records (Note 1) are valuable resources of the Government to support evidence-based decision-making and meet operational and regulatory requirements, and are essential for an open and accountable government. Good records management enhances operational efficiency and effectiveness while minimising costs. Records management is therefore an important function of government bureaux/departments (B/Ds). The Government Records Service (GRS) under the Administration Wing of the Chief Secretary for Administration's Office is responsible for formulating and implementing policies and plans for records management and archives administration (see Appendix A for an extract of the organisation chart of GRS).

1.3 ***Electronic government records.*** Development of information technology (IT) and the widespread use of network computers to conduct government business have resulted in the exponential growth of records being created digitally, e.g. e-mails, spreadsheets and electronic forms. According to a government-wide survey conducted by GRS in 2019, the quantity of electronic records kept by B/Ds increased by 224% from 3,707 terabytes (TB — Note 2) as of December 2015 to 12,008 TB as of December 2018.

1.4 ***Challenges in managing electronic records.*** According to GRS, electronic records have a vulnerable nature and present unique challenges for B/Ds in managing them because of the following:

Note 1: *According to General Circular No. 2/2009 "Mandatory Records Management Requirements" issued by the Director of Administration in April 2009, a record is any recorded information or data in any physical format or media created or received by an organisation during its course of official business and kept as evidence of policies, decisions, procedures, functions, activities and transactions.*

Note 2: *1 TB is equal to 1,024 gigabytes while 1 gigabyte is equal to 1,024 megabytes.*

(a) the fragility of media (e.g. magnetic tapes, optical discs and USB drives) upon which they are recorded;

(b) the dependency on technology to allow access and use of electronic records which cannot be read directly without the aid of computer software and hardware;

(c) the ease of manipulation (i.e. updated, deleted, and altered intentionally or inadvertently) without being discovered; and

(d) the absence of self-evident and ready contextual information (e.g. who created it, when, to whom was it sent, and why) to enable that electronic records are understandable and usable over time.

Having regard to the above considerations and the need for proper control over electronic records, new records management policy, strategies, practices, procedures and tools benchmarked against international records management standards and best practices are required to support efficient and effective management of electronic and non-electronic records under such an environment in B/Ds.

1.5 ***Electronic records management (ERM).*** According to GRS, ERM refers to the application of records management principles to manage records by electronic systems, notably an electronic recordkeeping system (ERKS — see para. 1.6). According to GRS, ERM has been widely adopted and promoted in the public sectors of other jurisdictions such as Australia, Canada, the European Union, New Zealand, Singapore, the United Kingdom and the United States. International professional bodies, notably the International Council on Archives, have also devoted continuous efforts to develop standards, best practices and solutions for ERM. With the growing need for proper management of electronic and non-electronic records in a consistent and integrated manner, it is the Government's records management policy to pursue ERM in B/Ds.

1.6 ***ERKS.*** An ERKS is an information/computer system with the necessary records management capabilities designed to electronically collect, organise, classify and control the creation, storage, retrieval, distribution, maintenance and use, disposal and preservation of records throughout the life cycle of records. According to GRS, the implementation of ERKS in B/Ds is likely to bring the following tangible and intangible benefits:

(a) better governance and greater accountability (e.g. supporting evidence-based and faster decision-making by providing reliable and authentic electronic records for the evaluation of past actions and decisions);

(b) improved organisational compliance with legal and regulatory requirements;

(c) enhanced operational efficiency and improved public services;

(d) more efficient and effective access to and sharing of information and knowledge;

(e) reduced costs for managing and storing records (e.g. by obviating the need to "print-and-file" (see para. 1.7) electronic records for management and storage);

(f) strengthened security and access control to government records; and

(g) better preservation of corporate and community memory.

1.7 ***Print-and-file requirement.*** According to General Circular No. 2/2009 issued in April 2009 (see Note 1 to para. 1.2), since the use of ERKS for keeping electronic records was being studied at that time (see para. 1.8), unless otherwise agreed by GRS, e-mail correspondence should be "printed-and-filed" for record purposes, i.e. subject officers should arrange to print an e-mail record directly from the e-mail software for filing in an appropriate paper-based file similar to other records.

Implementation of ERM and ERKS

1.8 ***Pilot project before 2009.*** The subject of ERM was initiated as early as 2001 when an ERM Working Group was established to develop policies, strategies, and standards for the effective management of electronic records, including studying the feasibility and implications of developing a properly designed ERKS. The Working Group was chaired by a Deputy Director of Administration, with members

from GRS, the then Efficiency Unit (now the Efficiency Office (EffO — Note 3)), and the Office of the Government Chief Information Officer (OGCIO). After implementing a pilot project from 2003 to 2008 (Note 4), GRS, EffO and OGCIO in 2009 completed a post-implementation review of the pilot project and identified the need for further work to address issues relating to the implementation of an ERKS in the Government (Note 5).

1.9 ***Government's Electronic Information Management (EIM) Programme.*** EIM (Note 6) was one of the key initiatives to be pursued under the 2008 update of Digital 21 Strategy (Note 7). In 2009, an EIM Steering Group (Note 8), which took over the work of the ERM Working Group (see para. 1.8), was established to steer the government-wide strategy and implementation of an EIM Programme. A consultancy study was conducted in 2010 to map out the future directions and implementation plan of government-wide EIM initiative, including ERKS. On the

---

Note 3: *The then Efficiency Unit under the Chief Secretary for Administration's Office was transferred to the Innovation and Technology Bureau and renamed as EffO on 1 April 2018.*

Note 4: *The pilot project comprised two phases, with Phase 1 covering a few offices in five departments (namely GRS, OGCIO, the Fire Services Department, the Trade and Industry Department, and the Transport Department) to test two ERKSs for one month in 2003, and Phase 2 covering a one-year pilot run in some offices of OGCIO and the Transport Department from 2007 to 2008.*

Note 5: *These issues comprised: (a) development of records management standards; (b) refinement of functional requirements; (c) management of confidential records in ERKS; and (d) preservation of electronic records. While issues (a) to (c) were fully addressed subsequently, there is still outstanding work relating to issue (d), which is discussed in PART 4 of this Audit Report.*

Note 6: *EIM refers to the management of information throughout its life cycle by electronic means. EIM aims to facilitate the right people to process the right information at the right time by the wider use of IT, and covers three domain areas, namely content management, records management and knowledge management.*

Note 7: *The Government's Digital 21 Strategy was the blueprint for the development of information and communications technology for Hong Kong. Since its first release in 1998, the Strategy was regularly updated to take into account technological advancements and the evolving needs of the community. It was last updated in 2014.*

Note 8: *The EIM Steering Group was convened by the Government Chief Information Officer with members including the Director of Administration, the Government Records Service Director, and the Commissioner for Efficiency.*

basis of the study which was endorsed by the EIM Steering Group, OGCIO issued a circular in May 2011 to promulgate the EIM Strategy and Framework. The Circular (i.e. "OGCIO Circular No. 1/2011") requires, among others, that:

(a) B/Ds should follow the EIM Framework (Note 9) set out in the Circular to develop EIM Strategies before actual implementation of EIM projects;

(b) B/Ds should take forward ERM as an integral part of the EIM initiative and adopt an ERKS which complies with the functional requirements developed by GRS to drive ERM in the Government; and

(c) EIM components, such as ERKS, should be provided as common shared services for B/Ds as options to reduce implementation costs, time and risks.

An EIM governance structure is established to oversee and execute the EIM Programme. The central EIM governance body is headed by the EIM Steering Group, which is supported by an EIM Working Group and an EIM Programme Management Office. Both the Working Group and the Programme Management Office consist of members from GRS, EffO and OGCIO. While the EIM Working Group is tasked to oversee the implementation progress of EIM Programme, the EIM Programme Management Office is responsible for executing programme tasks, providing project management support, and overseeing and monitoring the programme progress. The central EIM governance body maintains continual communication with B/Ds via the EIM coordinators on EIM matters. According to OGCIO, to steer and monitor the overall implementation of the EIM Programme, an EIM coordinator at directorate level should be appointed in each B/D. The governance structure of the Government's EIM Programme is shown in Appendix B.

1.10 ***Development of ERM standards and guidelines.*** In taking forward ERM, GRS has developed and issued the following standards and guidelines to support B/Ds:

(a) in conjunction with the promulgation of the Government's EIM Strategy and Framework by OGCIO:

Note 9: *The EIM Framework consists of five capability areas (i.e. Strategy, Technology, People, Process and Governance) that B/Ds need to consider when developing their EIM strategies.*

(i) in May 2011 (subsequently updated in May 2012 and September 2016) a publication entitled "Functional Requirements of an Electronic Recordkeeping System" which specifies a set of functional requirements of an ERKS for compliance by B/Ds in designing, developing and implementing an ERKS; and

(ii) in May 2012 (subsequently updated in September 2016) another publication entitled "Recordkeeping Metadata Standard for the Government of the Hong Kong Special Administrative Region" which specifies a set of recordkeeping metadata (Note 10) to be created, captured, used, managed and maintained in an ERKS;

(b) four sets of ERKS implementation guidelines from 2013 to 2015 to assist B/Ds to face the challenges in implementing an ERKS, three of which were subsequently updated in 2016 and 2017. The guidelines provide guidance to B/Ds in initiating, planning and implementing an ERKS;

(c) in August 2011 and updated in April 2017 a guidance document entitled "Disposal of Original Records (for records that have been digitised and stored in a digital form)" for compliance by B/Ds to assess the potential risks of early destruction of original records;

(d) in July 2013 a publication entitled "A Handbook on Preservation of Electronic Records" to enhance B/Ds' awareness of proper preservation of electronic records, and to promote best practices in this regard to B/Ds; and

(e) in October 2001 and updated in December 2017 the "Guideline on the Management of Electronic Messages" (previously known as "Guideline on the Management of Electronic Mail") to help B/Ds identify, create, file and manage electronic message records so that adequate and accurate evidence of official business and activities will be retained for operational, policy, legal, financial and archival purposes.

Note 10: *Recordkeeping metadata describes the content, context and structure of records and their management through time, e.g. 'title', 'date received' and 'recipient name'.*

1.11 ***ERKS pilot programme.*** Since 2010, an ERKS pilot programme has been implemented in two stages, as follows:

(a) ***Five early adopters.*** EffO implemented an ERKS as part of a comprehensive EIM system in 2010. In 2014 and 2015, another four early adopters including GRS, the former Communications and Technology Branch (renamed as Communications and Creative Industries Branch (CCIB) in November 2015) of the Commerce and Economic Development Bureau (CEDB), the Drainage Services Department (DSD), and the Rating and Valuation Department (RVD) had also implemented ERKSs. These early adopters used a package-plus-customisation approach to implement their ERKSs. They used different brands of commercial off-the-shelf ERKS software packages, with necessary customisation to meet records management requirements promulgated by GRS, as well as B/Ds' business requirements; and

(b) ***Six next-stage adopters.*** In October 2014, the E-Government Steering Committee (Note 11) endorsed a programme of implementing ERKS in a maximum of six B/Ds as the next stage development. Under this programme, three ERKS base systems were developed by OGCIO using three different ERKS solutions and were rolled out (fully or partially from 2016 to 2019) in five departments (i.e. the Architectural Services Department (ArchSD), the Civil Engineering and Development Department (CEDD), the Intellectual Property Department (IPD), the Marine Department (MD) and OGCIO — Note 12). Since GRS (a unit under the Administration Wing — see para. 1.2) is an early adopter of ERKS, the Administration Wing has also shared the ERKS infrastructure of GRS since

---

Note 11: *The E-Government Steering Committee was formed in 2004 to approve the strategic direction of the e-government programme, set targets for outcome, benefits and utilisation of such projects, and, if necessary, resolve differences among B/Ds or between OGCIO and B/Ds. The Committee was chaired by the Financial Secretary with members comprising representatives of CEDB, the Financial Services and the Treasury Bureau, OGCIO and EffO.*

Note 12: *The three ERKS base systems are respectively deployed to: (a) OGCIO and IPD; (b) CEDD; and (c) ArchSD and MD.*

2016. All these ERKSs are hosted on the Government Cloud Infrastructure (GovCloud — Note 13).

As of March 2019, the 11 B/Ds (Note 14) with some 5,500 users were using ERKS. The total estimated capital expenditure for developing and implementing ERKSs in the 11 B/Ds was around $110 million. Individual projects were mainly funded through a block allocation under the Capital Works Reserve Fund (CWRF) Head 710 Computerisation Subhead A007GX (Block Allocation) — New administrative computer systems (Note 15).

1.12 ***The Ombudsman's direct investigation report.*** In March 2014, the Office of the Ombudsman published a direct investigation report on public records management in Hong Kong. In connection with the management of electronic records, the Ombudsman recommended that the Government should:

(a) map out as soon as possible a clear and comprehensive implementation plan of ERKS with timelines for all parties concerned; and

(b) conduct studies to gauge ERM situations in B/Ds, with a view to identifying problems in the different practices among B/Ds and plugging existing loopholes.

1.13 ***Service-wide implementation of ERKS.*** In early 2019, GRS, EffO and OGCIO jointly completed a review of the implementation of ERKS in four B/Ds (viz. the Administration Wing, CEDD, IPD and OGCIO). According to a summary report

---

Note 13: *GovCloud, launched in December 2013, is used for hosting e-government services for use by B/Ds, such as EIM, and aims at a more cost-effective delivery of common e-government infrastructure.*

Note 14: *According to OGCIO, in the context of the ERKS pilot programme, EffO, GRS and the Administration Wing are regarded as separate B/Ds.*

Note 15: *CWRF was set up for financing the Public Works Programme, acquisition of land, capital subventions and major systems and equipment items. Projects of administrative computer systems, consultancies for feasibility studies and systems development that cost between $200,001 and $10 million each are funded by the block allocation. The Government Chief Information Officer can authorise expenditure under the block allocation under delegated authority.*

submitted to the Steering Committee on Innovation and Technology (Note 16) in March 2019, the review confirmed that the adoption of ERKS could bring about a number of intangible benefits (e.g. reducing the risk of inadvertent loss or unauthorised destruction of records), as well as financial benefits (e.g. reduced need for storage space for paper files). Based on the review findings, it was considered imperative and timely to roll out ERKS to all B/Ds on a mandatory basis (Note 17). After deliberations within the Government, the Policy Address Supplement published in October 2019 announced the Government's decision to roll out ERKS to all government B/Ds by end-2025 to enhance efficiency in preserving and managing government records. In February 2020, the Innovation and Technology Bureau and OGCIO submitted a funding proposal on the service-wide implementation of ERKS to the Panel on Information Technology and Broadcasting of the Legislative Council for seeking Members' support. The funding proposal involved a non-recurrent expenditure of $1,234 million and an annual recurrent cost of $270 million (Note 18).

Audit review

1.14 In 2011, the Audit Commission (Audit) completed a review of "Records management work of the Government Records Service", the results of which were reported in Chapter 10 of the Director of Audit's Report No. 57 of October 2011. In October 2019, Audit commenced a review to examine the Government's efforts in implementing ERKS, focusing on:

(a) planning for the service-wide implementation of ERKS (PART 2);

Note 16: *The Steering Committee on Innovation and Technology is chaired by the Chief Executive of the Hong Kong Special Administrative Region to examine and steer measures under the eight areas of innovation and technology development as well as smart city projects.*

Note 17: *During the review, a questionnaire survey of over 900 ERKS users in the four B/Ds had been conducted. The survey results indicated that over 60% of respondents considered that ERKS could better protect government records. Main concerns of the users included unstable system performance during the initial stage, slow response in handling records with large file size, batch filing of multiple records not possible and limited parameters for search functions, etc.*

Note 18: *The non-recurrent expenditure covers the costs for hardware, software, cloud service, system implementation, contract staff and training. The new system is estimated to incur an annual recurrent cost of $270 million upon its complete rollout in 2025-26, covering the costs for hardware and software maintenance, cloud service and system maintenance.*

(b) implementation of ERKS pilot programme (PART 3); and

(c) archiving of electronic records (PART 4).

Audit has found room for improvement in the above areas and has made a number of recommendations to address the issues.

Acknowledgement

1.15 Audit would like to acknowledge with gratitude the full cooperation of the staff of the Innovation and Technology Bureau, Administration Wing of the Chief Secretary for Administration's Office, OGCIO, EffO, CEDB, CEDD, MD and RVD during the course of the audit review.

PART 2: PLANNING FOR THE SERVICE-WIDE IMPLEMENTATION OF ELECTRONIC RECORDKEEPING SYSTEM

2.1 This PART examines the planning for the service-wide implementation of ERKS, focusing on:

(a) submission of implementation plans by B/Ds (paras. 2.6 to 2.12); and

(b) other planning issues (paras. 2.13 to 2.26).

Preparation for the service-wide implementation of ERKS

2.2 ***Overall implementation plan.*** The service-wide implementation of ERKS in all B/Ds by end-2025 was discussed and endorsed by high-level committees within the Government in 2019. Excluding 7 B/Ds (Note 19) which have fully implemented ERKS, the service-wide implementation within the Government will cover 75 B/Ds (including the Hong Kong Housing Authority and the five trading fund departments). To achieve economies of scale on software licences, and implementation and support costs, a single ERKS software solution will be adopted to develop a central ERKS as a "common service platform" for deployment to B/Ds. The Government has planned to obtain funding approval of the Finance Committee of the Legislative Council in mid-2020. After obtaining funding approval, OGCIO will conduct a tender exercise to procure the central ERKS targeted to be ready by mid-2021 for deployment to B/Ds from mid-2021 to end-2025.

2.3 ***B/Ds' preparatory work.*** In adopting ERKS, B/Ds are required to manage a systemic change not only in learning to use the new IT system but also the work culture and practices among record users at all levels to migrate from a paper-based recordkeeping system to an electronic one. In the process, B/Ds will need to perform the following additional tasks:

Note 19: *The 7 B/Ds are EffO, GRS, DSD, the Administration Wing, IPD, OGCIO and CEDD.*

(a) reviewing and refining departmental records classification scheme (i.e. the file plan) to enhance record sharing and reduce filing duplication;

(b) defining user roles/profiles and access control for using ERKS;

(c) developing departmental records management practices and guidelines governing the use of ERKS;

(d) integrating ERKS with the departmental e-mail system and deploying ERKS client packages to B/Ds' client workstations;

(e) converting existing paper records into electronic form if necessary depending on future reference value and business needs;

(f) organising change management activities and staff training; and

(g) testing the system before live-run.

According to GRS, tasks (a) and (b) are essential steps in the preparation for the smooth operation of ERKS and should be completed before commencing the implementation of the new system. Based on the experience of the pilot ERKS programme, a small or medium-sized B/D may take about one year while a large-sized B/D may take a longer period of two to three years to complete the two tasks (Note 20).

2.4 ***Formulation of B/Ds' implementation plans.*** Taking into account the tasks in paragraph 2.3(a) to (g), all bureaux should submit to OGCIO the ERKS implementation plans of the departments under their purview by end-December 2019. The implementation plan should include a timetable for adoption of ERKS, having regard to the following principles:

(a) the implementation work from mid-2021 should best be evened out over 4.5 years up to end-2025;

Note 20: *B/Ds with not more than 500, more than 500 to 2,000 and more than 2,000 ERKS users are classified as "small-sized", "medium-sized" and "large-sized" respectively.*

(b) bureaux should implement ERKS early to set an example for the departments under their purview;

(c) B/Ds with mostly born-digital records (e.g. e-mails) should implement ERKS as early as possible to reap the benefits of ERKS;

(d) B/Ds should take into consideration the lead time required for tasks (a) and (b) mentioned in paragraph 2.3; and

(e) large-sized B/Ds should start the preparatory work as early as possible and the rollout should not be later than 2023 as the rollout may have to be conducted in batches considering the large number of users.

To ensure that adequate and timely support is provided to all B/Ds, OGCIO will review individual plans with the concerned B/Ds and adjust the timetable as necessary so that an average of around 15 B/Ds will implement ERKS each year. Based on the implementation plans, OGCIO, GRS and EffO will arrange working meetings with individual B/Ds to draw up their detailed plans including the system works required and staff training.

2.5 ***Support measures to B/Ds.*** OGCIO is working in conjunction with GRS and EffO in providing technical and administrative support to B/Ds to facilitate the service-wide implementation of ERKS. From July to December 2019, OGCIO, GRS and EffO held a number of sessions to brief B/Ds on the preparatory work required for implementing ERKS. OGCIO is responsible for the overall project management of ERKS including the formulation of implementation plan and rollout strategy. It has also been providing technical support to B/Ds on implementation arrangements. EffO has been supporting the implementation of ERKS on "change management" through providing a suite of tools (methodologies, templates and sample plans for stakeholder engagement and communication), and bringing B/Ds together for knowledge and experience sharing in the form of a community of practice. GRS has been supporting the implementation of ERKS on "records management" through providing training and guidelines on how to conduct review of records classification scheme in ERKS environment, and how to develop adequate and appropriate records management practices and procedures governing the use of ERKS in B/Ds.

Submission of implementation plans by bureaux and departments

Delay in submission of implementation plans

2.6 ***Implementation plans.*** In August 2019, the EIM Programme Management Office invited all bureaux to coordinate the ERKS implementation plans of all 75 B/Ds for submission by end-December 2019. The implementation plan of a B/D should include:

(a) contact person of the B/D;

(b) number of ERKS users;

(c) target commencement date to review records classification scheme (see para. 2.3(a)); and

(d) target number of ERKS users to be rolled out in each quarter.

2.7 ***Implementation plans from B/Ds not submitted on time.*** Audit examined the records of the EIM Programme Management Office and found that, of the 75 B/Ds, 17 (23%) had not yet submitted their implementation plans up to 6 February 2020. While OGCIO had followed up with the concerned bureaux (e.g. by issuing reminders) from November 2019 to early February 2020, the EIM Programme Management Office needs to take further actions to follow up with the 17 B/Ds on the outstanding implementation plans.

Need to review implementation plans with B/Ds

2.8 Audit examination on the implementation plans submitted by the 58 B/Ds revealed the following issues:

(a) ***Full rollout by end-2025 not achievable by one B/D.*** According to the initial timetable under the implementation plan submitted by one B/D to OGCIO, the ERKS rollout would commence in a phased approach starting from the second quarter of 2025, with the rollout to the rest of ERKS users commencing from 2026 onwards; and

(b) ***Implementation work not evenly spread out.*** Based on the implementation plans submitted by 57 B/Ds (Note 21), their commencement of implementation work would not be spread out evenly over the period from mid-2021 to end-2025. There would be a large number of B/Ds (i.e. some 80% of B/Ds) commencing ERKS implementation from 2022 to 2024 (around 16 B/Ds each year) and a small number of B/Ds commencing ERKS implementation in earlier or later periods, i.e. 2 B/Ds in mid-2021 and 10 B/Ds in 2025.

Upon receipt of the implementation plans from the remaining 17 B/Ds, the EIM Programme Management Office should: (i) review B/Ds' implementation plans to ensure that the workload is evenly spread out over the period from mid-2021 to end-2025 as far as practicable in accordance with the original implementation strategy (see para. 2.4); and (ii) liaise with and provide necessary support to those which have indicated difficulties in meeting the target of service-wide implementation of ERKS by end-2025.

Need to enhance management oversight by B/Ds to support ERKS implementation

2.9 ***Engagement of senior management of B/Ds.*** ERKS implementation requires strong commitment from the top management of B/Ds. In this connection, OGCIO disseminated information about the service-wide implementation of ERKS through the following channels:

(a) circulation of a paper to all bureaux for comments before submission to a high-level meeting within the Government in July 2019;

(b) a joint presentation by the Government Chief Information Officer and the Director of Administration on the implementation roadmap of ERKS in the Government, in the Heads of Departments' meeting in August 2019; and

---

Note 21: *One B/D reported that its ERKS would be implemented under a departmental IT system project, the funding for which was approved by the Legislative Council in May 2018. According to the concerned B/D, the contractor would design ERKS in accordance with the technical and functional requirements developed by GRS. Where appropriate, expert advice from GRS and OGCIO would be sought during the stage of system design and development.*

(c) a presentation on the implementation roadmap of ERKS in the Government in the OGCIO Stakeholders' Engagement meeting in September 2019.

2.10 ***Need to provide stronger management oversight.*** Under the EIM Strategy and Framework promulgated in OGCIO Circular No. 1/2011 (see para. 1.9), for steering and monitoring the overall implementation of EIM (including ERKS), an EIM coordinator at directorate level should be appointed in each B/D. The roles and responsibilities of the EIM coordinators include, among others, liaising with the EIM Steering Group via the EIM Programme Management Office on policy issues and matters of EIM. In this connection, Audit examined the list of 84 EIM coordinators for the 75 B/Ds under the service-wide implementation of ERKS as of December 2019 and the attendance records of two briefing sessions (Note 22) on ERKS implementation organised by the EIM Programme Management Office in July and August 2019 (see para. 2.5) and found that:

(a) of the 75 B/Ds, 10 (13%) had appointed non-directorate level staff as their sole EIM coordinators (Note 23); and

(b) 59 (70%) of the 84 EIM coordinators had not attended the briefing sessions in person.

In light of the latest pledge on the service-wide implementation of ERKS by end-2025, the EIM Programme Management Office needs to remind the B/Ds concerned to provide stronger management oversight, including appointment of directorate level staff as the EIM coordinators to ensure the smooth implementation of ERKS.

Audit recommendations

2.11 **Audit has *recommended* that the Government Chief Information Officer, the Director of Administration and the Commissioner for Efficiency should:**

Note 22: *B/Ds were advised to nominate a directorate officer responsible for departmental records management to steer the ERKS implementation and to attend the briefing.*

Note 23: *Of the 10 B/Ds, 3 had only one directorate level staff.*

(a) **take further actions to follow up with B/Ds on outstanding ERKS implementation plans;**

(b) **review B/Ds' ERKS implementation plans to ensure that the workload over the period from mid-2021 to end-2025 is evenly spread out as far as practicable, and liaise with and provide necessary support to those which have indicated difficulties in meeting the target of service-wide implementation of ERKS by end-2025; and**

(c) **remind B/Ds to provide stronger management oversight on the service-wide implementation of ERKS.**

Response from the Government

2.12 The Government Chief Information Officer, the Director of Administration and the Commissioner for Efficiency agree with the audit recommendations. The Director of Administration has said that:

(a) regarding the audit recommendation in paragraph 2.11(a), the EIM Programme Management Office:

(i) has been taking a proactive approach to assist B/Ds in drawing up their ERKS implementation plans. OGCIO, GRS and EffO have conducted a total of 17 briefings to B/Ds from July to December 2019 to provide information on different aspects ranging from introduction of ERKS, preparation work required for ERKS implementation and importance of change management, review of records classification scheme, to technical details of implementation of ERKS;

(ii) issued four reminders to relevant bureaux on 15 November 2019, 3 January 2020, 5 February 2020 and 18 March 2020 respectively for timely submission of the implementation plans; and

(iii) will further liaise with the relevant bureaux to request submission of the outstanding ERKS implementation plans by 15 April 2020;

(b) regarding the audit recommendation in paragraph 2.11(b), the EIM Programme Management Office agrees that it will be desirable for the implementation plans of ERKS to be evenly spread out over the period from mid-2021 to end-2025 as far as practicable. Upon receipt of the outstanding implementation plans, the EIM Programme Management Office will review individual plans with the concerned bureaux and adjust the timetable with a view to spreading out the implementation plan evenly as far as practicable; and

(c) regarding the audit recommendation in paragraph 2.11(c), the EIM Programme Management Office:

(i) has been taking measures to enhance senior management support on the service-wide implementation of ERKS. Apart from arranging briefings to senior management of B/Ds as mentioned in paragraph 2.9, OGCIO, GRS and EffO have also conducted briefings cum meetings on implementation of ERKS to senior/directorate officers of four B/Ds from October 2019 to January 2020;

(ii) will continue with such efforts vigilantly to ensure a stronger management oversight for service-wide implementation of ERKS; and

(iii) will also remind B/Ds to appoint an EIM coordinator at the directorate level to oversee the service-wide implementation of ERKS, and will keep EIM coordinators informed of policy issues on EIM and ERKS.

Other planning issues

2.13 In the course of examining the implementation work of ERKS, Audit identified the following planning issues which should be taken into consideration in planning the service-wide implementation of ERKS:

(a) electronic management of personnel records;

(b) remote access to confidential records;

(c) replacement of government e-mail system; and

(d) manual data input efforts in using ERKS.

Need to implement electronic management of personnel records

2.14 ***Types of records to be managed in ERKS.*** According to ERKS implementation guidelines issued by GRS (see para. 1.10(b)), ERKS will progressively replace existing paper-based recordkeeping system for managing:

(a) unstructured electronic records, such as e-mails, notes of meeting and videos (Note 24); and

(b) non-electronic records, such as letters from the public and signed contracts (Note 25),

in an integrated, consistent and secure manner. ERKS is not intended for managing structured electronic records (Note 26), such as data in business IT systems (e.g. licensing or case management systems in different B/Ds).

2.15 ***ERKS not used for managing personnel records.*** According to OGCIO, while some B/Ds have implemented IT systems for human resources management

---

Note 24: *Unstructured electronic records refer to those created in an unstructured computing environment where: (a) business processes and workflows are not well defined; (b) a user has relative autonomy over what information is created, sent and stored; and (c) accountability for recordkeeping has not been well defined.*

Note 25: *To manage non-electronic records in ERKS, relevant information of the records (e.g. subject heading, sender, recipient, date sent/date received, location of the physical records) is registered in ERKS.*

Note 26: *Structured electronic records refer to those created in a structured computing environment where: (a) business processes are typically highly structured; (b) structured tools and techniques are employed to develop systems; and (c) accountability for the design, development, and maintenance of systems (including integrity of the records generated in the system) has been assigned.*

(i.e. keeping personnel records (Note 27) which are classified as structured electronic records), a number of B/Ds do not have dedicated IT systems to manage their human resources processes and need to keep personnel records on paper files. In response to Audit's enquiry on whether B/Ds which do not have human resources management IT systems may use ERKS for managing personnel records in future, in February 2020 GRS said that:

(a) the main function of ERKS was to handle records in an unstructured computing environment, such as e-mails, minutes of meeting, letters and electronic messages. Records kept in structured computing environment, such as B/Ds' IT business systems, were outside the scope of ERKS. GRS understood that the Government was implementing the Government Human Resources Management Services (GovHRMS), which was a central IT system developed by OGCIO to handle human resources management operations and had already been rolled out to some B/Ds for pilot testing. GovHRMS could enable capturing staff data from the source, integrate and automate end-to-end human resources management activities for staff from recruitment to exit. In this connection, the personnel records should best be handled by GovHRMS under a structured computing environment in the long run;

(b) GRS anticipated that there would be practical issues should personnel records be covered in the scope of ERKS. For example, some officers were transferred from one B/D to another from time to time. At present, not all B/Ds had implemented ERKS. If an officer was transferred between B/Ds with and without ERKS implemented, the officer's personnel records would have to be printed out from ERKS as paper records for use by B/Ds without ERKS, or the personnel records in paper form would have to be scanned into the receiving B/D's ERKS. The situation would be more complicated if, in the latter case, the officer was subsequently transferred to another B/D without ERKS; and

(c) in view of (a) and (b), GRS advised B/Ds with ERKS to continue to manage their personnel records in paper files pending the full implementation of GovHRMS.

Note 27: *Personnel records in a B/D include records relating to appointments, conduct and discipline, hours of work, human resources planning, leave, occupational safety and health, promotion, staff performance and appraisal, staff relations, training and development, and personal case records.*

2.16 ***Need to consider the way forward for electronic management of personnel records.*** Upon Audit's enquiry, OGCIO in March 2020 said that GovHRMS was a shared common service provided by OGCIO for adoption by B/Ds on a voluntary basis. In Audit's view, as there is no plan of full implementation of GovHRMS in all B/Ds, the EIM Programme Management Office needs to consider the way forward for the electronic management of personnel records by B/Ds, such as promoting the wider adoption of GovHRMS.

Need to critically evaluate feasibility of remote access to confidential records

2.17 ***Remote access to confidential records not supported.*** One of the benefits of ERKS is to facilitate easy retrieval of records. It allows greater flexibility in where and when staff locate and collaborate work-related documents. Currently, ERKS supports the capturing of records at three classification levels, namely unclassified, restricted and confidential. However, remote access to records at confidential level is not supported by ERKS being used by the 11 B/Ds under the pilot programme (Note 28). In other words, a user can only retrieve confidential records in ERKS when connected to government network in government offices. This arrangement is different from the government e-mail system, which supports remote access to confidential e-mails. In response to Audit's enquiry, OGCIO in January 2020 said that:

(a) in accordance with the Government Security Regulations:

  (i) confidential information must be encrypted when transmitting over an untrusted communication network, e.g. networks that use public telecommunication lines such as wireless networks; and

  (ii) other than accessing e-mails under the approved information systems (such as the government confidential e-mail systems) stipulated in the Government Security Regulations, approval from Head of B/D must be sought for both transmission of confidential

Note 28: *Of the 11 B/Ds: (a) ERKSs in 4 B/Ds support remote access to restricted and unclassified records; (b) ERKSs in 6 B/Ds do not support remote access to all records; and (c) ERKS of the remaining department only manages unclassified records.*

information through any wireless networks and the device used for the transmission;

(b) when accessing ERKS records at confidential level, requirements set out in (a) should be observed; and

(c) OGCIO had recently been in contact with the Security Bureau to identify the necessary security control measures for supporting remote access by B/D users when necessary.

2.18 ***Need to critically evaluate feasibility of remote access to confidential records.*** Supporting remote access to ERKS records at confidential level will facilitate easy retrieval of confidential records by staff when working at locations other than in government offices with connection to government network (e.g. working from home when warranted by special circumstances — Note 29). However, all related security issues including those mentioned in paragraph 2.17 will need to be addressed. In Audit's view, the EIM Programme Management Office needs to critically evaluate the feasibility of providing remote access to confidential records for the service-wide implementation of ERKS, in consultation with the Security Bureau, having regard to the prevailing security requirements.

Need to synchronise the implementation of the Centrally Managed Messaging Platform and ERKS

2.19 ***Integration with e-mail systems.*** According to GRS guidelines, it is a mandatory requirement that ERKS must enable integration with business applications, e.g. an e-mail system to facilitate record capturing. According to the EIM Programme Management Office, upon the service-wide implementation of ERKS, it will be integrated with either: (a) the decentralised e-mail systems currently in operation; or

---

Note 29: *From 29 January 2020 to 1 March 2020 and from 23 March 2020 onwards until further notice, to reduce the risk of the spread of the novel coronavirus in the community, the Government implemented a special work arrangement whereby certain staff were not required to return to office but to work from home. This is an example of the special circumstances under which some staff might need to have remote access to confidential records for performing their work effectively and efficiently.*

(b) the Centrally Managed Messaging Platform (CMMP — Note 30), depending on which e-mail system is being used by a B/D at the time of ERKS implementation.

2.20 ***Implementation progress of CMMP.*** According to the implementation plan of CMMP as stated in the paper submitted to the Finance Committee of the Legislative Council in May 2017, CMMP would be rolled out by phases for 22 B/Ds (revised to 24 B/Ds during implementation) in the Central Government Offices and their related sub-offices from December 2018 to June 2020. According to the progress report as at 31 March 2019 submitted to the Finance Committee in October 2019, the system rollout of Phase 1 would commence in the fourth quarter of 2019 and the scheduled implementation date was revised from June 2020 to December 2020.

2.21 ***Need to synchronise the implementation of ERKS and CMMP as far as practicable.*** Given that the deployment of ERKS to B/Ds is planned to commence in mid-2021 (see para. 2.2), i.e. after the implementation of CMMP by December 2020, ERKS will be integrated with CMMP for the 24 B/Ds in the Central Government Offices and their related sub-offices. According to the EIM Programme Management Office, for the remaining departments, ERKS would be integrated with the existing decentralised e-mail systems first. Upon the rollout of CMMP, ERKS would be integrated with CMMP. As other departments could roll out CMMP starting from 2021-22, they might take into account the timeframe for CMMP implementation when drawing up the high-level implementation plans for ERKS (see para. 2.6). In response to Audit's enquiry, in January 2020, OGCIO said that the implementation plan of CMMP for the remaining departments was being planned. In Audit's view, in order to avoid duplication of efforts, it is more desirable if the implementation of ERKS and CMMP can be synchronised for the remaining departments. The EIM Programme Management Office, in implementing ERKS in the remaining B/Ds in future, should take into account the implementation plan of CMMP as far as practicable.

Note 30: *In November 2017, the Finance Committee of the Legislative Council approved a funding of $252.2 million under Head 710 of CWRF for implementing CMMP to replace the decentralised e-mail systems currently in operation in B/Ds.*

Need to explore ways to reduce manual data input efforts

2.22 ***Manual data input efforts in using ERKS.*** According to GRS, records are not captured automatically by ERKS. Subject officers should exercise discretion in deciding whether a piece of information or document should be regarded as records and captured into ERKS according to the business rules on creation and collection of records laid down by the respective B/Ds (Note 31). For e-mails, as the e-mail system is integrated with ERKS (see para. 2.19), most metadata of records (e.g. time and date, title, sender and recipients of an e-mail) can be automatically captured from the e-mail system to ERKS. For records other than e-mails, including non-electronic records, users are required to input most metadata of records into ERKS manually. Such manual data input efforts are prone to omissions and errors. Against this background, Audit considers that there are merits for the EIM Programme Management Office to take measures to reduce the extent of manual efforts required to input data into ERKS:

(a) ***Promoting the wider use of workflow functions in ERKS.*** According to GRS guidelines, workflow functions:

(i) are optional requirements of an ERKS which may be adopted at the discretion of individual B/Ds, having regard to their business needs;

(ii) automate business processes to improve efficiency in performing business tasks. If a workflow facility is implemented together with an ERKS, it will provide a very useful tool to enable users to initiate workflows to pass documents, records or tasks to other users for specific actions and to support specific business processes; and

(iii) can facilitate the automation of records management activities such as seeking approval for disposal of folders that are due for destruction, and integration of records management process with business processes, e.g. automatic capturing of records.

Note 31: *In accordance with the Administration Wing Circular Memorandum No. 4/2012, entitled "Guidelines on Creation and Collection of Records", the creation/collection of records should be adequate but not excessive. All B/Ds should develop their business rules to document decisions as to what records are to be created and kept by B/Ds. The business rules should give clear instructions to staff on: (a) what records to be created or collected; (b) who and when to create or collect records; and (c) where to keep records.*

There is a need to promote the wider use of workflow functions during the service-wide implementation of ERKS; and

(b) ***Keeping in view latest technological development in ERM.*** Upon Audit's enquiry, GRS in February 2020 said that in view of the existing records management principle that records should not be automatically created, GRS had not conducted any study on automating the process of records creation and classification, and had no plan to do so. Audit examined the reviews conducted by national archives of overseas jurisdictions with experiences in implementing ERKS (i.e. the United States and the United Kingdom) and found that:

(i) a review conducted by the National Archives of the United Kingdom concluded that the existing systems, which required individual users to identify documents that constituted official records, and then save them into ERKS had not worked well. The processes had been cumbersome (e.g. users considered it an unwanted burden to fill in a range of additional fields (i.e. the metadata) upon saving a record) and compliance had been poor (i.e. users saved records elsewhere (e.g. shared drives) rather than ERKS); and

(ii) the National Archives and Records Administration of the United States considered that asking individuals for taking responsibilities for identifying public records and saving them into an ERKS was proven to have failed. Hence, it was pursuing various automated solutions such as rule-based automation (Note 32) and auto-categorisation of records (Note 33).

Note 32: *Rule-based automation refers to the use of automated business rules that act on metadata, user roles, or another feature of records for identifying and capturing records falling under different categories. For example, a rule can be set in the system to capture all e-mails received or sent by a specific e-mail account containing certain key words automatically.*

Note 33: *With auto-categorisation of records, computer analysis of record content links the records to appropriate file categories. An expert trains the system to recognise records that fit in each retention category based on categorisation of a training set and iterative reviews of additional machine-coded documents. The algorithm learns to recognise patterns that are common to records that have already been categorised in a particular series with increasing accuracy as the expert trains it.*

In Audit's view, there is a need to keep in view the latest technological development in ERM with a view to reducing manual data input efforts in using ERKS.

Audit recommendations

2.23 **Audit has *recommended* that the Government Chief Information Officer, the Director of Administration and the Commissioner for Efficiency should:**

(a) **consider the way forward for the electronic management of personnel records by B/Ds, such as promoting the wider adoption of GovHRMS;**

(b) **in consultation with the Security Bureau, critically evaluate the feasibility of providing remote access to confidential records in ERKS;**

(c) **in implementing ERKS in the remaining B/Ds in future, take into account the implementation plan of CMMP as far as practicable; and**

(d) **take measures to reduce the extent of manual data input efforts required to capture records into ERKS, including:**

(i) **promoting the wider use of workflow functions in ERKS during the service-wide implementation of ERKS; and**

(ii) **keeping in view the latest technological development in ERM.**

Response from the Government

2.24 The Government Chief Information Officer agrees with the audit recommendations. As regards the audit recommendation in paragraph 2.23(b), he has said that OGCIO has started discussion with the Security Bureau on the security design of ERKS including introducing necessary security measures in providing remote access to confidential records.

2.25 The Director of Administration agrees with the audit recommendations. She has said that:

(a) regarding the audit recommendation in paragraph 2.23(a):

(i) GRS will draw up specific guidelines on electronic management of personnel records for B/Ds to follow; and

(ii) OGCIO, in collaboration with GRS and EffO, will step up efforts to promote wider adoption of GovHRMS;

(b) regarding the audit recommendations in paragraph 2.23(b) and (c):

(i) GRS has updated the standards and requirements of ERKS for management of confidential records in ERKS in 2016; and

(ii) OGCIO has been working closely with the Security Bureau during the development of CMMP and the ERKS base system to ensure that the operations of both CMMP and ERKS can address all the security concerns. OGCIO will also work in conjunction with GRS and EffO to evaluate the feasibility of providing remote access to confidential records in ERKS for all B/Ds;

(c) regarding the audit recommendation in paragraph 2.23(d)(i):

(i) in order to minimise manual data input efforts in using ERKS, ERKS possesses functionalities to automate the capturing of metadata of records from the e-mail system to ERKS. Some ERKSs of B/Ds under the ERKS pilot programme possess functionalities to automate capturing of metadata of records from scanned records or other born-digital records;

(ii) the central ERKS to be implemented on a government-wide basis will possess functionalities to automate capturing of metadata of records from e-mail system, scanned records and other born-digital records. To further enhance automation, the central ERKS will be equipped with a workflow facility for records management activities

for B/Ds' use, which will also be able to capture most metadata of the records in the workflow automatically; and

(iii) in fact, OGCIO, GRS and EffO have been promoting the wider use of e-mails for official communications and workflow functions in ERKS during briefings to B/Ds, and will continue to promote such practice in future briefings to B/Ds and in ERKS guidelines; and

(d) regarding the audit recommendation in paragraph 2.23(d)(ii), the EIM Programme Management Office will continue to keep in view the latest technological developments in ERM with a view to exploring and building in suitable measures to minimise the extent of manual data input efforts during records capture process in the central ERKS as far as possible.

2.26 The Commissioner for Efficiency agrees with the audit recommendations in paragraph 2.23(a) and 2.23(d)(i).

PART 3: IMPLEMENTATION OF ELECTRONIC RECORDKEEPING SYSTEM PILOT PROGRAMME

3.1 This PART examines the implementation of ERKS pilot programme, focusing on:

(a) system development (paras. 3.2 to 3.36);

(b) system operation (paras. 3.37 to 3.42); and

(c) migration to central ERKS (paras. 3.43 to 3.47).

System development

ERKS pilot programme

3.2 ***Five early adopters.*** In addition to EffO which implemented an ERKS as part of a comprehensive EIM system in 2010, following the promulgation of the EIM Strategy and Framework in 2011 (see para. 1.9), four B/Ds, namely GRS, CCIB of CEDB, DSD and RVD, commenced the implementation of their respective ERKSs from 2011 to 2013. The five early adopters arranged their own procurement and implementation of commercial off-the-shelf ERKS software packages, with certain customisation work. In October 2014, the implementation of these pioneer projects was discussed in an E-Government Steering Committee meeting. The Committee was informed that some issues (Note 34) had led to high one-off and recurrent costs, and

---

Note 34: *They included: (a) industry-wide issues of insufficient experienced systems integrators, and uncertainty about the Government's plan for wider implementation and project acceptance standards; (b) confirmation of specifications for confidential registry and commercial off-the-shelf packages for wider rollout; (c) readiness within government agencies to manage the projects and associated changes, particularly benefits realisation; and (d) inconsistency in the business processes and practices in electronic recordkeeping.*

often long implementation timeframes (Note 35), and should be considered in the next stage development.

3.3 ***Need to extend the pilot programme.*** In October 2014, the E-Government Steering Committee noted that:

(a) GRS and OGCIO had assessed the availability of mature ERKS software products in the market. After examining the functionalities and reviewing the demonstrations conducted by respective software providers, only a few software products appeared to satisfy the ERKS functional and metadata requirements stipulated by GRS;

(b) EffO, GRS and OGCIO jointly conducted a review to identify the best practices for implementing electronic recordkeeping. However, the size of the pioneering B/Ds was relatively small and the recordkeeping workflow and organisation structure were not representative;

(c) at the next stage, implementing ERKS in a few larger departments with more complex records management requirements was advisable, rather than proceeding directly to full-scale rollout, because it would:

(i) ensure that the Government could have a full understanding of implementation issues affecting larger and more complex B/Ds, including the change management and human resources management implications;

(ii) provide a better test of the financial and operational benefits upon which the business case for implementing ERKS would be based;

(iii) help build up the capabilities of local industry to support the full-scale implementation of ERKS; and

(iv) provide an opportunity to test out shared procurement, through which an ERKS package for two or three departments would be obtained through one tender, to see if costs would be reduced through economies of scale; and

---

Note 35: *The one-off costs ranged from $5.9 to $9.9 million, the annual recurrent costs ranged from $1.1 to $2 million, and the implementation timeframe ranged from 6 to 21 months.*

(d) the GovCloud platform would be able to host departmental ERKSs. It was expected that adopting the common infrastructure service approach, instead of having individual B/Ds implement and install their own ERKSs, would likely result in savings in terms of costs and time and would also minimise risk.

The E-Government Steering Committee thus endorsed the proposal of implementing ERKS for a maximum of six B/Ds (Note 36) as the next stage development. OGCIO would centrally arrange for the provision of hardware for hosting, and for the procurement of software and configuration services.

3.4 ***Six next-stage adopters.*** The extended pilot programme involved implementing ERKS by way of a common/shared service platform managed by OGCIO in another six B/Ds (viz. the Administration Wing, CEDD, IPD, ArchSD, MD and OGCIO). For the Administration Wing, its ERKS was implemented on a shared infrastructure with GRS (see para. 1.11(b)). Three ERKS base systems were built as common services for deployment to the remaining five participating B/Ds (see para. 3.5). The required products and services for the implementation of ERKS in the Administration Wing were acquired via Standing Offer Agreements (Note 37) and direct purchase, while those for the remaining five B/Ds were acquired via an open tender exercise (see para. 3.6). The non-recurrent cost of about $132 million for the extended pilot programme was funded by pooling resources from a number of project votes of OGCIO and the participating B/Ds under CWRF Head 710 (Note 38).

Note 36: *Participating B/Ds would be selected based on their readiness, interest and whether they provided a good sampling of the range of issues and opportunities that would be encountered across the whole of government for the purpose of measuring benefits arising from implementation of ERKS.*

Note 37: *OGCIO and Government Logistics Department arranged and managed Standing Offer Agreements for the procurement of IT products and services by B/Ds, e.g. supply of network products and server systems and provision of related services, and provision of IT professional services.*

Note 38: *OGCIO obtained funding for two projects concerning the implementation for the three base systems while the participating B/Ds obtained funding for the deployment services. The project vote of GovCloud (funding approved by the Finance Committee of the Legislative Council in 2012) covered the hardware and hosting as well as the software licence costs.*

3.5 ***Implementation strategy of next stage development.*** For the next stage development of ERKS pilot programme, the five B/Ds were grouped under three projects, namely Projects 1 to 3 (Note 39), and one contract was awarded for each project. Under each contract, the contractor would provide the total solution and services for the implementation of ERKS by making use of one commercial off-the-shelf ERKS software package with necessary configuration and customisation. The contract covered the provision of implementation, on-going support and maintenance services, and supply of necessary software and hardware.

3.6 ***Tender exercise in 2015.*** A tender was issued by OGCIO in mid-2015 for procuring the ERKS services. By close of tender in July 2015, 14 offers from 9 tenderers were received. After evaluation, 8 offers were found conforming. In November 2015, three contracts were awarded, respectively, to: (a) Contractor A at a total cost of $40.8 million for implementing the ERKS base system and system deployment (see para. 3.7) for OGCIO and IPD; (b) Contractor B at a total cost of $36.3 million for implementing the ERKS base system and system deployment for ArchSD and MD; and (c) Contractor C at a total cost of $33 million for implementing the ERKS base system and system deployment for CEDD.

3.7 ***Two-stage implementation.*** ERKS implementation has been divided into two stages under each contract: (a) base system implementation (Note 40); and (b) deployment to B/Ds with configuration to suit their operational needs (hereinafter referred to as system deployment — Note 41). OGCIO is responsible for administering the contracts, implementing the base system and supporting the base system during its deployment to B/Ds. OGCIO, as project owner of base system implementation and with the aim of ensuring quality and timeliness in conducting the project, is responsible for carrying out the user acceptance test of the base system prior to deployment to B/Ds. Other B/Ds, as project owners of system deployment,

---

Note 39: *Project 1 covered OGCIO and IPD; Project 2 covered ArchSD and MD; and Project 3 covered CEDD.*

Note 40: *The base system implementation included developing functions such as records classification and identification, capturing of records, security and access control, retention and disposal, and generation of management reports according to GRS's standards and requirements.*

Note 41: *System deployment included configuration of departmental records classification scheme, records disposal and retention schedules, user access rights setting, and integration with the e-mail system.*

are responsible for collecting the requirements for the system to be deployed to them so as to meet their own operational needs, conducting user acceptance test by checking the configuration and testing the ERKS, and setting up hardware and software for system rollout.

3.8 ***Project organisations and governance structure.*** According to the Programme Management Plan for the pilot programme for next stage development of ERKS, the EIM Steering Group was the Programme Owner. Project organisations, i.e. a Programme Steering Committee (Note 42) and a Programme Management Office, were set up for the governance of the projects of implementation of the three base systems. B/Ds would set up their own project governance structures, including a project steering committee (PSC) to steer the project, for the implementation of ERKS in the B/Ds.

3.9 ***Project monitoring.*** All ERKS projects should follow the project governance mechanism for government IT projects stipulated in OGCIO Circular No. 2/2011. B/Ds are required to submit status updates on the projects to OGCIO on a quarterly basis (i.e. through the submission of Quarterly Project Progress Review Forms). In addition, according to OGCIO Circular No. 3/2007, B/Ds are required to submit Post Implementation Departmental Returns (PIDRs — Note 43) six months after the projects are in operation.

Delay in ERKS implementation

3.10 According to the quarterly updates and/or PIDRs (see para. 3.9) submitted to OGCIO by the 11 B/Ds, there were delays in 8 out of the 11 projects under the

---

Note 42: *The Programme Steering Committee was chaired by the Deputy Government Chief Information Officer, with members from the six participating B/Ds as business representatives and members from OGCIO, GRS and EffO as technical representatives.*

Note 43: *The purpose of PIDR is to evaluate the achievement of the projects to ensure that the Government's investment in the projects has attained the intended objectives in a timely and cost-effective way. After examining the PIDR results (such as whether there has been a substantial deviation from the planned achievements), OGCIO will determine whether to initiate Post Implementation Reviews to look into the causes of deviation and identify necessary improvement, taking into account the recommendations of the pertinent B/Ds.*

ERKS pilot programme (see Table 1). Among the five early adopters, CCIB of CEDB recorded the longest delay (18 months). According to its PIDR, the delay was mainly due to longer time taken for resolving technical problems. Audit noted that technical problems continued to emerge after system rollout and hence CCIB of CEDB was unable to dispense with the print-and-file practice (see para. 3.25(a)(i)). Upon Audit's enquiry, CCIB of CEDB in March 2020 said that:

(a) back in 2012, choices of ERKS products in the market were limited given the need to comply with GRS requirements;

(b) the original ERKS implementation plan was unrealistic because unexpected technical and operational issues had entailed substantial time and efforts to ensure smooth delivery of the critical mission of proper record retention and retrieval. There was also substantial rectification work during the system live-run stage before project completion; and

(c) hence, the time spent was unavoidable and should not be considered as a delay.

Regarding the ERKS pilot projects under the next stage development, as of December 2019, implementation had been completed except the one for MD, which was anticipated to be completed in June 2021. Audit selected the MD's ERKS implementation (under Project 2 — see Note 39 to para. 3.5) for review and found areas for improvement as elaborated in paragraphs 3.11 to 3.17.

Table 1

Delays in system live-run of projects under the ERKS pilot programme (December 2019)

B/D	Number of users as at live-run date	System live-run date (Note 1)		Delay (Month)
		Planned	Actual	
Five early adopters:				
EffO	100	Jan 2010	Jun 2010	5
GRS	145	Dec 2013	May 2014	5
CCIB of CEDB	70	Dec 2012	Jun 2014	18
RVD	100	Nov 2014	Nov 2014	—
DSD (Note 2)	240	May 2015	Apr 2016	11
Six next-stage adopters:				
IPD	200	Apr 2016	Jul 2016	3
OGCIO	1,000	Mar 2016	Aug 2016	5
Administration Wing	200	Dec 2016	Dec 2016	—
CEDD	1,500	Jun 2018	May 2018	—
ArchSD (Note 3)	200	Jul 2017	Sep 2019	26
MD (Note 3)	750	Jan 2020 (Jun 2021 — Note 4)	Not yet completed	17 (Note 4)

Source: *Audit analysis of OGCIO records*

Note 1: *For ERKS implemented in phases, the system live-run date of the last phase of implementation was used to measure project delays.*

Table 1
(Cont'd)

Note 2: *According to DSD, in addition to ERKS, the project scope covered implementation of another EIM system, namely collaborative workspace system. The system mainly involves electronic workflow to support better management of selected business processes such as easier management of tasks involving various personnel, better enforcement of following pre-defined procedures, easier monitoring of task status, bring-up reminders for tasks nearly due and reducing waiting time on delivering hard copy documents. Seizing this opportunity to streamline business processes, a longer time than planned had been taken to conduct business process re-engineering.*

Note 3: *ArchSD's ERKS only included one branch. ERKSs of MD and ArchSD were implemented under the same contract sharing a common base system under Project 2.*

Note 4: *As of December 2019, the original target system live-run date had been extended by 17 months from January 2020 to June 2021.*

3.11 ***Implementation of ERKS common base system for MD and ArchSD (hereinafter referred to as the common base system).*** According to the Project Highlight Report (Note 44) of the common base system, base system for MD was planned to be ready for deployment to MD in May 2016. In view of the delay in implementing the common base system (see paras. 3.12 to 3.14), in June 2017, OGCIO approved Contractor B's proposal of dividing the common base system functions into core functions and remaining functions (Note 45). According to MD, in September 2017, the common base system was deployed to MD for testing when the core functions of the system were ready. According to OGCIO, the whole common base system was completed in August 2019 when all the core and remaining functions were ready for use. As compared with the planned completion date of May 2016, there was a delay of 39 months. Table 2 shows the delays in key milestones:

Note 44: *It documents the project status, progress of key activities and milestones of the project, and other issues such as project changes.*

Note 45: *Core functions include functions on: (a) record capturing; (b) use of records; and (c) records management. Remaining functions include functions to: (a) assign records disposal schedule to aggregation; (b) prepare consignment with types of disposal action; and (c) create reports relating to records disposal and retention.*

Table 2

Delay in key milestones of Project 2 ERKS common base system (30 October 2019)

Stage	Description	Completion date		Delay (Month)
		Planned (Note)	Actual	
1	Project initiation	Feb 2016	Feb 2016	—
2	System analysis and design	Mar 2016	Sep 2016	6
3	Delivery, installation test and setup of hardware and software for the base system	Apr 2016	Dec 2017	20
4	Implementation of the base system	May 2016	Feb 2017	9
5	Security risk assessment and audit, privacy impact assessment for the base system	Jun 2016	Dec 2017	18
6	Acceptance test for the base system	Jun 2016	Sep 2019	39
7	Review of the functionality of the base system	Aug 2016	Sep 2018	25
8	Support of the base system during deployment and nursing	Apr 2020	Not yet completed	—
9	Project closure	Apr 2020	Not yet completed	—

Source: *OGCIO records*

Note: *According to contract provision, the planned completion date was specified in the Project Initiation Document approved by OGCIO.*

Remarks: *The delay in the implementation of the common base system had a knock-on effect on the subsequent batches of rollout and the overall ERKS implementation completion date was extended by 17 months from January 2020 to June 2021 (see Table 1 in para. 3.10).*

3.12 ***Implementation of system deployment for MD.*** MD's system deployment comprises 4 batches (Note 46). As of February 2020, only Batch 1 had been implemented. As compared with the target completion date of January 2018, Batch 1 system deployment was only completed in August 2019 with a delay of 19 months. Table 3 shows the delay in key milestones of system deployment for MD's ERKS (Batch 1).

Table 3

Delay in key milestones of system deployment for MD's ERKS (Batch 1)
(30 October 2019)

Key milestones	Completion date		Delay (Month)
	Planned (Note 1)	Actual	
Project initiation	Mar 2017	Apr 2017	1
Collection of configuration requirements	May 2017	Jul 2017	2
System deployment and client installation	Aug 2017	Sep 2017	1
User acceptance test and training	Dec 2017	Jun 2019 (Note 2)	18
System live-run (for Batch 1)	Jan 2018	Aug 2019	19

Source: *OGCIO and MD records*

Note 1: *According to contract provision, the planned completion date was specified in the Project Initiation Document approved by MD Project Steering Committee (see para. 3.17).*

Note 2: *According to MD, the testing of core functions was completed in September 2018 while that of the remaining functions was completed in June 2019.*

Note 46: *According to MD, its ERKS implementation adopts an incremental approach with users grouped into four batches (involving different user sections/units) for implementation. Batches 1 to 4 of system deployment involve the development of records classification scheme for user sections/units, deployment and setup of hardware and software, conduct of user acceptance test and training, etc.*

3.13 ***Main reasons for the delays.*** Audit examination revealed that the delays in implementing the common base system and Batch 1 system deployment were mainly attributable to the unsatisfactory performance of Contractor B:

(a) ***Common base system.*** There was a serious delay in key milestones on system design and development. According to OGCIO, it had closely monitored Contractor B's progress in developing the system and rectifying identified issues. From September 2016 to June 2017, OGCIO issued seven warning letters to Contractor B on its unsatisfactory performance, including:

(i) severe schedule slippage and loose management of its performance of the Contract;

(ii) inadequate staff resources; and

(iii) failure to submit a rectification plan on staff resources to demonstrate its commitment to complete the project on time.

In order to speed up the progress, in June 2017, OGCIO approved Contractor B's proposal of dividing the common base system functions into core functions and remaining functions, with priority accorded to delivery of core functions such that the implementation of MD's system deployment would not be seriously affected. In the light of the substantial delay, OGCIO had adopted/explored various measures including issuing warning letters to Contractor B and terminating the contract (Note 47); and

---

Note 47: *The Government has the right to terminate the Contract if the Contractor: (a) persistently failed to carry out the whole or any part of the services punctually or in accordance with the terms and conditions of the Contract; or (b) fails to successfully complete any activity in accordance with the terms and conditions of the Contract for more than eight weeks after the date specified in the implementation plan by which that activity should have been completed. After seeking legal advice and taking into consideration that the Contractor had not abandoned the project, OGCIO considered that the decision to terminate the Contract should not be taken lightly as there was a need to consider the consequences of termination and the costs and time of re-tendering for a contractor to implement ERKS.*

(b) ***System deployment to MD.*** According to MD, a premature base system was deployed to MD for testing resulting in substantial number of errors identified in the user acceptance test. The large number of errors took a long time to fix:

(i) ***A substantial number of errors found.*** When errors were found in the testing of the common base system and system deployment, they were recorded in the test incidents reports (TIRs) for subsequent rectification by Contractor B as a quality assurance. According to MD, when the common base system was deployed to MD in September 2017, there were 475 TIRs. Contractor B was required to fix the errors before the ERKS for MD could be rolled out to Batch 1 users. For the user acceptance test and training stage of Batch 1 of system deployment from September 2017 to October 2019, there were a total of 765 TIRs identified by MD (Note 48) when carrying out user acceptance test on the core and remaining functions. As of October 2019, among the 765 TIRs, 604 (79%) had been closed, 125 (16%) were still outstanding, and 36 (5%) had been withdrawn/clarified without further action taken. According to MD, of the 765 TIRs, 554 (72%) were related to the functions of the common base system;

(ii) ***Long time taken in fixing errors identified in critical TIRs.*** To expedite the rectification of TIRs, MD and Contractor B agreed to tackle critical TIRs (i.e. urgent and high-priority cases) first. Audit analysed the 604 closed TIRs and found that 480 (79%) TIRs were classified as urgent/high priority. For these 479 TIRs (111 (urgent) + 368 (high priority) (Note 49)), it took Contractor B 92.4 days (ranging from 0.6 to 518.5 days), on average, to fix the errors identified in the TIRs (see Table 4); and

---

Note 48: *According to MD, during the period, there were about 300 TIRs identified by ArchSD and about 910 TIRs identified by OGCIO.*

Note 49: *Only 368 instead of 369 high-priority TIRs were analysed because the error reporting date of the remaining TIR could not be found.*

Table 4

Time taken for Contractor B to fix errors identified in 479 urgent/high-priority TIRs (September 2017 to October 2019)

TIR		Time taken		
Classification	Number	Average	Maximum	Minimum
		(Day)		
Urgent	111	110.5	391.8	0.6
High priority	368	87.0	518.5	0.7

Source: *Audit analysis of MD records*

(iii) ***High re-test failure rate.*** Out of the 765 TIRs, 246 (32%) failed the required testing one or more times, ranging from 1 to 14 times. According to MD, when errors identified in TIRs were reported fixed by Contractor B, OGCIO would test and verify that the errors had been fixed before passing to MD. On many occasions, MD found that errors identified in TIRs had not been entirely fixed and had to return to Contractor B for follow-up. MD considered that Contractor B's inability to rectify the system errors resulted in extra efforts by MD to test and verify the re-test TIRs again.

As of February 2020, the total number of outstanding TIRs for the common base system was 191, comprising 7 urgent/high-priority cases and 184 normal/low-priority cases. The total number of outstanding TIRs for MD's system deployment was 78, comprising 2 urgent/high-priority cases and 76 normal/low-priority cases.

3.14 In March 2020, MD and OGCIO informed Audit that:

MD

(a) regarding the division of base system functions of the common base system into core and remaining functions (see para. 3.13(a)), there was a risk in splitting the functions which had resulted in 4.5 months delay due to the

additional time required to fix all the bugs when merging these two integral parts of the base system. In October 2017, shortly after ERKS was deployed to MD, MD had sent an e-mail to OGCIO, expressing grave concern about the system performance in view of the large number of bugs identified in the user acceptance test. MD considered that a premature system was deployed to MD (see para. 3.13(b));

(b) regarding the rectification of errors recorded in TIRs (see para. 3.13(b)):

(i) MD had spent extra efforts in conducting additional and frequent meetings with Contractor B to ensure that it fully understood the system errors;

(ii) repeated e-mails were sent to the Contractor urging it to expedite the error-fixing process; and

(iii) since the Contractor failed to maintain effective communication with its sub-contractors and conduct quality check, the process of bug fixing was slow;

OGCIO

(c) the division of base system functions of the common base system into core and remaining functions aimed at mitigating the delay in implementing the common base system. As compared with the delay of the common base system of 39 months, the delay in the system live-run (for Batch 1) was 19 months; and

(d) after receiving the system error reports from MD, OGCIO had taken prompt actions to follow up with Contractor B, with priority accorded to urgent/high-priority cases. It would endeavour to fix the errors recorded in the outstanding TIRs as soon as possible.

Need to seek legal advice about imposing liquidated damages

3.15 According to OGCIO, when there was a slippage of project schedule in 2016, it had considered different options including imposing liquidated damages and termination of contract. However, according to the contract provision, liquidated

damages can only be imposed if the Contractor fails to supply and deliver the System in Ready for Use condition (i.e. put into live-run) by the completion date, which was the completion date of rollout of all four batches in MD scheduled for January 2020 at that time. In the warning letters of 30 November and 13 December 2016 issued to Contractor B (see para. 3.13(a)), OGCIO said that it reserved the rights to impose liquidated damages (Note 50) and terminate the Contract if there was no improvement in its performance. In consideration of the project slippage, two Project Issue Reports were prepared by Contractor B to record project issues and resolutions, and to re-baseline project schedule. OGCIO noted that Contractor B had strengthened the project governance and injected additional resources to the project since December 2016 and made significant progress in the development work while the restructured development team still needed to catch up the previous slippage. However, there were still a number of outstanding issues. The project schedule was further revised in 2019 and the extension of the target completion date of the whole system to June 2021 was endorsed without imposing liquidated damages on Contractor B before re-baselining the project schedule. In this connection, while having sought the Department of Justice's advice on the termination of contract and the consequence of accepting a revised implementation plan, OGCIO (as the contract administrator) did not seek specific legal advice about imposing liquidated damages ($2 million — Note 51) before approving the extension of completion date, despite the unsatisfactory performance of Contractor B (see para. 3.13). To better protect Government's interest, Audit considers that OGCIO should have sought the Department of Justice's advice on whether liquidated damages should be imposed on granting the extension of completion date.

Note 50: *According to the provisions of the Contract, the Contractor shall supply and deliver to the Government the System in Ready for Use condition on or before the completion date. If the Contractor fails to do so, the Contractor shall pay to the Government as and by way of liquidated damages for the losses and damage sustained by the Government resulting from delay during the period from that completion date to the actual date on which the Contractor provides the System Ready for Use the sum of zero point fifteen (0.15) percent of the total implementation price for each day or part of the day of such delay, subject to a ceiling of fifteen (15) percent of the total implementation price.*

Note 51: *The amount of liquidated damages that could have been imposed is $2 million, which is capped at 15% of the total estimated contract value that could have been imposed less cost of system maintenance ($13.6 million). The maximum liquidated damages covers the loss arising from the delay of 100 days.*

Inadequacies in monitoring project progress

3.16 ***Monitoring by OGCIO.*** OGCIO has set up a two-tier project governance structure comprising a PSC and a Project Team to oversee the common base system development of MD and ArchSD (see Figure 1). Audit examination revealed inadequacies in OGCIO's project monitoring:

(a) only two OGCIO PSC meetings (in December 2015 and June 2016) had been held. From July 2016 to August 2019, although the Project Team actively monitored the performance of Contractor B, no PSC meetings had been conducted to provide timely strategic guidance on project implementation issues including the termination of contract or imposition of liquidated damages; and

(b) no project management plan had been submitted to PSC from September 2016 to August 2019.

Figure 1

OGCIO's two-tier project governance structure

PSC (Note 1)
To oversee and provide strategic direction to the implementation of a project and review project performance

OGCIO Project Team (Note 2)
To provide oversight and input to project management aspects and report to PSC about the progress and any problems that arise during the project

Source: *OGCIO records*

Note 1: *PSC was chaired by the Chief Systems Manager with representatives from GRS and the Project Management Office as members.*

Note 2: *OGCIO Project Team comprised relevant officers from OGCIO and representatives of the Contractor.*

3.17 ***Monitoring by MD.*** MD Information Technology Steering Committee (ITSC — Note 52) oversees the departmental IT strategy and implementation. In accordance with the guidelines of OGCIO (see para. 3.9), MD adopted a three-tier project governance structure comprising: (a) a PSC; (b) a Project Assurance Team (PAT); and (c) a Project Team to oversee the implementation of system deployment of the ERKS Project (see Figure 2). In April 2017, PSC approved a Project Initiation Document (PID) (Note 53) for monitoring and control of the ERKS project. PID sets out the control mechanism, such as checkpoint meetings, project progress reports and project issues for special attention. Audit examination revealed inadequacies in MD's project monitoring, as follows:

(a) ***Regular PSC and PAT meetings not conducted.*** The key roles of PSC and PAT are to oversee and provide guidance and strategic direction to the implementation of the project and to ensure project delivery (see Figure 2). However, Audit noted that, up to March 2020, since the commencement of the project by MD in January 2017, PSC and PAT had only held one meeting (Note 54 and Note 55) in August 2019 for endorsing the revised rollout date of Batch 1 system deployment. According to MD: (i) given the potential serious implications, steer on the revised implementation schedules for the project was sought on a number of occasions from MD ITSC, which was a high level committee overseeing all IT strategy and

---

Note 52: *The Deputy Director (Special Duties) of MD was both the Project Owner of the MD's system deployment and the chairperson of MD ITSC.*

Note 53: *MD's PID described the approach for managing the Project of MD for the implementation of ERKS with the aim of ensuring quality and timeliness in conducting the Project.*

Note 54: *At its first meeting held in August 2019, PSC of MD approved the extension of target completion date for system live-run of Batch 1 of MD's system deployment by 17 months from January 2018 to June 2019. The delay in completion of the common base system had also a knock-on effect on the planned completion date of the overall MD ERKS implementation, which was approved by PSC to be extended by 17 months from January 2020 to June 2021.*

Note 55: *PAT held only one meeting in the project period, which was on the same day of the PSC meeting, to recommend the system rollout date for Batch 1 and revise project schedule laid down in PID. According to MD: (a) the implementation progress of ERKS was reported at half-yearly intervals at the MD ITSC which is chaired by the Deputy Director (Special Duties) with divisional representatives at directorate rank as members; and (b) endorsement and steer had been sought from PSC by circulation since January 2017 (this included endorsement for PID and project progress updates through e-mails).*

implementation in MD; and (ii) due to the on-going problems of system deployment to MD, frequent meetings (including checkpoint meetings and ad hoc meetings) had been held by MD with Contractor B and OGCIO to sort out the problems identified as a matter of urgency, without waiting for the next PSC/PAT meeting; and

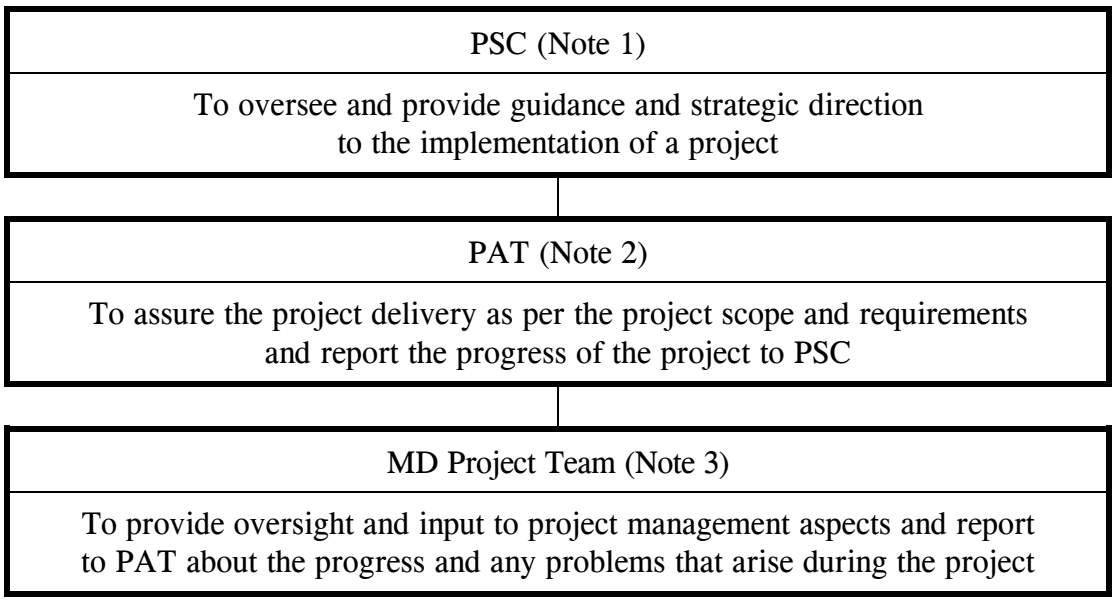
(b) ***Project Progress Reports not timely prepared for management review.*** According to PID, Contractor B was required to submit Project Progress Reports, on a monthly basis, stating the project progress and major issues encountered commencing from March 2017. The Project Progress Reports would be distributed to PSC and PAT members for information. However, Audit found that MD had only requested Contractor B to submit Project Progress Reports since September 2018. Since December 2019, Project Progress Reports had been distributed to members of PSC and PAT (Note 56). In this connection, in January 2020, MD informed Audit that the progress of the ERKS Project was reported by Contractor B at monthly checkpoint meetings and the notes of meetings served as a record of the progress.

In Audit's view, OGCIO needs to closely monitor the project progress to ensure that ERKS for MD can be completed by the revised completion date of June 2021. In view of the substantial delay in the common base system, OGCIO needs to draw lessons to improve the monitoring of contractors in the service-wide implementation of ERKS. Audit also considers that MD needs to strengthen the monitoring of Contractor B's performance by holding regular PSC and PAT meetings and requiring Contractor B to timely submit Project Progress Reports in accordance with the requirements in PID.

Note 56: *6 out of 16 PAT members were members of the Project Team who would be distributed the Project Progress Reports. In addition, the chairperson of PAT participated in the monthly checkpoint meetings.*

Figure 2

MD's ERKS project governance structure



Source: *MD records*

Note 1: *PSC was chaired by the Departmental Secretary of MD with representatives from the Information Technology Management Section, Administration Section, and various Divisions as members.*

Note 2: *PAT was chaired by the Senior Information Technology Manager with representatives from the Information Technology Management Section, Administration Section, and various Divisions as members.*

Note 3: *MD Project Team comprised the Information Technology Manager (MD Project Manager) and representatives from the Information Technology Management Section and Administration Section as members.*

Remarks: *MD ITSC is tasked to review the departmental IT strategy, and explore and steer joined-up Government IT initiatives and coordinate the integration with other Government IT systems.*

Inadequacies in preparing and submitting PIDRs

3.18 ***Delays in submission of PIDRs.*** The ERKS pilot programme involved 13 projects (including one project for 11 B/Ds each plus two projects for base systems — see Note 38 to para. 3.4) funded under CWRF Head 710. As of January 2020, PIDRs of 10 completed projects were due for submission. Of the 10 PIDRs, despite the issue of monthly reminders by OGCIO, 8 were submitted late or still outstanding (see Table 5).

Table 5

Delays in submission of PIDRs
(January 2020)

Project	Date of system live-run stated in PIDR (a)	Date of submission of PIDR (b)	Time lapse (c) = (b) − (a) (Month)	Delay (Note 1) (d) = (c) − 7 months (Month)
EffO	1 Jun 2010	11 Oct 2011	16	9 (Note 2)
GRS	13 May 2014	30 Dec 2014	7	—
CCIB of CEDB	23 Jun 2014	25 May 2017	35	23 (Note 3)
RVD	28 Nov 2014	26 May 2015	6	—
DSD	25 Apr 2016	20 Feb 2017	10	3
IPD	20 Jul 2016	27 Mar 2017	8	1
OGCIO	31 Aug 2016	17 Oct 2017	14	7
Administration Wing	30 Dec 2016	1 Oct 2017	9	2 (Note 4)
Base systems for Projects 1 and 3	14 May 2018	Not yet	20	13
CEDD	31 May 2018	16 Jul 2019	13	6

Source: *Audit analysis of OGCIO records*

Note 1: *According to the PIDR template, the timeframe of submission is within seven months after the system live-run date. This is slightly different from the requirement stipulated in OGCIO Circular No. 3/2007, i.e. to submit a PIDR six months after the project is in operation (see para. 3.9).*

Note 2: *According to EffO, after system live-run, the system was further enhanced and hence the submission of PIDR was withheld until the successful completion of the enhancement.*

Note 3: *According to CEDB, with the agreement of OGCIO, the deadline of submission was extended by 5 months to June 2015. Due to continuous emergence of technical problems after system rollout, the submission of PIDR was withheld until the smooth completion of all rectification work in March 2017.*

Note 4: *According to the Administration Wing, its ERKS was rolled out to Phase 1 users on 30 December 2016 and other users on 17 March 2017. In the event, PIDR was completed in October 2017, i.e. which was within seven months after the system live-run.*

3.19 ***Savings in paper/printing costs not properly reported in PIDRs.*** Audit found that all B/Ds reported in PIDRs that savings in paper/printing costs had been or would be realised. However, as the time needed to dispense with the print-and-file practice varied (see para. 3.23), some B/Ds had not yet dispensed with the print-and-file practice at the time of submitting PIDRs (see Table 5 in para. 3.18). In Audit's view, the benefits of ERKS in reducing their paper/printing costs can only be realisable and measureable in longer term after dispensing with the print-and-file practice. For the service-wide implementation of ERKS, there is a need to set up a mechanism to measure B/Ds' savings in paper/printing costs upon the cessation of the print-and-file practice.

Areas for improvement in dispensing with print-and-file practice

3.20 ***Compliance assessment.*** As stipulated in General Circular No. 2/2009, B/Ds should adopt print-and-file practice to retain e-mail records in their departmental recordkeeping system unless otherwise agreed by GRS. According to GRS guidelines, B/Ds which have fully implemented a proper ERKS should conduct a compliance assessment (Note 57) before seeking GRS's prior approval for dispensing with the print-and-file practice in managing e-mail records. The compliance assessment covers two mandatory components:

(a) an evaluation of an ERKS including its functionality, features, system configuration and customisation; and

(b) an evaluation of departmental records management policies, practices and procedures governing the use, management and maintenance of an ERKS.

Note 57: *A compliance assessment aims to assist B/Ds in evaluating and validating whether an ERKS and the associated departmental records management policies, practices and procedures governing the use, management and maintenance of an ERKS are able to: (a) comply with the Government's records management policy and ERM requirements; (b) support the discharge of records management functions and activities common to B/Ds; (c) maintain the authenticity, integrity, reliability and usability of records managed by an ERKS throughout their life cycles to serve as reliable evidence of decisions and activities of B/Ds; (d) meet specific business, operational and records management needs of B/Ds; and (e) ensure that records with archival value are properly managed by an ERKS before they are transferred to GRS for retention.*

B/Ds should conduct the evaluation in (a) in the context of system acceptance, i.e. prior to the rollout of an ERKS to users, and the evaluation in (b) no later than three months after the rollout of an ERKS.

3.21 ***GRS approval procedure.*** If a B/D has achieved the required ratings in the compliance assessment, the B/D may make a request to seek GRS's agreement to dispense with the print-and-file practice in managing e-mail correspondence together with the required ERKS documentation including the system and user manuals, the compliance assessment report and the departmental records management policies, practices and procedures. If needed, GRS may require the B/D concerned to conduct a demonstration of ERKS functionality on site to GRS representatives. GRS will notify the B/D concerned in writing if agreement is given to dispense with the print-and-file practice with effect from a specified date. For a refusal case, GRS will provide advice and recommendations for the B/D concerned to make improvements. Upon the satisfactory completion of the improvement measures, the B/D concerned may make a fresh request to GRS to discard the print-and-file practice.

3.22 ***Cessation of print-and-file practice.*** As of December 2019, 7 of the 11 B/Ds under the ERKS pilot programme (i.e. EffO, GRS, DSD, OGCIO, IPD, the Administration Wing and CEDD) had dispensed with the print-and-file practice. The progress for the remaining 4 B/Ds is as follows:

(a) ***Two early adopters.*** While both CCIB of CEDB and RVD rolled out their ERKSs in 2014, they have not dispensed with the print-and-file practice (see para. 3.25). They have been adopting a parallel run of ERKS and the print-and-file practice for over five years; and

(b) ***Two next-stage adopters.*** Both ArchSD and MD have not applied to GRS for dispensing with the print-and-file practice because ERKS was recently launched in the two B/Ds.

To reap the benefits of ERKS in reducing costs for printing, managing and storing paper records, there is a need to dispense with the print-and-file practice as soon as practicable. In addition, Audit has identified areas for improvement in enforcing the compliance with cessation of print-and-file practice in the B/Ds under the ERKS pilot programme as elaborated in paragraphs 3.23 to 3.25.

3.23 ***Variance in time taken to dispense with print-and-file practice.*** Audit analysis revealed that the time B/Ds under the pilot ERKS programme had taken to cease the print-and-file practice (i.e. counting from the system live-run date of ERKS to the specified date approved by GRS to dispense with the print-and-file practice) ranged from 3 to 25 months (see Table 6).

Table 6

Time taken to cease print-and-file practice in seven B/Ds under ERKS pilot programme

B/D	System live-run date (Note 1) (a)	Date of cessation of print-and-file practice (b)	Duration of parallel run (c) = (b) − (a) (Month)
Three early adopters:			
EffO (Note 2)	Jun 2010	Jun 2010	—
GRS (for unclassified and restricted records) (for confidential records)	May 2014 Sep 2015	Sep 2014 Oct 2016	4 13
DSD	Apr 2016	May 2018 (Phase 1)	25
Four next-stage adopters:			
IPD	Jul 2016	Dec 2017	17
OGCIO	Aug 2016	Apr 2017	8
Administration Wing	Dec 2016	Mar 2018	15
CEDD	May 2018	Aug 2018 (Phases 1 and 2) Oct 2018 (Phase 3)	3 (Phases 1 and 2) 5 (Phase 3)

Source: Audit analysis of OGCIO and GRS records

Note 1: For ERKS implemented in phases, the system live-run date for the last phase of implementation is adopted to measure the duration of parallel run.

Note 2: According to GRS, EffO implemented its ERKS in 2010 and dispensed with the print-and-file practice accordingly. At that time, GRS had not yet promulgated relevant guidelines and procedures requiring B/Ds to obtain GRS's approval before dispensing with the print-and-file practice.

3.24 ***Early involvement of GRS being a key success factor.*** Audit noted that while CEDD's ERKS supported the highest number of users (i.e. around 1,500 users) among the B/Ds under the ERKS pilot programme, CEDD only took five months to cease the print-and-file practice in October 2018 after the system live-run date in May 2018. Audit noted that early involvement of GRS could be one of the key success factors contributing to the timely cessation of the print-and-file practice. Specifically, instead of involving GRS for dispensing with the print-and-file practice only after system live-run, CEDD engaged GRS to conduct a compliance check of the ERKS functional requirements upon the completion of each phase such that any issues identified by GRS during the compliance check could be resolved in a timely manner. In Audit's view, such good practice should be promoted during service-wide implementation of ERKS, especially for large-sized B/Ds implementing ERKS in phases.

3.25 ***Prolonged parallel run of ERKS and print-and-file practice in two B/Ds.*** As mentioned in paragraph 3.22(a), two early adopters, namely CCIB of CEDB and RVD, have continued to adopt a parallel run of ERKS and the print-and-file practice for over five years since the rollout of ERKS in 2014. In Audit's view, the prolonged parallel run is undesirable because it creates additional workload to users in managing records. Omission in filing is also more likely to occur. Audit sample check of 20 paper files in CCIB of CEDB found that in 8 files, some records were not filed in ERKS, or were filed into ERKS late (see para. 3.38(c)). On the other hand, some e-mails in 3 of the 20 files were not printed and filed. Audit noted that the prolonged parallel run was mainly attributable to:

(a) ***Technical problems.*** Both CCIB of CEDB and RVD had encountered technical problems after the rollout of ERKS, as follows:

(i) ***CCIB of CEDB.*** After the rollout of ERKS in June 2014, technical issues emerged intermittently. During the compliance check conducted by GRS in December 2014, two issues of non-compliance with ERKS functional requirements and the Recordkeeping Metadata Standard (see para. 1.10(a)) were identified. ERKS was enhanced in June 2015 to address the issues. One year later, CCIB of CEDB identified another critical issue relating to the search function of ERKS. The issue was resolved in September 2016. In early 2017, CCIB of CEDB found that there was a need to enhance the existing ERKS to: (i) comply with the updated functional requirements of ERKS promulgated by GRS in September 2016;

and (ii) tackle the end of support of the existing ERKS solution by April 2018. As a result, CCIB of CEDB decided to migrate its ERKS to the ERKS base system developed by OGCIO. The migration was completed in June 2019. In January 2020, CCIB of CEDB was preparing another submission to GRS for dispensing with the print-and-file practice; and

(ii) ***RVD.*** While the contractor of RVD's ERKS in October 2014 confirmed that the system had been implemented in accordance with the functional requirements stipulated by GRS, GRS found issues of non-compliance with the functional requirements during two demonstration sessions on RVD's ERKS functionality held in November and December 2014. In February 2015, RVD implemented enhancements to address the issues. In March 2016, RVD submitted a request to GRS for dispensing with the print-and-file practice (Note 58). From April 2016 to June 2017, three demonstration sessions were held and RVD completed enhancements to address some of the issues raised by GRS. However, there were still outstanding issues. In June, October and November 2017, GRS held three meetings with RVD to discuss proposed enhancements to address the outstanding issues, however, no mutual agreement could be reached. According to RVD, due to limitations of the software package adopted for the ERKS, a complete system upgrade or substantial enhancements would be the only viable options to meet the functional requirements stipulated by GRS. However, both options would be resource-demanding and would involve technical complication; and

(b) ***System migration and competing priorities.*** Upon Audit's enquiry, CCIB of CEDB and RVD in March 2020 said that:

Note 58: *According to RVD, the evaluation of departmental records management policies, practices and procedures (see para. 3.20(b)) commenced in April 2015 and the compliance assessment report was being finalised in September 2015. However, as GRS promulgated an updated guideline on the evaluation of ERKS in September 2015, the compliance assessment report had to be revised to take into account the then prevailing GRS requirements and was only finalised in February 2016.*

CCIB of CEDB

(i) according to GRS guidelines, a B/D should make a request for dispensing with the print-and-file practice in its entire organisation in one go unless otherwise agreed by GRS in advance. ERKS had yet to be implemented in the entire organisation of CCIB. Create Hong Kong under CCIB was planning to implement its ERKS in 2021;

(ii) although its ERKS had been migrated to OGCIO's base system since June 2019, more time was needed to observe its performance. The parallel run of the print-and-file practice and ERKS was therefore necessary to avoid disruption of record retention and should not be seen as a departure from GRS guidelines nor a delay in dispensing with print-and-file practice;

(iii) plans were underway to seek GRS approval to dispense with print-and-file practice having regard to the stable performance of its ERKS;

RVD

(iv) after the meetings with GRS in 2017, RVD had been heavily engaged in other priority work including the additional workload required for achieving the statutory commitment and assisting in the formulation of new policies, as well as other system development/enhancement projects; and

(v) RVD approached GRS in January 2020 to stocktake the outstanding issues regarding the cessation of print-and-file practice with a view to working out a schedule for obtaining GRS's approval to dispense with the print-and-file practice as soon as practicable.

In Audit's view, there is a need to strengthen the system acceptance procedures to ensure that technical issues are identified and resolved prior to system rollout as far as practicable. CCIB of CEDB and RVD should work closely with GRS to dispense with the print-and-file practice, including addressing issues of non-compliance with functional requirements and Recordkeeping Metadata Standard, if any.

Audit recommendations

3.26 **Audit has *recommended* that the Government Chief Information Officer should:**

(a) **draw lessons from the implementation of common base system to improve the monitoring of contractors in the service-wide implementation of ERKS, including:**

(i) **holding regular PSC meetings to provide strategic direction on project implementation; and**

(ii) **in granting extension of time of target completion dates in ERKS projects for the remaining B/Ds in future, seeking the Department of Justice's advice on whether liquidated damages should be imposed, having regard to the contractor's performance and the loss to the Government arising from the project delay;**

(b) **closely monitor Contractor B's progress to ensure that ERKS for MD can be completed by the revised completion date of June 2021 and the errors identified are rectified as soon as possible; and**

(c) **take effective measures to ensure PIDRs of ERKS projects are submitted in a timely manner.**

3.27 **Audit has *recommended* that the Director of Marine should:**

(a) **strengthen the monitoring of ERKS project progress and hold regular PSC and PAT meetings to oversee Contractor B's performance; and**

(b) **require Contractor B to timely submit Project Progress Reports in accordance with the PID requirements.**

3.28 **Audit has *recommended* that, in preparing for the service-wide implementation of ERKS, the Government Chief Information Officer, the Director of Administration and the Commissioner for Efficiency should:**

(a) **set up a mechanism to measure B/Ds' savings in paper/printing costs upon the cessation of the print-and-file practice;**

(b) **promote the good practice of early involvement of GRS in preparing for a timely cessation of the print-and-file practice; and**

(c) **strengthen the system acceptance procedures to ensure that technical issues are identified and resolved prior to system rollout as far as practicable.**

3.29 **Audit has *recommended* that the Secretary for Commerce and Economic Development should work closely with GRS to dispense with the print-and-file practice in CCIB.**

3.30 **Audit has *recommended* that the Commissioner of Rating and Valuation should work closely with GRS to dispense with the print-and-file practice in RVD offices which have implemented ERKS.**

Response from the Government

3.31 The Government Chief Information Officer agrees with the audit recommendations in paragraph 3.26. He has said that:

(a) OGCIO is closely monitoring Contractor B's progress in rectifying the errors identified in the outstanding TIRs. In addition to weekly checkpoint meetings with the Contractor, OGCIO has been working closely with the Contractor to follow up on the outstanding issues; and

(b) monthly reminders are issued to remind B/Ds to submit PIDRs.

3.32 The Director of Marine agrees with the audit recommendations in paragraph 3.27. She has said that:

(a) MD has strengthened the monitoring of ERKS project progress and scheduled regular PSC and PAT meetings for the remaining batches of implementation; and

(b) on the request of MD, Contractor B has already submitted Project Progress Reports since September 2018. MD will continue to closely monitor the timely submission of reports by the Contractor.

3.33 The Government Chief Information Officer, the Director of Administration and the Commissioner for Efficiency agree with the audit recommendations in paragraph 3.28. The Director of Administration has said that:

(a) regarding the audit recommendation in paragraph 3.28(a), EffO will work in collaboration with GRS to support the EIM Programme Management Office in setting up a mechanism to measure B/Ds' savings in paper/printing costs upon the cessation of the print-and-file practice; and

(b) regarding the audit recommendations in paragraph 3.28(b) and (c), GRS:

(i) has been taking measures to support B/Ds in dispensing with the print-and-file practice. GRS has developed a "Manual on Evaluation of an Electronic Recordkeeping System" to assist B/Ds in evaluating and validating the ERKS and associated departmental records management policies, practices and procedures governing the use, management and maintenance of an ERKS in compliance with ERM standards and requirements;

(ii) has been working closely with OGCIO to facilitate B/Ds to dispense with the print-and-file practice through a streamlined two-stage validation approach. Specifically, in Stage 1, GRS will work with OGCIO to ensure that the base ERKS system can meet all the requirements set out in the ERM standards and requirements. In Stage 2, when B/Ds submit their applications to seek GRS's approval for dispensing with the print-and-file practice, GRS will request the B/Ds, among others, to demonstrate that their ERKSs

meet the ERM standards and requirements and they have put in place associated departmental records management policies, practices and procedures. As GRS has already evaluated the base system in Stage 1, the B/Ds will only need to conduct the demonstration of their ERKSs on a smaller scale as compared with the ERKS developed by the five early adopters. The entire process will hence be shortened from three months to one month;

(iii) has also taken measures to help B/Ds develop the associated departmental records management policies, practices and procedures governing the use, management and maintenance of an ERKS so as to facilitate their early cessation of the print-and-file practice. GRS has compiled a "Handbook on Records Management Practices and Guidelines for an Electronic Recordkeeping System" to provide guidance for B/Ds to adopt as their own practices and guidelines. GRS has also conducted briefings to assist B/Ds for this purpose. During the service-wide implementation of ERKS, GRS will be involved in the early stage for the development of the base system. This approach will help B/Ds take less time to meet GRS requirements when seeking approval for ceasing the print-and-file practice; and

(iv) will continue to adopt the above facilitating and streamlining measures to facilitate B/Ds in evaluation of their ERKS for cessation of the print-and-file practice. GRS will also continue to provide training for B/Ds to develop their associated departmental records management policies, practices and procedures governing the use, management and maintenance of an ERKS. The early involvement of GRS during the base system development stage can also ensure that technical issues are identified and resolved prior to system rollout. Depending on the lead-time required by users to adapt to the new filing procedures under an ERKS environment, GRS believes most of the B/Ds can shorten the parallel run period and submit applications to seek GRS's approval for dispensing with the print-and-file practice within six months following their implementation of ERKS.

3.34 The Secretary for Commerce and Economic Development accepts the audit recommendation in paragraph 3.29. He has said that, with GRS latest agreement, CCIB of CEDB would arrange to dispense with the print-and-file practice of records by phases starting from September 2020.

3.35 The Commissioner of Rating and Valuation agrees with the audit recommendation in paragraph 3.30. He has said that:

(a) RVD will continue to work closely with GRS to dispense with the print-and-file practice in its offices. It has been engaging GRS actively in resolving the technical problems with a view to fully complying with the functional requirements as stipulated by GRS; and

(b) following two meetings held between RVD and GRS in March 2020, RVD will take necessary steps, in close consultation with GRS, to complete the system enhancements to the RVD's ERKS as soon as possible and aims at obtaining the approval from GRS to waive the print-and-file practice within 2020.

3.36 The Director of Administration agrees with the audit recommendations in paragraphs 3.29 and 3.30. She has said that:

(a) GRS has been keeping close contact with CCIB of CEDB and providing it with all the necessary assistance in obtaining GRS's approval to dispense with the print-and-file practice. It is the aim to facilitate CCIB of CEDB to obtain GRS's approval to dispense with the print-and-file practice as early as possible and no later than September 2020; and

(b) RVD and GRS held meetings on 11 and 17 March 2020 to discuss how the ERKS of RVD should be enhanced in order to meet the ERKS standards and requirements for cessation of the print-and-file practice. GRS would continue to liaise with RVD with a view to facilitating RVD to obtain GRS's approval to dispense with the print-and-file practice as early as possible within 2020.

System operation

3.37 ***Audit examination of ERKS system operation.*** Audit selected four B/Ds under the ERKS pilot programme (i.e. two from the early adopters (namely GRS and CCIB of CEDB) and two from the next-stage adopters (namely OGCIO and CEDD)) for examining the records management functionalities and practices in ERKS environment. Audit examination involved:

(a) requesting selected B/Ds to provide Audit with read-only access rights to ERKS;

(b) testing the retrieval functions of ERKS, such as sorting and searching of records;

(c) examining the management reports generated from ERKS; and

(d) analysing the metadata of records.

Areas for improvement in system operation

3.38 Audit examination of the ERKS in the four selected B/Ds has revealed the following areas for improvement:

(a) ***Failure to provide Audit with access rights to ERKS.*** Audit was able to obtain read-only access rights to ERKS in all selected B/Ds except OGCIO. Upon Audit's enquiry, OGCIO in January 2020 said that access to its ERKS could not be provided to Audit because such requirement (i.e. creating accounts with read-only access rights for non-OGCIO users) had not been taken into account when designing the user profiles of OGCIO's ERKS. To facilitate Audit's examination, OGCIO provided Audit with a copy of records relevant to ERKS implementation together with a list of recordkeeping metadata (e.g. record title and record creation date). In Audit's view, the design of user profiles of OGCIO's ERKS does not meet audit requirements regarding obtaining reliable audit evidence efficiently

through the system (Note 59). To enhance public accountability, OGCIO needs to: (i) remind B/Ds to fully take into account audit requirements in designing their ERKSs in the service-wide implementation of ERKS; and (ii) make necessary adjustments to the design of user profiles of OGCIO's ERKS to meet audit requirements as far as practicable;

(b) ***Users with low usage.*** ERKS in all four selected B/Ds supported the generation of a management report to show statistical information on users' activities (the user access report). Audit examined the user access reports of the four B/Ds generated from December 2019 to January 2020 and found that while the design of the report in the four B/Ds was slightly different, the issue of low usage of some users was generally observed in all four B/Ds. For example, as of January 2020, 306 (30%) of 1,025 ERKS users in OGCIO and 105 (7%) of 1,500 ERKS users in CEDD were found not using ERKS for over one year. There is a need for GRS to remind B/Ds with ERKS to identify users with low usage and investigate the reasons for taking appropriate action; and

(c) ***No guidelines on time limit for capturing records into ERKS.*** According to GRS guidelines, all records should be captured into ERKS as soon as practicable. All four B/Ds did not specify in their departmental guidelines the time limit to capture a record into ERKS. Audit analysis of the filing dates of e-mails in ERKS revealed that some e-mails were only captured into ERKS over three months after the sent/received date. For example, in 2019, 7,747 (22%) of 35,567 e-mail records in OGCIO and 3,792 (17%) of 22,700 e-mail records in CCIB of CEDB were captured over three months after the sent/received date. Audit analysis further found that among the 11,539 (i.e. 7,747 + 3,792) e-mails filed over three months after the sent/received date, 44% in OGCIO and 38% in CCIB of CEDB were captured into ERKS over one year after the sent/received date. There is a need for GRS to remind B/Ds with ERKS to formulate guidelines on the time limit to ensure timely filing of records into ERKS.

Note 59: *Since ERKS has built in security and access control functions, i.e. protecting records from inadvertent and unauthorised alteration, deletion, access and retrieval, as well as monitoring the integrity of records through audit trails, the audit evidence obtained by accessing records in ERKS directly is more reliable.*

Audit recommendations

3.39 **Audit has *recommended* that the Government Chief Information Officer should, in order to enhance public accountability:**

(a) **remind B/Ds to fully take into account audit requirements in designing their ERKSs in the service-wide implementation of ERKS; and**

(b) **make necessary adjustments to the design of user profiles of OGCIO's ERKS to meet audit requirements as far as practicable.**

3.40 **Audit has *recommended* that the Director of Administration should remind B/Ds with ERKS to:**

(a) **identify users with low usage and investigate the reasons for taking appropriate action; and**

(b) **formulate guidelines on the time limit for filing records into ERKS.**

Response from the Government

3.41 The Government Chief Information Officer agrees with the audit recommendations in paragraph 3.39.

3.42 The Director of Administration agrees with the audit recommendations in paragraph 3.40. She has said that:

(a) the usage statistics set out in paragraph 3.38(b) show that some users may not have made use of the ERKS to capture or search records. This could be due to different reasons relating to the internal operation and division of responsibilities of the B/Ds concerned. For example, some records users may delegate their ERKS filing work to other members of the team or the filing registry. Retrieval of records from ERKS may also be done by other staff members. The number of records in ERKS of B/Ds under the pilot programme has been increasing gradually over the past years with a steady

growth rate. This shows that these B/Ds have been making active use of ERKS in keeping their records;

(b) GRS has taken measures to support B/Ds in monitoring the operation and usage of ERKS. ERKS is equipped with functionalities for generation of different records management reports and audit logs for monitoring purpose. GRS has regularly reminded B/Ds to implement a departmental monitoring mechanism for their ERKSs through implementation guidelines and briefings for B/Ds. To further encourage more users to use ERKS, GRS will update these guidelines on a systematic monitoring approach e.g. through conducting surprise checks and surveys on usage of ERKS as part of their departmental monitoring mechanism. B/Ds will also be advised to organise more refresher training for their staff so as to familiarise them with the functionalities and operation of an ERKS; and

(c) according to the existing records management principles, records should be captured as soon as possible. GRS will develop more specific guidelines for B/Ds to capture records under ERKS. For example, officers will be advised that under normal circumstances, records should be captured into ERKS within 30 days and under exceptional circumstances, records could be captured within three months.

Migration to central electronic recordkeeping system

Need to closely monitor operating costs and consider migration to central ERKS in due course

3.43 ***Sustainability of ERKS.*** The implementation or adoption of an ERKS by B/Ds is a mandatory requirement of the Government's EIM Strategy. Therefore, it is important to ensure that the implementation of ERKS in B/Ds is financially sustainable in the long run. In the first meeting of the Programme Steering Committee of the pilot programme for the next stage development of ERKS (see para. 3.8) held in December 2015, the Chairperson advised that B/Ds should strive to achieve savings after adoption of ERKS to ensure sustainability.

3.44 ***Discussions on the way forward for the pilot projects.*** During an EIM Steering Group meeting held in February 2019, the Government Chief Information Officer indicated that B/Ds under the pilot programme could still use their current

ERKS solutions and might consider migration later when their current ERKS solutions became obsolete and due for replacement. Another member opined that careful consideration would be required for adopting different solutions in the long run because B/Ds would need to transfer records to GRS. According to GRS, technical solutions for transfer of records from B/Ds adopting different ERKS solutions would be considered in developing the digital repository (see para. 4.9(b)). It was expected that B/Ds would adopt the new solution if the operating or upgrade cost of their current ERKS solutions was higher than the migration cost.

3.45 ***High operating expenditure of pilot projects.*** Table 7 reveals that the annual operating expenditure of ERKS per user for the pilot projects in 2018-19 ranged from $1,667 to $35,714.

Table 7

Annual operating expenditure of ERKSs by B/Ds
(2018-19)

Project	Number of users (a)	Annual operating expenditure (b) ($ million)	Annual operating expenditure per user (c) = (b) ÷ (a) ($)
EffO (Note)	210	2.2	10,476
GRS	130	2.7	20,769
CCIB of CEDB	70	2.5	35,714
RVD	100	0.7	7,000
DSD	992	2.3	2,319
Administration Wing	160	1.6	10,000
Project 1 - IPD	200	5.1	4,250
- OGCIO	1,000		
Project 2 - ArchSD	200	2.3	2,421
- MD	750		
Project 3 - CEDD	1,500	2.5	1,667

Source: *Audit analysis of OGCIO records*

Note: *According to EffO, the annual operating expenditure covered the whole EIM system including ERKS. In addition to the users in EffO, the system was extended to cover Management Services Officers in other B/Ds.*

In the service-wide implementation, to achieve economies of scale on software licences, and implementation and support costs, a single ERKS software solution will be adopted to develop the central ERKS for deployment to the remaining 75 B/Ds (see para. 2.2). The annual recurrent cost (including storage, network, processing power, software licence, maintenance and support) for each ERKS user is estimated to be about $1,500. Given that the estimated annual recurrent cost of the central ERKS is much lower than that of pilot projects, B/Ds under the ERKS pilot programme should keep in view the merits of migrating to the central ERKS (see para. 3.25(a)(ii) for an example) when their ERKSs are due for replacement in future.

Audit recommendation

3.46 **Audit has *recommended* that the Government Chief Information Officer, the Director of Administration and the Commissioner for Efficiency should jointly remind the 11 B/Ds under the ERKS pilot programme to keep in view the merits of migrating to the central ERKS when their ERKSs are due for replacement in future.**

Response from the Government

3.47 The Government Chief Information Officer, the Director of Administration and the Commissioner for Efficiency agree with the audit recommendation. The Director of Administration has said that:

(a) OGCIO, GRS and EffO appreciate the merits for the 11 B/Ds under the ERKS pilot programme to migrate to the central ERKS. To facilitate future migration, GRS has developed the "Recordkeeping Metadata Standard for the Government of the Hong Kong Special Administrative Region" to ensure that all ERKSs adopted by B/Ds will use appropriate and sufficient recordkeeping metadata in a consistent manner so as to help B/Ds export records with the required recordkeeping metadata from one ERKS to another; and

(b) the EIM Programme Management Office will keep in view the need for migration of ERKS for the 11 B/Ds under the ERKS pilot programme to the central ERKS and continue rendering all the necessary support to B/Ds for the migration.

PART 4: ARCHIVING OF ELECTRONIC RECORDS

4.1 This PART examines the archiving of electronic records, focusing on:

(a) long-term preservation of electronic records (paras. 4.2 to 4.15); and

(b) archiving of government records on websites and social media platforms (paras. 4.16 to 4.19).

Long-term preservation of electronic records

4.2 ***Life cycle of records.*** According to GRS, the whole life cycle of records management encompasses the creation and collection, classification, scheduling and final disposal of records, records transfer, and public access to archival records. In view of constantly changing technology, a robust life-cycle management approach should be taken to manage and preserve electronic records once they are created or received. According to their respective stages in the life cycle, records can be categorised into the following:

(a) ***Active records.*** Active records refer to records frequently used for current business and therefore should be maintained in their place of origin or receipt;

(b) ***Inactive records.*** Inactive records refer to records which are no longer required or rarely required for the conduct of business or reference; and

(c) ***Archival records.*** Archival records, or archives, refer to records which are appraised to have archival value for permanent preservation by GRS. These records need to be transferred by B/Ds to GRS for permanent retention.

4.3 ***Importance of long-term preservation of electronic records.*** According to GRS, long-term preservation of electronic records is necessary to ensure that electronic records are authentic, complete, accessible, identifiable, understandable and usable for as long as they are required to serve legal, regulatory, business and

archival requirements. To achieve that, it is necessary to formulate government-wide policy and strategies for preserving electronic records over time.

Progress in conducting the comprehensive study

4.4 ***Preliminary study.*** In October 2009, GRS, EffO and OGCIO completed a review of ERKS pilot project (see para. 1.8). The review identified the need for further work, which included studies on strategies and technical solutions for long-term preservation of electronic records. With the promulgation of the Government EIM strategy in 2011, the studies on long-term preservation of electronic records became one of the central initiatives under the EIM Programme (see para. 1.9). In view of the magnitude and complexity of the comprehensive study, a task force comprising members from GRS and OGCIO conducted a preliminary study from February 2012 to January 2013 to:

(a) study experience of overseas countries in dealing with preservation of electronic records;

(b) gauge the business needs of B/Ds to preserve electronic records to meet legal, regulatory, business and evidence needs;

(c) identify the archival needs of GRS in preserving archival records in electronic form; and

(d) define the scope of the comprehensive study.

The key activities of the preliminary study included: (i) a government-wide survey on preservation of electronic records in B/Ds; and (ii) studies focused on the policies, strategies, standards, practices and technical solutions for long-term preservation of electronic records and archival records in electronic form of four overseas countries, namely Australia, New Zealand, the United Kingdom and Singapore.

4.5 ***Slow progress in conducting the comprehensive study.*** According to the original plan submitted to the EIM Steering Group in 2011, the comprehensive study on long-term preservation of electronic records was scheduled to commence in May 2013 for completion in December 2014. Audit found that the progress of the comprehensive study was slow. Compared with the original target completion date

of December 2014, the revised target completion date set by the EIM Programme Management Office as of October 2019 was May 2021, representing a delay of about 6 years. Given that 11 B/Ds have implemented ERKS since 2010 (see paras. 3.2 and 3.4), the need for transfer of electronic records with archival value from B/Ds to GRS for permanent retention will arise in the near future. Hence, there is a need to step up efforts to avoid further delay. Audit examined GRS and OGCIO records in connection with the comprehensive study and found that the delay was mainly attributable to the following:

(a) deferral in commencement due to competing priorities (para. 4.6);

(b) change in study approach (paras. 4.7 to 4.9); and

(c) long time taken in preparatory work (paras. 4.10 to 4.12).

Deferral in commencement due to competing priorities

4.6 ***Suspension of the original plan.*** In February 2013, the EIM Programme Management Office reported in the monthly progress report that:

(a) the task force had completed the scoping requirements of the comprehensive study;

(b) having regard to the competing demands on expertise and skilled manpower resources in records management, archival administration and IT in taking forward EIM, the Administration Wing would review the timing for conducting the comprehensive study during the review of the EIM Programme scheduled for 2014; and

(c) if appropriate, the Administration Wing would work out the actual timetable of the comprehensive study nearer the time.

As a result, the original plan with defined timeframe (i.e. to conduct the comprehensive study from May 2013 to December 2014) was replaced by a revised plan with no specified timeframe. Audit found that the preparatory work for the comprehensive study only resumed in March 2017, some four years after the completion of the preliminary study in January 2013.

Change in study approach

4.7 ***Original scope of the comprehensive study.*** In March 2017, GRS and OGCIO agreed on the scoping of the comprehensive study, which was to be conducted in two phases, as follows:

(a) ***Phase 1.*** The study would focus on the development of policies, strategies, standards and guidelines on long-term preservation of electronic records and study of challenges on preservation of electronic records in B/Ds; and

(b) ***Phase 2.*** The study would identify technical issues and recommend solutions to manage and preserve archival materials in electronic forms managed by and stored in GRS, including feasibility of setting up of a digital archive in GRS for preservation of archival materials in electronic forms.

4.8 ***Request for information exercise.*** GRS and OGCIO conducted a request for information exercise for the comprehensive study in March 2017. While 65 potential consultancy service providers were invited, only four responded to the request for information exercise. The proposals from two local consultants were considered irrelevant, whereas the other two consultants from overseas only indicated interest in the Phase 1 study.

4.9 ***Revised study approach.*** Having regard to the result of the exercise, GRS and OGCIO agreed in May 2017 to a revised approach in pursuing the comprehensive study on the assumption that the projects could commence in April 2018 upon approval of funding from CWRF:

(a) ***Phase 1 study.*** Phase 1 study would be pursued first with a target completion date in the second quarter of 2020;

(b) ***Setting up of a digital repository.*** Since no potential consultancy service provider had indicated interest in the Phase 2 study, GRS and OGCIO would set up a digital repository as an interim solution to cater for the potential transfer of electronic records from B/Ds to GRS in near future (see para. 4.2(c)). The target completion date was the first quarter of 2019; and

(c) ***Long-term strategy for setting up digital archive.*** After gaining experience from the operation of the digital repository and having regard to future advancement in IT and development of international best practices on preservation of digital records, GRS would then work out the long-term strategy for setting up a digital archive.

Long time taken in preparatory work

4.10 ***Phase 1 study.*** The implementation progress of the Phase 1 study is as follows:

(a) ***Funding approval.*** In June 2018, a funding of $7.2 million from CWRF was approved to pursue the Phase 1 study;

(b) ***Drafting of consultancy brief.*** GRS commenced drafting the consultancy brief in September 2017. The drafting of consultancy brief encompassed the process of collecting and incorporating comments from OGCIO and GRS's internal users as well as seeking legal advice from the Department of Justice. The process was completed in December 2018. In January 2019, approval was obtained from the Departmental Consultants Selection Committee of the Chief Secretary for Administration's Office enabling GRS to commence procurement of consultancy service;

(c) ***Procurement of consultancy service.*** In January 2019, GRS invited proposals from 64 consultancy service providers and one proposal was received by the deadline of February 2019. Approval to appoint the consultancy service provider was granted by the Departmental Consultants Selection Committee of the Chief Secretary for Administration's Office in May 2019; and

(d) ***Latest known position.*** As of October 2019, GRS was in the course of finalising the consultancy agreement, GRS planned to commence the Phase 1 study by end of 2019, with the consultancy service provider conducting its first on-site visit in March 2020. The target completion date of Phase 1 study was postponed from the second quarter of 2020 to May 2021.

4.11 ***Setting up of digital repository.*** The progress of implementing a digital repository is as follows:

(a) ***Preparatory work for procurement.*** In August 2017, GRS started the preparatory work for procurement of service (i.e. research on service providers and drafting of tender specifications) for setting up the digital repository. Ten potential service providers from overseas were identified. In April 2018, after a discussion between GRS and OGCIO, it was decided that to expedite the procurement process, an off-the-shelf software product would be procured through direct purchase authority, instead of tender exercise in the original plan, as the cost of the product would likely to be less than $1.4 million (Note 60). GRS then revised the specifications and circulated the same to OGCIO and among GRS's internal users for comments. As the procurement process would only commence after obtaining funding approval, GRS postponed the target completion date from the first quarter of 2019 to end of 2019;

(b) ***Funding approval.*** In December 2018, CWRF funding approval was obtained;

(c) ***Procurement of software product.*** In February 2019, GRS issued an invitation for proposals and one proposal was received by the deadline of March 2019. As the price quoted by the supplier exceeded the limit of $1.4 million, GRS commenced price negotiation with the supplier in mid-2019 and further postponed the target completion date to April 2020; and

(d) ***Latest known position.*** In August 2019, GRS received a revised quotation within the quotation limit from the supplier. The project commenced in October 2019 with a target to complete in June 2020.

4.12 Audit noted that GRS had taken a long time on the preparatory work for implementing the long-term preservation of electronic records. In Audit's view, GRS

Note 60: *According to the Stores and Procurement Regulations, procurement of stores and services with value above $1.4 million should be conducted by tender.*

needs to closely monitor the progress of the Phase 1 study and the setting up of the digital repository.

Preservation of electronic records in B/Ds

4.13 ***2012 government-wide survey.*** As part of the preliminary study on the preservation of electronic records (see para. 4.4), GRS and OGCIO jointly conducted a government-wide survey (covering a total of 74 B/Ds and offices) in 2012 to gauge the need for preservation of electronic records in B/Ds and assess the effectiveness of current preservation measures adopted by B/Ds. The survey found that:

(a) 69 (93%) of 74 B/Ds and offices had to manage and keep some of their electronic records for a further period of seven years or longer;

(b) 409 (46%) of 896 information systems that were used to manage and/or store electronic records for a further period of seven years or longer had not been upgraded, enhanced or re-developed since their live-run, and 204 (42%) of the remaining 487 upgraded systems did not possess built-in functionality to preserve electronic records;

(c) only 27 (36%) B/Ds and offices had conducted file format migration for their electronic records in the past seven years; and

(d) of 49 B/Ds and offices that had managed and/or stored electronic records in offline storage media, only 15 (31%) of them had conducted media renewal and/or media migration to preserve electronic records stored in offline storage media.

Based on the survey results, GRS and OGCIO considered that there was a clear business case for B/Ds to take timely and proper measures to preserve electronic records, and that the awareness of proper preservation of electronic records should be enhanced.

4.14 ***Promulgation of a guideline on preservation of electronic records.*** Against the background of the 2012 government-wide survey, GRS promulgated a guideline entitled "A Handbook on Preservation of Electronic Records" in July 2013 for reference by B/Ds in adopting proper measures and practices to preserve electronic

records. According to the Handbook, B/Ds should formulate a viable departmental preservation programme to ensure that sufficient resources and attention will be accorded to preserving electronic records timely and effectively. The Handbook also sets out 10 general good practices and measures to preserve electronic records including migration of obsolete file formats to another format, and regular review of offline storage media.

4.15 ***Need to ascertain progress made by B/Ds in improving preservation of electronic records.*** Audit noted that since the promulgation of the Handbook in July 2013, GRS had not regularly ascertained the progress made by B/Ds in improving their measures and practices in preserving electronic records (e.g. whether or not the B/Ds have implemented a departmental preservation programme). In view of the service-wide implementation of ERKS, the volume of government electronic records is expected to grow at a fast pace (see para. 1.3). In Audit's view, GRS should consider setting up a mechanism to regularly monitor B/Ds' practices in preserving electronic records.

Archiving of government records on websites and social media platforms

4.16 ***Government use of websites and social media.*** The use of government websites on the Internet is an efficient and effective way for dissemination of information. All B/Ds have set up their own websites to disseminate information. The Government has also set up a one-stop portal, the GovHK (www.gov.hk), which hosts a wide range of information and services most frequently sought by the public. In recent years, the use of social media, which refers to the use of web-based platforms, applications and technologies to enable users to socially interact with each other online, has become popular. Senior government officials and B/Ds are also using social media to disseminate information and interact with members of the public.

Areas for improvement in archiving of government websites and social media accounts

4.17 ***Absence of standards and guidelines on archiving of government records on websites.*** Audit examined the standards and guidelines on ERM promulgated by GRS and found that there was a lack of guidelines on management and archiving of records in government websites or social media platforms. For example, according

to the GRS guideline entitled "A Handbook on Records Management Practices and Guidelines for an Electronic Recordkeeping System", it does not cover the management of records in the web environment (i.e. government websites and social media accounts). While OGCIO has promulgated guidelines on government websites, the guidelines mainly cover IT aspects such as security, design and accessibility.

4.18 ***Overseas practices.*** Audit research on archiving of government websites and social media accounts in some overseas jurisdictions has revealed that web archiving initiatives have been implemented by national archives/libraries or in collaboration with non-governmental organisations (e.g. universities) in overseas jurisdictions for quite some time. The archived government websites and/or social media accounts are usually accessible by the public through dedicated websites established by the respective national archives/libraries. Table 8 shows a few examples of web archiving initiatives in overseas jurisdictions.

Table 8

Web archiving initiatives in four overseas jurisdictions (2003 to 2011)

Overseas jurisdiction	Year of commencement	Content archived
The United Kingdom	2003	Government websites and official social media accounts
Singapore	2006	Domain and selective archiving of websites with a focus on Singapore content, including government websites
The United States	2008	All federal government websites in the legislative, executive and judicial branches of government
Australia	2011	Commonwealth government websites

Source: Audit's Internet research

4.19 ***Need to formulate long-term strategy for web archiving.*** Up to February 2020, the Government did not have a centralised web archive of all government websites and/or official social media accounts, similar to the ones in overseas jurisdictions mentioned above. In this connection, Audit noted that:

(a) in November 2014, OGCIO conducted a study on web archiving which found that B/Ds would back up and archive contents of websites according to their individual needs; and

(b) in 2018, GRS commenced a pilot project on web archiving of government websites. A service provider was engaged to conduct archiving of selected government websites during the six-month period from August 2018 to January 2019.

In response to Audit's enquiry, in February 2020, GRS said that the experience gained in the pilot project would allow GRS to: (i) make a realistic estimation on the cost of the initiative, including the web harvesting service cost and the storage cost; and (ii) determine whether the web archiving task should better be conducted in-house or by outsourced contractors as well as the approach to store the archived web contents. GRS was consolidating the experience from this pilot project and had yet to formulate the long-term strategy for web archiving in the Government. In Audit's view, as Hong Kong is lagging behind other overseas jurisdictions in archiving of government websites and social media accounts, there is a need to formulate a long-term strategy for web archiving in the Government. There is also a need to promulgate guidelines on management of electronic records in web environment.

Audit recommendations

4.20 **Audit has *recommended* that the Director of Administration should:**

(a) **step up efforts to complete the comprehensive study on long-term preservation of electronic records;**

(b) **consider setting up a mechanism to regularly monitor B/Ds' practices in preserving electronic records; and**

(c) **formulate a long-term strategy for web archiving in the Government and promulgate guidelines on management of electronic records in web environment.**

Response from the Government

4.21 The Director of Administration agrees with the audit recommendations. She has said that:

(a) regarding the audit recommendation in 4.20(a):

(i) GRS has been working closely with OGCIO in planning and defining the scope of the comprehensive study on long-term preservation of electronic records. According to the research conducted by GRS, overseas archival authorities have encountered different problems in ensuring the long-term accessibility of digital archival records despite the significant resources they have devoted to identifying solutions;

(ii) one of the major problems is that digital records can appear in different file formats and can be kept in different media. As the number of file formats is evolving, it is difficult to find one single file format for preserving the digital archival records to ensure their long-term accessibility. As a result, if any file format becomes obsolete, it is necessary to migrate the digital records from the old format to a new format and the whole migration process has to be properly documented to maintain the authenticity and reliability of the records. Besides, even when the digital records are kept in a trusted storage medium with full backup, it is necessary to conduct periodic checks to ensure the integrity of the records and to prevent any loss of information in the records;

(iii) as explained in paragraph 4.6, it was decided not to commence the study before 2015 having regard to the need to accord priority and concentrate resources for implementation of the ERKS pilot projects. Subsequently, GRS resumed action in April 2016 to prepare the revised scope and implementation timetable for the comprehensive study. GRS then conducted a request for information exercise to gauge the availability of consultancy firms for the study in March 2017, followed by a funding application exercise and a procurement exercise;

(iv) owing to the longer-than-expected lead time required for seeking funding and completion of the necessary tendering procedures, GRS commenced Phase 1 of the comprehensive study in November 2019 and the plan is to complete the study by mid-2021. GRS will closely monitor the progress of the comprehensive study to ensure that it is completed on time; and

(v) GRS appreciates the need for proper preservation of electronic records in B/Ds. The comprehensive study will help develop comprehensive guidelines to facilitate B/Ds' preservation of their electronic records. Selected B/Ds will be invited to meet the consultant on their needs and concerns on preservation of electronic records. GRS will keep in view the recommendations from the consultant on the Government's policy and strategy for the long-term preservation of electronic records and will develop detailed guidelines for B/Ds as appropriate;

(b) regarding the audit recommendation in paragraph 4.20(b), GRS will set up a mechanism to monitor B/Ds' practices in preserving electronic records including conducting surveys and on-site visits to B/Ds on a regular basis; and

(c) regarding the audit recommendation in paragraph 4.20(c):

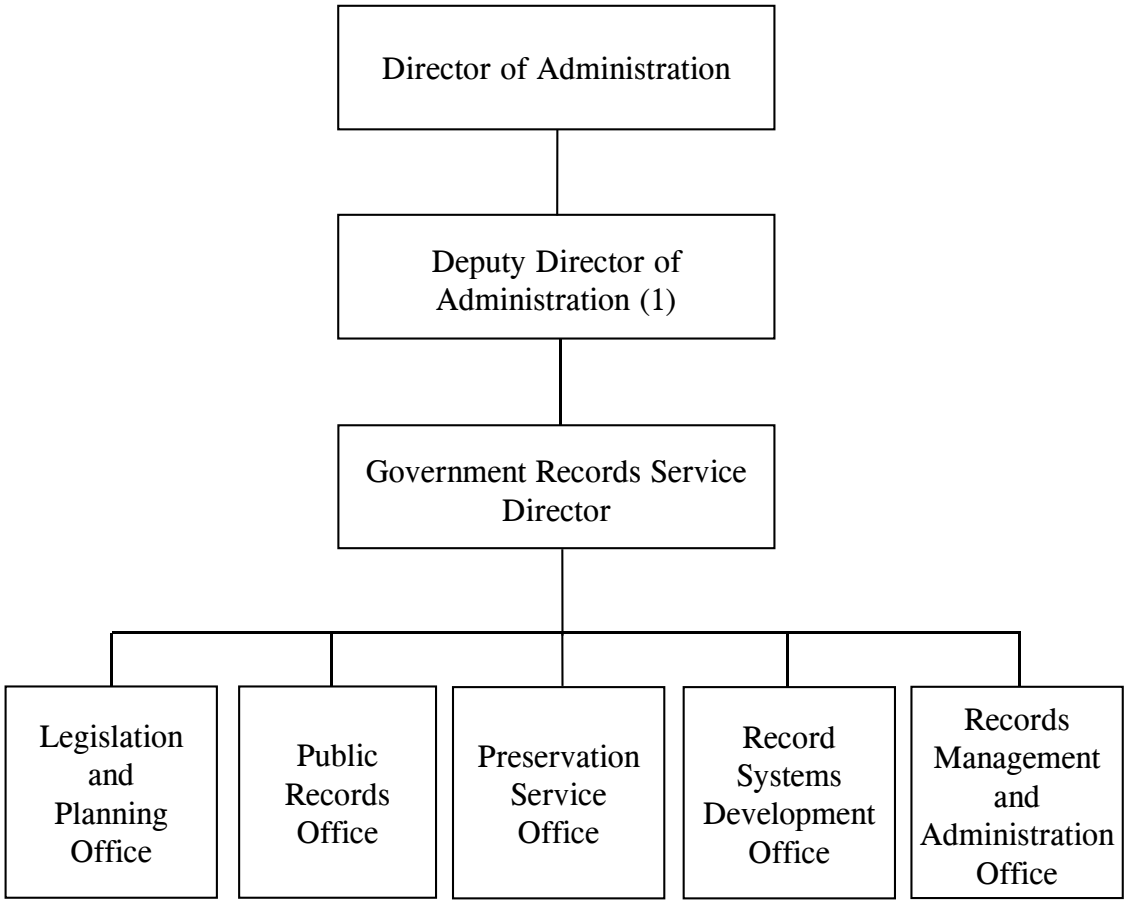
(i) web archiving is the process of collecting web contents of websites and preserving the collections in an archive format for access and use. According to the research conducted by GRS into those overseas jurisdictions which have started their work on website archiving, many of them had to substantially scale back their work in view of the significant costs involved in conducting web harvesting and storing the archived websites;

(ii) in addition, the remote harvesting technology has technical limitations and those webpages with dynamic contents (i.e. websites with video and audio streaming or interface with internal business IT systems), or hyperlinks to other websites, may result in missing links in the archived websites. To cope with the above challenges, different jurisdictions adopted different approaches in conducting their web archiving activities; and

(iii) to keep pace with the archives in overseas jurisdictions to preserve web contents of government websites as archive collections, GRS adopted a prudent approach and conducted a pilot project on archiving of Government websites in 2018. GRS is in the process of consolidating the experience from the pilot project. As the archiving of government websites is technically complex and involves substantial investment on a long-term basis, GRS will carefully assess the prevailing technology for remote harvesting of websites and cost implications before formulating the long-term strategy for web archiving in the Government.

Appendix A
(para. 1.2 refers)

Government Records Service: Organisation chart (extract) (31 December 2019)

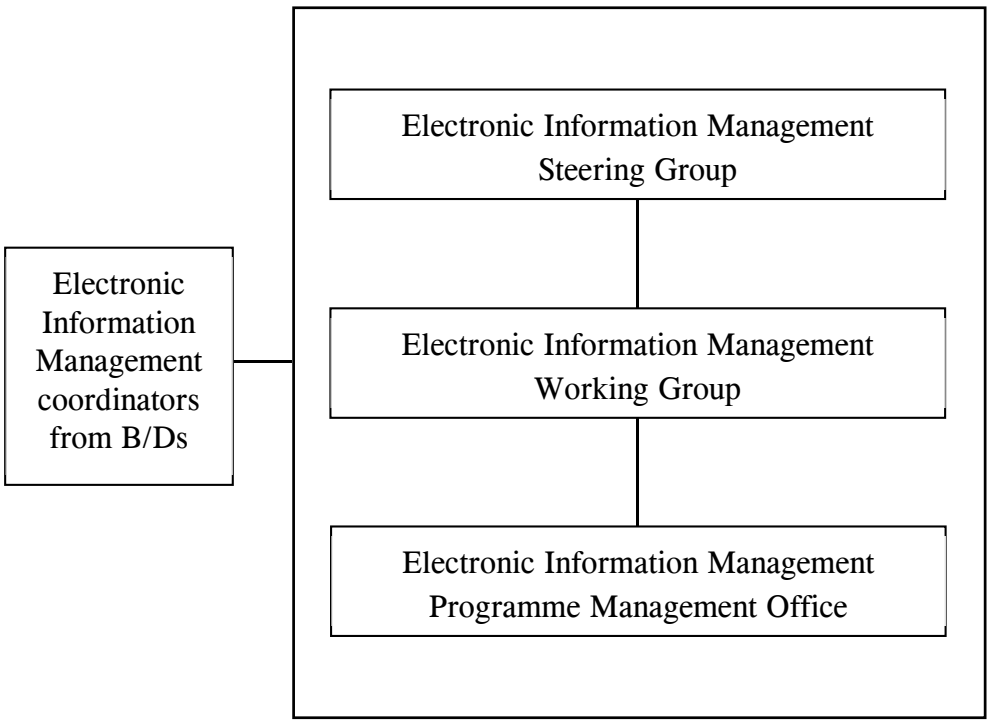


Source: GRS records

Appendix B
(para. 1.9 refers)

Governance structure of the Government's Electronic Information Management Programme (31 December 2019)

Central governance body (Note)



Source: *OGCIO records*

Note: *The central governance body comprises members from OGCIO, the Administration Wing of the Chief Secretary for Administration's Office and EffO. External domain experts are also engaged in the work of the Programme Management Office.*

Acronyms and abbreviations

ArchSD	Architectural Services Department
Audit	Audit Commission
B/Ds	Bureaux/departments
CCIB	Communications and Creative Industries Branch
CEDB	Commerce and Economic Development Bureau
CEDD	Civil Engineering and Development Department
CMMP	Centrally Managed Messaging Platform
CWRF	Capital Works Reserve Fund
DSD	Drainage Services Department
EffO	Efficiency Office
EIM	Electronic Information Management
ERKS	Electronic recordkeeping system
ERM	Electronic records management
GovCloud	Government Cloud Infrastructure
GovHRMS	Government Human Resources Management Services
GRS	Government Records Service
IPD	Intellectual Property Department
IT	Information technology
ITSC	Information Technology Steering Committee
MD	Marine Department
OGCIO	Office of the Government Chief Information Officer
PAT	Project Assurance Team
PID	Project Initiation Document
PIDR	Post Implementation Departmental Return
PSC	Project Steering Committee
RVD	Rating and Valuation Department
TB	Terabyte
TIR	Test incidents report