4.5.

GEM APPLICATION MANAGEMENT

MARCH 26, 2019

SUMMARY OF THE AUDIT

OBJECTIVE

Determine whether GEM application controls ensure that GEM does not pose any major data confidentiality, integrity and availability risks arising from the application's lifecycle, use and maintenance.

RESULTS

The GEM application has the following appropriate controls:

- Everyone knows the roles and responsibilities associated with the GEM application and who the owner is;
- Staff in the various departments have been made aware of the cybersecurity risks;
- Incident management and change management processes are adequate;
- Security settings are configured to enable strong passwords.

Nevertheless, existing logical access management controls need to be improved. This finding together with obsolete technology and a lack of human resources could lead to data confidentiality and corruption risks as well as risks that the Gestion de l'évaluation municipale (GEM) application could become unavailable.

Here are the items that need to be improved:

- The roles and responsibilities associated with the application and the owner of the application are known, but they have not been formalized;
- Access request forms are not retained and access profiles are not reviewed on a regular basis;
- There is a very large backlog of minor changes to be made;
- The team responsible for modifying the application in the test environment is also responsible for implementing changes in the production environment;
- The technologies used today are no longer supported by the vendor or they are too old, which makes it difficult to recruit staff with the required knowledge;
- In the context of a small team, the attrition of staff requires special attention because of the many retirements in the next 24 months;
- There is no formal process for updating documentation;
- Given the advanced age of the GEM application, access monitoring tools should be improved;
- A formal process needs to be implemented for more effective problem management;
- Application and infrastructure monitoring need to be strengthened for better failure detection.

In addition to these results, we have formulated various recommendations for business units.

The details of these recommendations and our conclusion are outlined in our audit report, presented in the following pages.

Note that the business units have had the opportunity to formulate their comments, which appear after the audit report recommendations.

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LIST OF ACRONYMS

ARMT
Act respecting municipal taxation

CA
Incident management application

FTP
File Transfer Protocol

GDM
Application de gestion des incidents et changements

GEM
Gestion de l'évaluation municipale

IT
Information Technology

JIRA
The City's incident and technological change management application.

MAPAQ
Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec

PG
software Municipal assessment software used by several cities in Quebec.

RACI
A responsibility matrix

SEF
Service de l'évaluation foncière

STI
Service des technologies de l'information

UST
User Support Technician – Service de l'évaluation foncière

1. BACKGROUND

Reporting to the Direction générale adjointe aux services institutionnels, the Service de l'évaluation foncière (SEF) mission is to prepare, maintain and defend the real estate assessment rolls of municipalities in the Montréal agglomeration, in accordance with the provisions of the *Act respecting municipal taxation* (ARMT).

The Gestion de l'évaluation municipale application (GEM) is used to establish and update the Ville de Montréal's (the City) real estate assessment rolls. This roll is an inventory of all buildings on a municipality's land. In 2017, the Ville de Montréal's building inventory included 438,000 units valued at $274 billion. A new assessment roll is filed every three years in accordance with the *Act respecting municipal taxation* and regulations under the Act. The GEM application is also used to issue certificates of amendments to units of assessment. Modules are used to distribute the tasks to be performed by the employees and to control transactions that change the assessment roll. GEM application assessment data are used to calculate taxes that generated $4.2 billion in revenue in 2017, representing 76% of the City's total unconsolidated revenues.

The SEF's activities and the GEM application are primarily required to meet the obligations set out in the ARMT and regulations under the Act.

The City first developed the GEM application in 2004. The Ville de Québec subsequently joined it in 2008. It has been changed regularly to include new tasks such as licence management. Since about 2010, the City has been changing the GEM application on its own.

Internal access to the GEM application is via an Internet browser. Secure remote access is only available to a few SEF managers and to City inspectors. The GEM application cannot be accessed from outside the City's network. The GEM application has a 10G Oracle database hosted on a Unix server. The Oracle Designer tool is used for development and to generate application screens and reports. Four environments are supported:

- Development;
- Tests;
- Acceptance;
- Production.

The main GEM application input interfaces are:

- The Bureau de la publicité et des droits: data on deeds of sale. Judgments are uploaded onto a file sent by email. Some information is manually recorded by the SEF;
- Boroughs: most boroughs use the City's licence management application;
- Related municipalities: most related municipalities use the PG software (municipal assessment software used by several Quebec cities). Some still send their licence information on paper;

- The Service des incendies: data on units of assessment that have been damaged are sent to the GEM application (by Oracle view from the Service des incendies software);
- The Service des finances: rental memos for exemptions (e.g., a federally owned building) and tenant data for these buildings are sent to the GEM application.

The main GEM application output interfaces are:

- The Service des finances to the OASIS application: OASIS is used to manage tax bills issued by the City based on real estate assessment data. Transfers are performed weekly via File Transfer Protocol (FTP). The GEM application is strategic for OASIS because it provides critical data for calculating property taxes.
- Related municipalities: real estate assessment data for these municipalities are sent by FTP;
- The Ministère des Affaires municipales et de l'Habitation (MAMH): all rolls and some assessment certificates are sent to MAMH.
- The Conseil scolaire: rolls and land certificates are sent by FTP and are used for school taxation;
- The Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec (MAPAQ): sends certificates for registered farms.

The 170 active users of the GEM application are supported by a pilot and three User Support Technicians (UST) for SEF. At the Service des technologies de l'information (STI), a business analyst, three programmers and two IT analysts are responsible for the GEM application.

Since the fall of 2018, a call for tenders is being drafted (project number 74551 in the 2018 Three-year capital expenditures program) to modernize and merge the GEM and OASIS applications into a single application. The call for tenders is currently being revised for publication in the spring of 2019.

2. PURPOSE AND SCOPE OF THE AUDIT

In accordance with the *Cities and Towns Act*, we have conducted an audit engagement in compliance with the Canadian Standard on Assurance Engagement (CSAE) 3001 described in the CPA Canada Handbook – Assurance.

The purpose of this audit was to assess management of GEM application governance and maintenance in order to limit data loss and corruption risks, and risks relating to loss of operational efficiency and changes in the application.

The role of the Auditor General of the Ville de Montréal is to provide a conclusion on the purposes of the audit. To do so, we have collected a sufficient amount of relevant evidence on which to base our conclusion and to obtain a reasonable level of assurance. Our assessment is based on criteria we have deemed valid for the purposes of this audit. These are set out in the appendix 5.1.

The Auditor General of the Ville de Montréal applies the *Canadian Standard on Quality Control* (CSQC) 1 of the CPA Canada Handbook – Assurance and, consequently, maintains a comprehensive quality control system that includes documented policies and procedures with respect to compliance with ethical guidelines, professional standards and applicable legal and regulatory requirements. It also complies with regulations on independence and other ethical guidelines of the *Code of Ethics of Chartered Professional Accountants*, which is governed by fundamental principles of integrity, professional competence, diligence, confidentiality and professional conduct.

Our audit focused on the five following assessment criteria:

- Criterion 1 — Roles and responsibilities;
- Criterion 2 — Logical access management;
- Criterion 3 — Change management;
- Criterion 4 — Human resource and technical sustainability;
- Criterion 5 — Operations management.

Our engagement did not include items related to IT recovery and the backup process, because they were covered in our 2015 Information and communications technology recovery management audit. Recommendations had been issued with an implementation schedule extending to early 2020.

Our audit was performed from July 16, 2018 to March 26, 2019. The work involved conducting interviews with staff, reviewing various documents and conducting surveys that we considered appropriate to obtain the necessary audit evidence.

Upon completing our audit work, we presented a draft audit report to the managers of each audited business unit for discussion purposes, and to each business unit involved in the audit in order to obtain action plans and implementation timelines.

3. AUDIT RESULTS

3.1. ROLES AND RESPONSIBILITIES

3.1.A. BACKGROUND AND FINDINGS

In order to clearly define accountability for roles and responsibilities, they must be properly defined, written and validated by all stakeholders. This process usually gives rise to a RACI matrix (Responsible, Approver, Consulted, and Informed), which provides a reference for each application process throughout its lifecycle. It can be used as a baseline if changes are required or the application needs to be migrated to a new system.

It is important to define who will be responsible for each application in order to provide clear accountability for each action requiring a validation string. The application manager is in charge of keeping the application operational. He must be involved in each major change and every application migration.

We noted that there is no matrix (e.g., RACI matrix) that defines roles and responsibilities. Also, the GEM application owner has not been formally identified. However, we should point out that each party knows and complies with the roles and responsibilities.

The absence of a roles and responsibilities matrix could cause application governance problems such as:

- complicated or ineffective collaboration between teams (e.g., users redirected to the wrong teams for access or incident management);
- more human errors in production processes or delays in the steps to be taken by operational teams (e.g., duplication in production processes, deletions);
- granting application privileges without going through the validation cycle.

RECOMMENDATION

3.1.B. **We recommend that the Service des technologies de l'information work with the Service de l'évaluation foncière to create a roles and responsibilities matrix (e.g., a RACI matrix) for the municipal assessment management application. The matrix must also officially designate the application owner.**

BUSINESS UNIT'S RESPONSE

3.1.B. ***Service des technologies de l'information jointly with the Service de l'évaluation foncière***

[TRANSLATION] The roles and responsibilities of the Service de l'évaluation foncière and the Service des technologies de l'information are known, and the owner of the application is known.

The deliverable involved producing a RACI matrix, (represents a matrix of responsibilities) which we sent to the Service de l'évaluation foncière for comments. We formalized the owner of the application in the document. ***(Planned completion: June 2019)***

3.2. LOGICAL ACCESS MANAGEMENT

3.2.1. ACCESS MANAGEMENT POLICY

3.2.1.A. BACKGROUND AND FINDINGS

A number of measures, documentation and restrictions are required to prevent security breaches, access bypass and abuse of privileges.

Many controls, processes and regulations must be established to prevent unauthorized access and identity theft.

We have taken note of the existing access management process and the various documents used to verify that access privileges are properly assigned and monitored.

However, we found the following:

- There is no access management procedure;
- The process for granting and removing logical access is incomplete. Application and validation forms are not archived, making it impossible to keep track of approvals;
- The access rights review process must be formalized;
- Several generic accounts have very limited access to a production environment (read only access to a few screens). There is a sound basis for these accounts except for one account, which has become difficult to monitor.

Although we did not find any cases of illegitimate access in our tests, without formalized and documented access management, inappropriate access rights could be granted or retained, which could lead to errors or fraud. It would be difficult to hold users of poorly controlled generic accounts accountable for inappropriate actions.

RECOMMENDATION

3.2.1.B. **We recommend that the Service de l’évaluation foncière:**

- **create an access management procedure;**
- **retain duly approved access request forms and access removal request forms;**
- **formalize the access rights review process;**
- **review the management and redefinition of generic accounts. There must be a properly documented and approved waiver form for each generic account created.**

BUSINESS UNIT'S RESPONSE

3.2.1.B. ***Service de l'évaluation foncière***

[TRANSLATION] The existing procedure will be reviewed and improved, and expressly detailed in a document and distributed to the persons to whom the procedure applies. ***(Planned completion: May 30, 2019)***

The forms will be reviewed and an application retention method will be implemented. ***(Planned completion: May 30, 2019)***

Access rights are reviewed periodically, but the process is rather informal. These reviews will be performed on a routine basis, and the frequency of reviews will be established. ***(Planned completion: May 30, 2019)***

The management of generic accounts is already under review. All access rights will have been reviewed and formalized by May 15, 2019.

3.2.2. PASSWORD STRENGTH

3.2.2.A. BACKGROUND AND FINDINGS

It is important to establish security rules for strong passwords. During a cyberattack, it is easy to crack weak passwords.

We found that the password security rules for the GEM application are adequate, because they follow best industry practices.

However, given the advanced age of the GEM application, access monitoring tools should be improved.

3.2.3. SEGREGATION OF ACCESS RIGHTS

3.2.3.A. BACKGROUND AND FINDINGS

To prevent unauthorized access or fraudulent use of the GEM application, it is important to segregate rights between profiles and rights granted. In this context, access to high-privilege accounts must be stringently regulated and monitored.

We found that the definition of the various profiles in the GEM application provide good segregation of rights and adequate access control. Profiles are defined based on the positions filled by users. However, they are not subject to regular review.

Failure to review profiles and associated access rights on a regular basis could lead to users having access rights to control key milestones in a transaction or event (e.g., amend an assessment and authorize the amendment).

RECOMMENDATION	
3.2.3.B.	**We recommend that the Service de l'évaluation foncière establish a process for regular review of access profiles and the rights they contain.**

BUSINESS UNIT'S RESPONSE	
3.2.3.B.	***Service de l'évaluation foncière*** *[TRANSLATION] A process for reviewing the rights granted in each existing user profile will be defined. The review will be performed annually, or whenever a process or the roles and responsibilities of a group of employees are changed.* ***(Planned completion: May 30, 2019)***

3.2.4. CYBERSECURITY AWARENESS

3.2.4.A. BACKGROUND AND FINDINGS

To ensure appropriate security controls and measures, staff must attend periodic cybersecurity awareness and training workshops to prevent internal security breaches and vulnerabilities.

We noted that the City has a cybersecurity department and has set up an awareness and training portal for employees.

We reviewed the portal's content, update frequency, and regular planning of training and awareness workshops. We examined these items and found that staff has been properly educated and trained to manage cybersecurity situations.

No recommendations are required.

3.3. CHANGE MANAGEMENT

3.3.1. CHANGE MANAGEMENT PROCESS

3.3.1.A. BACKGROUND AND FINDINGS

Any changes in a production environment must follow a number of regulations and processes, and undergo validation. Without proper processes and controls, the application's integrity and stability would be at risk. It is critical that appropriate monitoring, control and surveillance tools be used.

We found the following:

- Change management is appropriately documented, and the tools used by the SEF and STI teams are adequate;
- Changes are properly documented and approved using change management tools (JIRA and GDM);
- Changes go through the appropriate test phases and the approval cycle, as required;
- Each change put into production is prioritized, planned and monitored.

However, we found that there is a considerable backlog of changes (more than 400 changes), which could increase without any appropriate steps having been taken to remedy the situation.

Although these backlogged changes are minor, their increasing number creates risks because they require more workarounds that could lead to a larger problem.

RECOMMENDATION

3.3.1.B. **We recommend that the Service des technologies de l'information work with the Service de l'évaluation foncière to review the backlog of production changes to understand the issues and use this knowledge for the new application.**

BUSINESS UNIT'S RESPONSE

3.3.1.B. ***Service des technologies de l'information jointly with the Service de l'évaluation foncière***

[TRANSLATION] It took us more than six months to prepare the call for tenders to replace the Gestion de l'évaluation municipale, including functionality checklists, in close collaboration with the Service de l'évaluation foncière.

The specifications in the call for tenders include more than 180 use cases specific to property assessment, as well as requests for changes not made in production. This covers all the features that the client wants in the new application.

The deliverable will therefore consist of adding a status (included in the call for tenders) to the list of changes that have not been implemented. More than 400 change requests are identified. ***(Planned completion: June 2019)***

3.3.2. RESTRICTION OF RIGHTS IN THE PRODUCTION ENVIRONMENT

3.3.2.A. BACKGROUND AND FINDINGS

The team of programmers often makes change errors in a production environment instead of a test environment because they have write rights in both environments. Programmers can bypass official processes when they have direct access to the production environment.

We reviewed the list of production users and their rights and found that the team in charge of changing the software (the programmer) and the team responsible for implementing the changes (operation) is the same. As a result, access rights cannot be segregated. It is our understanding that it is difficult to apply this principle because the teams are so small.

Without limited restriction of production rights, programmers could implement unauthorized changes in production. The integrity of the application could be compromised.

RECOMMENDATION

3.3.2.B. **We recommend that the Service de l'évaluation foncière work with the Service des technologies de l'information to implement a compensating control (e.g., a release report) to ensure that all releases have been approved by the change validation committee.**

BUSINESS UNIT'S RESPONSE

3.3.2.B. ***Service de l'évaluation foncière jointly with the Service des technologies de l'information***

[TRANSLATION] As mentioned in the report, the small size of the team limits the ability to separate roles during releases.

The deliverable will consist of a release report that will be reviewed and approved by the division head and the client.
(Planned completion: September 2019)

3.3.3. STATUTORY COMPLIANCE

3.3.3.A. BACKGROUND AND FINDINGS

The GEM application must track and incorporate amendments to property assessment laws and regulations. Otherwise the application may fail to comply with statutory requirements.

We found that amendments to various laws and regulations were properly prioritized and implemented in a timely manner.

No recommendations are required.

3.4. HUMAN RESOURCE AND TECHNICAL SUSTAINABILITY

3.4.A. BACKGROUND AND FINDINGS

To ensure proper and optimal use, an application must meet inspection, upgrade, and up-to-date documentation requirements. The technological debt that has accumulated can make the GEM application very difficult to maintain and reduce its performance.

We found the following:

- The application has not been upgraded since it was created in 2004;
- The versions of databases used by the application are obsolete and no longer supported by the supplier, which may lead to major vulnerabilities;
- Because this application is obsolete, it is more difficult to recruit new resources given the technological prerequisites;
- The size of the operating teams is also already very small today (5 people for 170 users). With the retirements expected to occur in the next 24 months, it will be difficult to keep the application operational.

Knowledge of the application may be lost if staff attrition is not properly managed. If the GEM application's technological debt is not managed, it would be difficult to keep it operational until the replacement project is completed. Also, because the supplier is no longer issuing security updates, the application could be at risk of cyberattack due to uncorrected vulnerabilities.

RECOMMENDATION

3.4.B. **We recommend that the Service des technologies de l'information work with the Service de l'évaluation foncière to:**

- **prioritize the project to replace the property assessment management application in order to eliminate the technological debt accumulated in recent years;**
- **define a succession plan to recruit a sufficient number of resources and transfer knowledge required to keep the municipal assessment management application operational until the replacement project is completed.**

BUSINESS UNIT'S RESPONSE

3.4.B. ***Service des technologies de l'information jointly with the Service de l'évaluation foncière***

[TRANSLATION] The replacement project is part of our prioritized project roadmap and must be approved by the city manager's committee. During the week of May 6, the plan will be submitted to the assistant general director of the Service des technologies de l'information, and subsequently to the city manager, to obtain the required budgets.

With respect to the succession plan, a re-evaluation of the resources required for operations is underway and recommendations will be forwarded to the deputy director general of the Services aux citoyens. ***(Planned completion: September 2019)***

3.5. OPERATIONS MANAGEMENT

3.5.1. APPLICATION DOCUMENTATION

3.5.1.A. BACKGROUND AND FINDINGS

In order to ensure the application's operational efficiency and maintainability, it is important to have clear, up-to-date documentation. This documentation must be verified and indexed regularly to ensure proper traceability.

We found the following:

- Relevant application operation documentation is available (including monitoring of automated procedures);
- Although this documentation was updated in September 2018, there is no update process.

Without a documentation update process, the documentation could become obsolete, which could lead to a progressive loss of knowledge. As a result, application failure risks and failure response times could both increase.

RECOMMENDATION

3.5.1.B. **We recommend that the Service des technologies de l'information implement a documentation update process.**

BUSINESS UNIT'S RESPONSE

3.5.1.B. ***Service des technologies de l'information***
[TRANSLATION] The Service des technologies de l'information provided us with confirmation that it agrees with the recommendation it received. The detailed action plan will follow shortly.

3.5.2. INCIDENT MANAGEMENT

3.5.2.A. BACKGROUND AND FINDINGS

In the lifecycle of an application, every incident detected in production must be properly documented in a ticketing application that enables unique identification of each incident by documenting the source of the problem, the impacts, and its resolution.

We found that incidents recorded in GEM or JIRA tools are documented and tracked correctly according to the lifecycle of an incident (creation, testing, communication, resolution, and closure).

No recommendations are required.

3.5.3. PROBLEM MANAGEMENT

3.5.3.A. BACKGROUND AND FINDINGS

A problem is the recurrence of an incident requiring a correction action plan. For each problem, this plan must be monitored periodically to ensure proper implementation and progress of corrective actions.

We found that the problems are properly recorded in the ticketing system, but, to date, there is no problem management process with the necessary monitoring.

Without this process, there could be weaknesses in implementing an action plan that requires close monitoring, and problems may not be resolved in a timely manner.

RECOMMENDATION

3.5.3.B. **We recommend that the Service des technologies de l'information implement a problem management process for the property assessment management application.**

BUSINESS UNIT'S RESPONSE

3.5.3.B. ***Service des technologies de l'information***
[TRANSLATION] The Service des technologies de l'information provided us with confirmation that it agrees with the recommendation it received. The detailed action plan will follow shortly.

3.5.4. APPLICATION AND INFRASTRUCTURE MONITORING

3.5.4.A. BACKGROUND AND FINDINGS

The GEM application's sensitive infrastructure and processes require appropriate incident monitoring and service continuity to reduce downtime and provide the various application stakeholders with prompt information updates. Critical application screens as well as infrastructure (including servers and databases) must therefore be monitored by the operating teams.

We found that there were no tools or reports to effectively detect service slowdowns or failures on critical application screens or GEM application infrastructure.

Without preventive monitoring of critical application screens and infrastructure, operations teams would not have the feedback needed to respond to a major incident. Resolution time would be extended.

RECOMMENDATION

3.5.4.B. **We recommend that the Service des technologies de l'information implement a property assessment management application monitoring process that will ensure that critical screens and servers and databases are monitored.**

BUSINESS UNIT'S RESPONSE

3.5.4.B. ***Service des technologies de l'information***
[TRANSLATION] The Service des technologies de l'information provided us with confirmation that it agrees with the recommendation it received. The detailed action plan will follow shortly.

4. CONCLUSION

It is important to point out that the Gestion de l'évaluation municipale (GEM) application provides the data needed to produce the taxation that generated $4.2 billion in revenue in 2017, i.e. 76% of the City's total unconsolidated revenues.

The GEM application has appropriate controls for stakeholder knowledge of roles and responsibilities, staff awareness of cybersecurity risks, incident and change management processes, and password security parameters.

Nevertheless, existing logical access management controls need to be improved. This finding together with obsolete technology and a lack of human resources could lead to data confidentiality and corruption risks as well as risks that the GEM application could become unavailable.

Here are the details according to the following evaluation criteria:

Criterion 1: Roles and responsibilities

Everyone knows the roles and responsibilities associated with the application and who the owner is. However, roles and responsibilities have not been formalized.

Criterion 2: Logical access management

We note some areas for improvement in the access management policy. Access request forms are not retained. It should be noted that the profile creation procedure and the user account review process must be formalized. Finally, there are no proper guidelines for managing generic accounts.

Passwords are strong enough to secure the accounts. However, given the advanced age of the GEM application, access monitoring tools should be improved.

Segregation of access rights is properly defined so that rights granted correctly based on the user profile. However, these profiles do not undergo regular review.

Staff in the various departments have been made aware of the cybersecurity risks. The portal and the various awareness campaigns available are effective tools to provide protection against this type of risk.

Criterion 3: Change management

This process defines each stage of the lifecycle of a change request (the request, tests, and releases). Changes required pursuant to a new regulation or law are implemented in a timely manner.

However, we have noticed that there is a very large backlog of minor changes that need to be implemented or are pending.

Also, the team responsible for modifying the application is also responsible for implementing production changes.

Criterion 4: Human resource and technical sustainability

The GEM application has accumulated a very large technological debt. An action plan is required to replace this obsolete application. Technologies used today are no longer supported by suppliers or they are so old that qualified staff is no available to operate them. Also, staff attrition requires special attention given the many retirements expected over the next 24 months.

Criterion 5: Operations management

Application documentation is available for operations management, but there is no documentation update process.

Incidents are being managed appropriately. A formal process needs to be implemented for more effective problem management. Finally, application and infrastructure monitoring must be strengthened to better detect failures, which will increase the teams' ability to respond.

5. APPENDIX

5.1. OBJECTIVE AND EVALUATION CRITERIA

OBJECTIVE

Determine whether the control mechanisms put in place for the GEM applicable ensure that GEM does not present any major risks in terms of data confidentiality, integrity and availability related to its life cycle, use and maintenance.

EVALUATION CRITERIA

Criterion 1: Roles and responsibilities

Roles and responsibilities are defined, approved, communicated and provide clear accountability (e.g., the RACI matrix). The GEM application owner has been formally identified.

Criterion 2: Logical access management

Access management must be properly documented and include periodic access reviews. The GEM application uses authentication parameters that are strong enough to maintain a secure environment. Otherwise, the risk of unauthorized access may increase. Profiles and rights granted enable proper segregation to prevent unauthorized access or fraud. Monitoring must be implemented to detect incidents in a timely manner.

Criterion 3: Change management

Any changes in the production environment must be properly documented, tracked, tested and validated by the competent authorities. Programmers have limited access to the production environment. Changes in the production environment are monitored. Statutory and regulatory amendments are incorporated into the GEM application in a timely manner.

Criterion 4: Human resource and technical sustainability

It is important to limit technological debt during the application's lifecycle, ensure adequate documentation, have enough qualified staff to keep the application operating without any major risks (e.g., untimely and repeated system shutdowns).

Criterion 5: Operations management

The GEM application has documentation to minimize operational risks. A single ticket is issued for each incident in the production environment. It tracks the source of the problem, the problem and its resolution. There is an action plan to deal with major problems and incidents. Key GEM application infrastructure and processes are properly monitored.