NATURAL SCIENCES AND ENGINEERING RESEARCH COUNCIL OF CANADA

SYSTEM UNDER DEVELOPMENT AUDIT OF THE EBUSINESS PROJECT 2004

Final Report

TKR Associates Inc.

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ACRONYMS AND ABBREVIATIONS

CASD	Common Administrative Services Directorate
CICA	Canadian Institute of Chartered Accountants
CIHR	Canadian Institute For Health Research
FTE	Full Time Equivalent
IM/IT	Information Management / Information Technology
ISD	Information Systems Division
IT	Information Technology
NAMIS	NSERC Awards Management Information System
NSERC	Natural Sciences and Engineering Research Council of Canada
Q-A	Quality Assurance
SSHRC	Social Sciences and Humanities Research Council of Canada

TABLE OF CONTENTS

1 Summary

The eBusiness Project is now into its third year of development and is making significant progress. The community of external users appreciates the benefits that the system brings to ease the burden associated with preparing and submitting applications for funding. The eSubmission and several other components have been completed and many others are progressing well.

It is not clear from the written record, however, where NSERC stands today with regard to its original eVision. The impression that one gathers is that there has not been as much progress to date as was originally expected. eBusiness has not yet succeeded in positioning NSERC as a leader in the use of automated tools, as was articulated by Management Committee in November 2000. NSERC now stands at about mid-position among comparable funding organizations: Ahead of NSERC are the National Science Foundation (Washington), the Fonds Québécois and the Killam Foundation; behind NSERC are SSHRC and CIHR.

Notwithstanding deserved recognition for progress achieved to date, it is the primary function of an audit to draw attention to shortcomings and to make recommendations for improvement. To this end, we note the following:

a. There are significant weaknesses in project management, primarily in project scheduling. The lack of a project schedule inhibits management from any meaningful understanding of progress, and of where the eBusiness Project stands overall. It also undermines management's ability to set targets and priorities for future eBusiness development.

b. Although considerable progress has been made since last year in preparing for cost tracking, this important feature is not yet fully implemented. For this reason, NSERC Management cannot exercise cost control, as there is no quantitative basis for assessing alternatives involving resource allocation.

c. There is a general lack of focus on key controllable variables: *resources*, *schedule* and *component specifications*; stemming in large part from shortcomings a. and b. above. This lack of focus manifests itself in an absence of progress indicators, which complicates NSERC management's understanding of the overall status of the Project and of its components.

d. There is no master plan for the eBusiness Project. Without a master plan, NSERC management does not have a benchmark against which to measure and assess progress.

e. There are instances of practices that are characteristic of relative inexperience in developing large-scale IT projects the size and complexity of eBusiness. For example, changes affecting benchmark deliverables have been introduced without the formality of Project Charter changes and approvals that should accompany such changes, and there is a lack of follow-through on 'critical' and 'important' issues – as evidenced by project reporting.

f. The widespread use of NSERC staff with limited prior knowledge and experience in systems analysis and design, has necessitated considerable training and coach-

ing. Despite such efforts and the full cooperation and energies of the staff involved, gaps in systems know-how still remain. This is a potentially important handicap with regard to the up-coming difficult job of process transformation of the program branches (the Business Transformation Project).

Recommendations

The recommendations of this audit stem from the above general observations, which, in turn are an aggregated outcome of the research and interviews conducted in the course of pursuing specific lines of inquiry established by Internal Audit.

Each recommendation is presented at the end of the report section of its related Line of Inquiry. Recommendations are also listed in Annex C.

The following recommendations are particularly important:

1. Project Scheduling

The eCentre should ensure that project scheduling be done continuously and effectively. This means that the eCentre should have the resources necessary to maintain the project schedule at all times, and that the project schedule accurately reflect all components of the eBusiness Project to the lowest level of detail needed for effective control.

For project scheduling to be done effectively, the eCentre must be provided with appropriate inputs. To this end, all project participants – the eCentre, ISD and program branches – should provide reasonably accurate estimates of the time and resources they plan to use in the project, and should keep these estimates up-to-date at all times.

2. Cost-Tracking

The eCentre, based on the experience of the pilot, should implement cost tracking as soon as possible.

3. Master Plan

NSERC management should request the eCentre to prepare an eBusiness Master Plan and keep it up-to-date. This Plan should scope the work remaining to complete the implementation of the original eBusiness vision, updated as appropriate with work completed to date (including the Project Blueprint), as well as changes in the business environment, and developments in technology since the original Plan was created. The Plan should also be time-scaled and costed, so that NSERC management can exercise meaningful control.

4. Training

The eCentre should ensure that all staff involved in process transformation are fully trained in the appropriate techniques.

The eCentre should provide the Project Scheduler with a full range of training and coaching in the practice of project scheduling, and in the specific use of MS Project, which is NSERC's chosen scheduling software.

2 Introduction

2.1 Background

NSERC (the Natural Sciences and Engineering Research Council of Canada) is the national instrument for making strategic investments in Canada's capability in science and technology. NSERC supports both basic university research through research grants and project research through partnerships of universities with industry, as well as the advanced training of highly qualified people in both areas. NSERC budgeted $678 million in university-based research and training in 2002-2003.

In December 1999 NSERC and SSHRC attempted a joint project whose specific goal was to migrate from eForms to eBusiness. The project's mandate was: *to improve how* [*they*] *meet corporate goals and objectives through the provision of electronic tools*.[1]

The eBusiness project was to help develop and deliver such tools. The project was headed by a project director and three project managers, and was governed by a joint SSHRC/NSERC/CASD Steering Committee. In October 2000, the two Councils reorganized the management of the project to provide more independence to each Council. During the ten months of joint project work NSERC continued to develop web tools for its community. With the establishment of its own eBusiness Project, the move from eForms to eBusiness started to materialize.

At a special meeting held on November 2000, Management Committee endorsed an eBusiness strategy that would:

- Position NSERC as a leader in the use of web tools,
- Bring innovative solutions for eBusiness services, and
- Meet Government-On-Line (GOL) objectives of the Federal Government.

The goals defined by NSERC management targeted the needs of researchers, students, university administrative offices, industry, Council staff, and the public.

The e-Business Project was to focus on the following four objectives[2]:

1) Simplify and improve the application, progress monitoring and reporting processes through the provision of flexible, easy-to-use, reliable, accessible tools to help in the preparation of funding applications, their evaluation, in providing feedback to applicants, and in monitoring and reporting progress and results;
2) Streamline the administration of awards through the provision of simple and secure tools to grantees and university offices, in order to exchange information with the Council;
3) Increase the visibility and promotion of NSERC-sponsored research by strengthening communication activities and performance analysis; and
4) Improve internal operations through the review of current processes and the provision of electronic program-related administrative tools such as data capture, process automation, information management solutions, etc."

[1] Follow-up Report to SUD II Audit, updated September 6, 2002, page 2
[2] ibid, pp 2-3

To ensure success, Management Committee requested the investigation of similar systems and projects developed by similar organizations (e.g. NSF and FCAR[3]) and the feasibility of developing partnerships with them. The strategy was to be implemented using a project-by-project approach including pilots. In addition the E-business solutions was to take into account and balance the following factors:

Flexibility: To accommodate the diverse and changing nature of NSERC's business and operational requirements as well as information needs of the community.

Simplicity: To maximize ease of use, maintenance and improvements to the system.

Data integrity: To improve operational efficiency and data sharing, and preserve accountability.

Data retrieval functionality: To facilitate reporting and support decision-making at both operational and executive levels.

The eBusiness Project was given the responsibility to propose a direction for future e-business activities that flowed from the mandate, strategic goals and objectives defined by NSERC Management. Accenture, a private sector consultancy with experience in developing eBusiness strategies in similar organizations was engaged to develop:

- an eService delivery vision;
- an eBusiness delivery model;
- an eInfrastructure architecture;
- a migration strategy; and
- an overall eBusiness strategy.

The eBusiness Strategy was completed in April 2001 and included costs, risk assessment, and a high level implementation plan.

The eBusiness Project was launched with commencement of the eSubmission component of the Project in June 2001.

System-Under-Development Audits

Earlier, in February, 2001, Management Committee approved the annual undertaking of system-under-development audits, whose objective is to identify factors that could affect the successful delivery of the Project on time, within budget, and that meet user requirements.

The methodology of the first audit, completed in July 2001, used a risk framework consisting of four risk categories: *Governance*; *Business*; *Project*; and, *Technology*. The second audit, completed in September 2002, was a follow-up to the first audit and was based on the same risk framework.

The eSubmission component was completed by the end of September 2002 at a cost of about $2.5 million. Whereas the project was considered to be a success, it proved to be stressful and difficult, and the eCentre sought to avoid such problems to the extent possible in future undertakings. The eCentre commissioned a project post-mortem study, which was completed in April 2003 with several recommendations of interest and relevance to the internal audit function.

[3] Now known as Fonds Québécois de la recherche

2.2 Audit Terms of Reference

The Audit Objectives for this System Under Development Audit were established as follows:

- *Follow-up on the recommendations made in the last audit report;*
- *Conduct a post-mortem of the 2003 e-submission cycle for Strategic Projects and Discovery Grants programs, identifying the successes and problems encountered, and*
- *Assess whether project management practices are conducive to the successful delivery of e-business solutions, on time and within budget.*

If ineffective or inefficient practices are identified, specific corrective measures will be recommended. Areas for improvement should also be raised. The Lines of Inquiry for this third audit are as follows:

Follow-Up on Previous Audit
The previous system under development audit conducted from July to September 2002 contained several recommendations. A follow-up to determine the current state of the recommended actions and an assessment of the management response is required.

Post-Mortem
A post-mortem of the 2003 eSubmission cycle for Strategic Projects and Discovery Grants application processing is needed to determine:

- *The progress made on project deliverables and system performance as compared to the 2002 eSubmission cycle.*
- *The cause (governance, project and/or technical) of problems encountered and the recommended solutions to minimize the reoccurrence in future eSubmission cycles. Managing problems during peak eSubmission periods also requires analysis.*
- *The utility to the end user, i.e. are eBusiness solutions making a difference for applicants? In addition, how intuitive applicants find the current system and suggested improvements to future versions of eSubmission should be addressed.*
- *The performance of the help desk and its usefulness to clients. The tools/systems used to manage the help facility should also be examined.*

New/On-Going Risk Factors
Identifying eBusiness project risks and making recommendations to minimize the impact of these risks is an ongoing necessity for a project of this magnitude. A risk assessment in the areas of governance, project, and technical domains is required to answer the following questions:

Governance

- *Is the mandate of the project still valid? Are the roles and responsibilities of committees, divisions and managers clearly defined? Are decisions being made in a timely manner?*
- *Are internal and external communication efforts meeting the needs of the intended audiences?*

Project

- *Has scope creep become an issue, and if so, has it had an impact on the core deliverables of the project?*
- *Is the project management structure properly defined and are project management skills adequate?*
- *Are eBusiness solutions for external clients being delivered, and are the needs of program areas being addressed?*

- *Are the systems, structure, and skills needed for quality assurance adequate?*
- *Is the progress made to date comparable to similar projects in other organizations?*

Technical

- *Is NSERC on the right track with the technology solutions selected?*
- *Is the process, timing and responsibility for selecting software and hardware solutions properly defined?*

2.3 Audit Methodology

The elements of our investigation consisted of a review of available documentation, systems walk-through, direct interviews with management, key functional staff and representatives of the university user community, and telephone interviews with others in the user community possessing knowledge about the system in relation to its functionality and utility to themselves as end users.

In preparing the audit program, we relied on three primary sources:

- The *CICA Handbook* on auditing, published by the Canadian Institute of Chartered Accountants, updated to 1994,
- *Common Evaluation Criteria*, published by the Treasury Board Secretariat, undated but understood to be current, and
- The *IT Project Manager's Handbook*, published by the Treasury Board Secretariat, 1997.

Planning for this audit commenced with a meeting at NSERC on February 4. The draft Work Plan, based on the given terms of reference (Section 2.2 above, in italics) was reviewed by NSERC Internal Audit and the eCentre and discussed in the course of a meeting on February 11 and again on February 17. The final version of the Audit Work Plan was reviewed and approved on February 25.

Audit field work was carried out between February 4 and March 12, with last-minute interviews held on March 30. The Draft Report, dated March 31, 2004, was submitted for review April 2, a draft-Final version was submitted April 29th, and this, the Final Report, was submitted June 15th.

This report is based on the lines of inquiry of the approved Audit Work Plan. Its format follows the audit terms of reference. The line of inquiry corresponding to each audit objective is specified at the beginning of the respective report section.

2.4 The Audit Report

Chapters 3 to 5, which follow, present the audit observations in accordance with the approved lines of inquiry. Presentation is in the formal Observations, Background, Analysis and Conclusions, and Recommendations format.

Annex A lists all persons interviewed in the course of the audit.

Annex B lists the documents reviewed in the course of the audit.

Annex C lists all recommendations, in order of presentation, cross-referenced to the report section in which they are presented.

The preceding chapter – Summary – highlights the audit and presents the auditors' perspective of priority attention.

3 Follow-up on Previous Assessments

3.1 Follow-up Audit of the eBusiness Project – September 2002

The recommendations of the previous Follow-up Audit are presented below, with a summarization and assessment of their current status.

Recommended Action	Current Status and Comments
There should be a sharing of information and coordination of effort at multiple levels – strategic management and project.	The eBusiness governance structure has been strengthened since the last audit. Roles and responsibilities have been clarified. The project's visibility and impact has been improved by having the Project Director report to the Executive Vice President and by having the Executive VP chair the Steering Committee. The Executive VP's role includes ensuring strong linkages and communication across the organization and the various initiatives and projects. Notwithstanding these improvements, there continue to be expressions of concern about communication and governance. **Conclusion:** This recommendation has been implemented from the perspective of the concerns that gave rise to its formulation. Further, and more specific actions are addressed in other lines of inquiry in this audit. **Recommendation:** 3.1.1 The overall issue of sharing of information and coordination of effort at multiple levels should continue to be addressed by Internal Audit in future audits, but at a more specific level to facilitate concrete improvements.
The eBusiness Project needs to continue to be disciplined in its scope management.	The Project Charter functions to define project scope. Not all project charters are complete and up-to-date. **Conclusion:** Changes affecting benchmark deliverables can and do get introduced without the formality of Project Charter changes and approvals that should accompany such changes. **Recommendation:** 3.1.2 The eCentre should complete and update all Project Charters, ensuring coverage in sufficient detail to avoid ambiguity, especially in benchmark deliverables and changes.

Requirements management process must ensure that knowledgeable users at the appropriate level articulate their requirements.	The eBusiness project has a formal process – in place and operational – for identifying requirements and approving them. There have been several reported instances, however, of requirements being expanded or changed after having been approved. Such changes have the effect of increasing project costs and adversely impacting the project's implementation schedule. **Recommendation**: 3.1.3 The eCentre should ensure that approved changes are implemented as approved and not subsequently altered without approval.
The most serious area of risk is the lack of a detailed project plan with a critical path identified. The detailed plan must include user activities and schedule. The plan must be monitored and updated on an on-going basis.	A detailed project plan with a critical path has not yet been prepared. **Conclusion**: Identified as a serious risk in the previous audit, this shortcoming is now judged to be critical. Its absence is impeding progress, and inhibiting accountability and control over project activities. Please refer to Section 5.2.1 on page 22, and recommendations on the following page.
During the follow-up audit the project administration position was defined and staffed. The organization and management of project documentation will be key activity as well. *The position must support the project director in the development and on-going monitoring and updating of a detailed project plan.*	Project support has improved with the addition of a full-time Administrative Assistant, but weaknesses remain, with consequential effect on integrated planning and scheduling. **Conclusion**: As noted above, critical support is needed in project planning, whether provided by means of an FTE, a temporary position or a consultant, as also noted on page 22.

3.2 eSubmission Project Post-Mortem, April 2003

A Project Post-Mortem study of the eSubmission Project was conducted shortly after the Follow-up Audit to assess the extent to which the project is compliant with best practices, as defined by the Enhanced Management Framework for IM/IT projects as defined by Treasury Board.

The recommendations of the Post-Mortem study are presented below, with a summarization of their current status, management response and assessment.

Recommended Action	Current Status and Comments
1 NSERC should review best practices in project management, as promoted by Treasury Board and the Project Management Institute, in pursuit of all further components of the eBusiness Project. Those practices found to be suitable to the NSERC environment should be applied.	**Observations:** The eCentre prepared and submitted a Project Management Framework to the eBusiness Steering Committee. This Framework proposed: • A standard approach of phased implementation, • Monitoring progress against a project plan, • Responsibility of the project manager to ensure attainment targets of scope, cost and schedule, and • Appropriate levels of attention be given to problems when they arise. The Steering Committee formally approved these principles. **Recommendations**: 3.2.1 The Project Management Framework should be implemented by the eCentre. 3.2.2. The Management Committee should be kept informed of implementation progress and should follow up as appropriate.
2 Steps taken recently in making project planning more comprehensive should be continued. More extensive and detailed scheduling of project activities and prototyping should be pursued.	The eCentre is committed to ensuring that all projects be scheduled and reviewed by XXXXX. XXXXXXX. Exempt Privacy Act. The post has since been filled by an experienced NSERC staff person XXXXXX. Exempt Privacy Act. **Observations:** Project schedules are being produced. However, the MS Project schedules submitted to the Audit Team for review are not suitable for project control: – They are incomplete, – They do not adequately nest details to facilitate review from different perspectives, and – The Gantt chart presentation does not give visibility to where attention is needed, including the critical path. **Conclusion**: Project scheduling, to be done right, requires a lot of study and practice. XXXXX. Exempt Privacy Act. Please refer to Section 5.1.3 on page 20. **Recommendation**: 3.2.3 The eCentre should ensure that estimates are prepared

Recommended Action	Current Status and Comments
	for all eBusiness project components, are kept up-to-date, and are made available to the Project Scheduler.
3 NSERC should implement formal cost tracking and control as soon as is practicable	**Observations:** Concrete steps have been taken to implement cost tracking. These include: – Timesheets by non-core staff, which record staff time by project to the nearest half-day. – Financial codes to enable tracking of costs on a per-project basis. – A pilot cost-tracking, scheduled for December 2003-March 2004. Formal implementation remains to be done. **Recommendation**: 3.2.4 The eCentre, based on the experience of the pilot, should implement cost tracking as soon as possible.
4 Training in project management concepts and skills, and systems analysis techniques, should be provided to both eCentre and ISD staff. The scope of such training should be assessed with the assistance of Human Resources	**Observations:** A 3-day basic Project Management course has been provided to all eCentre staff, and seven eCentre staff have taken a course in Requirements Analysis, which included several systems analysis topics: relational databases, web technologies, object orientation, UML, use cases, activity diagrams and class diagrams. Some eCentre staff disagreed with the conclusion of the Post Mortem Report that more training is needed, explaining that pressure of deadlines and the number of issues needing immediate attention, distracted their attention from liaison activities. **Conclusions**: Notwithstanding encouraging progress to date, this audit reiterates the need for continued training in both project management skills and system analysis techniques. The latter, in particular, is judged to be critical, prior to the difficult job of process transformation in the program branches. By experience, process transformation (sometimes called re-engineering) requires considerable skill to be done effectively. **Recommendation**: 3.2.5 The eCentre should ensure that all staff doing process transformation are adequately trained.
5 The Table of Project Roles and Responsibilities updated recently should be circulated	**Observations:** The Table has been circulated to ISD and the Program Branches, and has been posted on the NSERC Intranet.

Recommended Action	Current Status and Comments
to all project participants. In addition, the Table should be posted on NSERC Intranet where project participants can easily find it	**Conclusion**: This recommendation has been completed satisfactorily.
6 The eCentre should formalize its project reporting to NSERC management. Management Reporting and Baseline Plan Revision cycles that focus attention on matters of particular concern to NSERC management should be used as the basis for agenda-setting in the various Committee reviews	**Observations**: The Management Committee meets every two weeks, and provides a suitable forum for eBusiness system reporting. The Steering Committee meets monthly or when a quorum can be convened providing the forum to review major deliverables, baseline changes, and other important matters. There is evidence, however, of the need to improve upon project reporting material submitted to committee members prior to meetings, and the nature of discussions and decision-making at these meetings. **Conclusions**: The structural elements of this recommendation have been implemented. The specifics of improving project reporting are addressed in Section 5.1.4 on page 21.
7 Change Management[4] should be formalized and applied within the eCentre to manage all project changes	**Observations**: The structural elements of this recommendation have been implemented: A suitable process is in place and staff roles and responsibilities have been updated to provide a suitable environment for the timely handling of change requests and changes. Software used is Rational ClearQuest, a leading activity-based change and defect tracking package that manages all types of change requests, including defects, enhancements, issues and documentation changes. **Conclusions**: This recommendation has been completed satisfactorily, as formulated. However, the overall change management process can be made more effective by having better detail data available for use in decision-making.

[4] Defined as the management of changes to the eBusiness System and its components.

Recommended Action	Current Status and Comments
8 Problem and Issue Management should be formalized and applied within the eCentre Issue Management also spans the entire project and should also be coordinated by the eCentre	**Observations**: The eCentre has combined the functions of problem management and issue management, and designated the Help Desk as the point of entry for all eBusiness related problems. Staff roles and responsibilities have yet to be updated. Problems are classified as being either functional or cosmetic, and prioritized within the functional group. Cosmetic problems are addressed later. Problems scheduled for resolution are tracked using Rational ClearQuest, discussed above. A User Group is in the process of being set up to do a triage and prioritization of suggestions and comments received by the Help Desk and other sources, including ISD and the program branches. Some problems encountered by external users are reported first to program branch staff, and sometimes repeatedly. This necessitates extra time and effort to sort and classify problems, and ensure that all of them get logged and processed. **Conclusions**: Progress in this area is encouraging, particularly regarding cooperation between the eCentre and ISD compared to this time last year. However, there is evidence of a backlog of outstanding requests. This backlog is discussed in some detail in Section 5.2.4 Adequacy of Quality Assurance, on page 24. **Recommendations**: 3.2.6 The eCentre, in close collaboration with ISD, should establish the a policy regarding the recording and resolution of requests, including notifications of complaints, problems and issues. This policy should be unambiguous as to objectives and responsibilities, and should be brief. This policy should not be limited to eBusiness but extend to all NSERC IT applications. 3.2.7 ISD should establish, publish, and implement effective practices to ensure that the above-mentioned policy is carried out effectively and efficiently. 3.2.8 NSERC Management should follow up on the above-noted policy and practices, to ensure that they get done in a timely fashion.

Recommended Action	Current Status and Comments
9 The eCentre, in planning the residual work for the eSubmission Project should increase the priority of documentation, in steps, until it gets done	**Observations**: The Executive Committee has recognized this problem as being mainly technical in nature, according to the Management Reply to the Post-Mortem report. ISD has recently strengthened its 'as-you-go' documentation capabilities through its 'development architecture' and has established a standard format for such documentation. ISD has pledged to keep its documentation up-to-date, but has not yet addressed documentation of past cycles. **Analysis and Conclusions**: Documentation is one of the least enjoyable activities of systems work and easily overlooked or put aside when there is pressure from other aspects of system development. Few organizations do documentation well. ISD is the primary beneficiary of such documentation. Historically, organizations that do good documentation are better able to maintain and upgrade software applications, and can do so in less time and at lower cost. NSERC/ISD is no exception. Documentation can be done to excess, but there is no evidence that ISD's 'as-you-go' documentation is excessive. There are some concerns, however, that it may not be sufficient. This should be looked into in more detail. **Recommendation**: 3.2.9 ISD should a) review and update its documentation policy and practices, b) ensure that practices are effective, ie. balance level of effort with payback in terms of reduced effort in maintenance and enhancements, and c) ensure that practices are carried out according to updated policy.
10 Clear lines of inquiry should be set up in advance of system-under-development audits	This audit is a reflection of management's commitment and action to improve system development performance.
11 NSERC management [should] formally adopt a comprehensive project management approach based on the proposed framework and recommendations of the Treasury Board and the Project Management Institute.	This recommendation was not addressed in management's response. However, the aggregate improvements to date and highlighted above indicate not only a willingness in this regard, but have also shown concrete steps taken towards implementing a comprehensive project management approach.

4 Post-Mortem of the 2003 eSubmission Cycle

4.1 Progress on Project Deliverables

In this Line of Inquiry, we were looking for documentation or similar evidence regarding the following:

- The scheduling of project deliverables at the outset of the development period,
- A detailed description (specification) of the output of each deliverable,
- A record of what was actually accomplished by the end of the period, and
- An assessment of performance, as reported to the Management Committee, and the Steering Committee as necessary.

Observations:

An examination of the Project Plan, as also noted on page 9, reveals a promising start, but with several shortcomings:

- The Plan is incomplete: several sections, dealing with ISD and other components, have not yet been included
- Some sections in the Plan have not been kept up-to-date
- The Plan does not adequately[5] nest activities to facilitate review at different levels of detail and from different perspectives, and
- The Gantt chart presentation of the Plan does not give visibility to where attention is needed, including, importantly, the Project's Critical Path.

A review of development specifications for the outputs of deliverables showed that they exist in written form, as recorded by development staff. It is understood that outputs (deliverables) are documented for future reference, but that such documentation is not kept up-to-date regularly.

eCentre reporting to the Management Committee is substantial, is done on a regular basis, ie. at virtually every meeting, and relates to the eBusiness project. However, because the Project Plan is not kept up-to-date regularly with the status of the overall project's various components and modules, reporting lacks rigour and precision. It is therefore unable to report overall percentage completion, and that of its components, nor can it compare forecast versus actual. Consequently, the Management Committee is left with impressions, for example, that progress of one particular component is doing well, or that another component is progressing ahead of expectations, or that yet another is experiencing trouble because of …, or … etc.

Analysis:

There are only three major[6] variables to be concerned about:

[5] There is a two-level hierarchy of activities, but it could be improved substantially to facilitate management control.

- **Component Specifications** (what is to be delivered and how it will perform)
- **Resources** (what is needed/used to meet specifications, usually expressed as costs in dollar terms), and
- **Schedule** (the time required to complete specifications).

Targets (expectations) are set for each and all of these, at the component level.

There are interdependencies between the variables, for example:

- System response time could be improved by adding hardware and bandwidth capacity (at a cost)
- Component completion dates could be shortened by adding more resources (consultant-programmers) though not necessarily in a linear relationship.

The eCentre should report to the Management Committee in terms of these variables, and what must be done to meet them. Given the nature of NSERC operations with calendar deadlines to meet in order to fulfill its obligations with the research community and other applicants, the tradeoff is limited to specifications versus resources.

Conclusions:

Schedule. Without adequate representation of the eBusiness Project Schedule and its components, it is impossible for the eCentre to manage the project effectively and for NSERC Management to provide help and guidance. The absence of an accurate project schedule accounts for why Management Committee meetings give rise to feelings of frustration: There isn't a suitably-quantified representation of project status to bring focus on alternative courses of action for which management input is needed.

Resources, with costs as proxy: This variable is addressed in Recommendation 3.2.4 on page 10.

Recommendations:

4.1.1 The eCentre should ensure that project scheduling be done continuously and effectively. This means that the eCentre should have the resources necessary to maintain the project schedule at all times, and that the project schedule accurately reflect all components of the eBusiness Project to the lowest level of detail needed for effective control.

4.1.2 The eCentre should ensure that the project management software utilized should have the capability of nesting layers of detail, that the schedule should exploit this capability, and that this nesting capability should be utilized in reporting the project to various audiences.

4.2 Progress on System Performance

In this Line of Inquiry, we were looking for evidence of system performance indicators that have been clearly defined, are quantifiable, are tracked on a routine basis against predetermined standards, and are used in reporting to management, wherein reporting results in taking corrective action as and when required.

[6] There are far more than three variables to look after in IT projects. The art of project management is to aggregate and minimize for purposes of control. The above three variables are those most commonly used for this type of project.

Observations:

We did not find performance indicators and their usage that meet the above criteria.

We were advised at the time of planning this audit that there are six performance indicators ready for use. These are:

- System stability
- System Downtime
- Screen Action Response Time
- Print Preview Response Time
- Internal User Satisfaction, and
- External User Satisfaction.

Some of the indicators are being tracked now, for example server downtime as a proxy for system downtime. In a report entitled *CC Daily Stats*, (undated), 'Server Down' has been recorded on average 14 times per week over the period January 5 to November 9, 2003. This is a much higher than desired frequency of downtime, and is due to well-known system stability problems that started to occur as researchers flooded the system with their electronic submissions. During the peak submission period from August 17 to November 2, the average rose to 37, and the peak of 110 outages occurred during the week of November 2.

In the Binder labeled *eBusiness Main Documents*, there is a report entitled *Performance Measurement Strategy*, dated February 2003. This document contains six tables in the main text and an additional ten pages of tables in the Appendix (which duplicate table information in the main text and add data for an additional twenty indicators). All of this presents a wealth of information pertaining to progress indicators for the eBusiness Project, and numerous suggestions as to how they might be tracked and controlled individually. With few exceptions, the suggestions are judged to be good.

However, implementing all 41 main text progress indicators would be impractical. The report does not recommend that this be done, but does refer to them as "core performance indicators to be tracked"[7] implying that they be implemented.

Overall, the *Performance Measurement Strategy* report is judged to be a useful first start in establishing performance indicators, and should be consulted further.

Recommendations:

4.2.1 ISD should establish and implement a policy of tracking a limited number of key performance indicators. The suggested number is three, but this number could be more or less depending on the need by NSERC management to be informed. The suggested[8] indictors are a) System Downtime – Elapsed, b) System Downtime – Incidents, and c) Complaints Received from External Users.

[7] Performance Management Network, Feb 13, 2003 p. 6

[8] System Performance Indicators work best when senior management decides which ones to use, requests that they be tracked, and schedules committee discussions around the significance of the tracked results.

4.2.2 The eCentre should track and report two additional performance indicators: d) Percent Complete – overall project, including individual components where appropriate[9], and e) Overall Cost, when cost data become available.

4.2.3 NSERC senior management, with input from the Management Committee, should review the suggested indicators, substitute as desired, and request that the approved set be tracked and reported on a regular basis.

4.2.4 ISD and the eCentre should devise the means for tracking the indicators for which they are responsible, and report results to management on a regular and routine basis. The suggested reporting frequency is monthly.

[9] Note that in order to derive overall percent complete, it is necessary to determine the percent complete of each component and then to aggregate them. Component results should be made available on request to explain deviations from expected performance of the overall project.

5 New / Ongoing Risk Factors

5.1 Governance

5.1.1 Validity of the Project Mandate

In this Line of Inquiry, we were looking for evidence of a change in vision or objectives of the original plan, as well as whether or not eBusiness is meeting its objectives vis-à-vis the Accenture vision.

Observations

Nearly three years have elapsed since NSERC management commissioned Accenture and launched the eBusiness era. Since then, the Council has made important progress toward lightening the load for its external users, and the benefits of this progress are beginning to be appreciated, according to a small sample of end users consulted in the course of this assignment.

No evidence was found within NSERC that would indicate that the vision or objectives have changed, or from among its various clients and other research funding institutions that the mandate of the eBusiness System should be changed. On the contrary, there is considerable evidence that NSERC should maintain – accelerate if possible – the schedule of eBusiness implementation. This issue is discussed further in Section 5.2.5 on page 25.

5.1.2 Roles and Responsibilities

In this Line of Inquiry, we were looking for evidence of clearly-defined roles and responsibilities of Committees, Divisions and Managers, push/pull communication of these roles and responsibilities to all parties (see also *Effectiveness of Communications* on page 21 following), the understanding of these roles and responsibilities by all parties, and a process in place for making changes to project roles and responsibilities.

Observations:

Project charters are intended to document project basics, including objectives, scope , benefits, deliverables, and organization and responsibilities.

Three Project charters were examined and in all three cases the responsibilities were documented and the documentation judged to be clear and easy to understand. It is understood, however, from discussions with various project staff, that not all projects or project components have documented charters.

It is also understood that some but not all completed project charters are available on the Intranet for consultation (pull) and that when completed, are usually e-mailed to project stakeholders or stakeholders are notified that the Project charter exists and can be observed on the Intranet. Note that at the time of writing, the Intranet had not been inspected to confirm these reported observations.

An informal process exists for making changes to project roles and responsibilities. The Project Director, as well as her counterpart within ISD, have the authority to make such changes. The culture of NSERC encourages such initiative and changes have been made without incident.

Discussions with eCentre and ISD staff confirmed that roles and responsibilities are well understood and clear, and have not been the object of significant concern. There have been incidents of tension between individuals, which is not at all uncommon in a pressure-cooker project environment, but these have been resolved in the past, and with the collaborative culture of NSERC still predominant, it is likely that such middle-ground consensus-finding when tensions arise, will continue.

Conclusions:

Roles and responsibilities are judged to not be a significant problem and no action need be taken at this time. Opportunities for improvement, such as completing project charters and updating the Intranet with them and with changes to them do exist, but can be done as a matter of course and need not be a focus of attention in this audit mechanism. The collaborative culture of NSERC can be leveraged to ensure satisfactory resolution of tensions and disagreements, which are a fact of life in the IT environment, and IT projects in particular.

5.1.3 Timeliness of Decision-making

In this Line of Inquiry, we were looking for evidence of structure in project progress reporting, action items and due dates in meeting minutes, and evidence of follow-up on these, and confirmation, from participants, of satisfied stakeholders.

Observations:

Progress reporting is indeed timely, ie. done regularly, but does not give management a clear picture of how far along the Project is at any given point in time (percentage complete), to what extent it is ahead of or behind schedule, and what options are available to get one or more of its components back on track in cases of schedule slippage.

Analysis and conclusions:

As noted on page 15, the three variables used to control the eBusiness Project – as in most IT projects of comparable size and complexity – are component specifications, resources and schedule. Specifications are set at the beginning of the annual development cycle, and from that point onward until the end of the cycle, control amounts to a trade-off between resources and schedule within the bounds of known development parameters. Specifications are not frozen altogether, as evidenced by interviews and minutes of meetings well into the development cycle, and this gives an extra degree of freedom to the control process. All in all, eBusiness should not be a difficult project to manage effectively.

One would expect to see timely and clear reporting of planned versus actual progress, but this type of reporting is not done, for two apparent reasons:

- The eCentre is not making effective use of its project management package: Microsoft Project.

- ISD has been reluctant to date to provide the eCentre with estimates of the time and resources needed to undertake discrete project components, believing that it would be too costly and time-consuming to do so.

Consequently, despite regular and timely reporting, management is not able to influence the conduct and outcome of the Project effectively.

Recommendations:

5.1.3.1 The eCentre should provide XXXXX Exempt Privacy Act. with a full range of training and coaching in the practice of project scheduling, and in the specific use of MS Project, which is NSERC's chosen scheduling software.

5.1.3.2 NSERC management should require all project participants – including the eCentre, ISD and program branches – to provide reasonably accurate estimates of the time and resources they plan to use in the project. Note that this is the only realistic way that one can estimate the level of effort and duration of project components.

5.1.4 Effectiveness of Communications

In this Line of Inquiry, we were looking for evidence of both push and pull, ie. information sent (pushed) to stakeholders about project particulars, and up-to-date availability of the same information on the Intranet (pull) for when stakeholders want to access it. Specific communications evidence that we looked for are: project progress reporting on a regular basis, decisions of all kinds when decisions are made, milestone events when they occur, and appropriate documentation, on completion of system components.

Observations:

Extensive interviews were conducted among Project stakeholders, and the subject of communications was brought up in nearly all interviews. The overall impression that one gathers is that project communications have been quite successful in informing stakeholders about the objectives, overall plan, and general progress to date about the eBusiness Project.

Most internal project communications are made available via the NSERC Intranet, as well as being sent to the target stakeholder by e-mail, or via notification by means of a 'flash' screen message.

As evidenced by interviews with external stakeholders (referees and researchers), NSERC has been effective in getting the message across about what the Council is doing to lighten the load for them, and about specifics of how to use the new system.

Analysis and conclusions:

It is evident that the project has succeeded in getting the message across to virtually all stakeholders that eBusiness represents a major change in the way NSERC does business and will affect them in many different ways.

Moreover, the means by which information is communicated is also satisfactory: It would be hard for any employee or stakeholder to avoid being aware of what eBusiness is all about and where the Council stands today.

As noted in Sections 5.1.3 and 5.2.1 however, project communications has been far less effective in internally communicating the results of project scheduling and control, but for reasons of content rather than the means, or communications channel, used.

The recommendations presented in Sections 5.1.3 and 5.2.1 also apply to this section as well.

5.2 Project

5.2.1 Scope Creep

A commonly-used definition of scope creep is as follows: *The scope of the project defines those things that are intentionally included in the project. As the project goes forward there is a tendency for this to be broadened*.

In this Line of Inquiry, we were looking for evidence of established standard practice and procedures for changing project scope, procedures to document all scope changes, identification of roles of who may originate a scope change and who may approve a scope change, definition of the work involved in the scope change, as a list of work items, schedule, and effort, and discussion/identification of the source of funding of each change. We were also looking for evidence that such practices and procedures are being followed.

Observations:

Procedures and practices for changing project scope have not been documented. Nor are there documented procedures for recording scope changes, identifying who may originate a scope change and who may approve a scope change, definition of the work involved in the scope change, etc.

Analysis and Conclusions:

The absence of procedures and practices for changing project scope has not surfaced as an issue because it is not clear in the first place as to exactly what comprises the scope of the overall project and of its annual development undertakings.

A casual observer might gather the impression that the eBusiness Project comprises all things to do with automating the submission, handling and approval of applications for research projects, grants, scholarships, etc., and as far as it goes, this is true. Furthermore, one can glean the scope of annual development undertakings through reports and presentations to management, for example a presentation entitled *eBusiness Project 2004-05 Project Planning* and a report entitled *eBusiness Project Update to Management Committee, Period ending February 20, 2004*. These and similar documents enable one to piece together the eBusiness situation today or at any other point in time. There are other documents that present a multi-year planning perspective, for example the *eBusiness Project Status Report & Multi-Year Planning* presentation dated Feb-Mar 2004.

In all of the documentation reviewed in the course of this audit, nothing was found that ties back to the Accenture study and clearly describes what has been done in eBusiness since then by way of progress.

This begs the following questions:

- What further activities constitute completion of the eBusiness Project?

- How much have we completed to date and where, overall, do we stand today?
- When will the eBusiness System be completed?
- What happens after that?
- How much will it cost overall?

And indeed, many other questions that should be phrased and answered.

In effect, there is no Master Plan, and because there is no Master Plan, it is hard to define project scope and communicate its meaning to management. This gives rise to appearances that scope creep is more of a feature than an aberration of the eBusiness Project.

Recommendations:

5.2.1.1 NSERC management should commission the preparation of an eBusiness Master Plan. This Plan should scope the work remaining to complete the implementation of the original eBusiness vision, updated as appropriate with work completed to date (including the Project Blueprint), as well as changes in the business environment, and developments in technology since the original Plan was created. The Plan should also be time-scaled and costed, so that NSERC management can allocate financial and other resources to ensure completion.

5.2.1.2 The eCentre should establish procedures for changing project scope, for documenting scope changes, for naming those persons who are authorized to originate scope changes and others who are authorized to approve them, and for defining the work involved in a particular scope change, including lists of work items, schedule, and effort. ISD should collaborate in this undertaking because such procedures should be adopted for all large CASD undertakings.

5.2.2 Project Management Structure

In this Line of Inquiry, we were examining the existing project structure and defined roles and responsibilities for evidence of dysfunctionality, ie. conflicting or overlapping jobs and gaps.

In reviewing project management skills, we were looking for discrepancies between actual and scheduled outputs and the explanation given by functional managers about the causes of differences in general and shortfalls in particular.

Observations:

Roles and responsibilities are well documented for the project, as well as for other IT activities, reflecting attention to this issue since being raised in the last audit (see Page 7).There are no evident instances of overlapping responsibilities, nor of gaps, ie. tasks, activities or outputs that have not been assigned responsibility.

The question of roles and responsibilities, however, was brought up extensively in interviews. There were a few mentions about people not doing what they are supposed to do, as well as other mentions and discussion about tensions and disagreements. In no instance, however, was it said or implied that assigned roles and responsibilities are not known or need to be changed.

Analysis and Conclusions:

Tensions and disagreements are commonplace in IT and particularly in large, high-pressure IT projects. The NSERC eBusiness Project is no exception.

The eBusiness Project has an adequate project management structure, well-defined roles and responsibilities and operates within an NSERC culture that encourages consensus and conflict avoidance and resolution.

5.2.3 Meeting Client and Program needs

In this Line of Inquiry, we were looking for any problem areas that have not been addressed elsewhere in this audit.

Observations:

In most interviews, after addressing specific issues, a general question was posed with regard to 'other problems'. Of the numerous replies and suggestions received, none warranted being addressed in the forum of an audit.

5.2.4 Adequacy of Quality Assurance

In this Line of Inquiry, we were looking for evidence that the Quality Assurance (Q-A) function is working effectively at NSERC. Investigation elements were as follows: the existence of proper testing and examination procedures, evidence that quality assurance is being carried out regularly and at the proper time in the System Development cycle, evidence that corrections are being applied, and the absence of negative indications of adequate quality assurance staff skills.

Observations:

Quality Assurance, since last year, has been using Rational ClearQuest, a leading activity-based change- and defect-tracking package that manages all types of change requests, including defects, enhancements, issues and documentation changes, as noted on page 11.

The Q-A section within ISD undertakes both component testing and stress-testing of whole components after 'builds'[10], in accordance with standard industry practice.

The Q-A team noted that they are often subjected to pressure to meet deadlines, and the time they have available for testing is often shortened, close to the point of inhibiting sound testing practices.

There is documented evidence of a backlog of outstanding requests. In the *Software Report of Outstanding Issues for the NSERC On-Line Application System* dated March 8, 2004, there is a compendium of 251 recorded 'issues'. Of these:

- 180 have been assigned to be resolved
- 47 have been postponed
- 24 are unaccounted for.

These issues have been prioritized as follows:

- Highest (Very Important) – 11
- High (Give High) – 30

[10] 'build' is the building a new version of a system component, or integrated system.

- Normal – 83
- Low – 6
- Unprioritized – 121

Other aspects of the recording of issues do not appear to have been carefully addressed, for example the 'logged in' date is sometimes recorded and the 'Fixed in' date is rarely recorded.

Analysis and Conclusions:

The Q-A Section has made significant improvements in the past year and overall is doing a good job of quality assurance.

There is room for improvement, however, particularly in addressing and resolving outstanding issues, and in the recording of results.

Recommendations:

5.2.4.1 ISD should take appropriate steps to reduce the backlog of outstanding issues, and to keep the backlog to a minimum.

5.2.4.2 With reference to recommendations on page 11, ISD management should ensure that the referenced practices are closely adhered to.

5.2.5 Adequacy of Progress to Date

In this domain, we contacted other research- and scholarship-funding institutions comparable to NSERC to review the present state of their automation efforts. We also made high-level comparisons of the NSERC eBusiness Project with projects of comparable size elsewhere in Government.

Observations:

From observations of researchers and others in the external user community, there are many research- and scholarship-funding institutions whose state of automation is more advanced than that of NSERC. The National Science Foundation's Fastlane System, which is comparable to NSERC's eBusiness System, has been in operation since the mid-1990s, and is reportedly easy to use. The Fonds Québécois de la recherche (formerly Fonds FCAR), whose operations are similar to NSERC and its sister councils SSHRC and CIHR, implemented a fully automated system in 1999.

Experience with automated submissions has mostly been positive: It has reduced the effort in preparing and submitting applications and particularly the attaching of various addenda to applications. The Canada Council reports that their system has improved operational efficiencies in addition to making things easier for applicants. NSF's Fastlane is operational, stable, effective, and appreciated by applicants for its ability to streamline and simplify the application process. The Fonds Québécois system reportedly works well, and is appreciated by the research community that it serves.

There is reported to be a vocal minority of (mostly) academics who resist automation in general and research submissions in particular. This minority tends to be older and diminishing in both numbers and influence, according to outside observers.

Analysis and Conclusions:

Generally speaking, NSERC is not at the vanguard of automation and ease of use in submitting applications for funding.

The rate of progress in implementing eBusiness – primarily a function of the rate of investment and the efficiency and effectiveness of the implementation effort – would appear to be lagging. To the extent that an objective of NSERC is to be in a position of leadership as a funding institution, it would be prudent for NSERC management to pay closer attention to these three variables.

This audit has not been done in sufficient detail to make specific recommendations in this regard. A supplementary study with clear objectives should be considered as a means to determine how NSERC should proceed from here on.

5.3 Technical

5.3.1 Adequacy of Technical Solutions

In this domain we undertook a high level scan of similar systems of other organizations comparable to NSERC regarding the technologies and systems approaches being used.

Observations:

There were no observations from among other government departments and research funding institutions that would give rise to concerns that NSERC is on the wrong track from a technical solutions perspective.

The recent (December 2003) shift from a client-server to a web-server based IT architecture using Java, is key to ensuring the future scalability of hardware, thereby enabling NSERC to maintain adequate response times and the ability to handle peak submission volumes without inconveniencing external system users.

Conclusion:
NSERC is on the right track with regard to the technology solutions selected.

5.3.2 Selection of Project Solutions

In this domain we undertook a high level assessment of the policies and procedures used by ISD for the acquisition of both software and hardware products.

Observations:

CASD has an established policy of compliance with Treasury Board Guidelines for procurement and ISD follows this policy.

As a byproduct of NAMIS, ISD developed procedures for:

- Requirements and specifications preparation
- Examination of alternatives
- Solicitations (bid requisitioning)
- Bid assessment and selection
- Testing and acceptance, and
- Management of the acquisition process.

ISD claims that it has been and is continuing to apply these procedures to eBusiness. There were no reported incidents or observations that would indicate that ISD is not compliant with this policy and procedures. There were no observations in the previous two audits with regard to non-compliance, nor in the Project Post-Mortem with regard to significant deviations from industry best practices.

Conclusions:

The process, timing and responsibility for selecting software and hardware solutions are properly defined.

ISD is in compliance with policies and procedures for the acquisition of software and hardware products.

Annexes

A List of Persons Interviewed

NSERC Staff

Michelle	Beaudry	Lynda	Laforest
Martine	Bergeron	Mario	Lamarca
Isabelle	Blain	Debbie	Lee
Vanessa	Budarick	Paul-Eric	Leonard
Suzanne	Burke	Nigel	Lloyd
Michel	Cavellin	Scott	MacRae
Mariette	Demers	Kalvin	Mercer
Ginette	Drouin	Yolaine	Morin
Terra	French	Marc	Roy
André	Godin	Daniel	Savoie
Laressa	Gorchovski	Robert	Therien
André	Isabelle	Walter	Viera
Alison	Janildo	Serge	Villemure
Paula	Knappers	Christiane	Villemure
Barney	Laciak	Nathalie	Zaquine

Other Persons Interviewed:

XXXXXX Exempt Privacy Act., U. of New Brunswick

XXXXXX Exempt Privacy Act., Fonds québécois de la recherche

XXXXXX Exempt Privacy Act., National Science Foundation

XXXXXX Exempt Privacy Act., Fonds québécois de la recherche

XXXXXX Exempt Privacy Act., University of Ottawa

Marcelle Ménard (Canada Council – Killam)

XXXXXX Exempt Privacy Act., Researcher, University of Waterloo

B List of Documents Reviewed

eBusiness Report Card: Feedback Analysis	NSERC	Feb 2004
eBusiness Project Overview	NSERC	Jul 2001
eBusiness Project Update to Management Committee	NSERC	Feb 2004
Fall 2003 eSubmission Incident Report	NSERC	
eSubmission Project 2003 Instructions & Forms Update – Post-Mortem Report	NSERC	
NSERC Policy on Electronic Approvals: Draft for comments	NSERC	Nov 2003
Memo to eBusiness Steering Committee re: Responsibility Matrix	NSERC	Feb 2004
eSubmission Project Post-Mortem	TKR	Apr 2003
Management Response to SUD I Audit	NSERC	May 2002
Follow-Up Report to SUD II Audit	Hallux	Sept 2002
eBusiness Center Organization Chart	NSERC	
eBusiness Master Project Plan	NSERC	Feb 2004
eBusiness Main Documents • Project Roles & Responsibilities • Critical Success Factors • Integrated eBusiness Strategy • IT Strategic Implementation Plan • Communication Framework • Performance Measurement Strategy • Change Management Strategy • Project Costing Policy & Procedure	NSERC	 ? Jun 2001 Feb 2003 Feb 2004 Mar 2003 Feb 2003 May 2003 Dec 2003
eBusiness Project Management Framework • Documentation & Consultation Checklist • Business Case • Charter • Risk Management Strategy • Requirements • Status Report • Change Request Management and Issues Tracking Process • Post Mortem • Completion Report	NSERC	
eBusiness Project Plan Update FY 2003-04	NSERC	Jun 2003
Management Response to eSubmission Post Mortem, 12 Apr 03	NSERC	Apr 2003
Project Manager's Meeting Jan 23, 2004	NSERC	Jan 2004

eBusiness Strategy as updated 18 February 2004 draft	NSERC	Feb 2004
Project Charter Extranet Project Draft 1.2	NSERC	Sept 2003
eBusiness Project 2004-05 Project Planning	NSERC	
NSERC eBusiness Enterprise Architecture Blueprint Volume 1 Version 1.0	NSERC	Sept 2002
NSERC eBusiness Enterprise Architecture Blueprint Volume 2 Version 1.0	NSERC	Sept 2002
eBusiness Project Plan Update	NSERC	May 2003
NSERC eBusiness IT Strategic Implementation Plan Version 1.0	NSERC	Jan 2003
NSERC eBusiness Strategy –Draft	NSERC	Feb 2004
eBusiness Steering Committee Meeting Minutes Feb 18 2004		Feb 2004
Management Plan NSERC On-Line System Presentation to Steering Committee	NSERC	March 2004
eBusiness Project 2004-05 Project Planning Presentation to Steering Committee	NSERC	March 2004
eBusiness Project Status Report & Multi-Year Planning	NSERC	Feb-Mar 2004

C List of Recommendations

Chapter 3: Follow-up on Previous Assessments

Section 3.1: System-Under-Development Audit, September 2002

3.1.1 The overall issue of sharing of information and coordination of effort at multiple levels should continue to be addressed by Internal Audit in future audits, but at a more specific level to facilitate concrete improvements

3.1.2 The eCentre should complete and update all Project Charters, ensuring coverage in sufficient detail to avoid ambiguity, especially in benchmark deliverables and changes.

3.1.3 The eCentre should ensure that approved changes are implemented as approved and not subsequently altered without approval.

Section 3.2: eSubmission Project Post-Mortem, April 2003

3.2.1 The Project Management Framework should be implemented.

3.2.2. NSERC management should be kept informed of implementation progress and should follow up as appropriate.

3.2.3 The eCentre should ensure that estimates are prepared for all eBusiness project components, are kept up-to-date, and are made available to the Project Scheduler.

3.2.4 The eCentre, based on the experience of the pilot, should implement cost tracking as soon as possible.

3.2.5 The eCentre should ensure that all staff doing process transformation are adequately trained.

3.2.6 The eCentre, in close collaboration with ISD, should establish the a policy regarding the recording and resolution of requests, including notifications of complaints, problems and issues. This policy should be unambiguous as to objectives and responsibilities, and should be brief. This policy should not be limited to eBusiness but extend to all NSERC IT applications.

3.2.7 ISD should establish, publish, and implement effective practices to ensure that the above-mentioned policy is carried out effectively and efficiently.

3.2.8 NSERC Management should follow up on the above-noted policy and practices, to ensure that they get done in a timely fashion.

3.2.9 ISD should a) review and update its documentation policy and practices, b) ensure that practices are effective, ie. balance level of effort with payback in terms of reduced effort in maintenance and enhancements, and c) ensure that practices are carried out according to updated policy.

Chapter 4: Post-Mortem of the 2003 eSubmission Cycle

Section 4.1: Progress on Project Deliverables

4.1.1 The eCentre should ensure that project scheduling be done continuously and effectively. This means that the eCentre should have the resources necessary to maintain the project schedule at all times, and that the project schedule accurately reflect all components of the eBusiness Project to the lowest level of detail needed for effective control.

4.1.2 The eCentre should ensure that the project management software utilized should have the capability of nesting layers of detail, that the schedule should exploit this capability, and that this nesting capability should be utilized in reporting the project to various audiences.

Section 4.2: Progress on System Performance

4.2.1 ISD should establish and implement a policy of tracking a limited number of key performance indicators. The suggested number is three, but this number could be more or less depending on the need by NSERC management to be informed. The suggested indictors are a) System Downtime – Elapsed, b) System Downtime – Incidents, and c) Complaints Received from External Users.

4.2.2 The eCentre should track and report two additional performance indicators: d) Percent Complete – overall project, including individual components where appropriate, and e) Overall Cost, when cost data become available.

4.2.3 NSERC senior management, with input from the Management Committee, should review the suggested indicators, substitute as desired, and request that the approved set be tracked and reported on a regular basis.

4.2.4 ISD and the eCentre should devise the means for tracking the indicators for which they are responsible, and report results to management on a regular and routine basis. The suggested reporting frequency is monthly.

Chapter 5: New / Ongoing Risk Factors

Section 5.1: Governance

5.1.3.1 The eCentre should provide XXXXXX Exempt Privacy Act with a full range of training and coaching in the practice of project scheduling, and in the specific use of MS Project, which is NSERC's chosen scheduling software.

5.1.3.2 NSERC management should require all project participants – including the eCentre, ISD and program branches – to provide reasonably accurate estimates of the time and resources they plan to use in the project. Note that this is the only realistic way that one can estimate the level of effort and duration of project components.

Section 5.2: Project

5.2.1.1 NSERC management should commission the preparation of an eBusiness Master Plan. This Plan should scope the work remaining to complete the implementation of the original eBusiness vision, updated as appropriate with work completed to date (including the Project Blueprint), as well as changes in the business environment, and developments in

technology since the original Plan was created. The Plan should also be time-scaled and costed, so that NSERC management can allocate financial and other resources to ensure completion.

5.2.1.2 The eCentre should establish procedures for changing project scope, for documenting scope changes, for naming those persons who are authorized to originate scope changes and others who are authorized to approve them, and for defining the work involved in a particular scope change, including lists of work items, schedule, and effort. ISD should collaborate in this undertaking because such procedures should be adopted for all large CASD undertakings.

5.2.4.1 ISD should take appropriate steps to reduce the backlog of outstanding issues, and to keep the backlog to a minimum.

5.2.4.2 With reference to recommendations on page 11, ISD management should ensure that the referenced practices are closely adhered to.

System under development audit of the eBusiness project 2004

Management (Action Plans) Responses

Management Responses completed by: Christiane Villemure, Director eBusiness Initiative

As of: 2004/06/14

	Audit Recommendation	Management Response	Responsibility Centre	Due Date
Follow Up on Previous Assessments				
3.1 System Under Development Audit , September 2002				
3.1.1	The overall issue of sharing of information and coordination of effort at multiple levels should continue to be addressed by Internal Audit in future audits, but at a more specific level to facilitate concrete improvements.	It is our experience that issues surrounding communications and governance resurface periodically during the course of a project of the magnitude of eBusiness. We agree that such issues need to be addressed on an ongoing basis. While the Audit Report does not provide any specific lines of inquiries, the eBusiness Initiative will prepare a short report outlining the governance model for eBusiness, established formal communications channels and suggestions for an action plan for concrete improvements. This will serve as the basis for the next Audit.	eBusiness Initiative	August 2004
3.1.2	The eBusiness Initiative should complete and update all Project Charters, ensuring coverage in sufficient detail to avoid ambiguity, especially in	Project Charters are prepared for all eBusiness projects and are presented to the Steering Committee for approval. However, the Audit Report is	eBusiness Initiative	May 2004

	Audit Recommendation	Management Response	Responsibility Centre	Due Date
	benchmark deliverables and changes.	right that the Charters have not been all kept up to date, because on most occasions, other mechanisms have been used to communicate changes. eBusiness will put in place a standing agenda item for the monthly meeting of the Steering Committee to report on progress, including scope, timeline and deliverable changes; additional information about projects as it becomes available; and adjustments made to projects. All this information will be maintained in the Project Charters, which will be updated and recirculated as needed.		
3.1.3	The eBusiness Initiative should ensure that approved changes are implemented as approved and not subsequently altered without approval.	A sign-off process by all project stakeholders was introduced at the beginning of the eBusiness initiative with the goal of obtaining a better control on project scope and deliverables. The observations of the Audit Report are correct in saying that in several instances, requirements have been changed or expanded after having been approved. The source of this problem is not due to a lack of the proper control mechanisms (proper escalation thresholds have been identified as part of the Project Management Framework), but rather to a lack of understanding of the impacts of changing the requirements after sign-off. A more detailed procedure and proper expectations will be formulated for staff to report changes officially in the future. The challenge in this is not the development of the procedure itself but in sen-	eBusiness Initiative	Sept 2004

	Audit Recommendation	Management Response	Responsibility Centre	Due Date
		sitizing staff about the fact that requirements definition is a defined task in projects with a defined timeframe that must be respected to maintain the ability to meet the deadline. A carefully-developed communication plan will accompany the new procedure to highlight the greater benefits and the requirements associated with this procedure. This is related to recommendation 5.2.1.2		
3.2 eSubmission Project Post-Mortem, April 2003				
3.2.1	The Project Management Framework should be implemented.	The Project Management Framework has been in use since its development in February 2003. Its implementation involves introducing many project management principles which are new at NSERC. Implementation has been gradual since February 2003 and will continue until fully completed. Done to date: - Templates have been developed for all documentation aspects associated with the Framework, except for the "completion report," to ensure consistency in reporting on all relevant aspects of a given project. These are all currently in use. - A pre-defined project work breakdown structure (WBS) is used as a basis to develop all project plans. Once project plans are developed by the individual managers, they are automatically rolled-up into the Master Plan by the Project Integrator. - Cost tracking, including actual time spent	eBusiness Initiative	

	Audit Recommendation	Management Response	Responsibility Centre	Due Date
		on projects by team members and capital versus non-capital costs. To be completed: - Develop the Project Completion Report template, and implement its use, including proper sign-off by project stakeholders. - All projects need to adjust to the formal project plan WBS structure and be kept up-to-date by project managers. Proper dependencies and critical path need to be recorded. - Implementation of the phase gate approval process. - Full implementation of the progress re-porting process, for all projects.		Oct 2004 End-Aug 2004 End-Aug 2004 End-Aug 2004
3.2.2	NSERC management should be kept informed of	Agreed. Management Committee will be kept in-	eBusiness Ini-	Ongoing

	Audit Recommendation	Management Response	Responsibility Centre	Due Date
	implementation progress and should follow up as appropriate.	formed of progress via formal reporting to the eBusiness Steering Committee.	tiative	
3.2.3	The eBusiness Initiative should ensure that estimates are prepared for all eBusiness project components, kept up-to-date and made available to the Project Scheduler.	This is currently being carried out and will need to be conducted on an ongoing basis throughout the project.	eBusiness/ISD	Ongoing
3.2.4	The eBusiness Initiative, based on the experience of the pilot, should implement cost tracking as soon as possible.	This has been done as of April 1st, 2004, to coincide with the beginning of the fiscal year.	eBusiness Initiative	complete
3.2.5	The eBusiness Initiative should ensure that all staff doing process transformation are adequately trained.	There are two components to this recommendation. First, sufficient time needs to be allocated to conduct process transformation activities and second, expertise needs to be available. In December 2003, a new project manager was hired and given the specific mandate to lead the business process redesign. With the goal of developing resident expertise in the matter, this individual has received the following training so far: - Change management (along with the entire eBusiness Initiative) - Work Improvement through Process Redesign and Simplification (two-day course). More advanced training is planned in business	eBusiness Initiative	Oct 2004

	Audit Recommendation	Management Response	Responsibility Centre	Due Date
		process redesign and specialized expertise will be brought in to conduct specific portions of the work when necessary. Another important mechanism to develop internal expertise is to foster the exchange of staff between the eBusiness division and other divisions of NSERC. This ensures a transfer of knowledge about the eBusiness transformation requirements and provides divisions with individuals who have previous involvement in transforming processes.		
3.2.6	The eBusiness Initiative, in close collaboration with ISD, should establish a policy regarding the recording and resolution of requests, including notifications of complaints, problems and issues. This policy should be unambiguous as to objectives and responsibilities, and should be brief. This policy should not be limited to eBusiness but extend to all NSERC IT applications.	A user group has recently been formed to ensure the management and maintenance of the eSubmission service. This group will use criteria for categorizing requests, which have been defined and approved by the Steering Committee. This group will also review the helpdesk log (complaints, frequent problems/issues and suggestions for enhancements). Preliminary roles and responsibilities have been drafted for review by the user group. In the first stage of operations, the user group will: - finalize its mandate, including roles and responsibilities; - define a process for recording, prioritizing and resolving requests; - determine a schedule for timely resolution of requests; and - determine proper linkages with other existing	eBusiness Initiative	Sept 2004

	Audit Recommendation	Management Response	Responsibility Centre	Due Date
		processes (see below). All this will be modeled against the NAMIS user group management process, which is established and has proven its effectiveness. This will also be applied to other eServices as they are delivered. Procedures developed to date: - The Remedy Call Tracking system tracks and logs the external support calls (or e-mails) and assists in ensuring the closure of all calls. Calls which require the system or a process to be addressed are then forwarded to the QA team for entry into Rational where it will be prioritized and tracked. - Calls which are "notification of complaints" are generally addressed and followed-up by senior project management staff. A formal process on management of complaints would further strengthen the existing model.		

	Audit Recommendation	Management Response	Responsibility Centre	Due Date
3.2.7	ISD should establish, publish and implement effective practices to ensure that the above-mentioned policy is carried out effectively and efficiently.	Agreed. Practices have been documented and accompanying workflows are published on the Intranet workgroup segments. The materials will also be reviewed during ramp-up training this summer. In collaboration with the eBusiness Initiative, a review of the materials will be conducted to ensure alignment with the eSubmission user group operations and the new "complaints management" procedure.	ISD / eBusiness	Sept 2004
3.2.8	NSERC Management should follow up on the above-noted policy and practices, to ensure that they get done in a timely fashion.	Agreed. Proper reports will be provided to Management.	Steering Committee	Ongoing
3.2.9	ISD should a) review and update its documentation policy and practices; b) ensure that practices are effective, i.e. balance level of effort with payback in terms of reduced effort in maintenance and enhancements; and c) ensure that practices are carried out according to up-dated policy.	Agreed. The ISD teams have developed template standards for business requirements, functional specification, technical specifications and QA test plans (scripts). Each is tied to a phase within the system development life cycle. Signoff of the business and functional specifications act as milestones and "gates" to the next phases of the life cycle. All completed documentation is recorded in a standard project segment on the Intranet. All ISD team members are familiar with the materials and how to use them – the practice has been integrated into the project cycle. Upon finalization of the project documentation it	ISD	Sept 2004

	Audit Recommendation	Management Response	Responsibility Centre	Due Date
		will be released from the workgroup segment to the public domain of the Intranet.		
Post-Mortem of the 2003 eSubmission Cycle				
4.1 Progress on Project Deliverables				
4.1.1	The eBusiness Initiative should ensure that project scheduling be done continuously and effectively. This means that the eBusiness Initiative should have the resources necessary to maintain the project schedule at all times, and that the project schedule accurately reflect all components of the eBusiness Project to the lowest level of detail needed for effective control.	Agreed. The responsibilities associated with project planning, scheduling and updating is under the full-time project integrator. Project managers have the responsibility to develop and maintain their own plans and schedules and submit them to the project integrator for incorporation into the Master Plan. A project planning and scheduling tutorial has been developed and used to provide training to all project managers. This tutorial will be formalized into a procedure as soon as we have enough experience with the process to guarantee its effectiveness. This tutorial specifies the level of detail project managers need to include in their plans and schedules.	eBusiness Initiative	Sept 2004
4.1.2	The eBusiness Initiative should ensure that the project management software utilized should have the capability of nesting layers of detail, that the schedule should exploit this capability and that this nesting capability should be utilized in reporting the project to various audiences.	Agreed. This is in progress. MS-Project is the software chosen for the eBusiness Master Plan. The eBusiness Initiative is in the process of establishing and improving a comprehensive Master Plan according to established	eBusiness Initiative	end-June 2004

	Audit Recommendation	Management Response	Responsibility Centre	Due Date
		standards to be followed in all aspects of the eBusiness Initiative. This process was started with the appointment of the project integrator in the Spring 2003. The Auditor has seen an earlier version of the Master Plan, which has been significantly improved since then. The Master Plan includes proper levels of detail, with roll-up capabilities that can be used as a function of the intended audience.		
4.2 Progress on System Performance				
4.2.1	ISD should establish and implement a policy of tracking a limited number of key performance indicators. The suggested number is three, but this number could be higher or lower depending on the need by NSERC management to be informed. The suggested indictors are a) System Downtime – Elapsed, b) System Downtime – Incidents, and c) Complaints Received from External Users.	This was addressed prior to publication of the final report. Due to the nature of the architecture and the need to interpret system generated messages of "downtime," a manual process was implemented to record both system downtime incidents (Production and Pilot environments only) as well as elapsed time. "Complaints received from External Users" will (must) be tied to Recommendation 3.2.6.	ISD	Complete
4.2.2	The eBusiness Initiative should track and report two additional performance indicators: d) Percent Complete – overall project, including individual components where appropriate; and e) Overall Cost, when cost data become available.	Agreed. Point "d" will be addressed once the Master Plan is completed and fully functional. Point "e" is already in place.	eBusiness Initiative	Aug 2004
4.2.3	NSERC senior management, with input from the	This recommendation will be addressed through	Steering Com-	June 2004

	Audit Recommendation	Management Response	Responsibility Centre	Due Date
	Management Committee, should review the suggested indicators, substitute as desired and request that the approved set be tracked and reported on a regular basis.	the regular progress reporting process to Management. A new format for the progress report, which accounts for those measures, has been in use since April 1, 2004. Feedback from Management will continue to be monitored to ensure the reports address Management's needs.	mittee	
4.2.4	ISD and the eBusiness Initiative should devise the means for tracking the indicators for which they are responsible, and report results to management on a regular and routine basis. The suggested reporting frequency is monthly.	See 4.2.3. A two-week Management reporting cycle has been in place since the inception of the eBusiness Initiative in May 2001. This process, under the responsibility of the project integrator, will be adapted to include reporting on proper indicators.	eBusiness Initiative	Aug 2004
New / Ongoing Risk Factors				
5.1 Governance				
5.1.3.1	The eBusiness Initiative should provide XXXXXX Exempt Privacy Act with a full range of training and coaching in the practice of project scheduling and in the specific use of MS Project, which is NSERC's chosen scheduling software.	In progress. This is a recognized need which is addressed through a mix of general and personalized training. XXXXXX Exempt Privacy Act. This program was selected because of its strong eBusiness component. This has been recognized as professional development for this employee and costs have been defrayed by NSERC. XXXXXX Exempt Privacy Act also received a two-day personalized training by a professional project manager on the project management techniques in use	eBusiness Initiative	Personalized training in scheduling: end-June 2004

	Audit Recommendation	Management Response	Responsibility Centre	Due Date
		by the eBusiness Initiative. Another one-day personalized training session is planned and will cover the details of project scheduling and progress indicator measurements with the eBusiness Master Plan as a test case.		
5.1.3.2	NSERC management should require all project participants – including the eBusiness Initiative, ISD and program branches – to provide reasonably accurate estimates of the time and resources they plan to use in the project. Note that this is the only realistic way that one can estimate the level of effort and duration of project components.	Agreed. In progress. See 4.1.1. Each project charter and the fiscal year planning process involve presenting estimates of time and resources required on a per-project basis. Projects will not proceed until approval is obtained from the Steering Committee. Note that this is a relatively new process at NSERC. Proper emphasis needs to be put on the importance of collecting this data regularly from all participants, of keeping the plans up-to-date and revising/confirming our estimates regularly. It is expected that our methodology for determining time and resource allocation will be improved significantly through collecting and analysing this data.	eBusiness/ISD	End-June 2004 but with continuous improve-ments
5.2 Project				
5.2.1.1	NSERC management should commission the preparation of an eBusiness Master Plan. This Plan should scope the work remaining to complete the implementation of the original eBusiness vision, updated as appropriate with work completed to date (including the Project Blue-	While this recommendation is valid, we are of the opinion it has been at least partially addressed throughout the life of the eBusiness Initiative. While the detailed Master Plan schedule is cur-	eBusiness Initiative	High-level planning: in place. BluePrint

	Audit Recommendation	Management Response	Responsibility Centre	Due Date
	print), as well as changes in the business environment, and developments in technology since the original Plan was created. The Plan should also be time-scaled and costed, so that NSERC management can allocate financial and other resources to ensure completion.	rently being worked on, Management has received high-level Master Plans since the beginning of the project. A high-level schedule and costs were included in the eBusiness Strategy developed by Accenture in May 2001. This plan was refined through the IT implementation planning exercise (Project BluePrint) delivered in Fall 2002, and each fiscal year's planning included a revision of the project objectives, work accomplished and work remaining. High-level costing is presented each time. Considering the recent software and hardware acquisitions and the changes in NSERC's strategic direction (mainly as a result of the new NSERC Vision), the eBusiness Vision has been updated and an exercise to update the former BluePrint is on the plan for 2004-05. It is not clear why the Auditor reported that a Master Plan is needed (i.e. is missing). We suspect that he may be referring to the importance of the next BluePrint revision exercise which we agree is needed. Also, proper communications will be strengthened on this aspect.		revisions: Dec 2004
5.2.1.2	The eBusiness Initiative should establish procedures for changing project scope; for documenting scope changes; for naming those persons who are authorized to originate scope changes and others who are authorized to approve them; and for defining the work involved in a particular scope change, including lists of work items, schedule and effort. ISD should collaborate in this undertaking because such procedures should	We agree with this recommendation. This responsibility will be assigned to the project integrator, who will work in collaboration with eBusiness Initiative colleagues and ISD.	eBusiness Initiative	Sept 2004

	Audit Recommendation	Management Response	Responsibility Centre	Due Date
	be adopted for all large CASD undertakings.			
5.2.4.1	ISD should take appropriate steps to reduce the backlog of outstanding issues, and to keep the backlog to a minimum.	This is related to 3.2.6 and will be carried out after proper prioritization of issues by internal clients.	ISD/eBusiness	Sept 2004
5.2.4.2	With reference to recommendations on page 11, ISD management should ensure that the referenced practices are closely adhered to.	Agreed. ISD will enforce its participation in the processes discussed on page 11: - Reporting to Management - Baseline Plan Revision Process - Change Management Process.	ISD	Ongoing