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Key Success Factors for the Project of Migrating to the Open Office Suite

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Project report

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Key Success Factors for the Project of Migrating to the Open Office Suite

Malika Aboubekr¹, Suzanne Rivard²

Executive Summary

The penetration and performance of free software is raising issues regarding its true capacities and, particularly, the desirability of choosing it. It is from this perspective that the Linux Migration Project was launched within the Sous-secrétariat à l'infrastructure gouvernementale et aux ressources informationnelles (SSIGRI). Its accompaniment by a team of researchers from CIRANO is intended to assess the risks and identify the conditions for success. The purpose of this report is to identify and assess the key success factors of this project.

Principal results

An analysis of the project's characteristics has enabled its specific features to be identified and the analytical tool to be adapted. From this approach, analysis of the key success factors has revealed that the pilot project substantially contributes to the reflection about migrating to free software. It demonstrates that, despite medium to high risk exposure, such a migration can be controlled. This is supported by considerable managerial ability and the reliability of the technology. Finally, it draws attention to a major problem that arises in a migration context: the absence of a shared interoperability framework, as is seen in two out of three parameters. The assessment grid of the project's key success factors (Table 1, p. 6) allows the following to be ascertained:

- The importance of the *Risk Assessment and Monitoring* factor during the software implementation process. Its estimated value of 3.7, in particular due to the absence of a common interoperability framework and the impossibility of remedying it within the context of the project, lowers the average of the *Processes* success factor, which is 4.8/7.
- *Managerial skills* are high (6.2/7), and the values found for this factor's components are generally comparable.
- *Technology* is assessed at 5.5/7; this parameter covers a contrasted reality:
 - The technology's intrinsic characteristics (independence with regard to software and publishers, cost controls, data continuity), assessed at 6.6/7, raise this ratio.
 - The technology's performance, assessed at 4.5/7, lowers this ratio. It implicates both the intrinsically high quality of the software tested, and problems due to the context of the pilot project—characterized, as it was, by the absence of a migration plan (choice of services/people to migrate) and to the absence of a common interoperability framework.

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Mandate

The Sous-secrétariat à l'infrastructure gouvernementale et aux ressources informationnelles (SSIGRI) has tasked CIRANO with supporting a pilot project to migrate to the OpenOffice.org free office suite under Linux and to document the process. This project, involving approximately ten SSIGRI workstations, was intended to test the infrastructure and experiment with the feasibility of such a project. Cirano's support approach is comprised of two parts:

The first deals with the pilot project of migrating to the free office suite. It is broken down into an assessment of the project's exposure to risk, which was the subject of a previous report, and a diagnosis of the project with regard to the presence of key success factors, which is the subject of this report. Our goal is to assess the presence of key success factors and to eventually propose paths for reflection with respect to their implementation.

The second part of the support approach consisted in taking stock of what is being done elsewhere in the world in matters of migration toward OpenOffice.org by using concrete examples of success and failure in these migrations, identified using literature reviews. The results of this review were presented in a report entitled "Migration vers OpenOffice.org sous environnement Windows : Analyse de trois cas."

Introduction

The framework for the migration pilot project is a reflection initiated in 2002 within the Québec Government on the market penetration of free software and the prospect of adopting it. This reflection made it clear that the establishment of a free software bundle for all stakeholders in the government runs up against the problem of the diversity of technological contexts within which it must be integrated.³

It is within this context and with the objective of testing the feasibility of a future migration to the OpenOffice.org office suite that the pilot project was born, along with the project support role assigned to a team of CIRANO researchers. The latter consists of identifying the presence of key success factors in the pilot project, which are presented in this report.

A project's success does not rest on one, or even on several, factors, but on the balanced marshalling of a group of factors, as we were able to ascertain during a recent analysis of an e-government administration project. The analysis⁴ of this project, conducted at the Government of Québec, enabled us to identify a constellation of key success factors for projects carried out within such contexts.

Despite differences with the pilot project to migrate to the free office suite, its context is sufficiently close to the one described in our study to make the success factor constellation highly relevant. This cluster of factors—adapted to the conditions specific to migrating to free software—will serve to assess the key success factors of the pilot project of migrating to the free office suite, as presented in this report.

The first part will be dedicated to presenting the assessment of the key success factors, after which each one will be examined individually. The second part will study certain success factors from the perspective of a larger migration project and will propose a few points to consider regarding the implementation of these key conditions for success.

³ Secrétariat du Conseil du trésor (Government of Québec), "Offre de services avec prix", September 2004, p. 10.

⁴ Aboubekr, Aubert, Boudreau, Rivard, 2003.

Key success factors of the pilot project

The pilot project's migration toward the free office suite was assessed in terms the key success factors, which are presented in Figure 1 and defined in Appendix 2. For each of these factors, the component variables are estimated on a scale of 1 to 7 in which 1 represents the most negative scenario (absence of the factor and/or component elements) and 7 is the most positive scenario. This assessment was carried out using data we collected and which is described in Appendix 1.

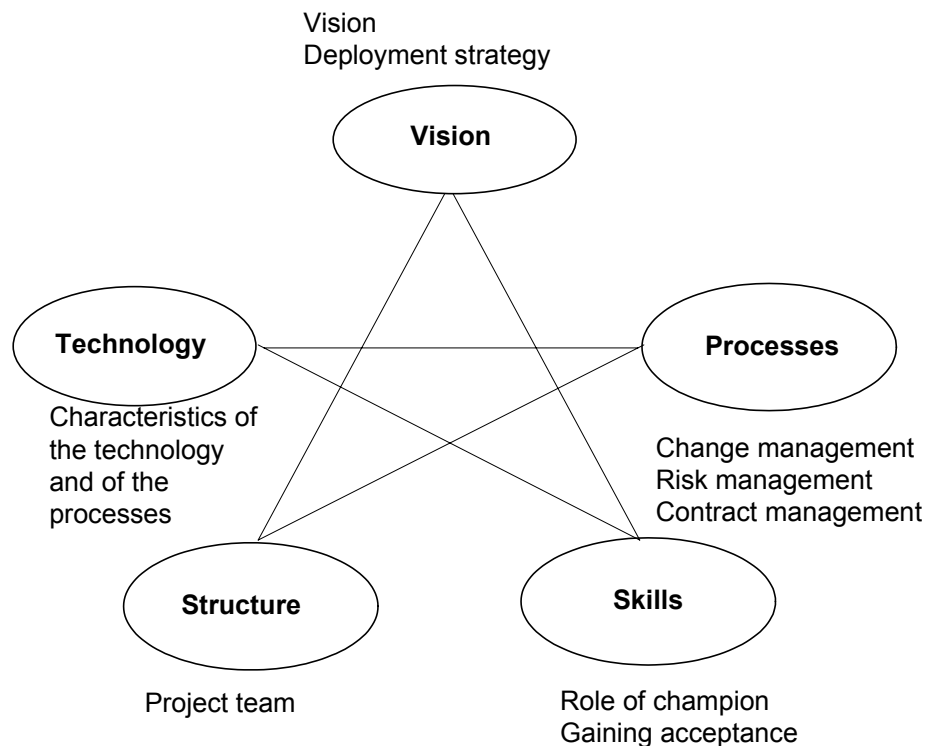


Figure 1: Key Success Factors of a Project

Assessment of the success factors of the pilot project

The assessment of a project's key success factors begins with a project description. Certain elements that are specific to the pilot project curtail its potential impact and mean that

some conditions within the success factor constellation are less relevant for its analysis. To account for this, we used the abridged constellation of key success factors presented in Figure 2. These conditions are summarized in Table 1. Each of these conditions was examined and its most important constituents assessed.

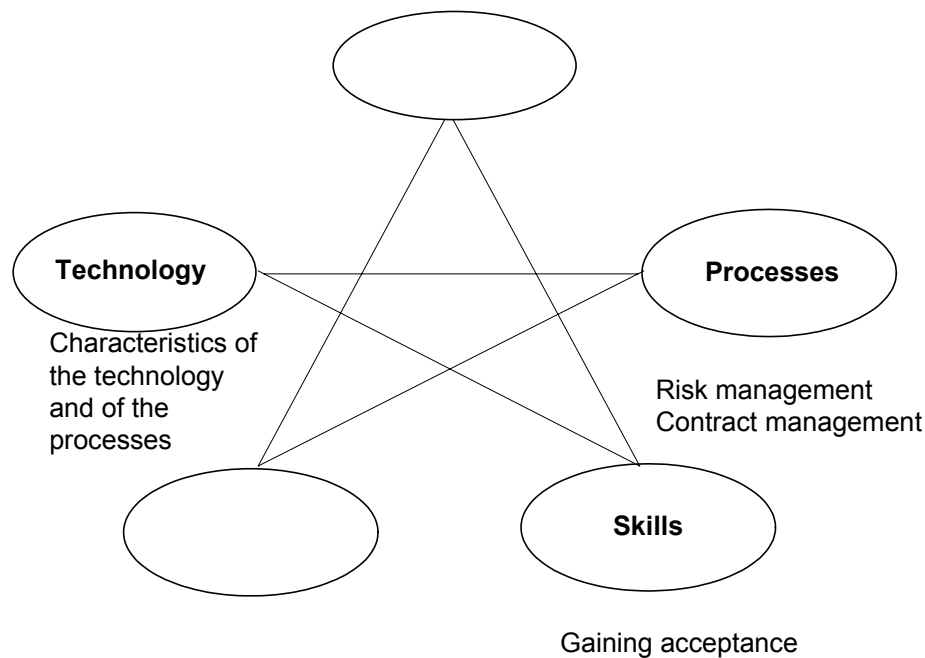
What are the characteristics of the pilot project of migrating to the free office suite from the perspective of the scope of changes it entails for the organization?

- Its objective is to contribute to refining the broader vision within which it is situated. On this subject, the project manager wrote⁵ *"In 2002, we began to think about the use of free software in a government context in order to arrive at an opinion on the topic. (...) Through this project, we wish to test the integration of a Linux workstation and free software into a mixed environment."* (authors' translation) Therefore, the pilot project is not designed to render a vision concrete, but rather to fit into a wider assessment process of the conditions for, and relevance of, free software in a government context.
- This migration project is temporary. After a few months, the participants' workstations should once again be equipped with Windows and MS Office⁶.
- This involves no changes to the organization, processes, or users' tasks (in terms of either the organization or content of the tasks, etc.). The only changes that the pilot project entails affect the way in which certain tasks are executed (some commands must be carried out differently with OpenOffice.org).
- It involves a limited number of users (approximately ten people).
- The affected users are all volunteers who are completely free to abandon the project at any time, significantly reducing the risk of resistance.
- It is carried out by a very small project team, essentially comprised of a project leader from SSIGRI.

⁵ Dionne, "Des postes de travail en Linux."

⁶ As of early March 2005, only four out of seven participants continued to use the Linux and OpenOffice.org environments.

Figure 2: Key success factors of the pilot project



The assessment grid of the project's key success factors (Table 1) demonstrates that:

- The most critical success factor in this project is *Processes*, assessed at 4.8/7. It is comprised of two components:
 - *Risk Assessment and Monitoring*, which tends to lower it (3.7/7). This is due to the fact that measures for mitigating the greatest risks could not be undertaken within such a small project. These measures, particularly the implementation of an interoperability framework, the importance of which is demonstrated in Figure 5, would be indispensable in a project of greater scope.
 - *Contract Management*, assessed at 6/7, tends to raise it, on the other hand, as it particularly captures a more effective selection process for the contractor.
- The *Managerial Skills* factor which, in this project, essentially captures the ability to *elicit users' acceptance*, has a high value of 6.2/7. It should be noted that the assessment of all the components of this factor are high, except for two of them: support and the users' perception of the installed software's relative benefits. As for support, the users sometimes deemed it inadequate. For participants in the pilot project, the implemented software did not present a relative benefit for the following reasons:

- difficulty working on files in collaboration with colleagues using MS Office because of insufficient interoperability between the two office suites, especially in the case of files containing macros, insertions, etc.;
- the unavailability of certain applications, such as Access, Visio, etc., which the users normally use.
- the length of time it takes to load a file in OpenOffice.org under Linux, which is longer than with MS Office.

In the context of a larger migration, the migration plan must create a migration procedure that takes these aspects into account and/or includes measures to resolve them. Such measures could not be implemented within the pilot project because of the condition that nothing in the technological infrastructure or in the participants' work habits may be changed.

- The *Technology* factor is assessed at 5.5/7; this value encompasses a disparate reality:
 - The technology's intrinsic characteristics (independence with regard to software and publishers, cost controls, data continuity), assessed at 6.6/7, raise this ratio.
 - The technology's performance, assessed at 4.5/7, lowers this ratio. It balances a very high level of intrinsic quality of the software tested with problems attributable to the context of the pilot project, which is characterized by the absence of a migration plan (choice of services/people to migrate) and the absence of a shared interoperability framework.

The assessment of the project's key success factors demonstrates that, despite a medium to high level of risk exposure, such a migration can be managed. This is supported by considerable managerial ability and the reliability of the technology. It shines the spotlight on a major problem that must be faced in a migration context: the absence of a common interoperability framework that appears in two out of three parameters.

Key factors of success	Assessment
The processes	4.8
<u>Risk Assessment and Monitoring</u>	3.7
▪ What is the project's risk exposure?	3.5
▪ Measures for assessing and monitoring risk?	4
<u>Contract management</u>	6
▪ Does the supplier have previous experience?	7
▪ Does the supplier have experience in the business setting?	5
▪ Was the integrator chosen based on quality criteria?	7
▪ Is post-implementation support available?	6
▪ Is post-implementation support high quality (fast, effective)?	5
Managerial skills	6.2
<u>Gaining acceptance</u>	6.2
▪ Were the users informed?	6
▪ Do the users perceive ease of use with the implemented technology?	6
▪ Were the users given the opportunity to try the technology before adopting it?	7
▪ Are the users supported?	5
▪ Do they perceive the relative benefit of the implemented technology?	5
▪ Do the users perceive the implemented technology as being easy to incorporate into their values, their culture, and their routine activities?	7
▪ Do the users perceive the implemented technology as being useful?	7
▪ Do the users feel that they have a choice in whether to adopt it?	7
The technology	5.5
<u>Characteristics of the technology</u>	6.6
▪ Does it make it possible to obtain independence from the publisher and the software?	7
▪ Does it enable cost control?	6
▪ Does it provide for data continuity?	7
<u>Performance of the technology</u>	4.5
▪ Does the technology present an advantage in carrying out tasks from the user's point of view?	2
▪ Is it stable and reliable?	7

Table 1: Assessment Grid for the Pilot Project

The processes

This chapter will discuss the two processes implemented to manage the pilot project: risk assessment and monitoring and contract management

Risk assessment and monitoring

This project's exposure to risk, represented in Figure 3, was assessed in a previous report⁷ as being medium to high. In this report, risk management is valued at 4.8/7 and takes into account the project's exposure to risk (assessed in the previous report) and risk monitoring. This, in turn, leads to the identification of abatement and mitigation mechanisms for reducing the impact of the risk factors with the highest severity score.

Risk factors

Of the thirteen risk factors identified in the assessment of the project's risk exposure⁸ and documented in Figure 4, five have a severity score of 4 and two a severity score of 5.⁹ The assessment of these factors made it possible to identify the variables that tend to increase their severity:

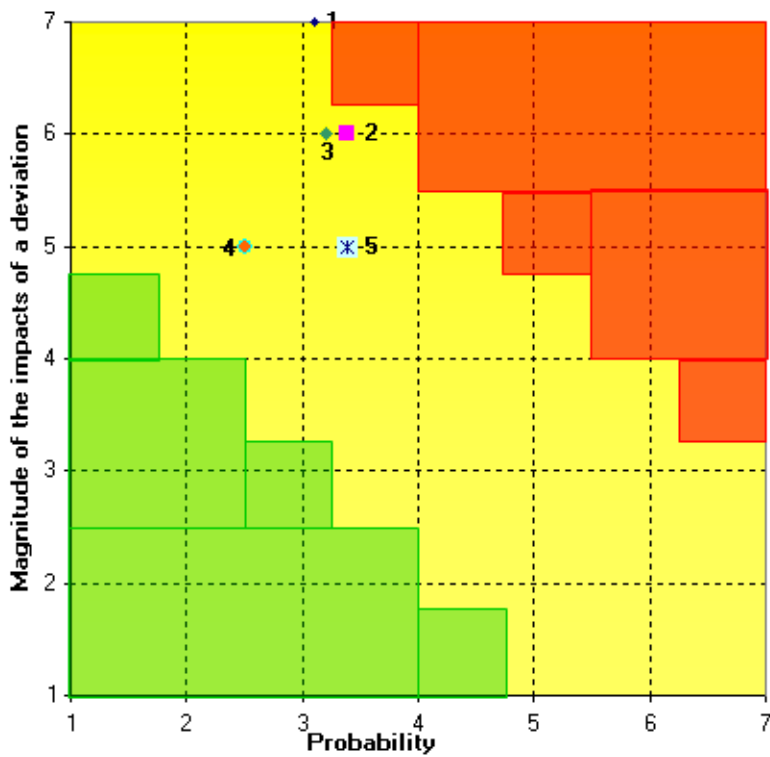
- For the factor *In-house expertise*, the variables Dependence on key users¹⁰ and Lack of expertise with the methodology and with the implementation support tools used by the integrator tend to increase its severity score.
- For the factor *Integrator's expertise*, the integrator's limited knowledge of the organization and the tasks that users have to carry out tends to increase its severity score.
- For the factor *Organizational environment*, the variable Level of cooperation and exchange between departments, in terms of ideas, information, computer systems, and projects, tends to increase its severity score.

⁷ "Évaluation de risque du projet de migration vers la suite bureautique libre sous Linux", CIRANO report 2005RP-09, February, 2005.

⁸ Report 2005RP-09, *op. cit.*

⁹ The scale used to assess risk exposure is inverted: 1 is equal to the minimum, and 7 to the maximum, risk exposure.

¹⁰ The difficulty in finding and/or replacing users is explained by the constraint placed on participants to pursue their activities seamlessly under a very different software environment.



#	Undesirable outcome	Probability	Magnitude of the impacts of a deviation
1	Operational discontinuity for the user	3.11	7
2	Interactional discontinuity for the user	3.38	6
3	Insufficiency of technical support	3.20	6
4	Need to modify the technological infrastructure	2.5	5
5	Failure of the users to adapt to the new work environment	3.38	5

Figure 3: Risk exposure map

- For the factor *Cultural compatibility integrator/organization*, the differences in organizational cultures between the Treasury Board Secretariat (client public

administration) and Révolution Linux (contracting small private service business) tend to increase its severity score.

- For the factor *Size of the community of users*, the fact that the Mandrakesoft software user community is not very developed in North America tends to increase its severity score.
- For the factor *Technological novelty*, the fact that the free office suite under Linux was being used for the first time in the organization tends to increase its severity score.
- For the factor *Degree of interdependence with non-project units/persons*, the two variables that comprise it (Collaboration with non-project persons and Activities requiring compatibility with non-project systems) increase its severity score. Moreover, this risk probably remains undervalued because it was assessed based on answers given by the actual participants in the project who, for the most part, do not have to share work documents with colleagues outside the project.

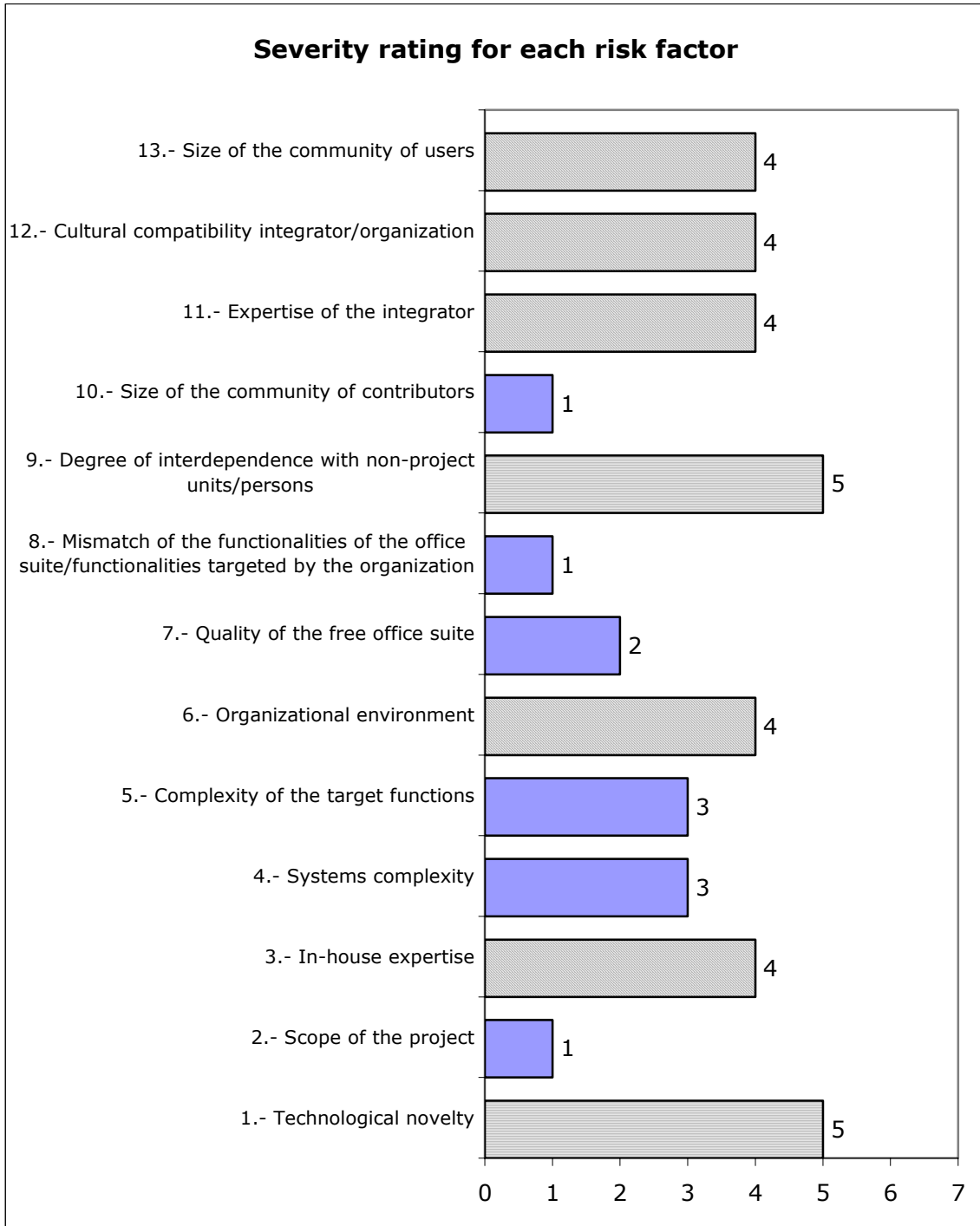


Figure 4: The thirteen risk factors

A few paths for mitigating risk exposure

Risk mitigation paths, intended to reduce the influence of the seven risk factors with a severity score exceeding medium, are proposed in Table 2.

With regard to *Technological novelty*, especially the newness of the software to be implemented, mitigation measures can consist of a policy of supporting future users during the switch in environment by paying special attention to alleviating their incomplete understanding and concerns. Training, and then user support, can also play an important role in this support if properly designed and targeted.

The risk factors *Integrator's expertise* and *Cultural compatibility integrator/organization* raise the issue of the criteria for choosing an integrator, his business experience, and his knowledge of the culture of the public administration.

Risks introduced by the factors *Degree of interdependence with non-project units/persons* and *Organizational environment* refer to the absence of interoperability that is attributable to the fact that the ubiquitous MS Office suite uses closed and proprietary formats. This sometimes makes interactions between OpenOffice.org and MS Office difficult. These interactions are possible in cases of simple documents (with no macros or complex graphics, etc.). But when it becomes a matter of sharing documents across platforms and/or working with documents containing macros or other advanced functionalities, interaction between the two suites proves more difficult and may affect the format of the documents. This problem surpasses the framework of this project as illustrated by the results of the analysts' work shown in Figure 5. It should be noted that this risk factor did not really come into play in the context of this project, inasmuch as the participants took it into account when they joined the project.

Given the scope of the pilot project and its specific elements, these mitigation measures were not required, especially since some of them exceeded the project's framework.

<i>Risk factors</i>	<i>Mitigation Paths</i>
Technological novelty	<ul style="list-style-type: none"> • Managing change • Informing and promoting awareness among future users about the features of the software to be implemented • Training these users • Organizing test periods in order to alleviate possible apprehensions • Ensure technical support for users
Expertise of the integrator + Cultural compatibility integrator/organization	<ul style="list-style-type: none"> • The choice of the contractor must account for his business experience and his knowledge of the organizational culture of the client.
Size of the community of users	<ul style="list-style-type: none"> • The choice of a better-known distribution in North America, for example, would ensure a broader local user community.
Degree of interdependence with non-project units/persons + Organizational environment	<ul style="list-style-type: none"> • The selection of services/people to migrate must account for the interactions required by their tasks. • Implementing a common interoperability framework would avoid this type of problem (Figure 5).

Table 1: Mitigation Paths

Desktop software in the public sector is dominated by Microsoft products, including the Office suite with the word processing program Word. The dominance of Microsoft products means that Microsoft's formats represent the de facto standard for the exchange of word-processed documents in government. The most important of these formats is the doc format, used by Word. The doc format is referred to below as a file format. The format is used to store a document as a file.

In the short term, if open-source alternatives are to be more widely used, they need to be able to handle Microsoft formats. It is difficult to achieve this fully, because Microsoft formats are secret. There is therefore no free competition on workstations. This makes it desirable that open standards for the desktop should be introduced in the long term, particularly a file format for word processed documents. (1)

- The results of IDC's study indicate that 63% of structures equipped with Linux link the free OS to a server platform whose added-valued resides in **its interoperability** with the various equipment architectures in place.(...) In other words, it is no longer necessary to replace the existing equipment architectures for the Linux environment to be supported, reducing the costs of migrating the servers to Linux.*
- Conversely, this promise of interoperability allows for architectural choices to be modified without calling into question the Linux environment and its related software solutions. This feature inherent to Linux helps **avoid the technologically constraining effects of locking** a part of the computer system into a server architecture over which the company does not control the future evolution: little improvement in performance, discontinuing of architecture by the manufacturer, a new technological paradigm of little or no compatibility that necessitates rewriting software (...). These specific elements directly meet the needs for flexibility expressed by nearly half of the companies and administrations surveyed (44%). (2)*

Sources :

(1) Danish Board of Technology, 2002, p. 21.

(2) Bahloul, 2004, p. 8.

Figure 5: Issues with interoperability

Contract management

Contract management was assessed at 6/7 based on the five criteria shown in Table 3. These were adapted from research results to the conditions of a project to migrate to free software (Rivard and Talbot, 2001).

<i>Elements of contract management</i>	
Previous successes = 7	Previous realizations by members of the integrator's team were reviewed during the selection period (CVs were provided). Specifically, they are familiar with Mandrakesoft products.
Business experience = 5	The supplier's experience and relevance were assessed, but not compatibility or knowledge of the tasks carried out within a central administration, as shown in Figure 6.
Service quality = 7	The integrator (Révolution Linux), mandated to implement the new configuration, was chosen based on a call for tenders and an assessment grid which is shown in Figure 6, and which bases 50% of the assessment on quality.
Availability of post-implementation support = 6	The contract provided that the supplier ensure post-implementation support ¹¹ .
Quality of the post-implementation support = 5	The speed with which problems were solved was brought up by participants who felt that the integrator's response time was too slow.
Source: Adapted from the software package assessment grid (Rivard and Talbot, 2001, p. 512).	

Table 2: Contractor selection criteria

¹¹ Révolution Linux, August 23, 2004.

The assessment grid used to select the contractor was comprised of two parts, each counting for 50%.

1. Quality was assessed based on the following five criteria:

The project manager's experience was assessed by taking into account his expertise in this type of project, particularly regarding the complexity and scope of the project and his specific contribution.

The favoured approach was assessed, particularly from the point of view of "originality and quality of the proposed solution in regard to the project's objectives".

The relevance of the supplier's experience in the field was assessed in light of "his experience in the realization of major projects involving free software in terms of identifying directions and implementing targeted software".

The relevance and experience of professionals on the team proposed by the provider were evaluated. For each team member, the following components were considered:

- *"experience in technological environments mixing free and licensed software, in terms of office and WEB tools;*
- *participation in projects allowing a thorough knowledge of technological infrastructures (hardware and software) to be demonstrated, as described briefly in Point 2.1.4 and widely used within the Government of Québec;*
- *participation in projects allowing a thorough knowledge of the potential issues and impacts associated with the implementation of free software, particularly in the public and parapublic sectors, to be demonstrated;*
- *demonstration, through experience, of a great deal of expertise in carrying out technological orientation studies."*

The depth of the provider's team. The provider's capacity to replace the project manager and team members, as required, while continuing to comply with the aforementioned criteria was evaluated.

2. The price the lowest price served as a reference for the choice of contractor.

Source: Secrétariat du Conseil du trésor (Government of Québec), "Contrat de services professionnels, Offre de services avec prix", September 2004, p. 20-22.

Figure 6: Elements of the Assessment Grid for the Pilot Project

Managerial skills

Despite the limited scope of the pilot project, user acceptance remains an essential condition for success.

Gaining acceptance

Users of the free office suite participated in the project voluntarily, without being presented with any constraints or incentives. This migration to the OpenOffice.org office suite does not imply any major changes for them because the tasks, as such, have not been modified, but only the way of some of them are performed. Because the project is of limited duration, this change will be temporary and the users will have to change their way of doing things once again. Finally, seven end users were bound by a major constraint:¹² these changes were not to disrupt the ongoing pursuit of their regular tasks.

Factors in adopting the free office suite

Participants explain their acceptance by citing that they were offered the possibility to test the OpenOffice.org office suite from the point of view of quality, stability and reliability of free software and the benefits they confer in terms of data continuity.¹³ Factors that came into play in adopting the OpenOffice.org suite were classified into two major categories in Table 4, where they are illustrated and assessed. Among these factors, we must note the special importance of voluntary participation in this project, which captures an interest in free software. This voluntary participation plays an important role in the success of the project, because participants tend to accept any problems encountered more readily.

- However, it must be noted that, while the success factor *Gaining acceptance* was estimated at 6.2/7, two out of eight components of this factor were assessed at 5. They were, the *Support* that the users received during the project and their incomplete understanding of the *Relative advantage* of the implemented software, owing to:
 - the difficulty in working on files in collaboration with colleagues under MS Office due to insufficient interoperability between the two office suites, mostly involving files containing macros, insertions, etc.;
 - the impossibility of using certain applications such as Access, Visio, etc., that they normally used;
 - the time that it takes for an OpenOffice.org file to open, which is longer than for an MS Office file.

¹² This constraint, incidentally, led to the withdrawal of four individuals even before the project began and of a fifth a few weeks thereafter. The reasons were: work overload; the need to use an Access database incompatible with the new configuration; unavailability of an ancillary Windows environment to carry out collaborative work; impossibility of maintaining a necessary level of interoperability with colleagues running Windows.

¹³ Open standard document format.

Factors related to technological innovation	
Factor	Tangible manifestations
Information = 6	Users know the office suite and some of them are already using this software.
Ease of use = 6	The office suite is easy to use, according to participants. In addition, many operations resemble those in Microsoft Office and do not require drastic changes, except for certain more advanced functionalities.
Possibility of testing = 7	This project provides the opportunity to test the office suite. It offers participants the possibility of trying this software on the job; this meets professional objectives for some of them.
Support = 5	Provision was made for the users to be supported by the integrator in this project. The participants encountered a few difficulties and did not always receive immediate answers, but this did not prevent them from functioning.
Factors linked to the adopting individual	
Factor	Tangible manifestations
Relative benefit = 5	The perception of the quality of the office suite is an important dimension of the motivation of participants, though some of were put off by the long time it takes OpenOffice.org to load.
Compatibility = 7	Compatibility with the values and cultures of the participants is one reason to support the project. As to their routine activities, the free software included the same functionalities as the proprietary software they were replacing.
Usefulness = 7	Project participants working in IT are acutely aware of the usefulness of this software, given their knowledge of the difficulties encountered with proprietary office software in terms of stability, security, data continuity (absence of open standards), and dependence.
Volunteerism = 7	Users were given the option to adopt the free office suite. The perception that they had a free choice regarding whether to adopt the software was an important motivation factor. Some participants were able to withdraw from the project.
Source: Adapted from Aubert and Bernard (2002).	

Table 3: Factors contributing to participation in the project

The technology

The success factor *Technology*, estimated at 5.5/7, examines its features. Among the elements identified and valued in Table 5, the importance of this factor must be seen from the perspective of the technology's capacity to improve users' performance of their tasks. It was assessed at 2 because, in the case of the pilot project, migrating to OpenOffice.org did not yield an immediate improvement in users execution of their tasks. On the contrary, they encountered difficulties due to the absence of a common interoperability framework (Figure 5) and a migration plan. The purpose of such a plan is to foresee difficulties that may be encountered by each user during the change in environment, in terms of collaborative work with colleagues who have not yet been migrated and/or using applications that are incompatible with the new environment.

This factor, which did not cause any major problems in the context of the pilot project, because the participants were volunteers, must be taken into consideration in other contexts.

Assessment	Characteristics
<p>Does it give the organization independence? = 7</p>	<p><i>"Adopting OpenOffice.org allows organizations to be independent in the management and evolution of their office equipment in terms of:</i></p> <ul style="list-style-type: none"> • the monopoly of a single economic agent: <i>OpenOffice.org's development and maintenance are based on a professional community, resulting in significant autonomy for the players. The organizations are therefore not bound to a single entity and benefit from true freedom of choice.</i> • the operating system used: <i>OpenOffice.org is not dependant on the operating system, being a multiplatform software suite (Windows, Mac OS, Linux, UNIX). OpenOffice.org may also become a unifying tool in ensuring standardization of data formats produced by diverse computer equipment.</i> • the file format: <i>OpenOffice.org is based on the open XML file format, guaranteeing total independence for organizations in terms of the technologies used in the use of data generated by the software suite."</i> (1)

<p>Does it allow for cost control? = 6</p>	<p><i>"Controlling costs incurred with the use of an office suite is certainly one of the major reasons for implementing OpenOffice.org. Migration to OpenOffice.org is not without cost. However, it does away with the licensing costs for using a software suite, making it possible to detach the software cost from the number of workstations on which it is installed. (...) Today, the value added by an office solution may be measured in terms of the needs expressed and the objectives met. Other factors of cost reduction are directly linked to implementing OpenOffice.org within organizations, especially:</i></p> <ul style="list-style-type: none"> <i>• absence of viruses: no risk of spreading a virus by running a macro</i> <i>• smaller files: reduced memory needs and congestion of internal networks during file exchange via e-mail." (1)</i>
<p>Does it provide data continuity? = 7</p>	<p><i>"The availability of the source code and the GPL licence guarantee continuity. Continuity derives from a group of users with more experience than is found within a business (...). For instance, the development of the phpMyAdmin software package was briefly halted. Eight months later, three individuals from Switzerland, Quebec and France resumed its development." (2)</i></p> <p><i>"OpenOffice.org offers the XML file format, which is open, public and free (the format is currently being standardized by OASIS [http://www.oasis-open.org/who/]). (...) OpenOffice.org complies with the XML paradigm by proposing a universal file format, guaranteeing interoperability and permanent availability of the data produced." (1)</i></p>

<p>Is it stable and reliable? = 7</p>	<p>Opinions in this matter are unanimous and very positive (see risk assessment).</p>
<p>Does the technology provide a benefit for the users' performance of their tasks? = 2</p>	<p><i>"Ergonomics and the array of functionalities are not strong arguments, in light of how high the leader [Microsoft] has set the standard."</i> (3)</p> <p>In addition, owing to the proprietary standards used by Microsoft, the participants encountered problems¹⁴ with:</p> <ul style="list-style-type: none"> • collaboration (working on the same documents) involving project participants and non-project colleagues; • work on applications that are incompatible with the office suite, such as Visio and Access; • work on Excel spreadsheets (for example) containing macros, complicated graphics, etc.
<p>Sources: (1) Lefèvre, 2004. (2) http://www.logiciel-libre.gouv.qc.ca/accueil/enjeux/le_developpement/les_craintes/ (3) Lévy-Abégnoli, 2005.</p>	

Table 4: Assessment of the technology

¹⁴ Source: interviews with, and e-mails from, project participants. Other, less important, problems that they encountered were attributable to insufficient training in some cases, and in others led to adjustments that the integrator made along the way.

The key success factors of a more far-reaching migration project

A more far-reaching migration project than the pilot project must take into account the full set of key success factors and not restrict itself those assessed for the pilot project. Some of these elements are already potentially in place, such as the vision and the presence of a champion.

The vision

The vision plays an important role in any project, in that it helps to “hold the course” throughout the progression of the project. A larger migration project could not be effected without a very clear vision of the desired future state. Elements of this vision, in terms of the importance that free software should be accorded, already exist. They are compiled in Table 6.

The vision	
Formulation of clear goals	<i>"The BDGE would like to develop and implement a business model to allow it to exploit free software to its fullest potential within government bodies, but also within the health and education networks and all partners in the municipal sector." (1)</i>
Developing a strategy	<p>"Work carried out by the Université Laval in 2003–2004:</p> <ul style="list-style-type: none"> • set up a watch group • maintained and moderated a free software information site <p>Work that should allow us to acquire a critical mass of information in 2003–2004:</p> <ul style="list-style-type: none"> • participation in the establishment of RESOLL (<i>Réseau d'expertise en standards ouverts et en logiciels libres</i>) • coexistence scenarios for differing environments • migration scenarios • total cost of ownership (TCO) • development of a usable software kit for the government <ul style="list-style-type: none"> ○ office environment ○ Web environment <p>This will allow us to develop a government approach to free software." (3)</p>

<p>Developing a strategy</p>	<p>"Work carried out by the Université Laval in 2003–2004:</p> <ul style="list-style-type: none"> • <i>set up a watch group</i> • <i>maintained and moderated a free software information site</i> <p>Work that should allow us to acquire a critical mass of information in 2003–2004:</p> <ul style="list-style-type: none"> • <i>participation in the establishment of RESOLL (Réseau d'expertise en standards ouverts et en logiciels libres)</i> • <i>coexistence scenarios for differing environments</i> • <i>migration scenarios</i> • <i>total cost of ownership (TCO)</i> • <i>development of a usable software kit for the government</i> <ul style="list-style-type: none"> ○ <i>office environment</i> ○ <i>Web environment</i> <p>This will allow us to develop a government approach to free software." (3)</p>
<p>Vision deployment strategy</p>	
<p>Action Plan</p>	<p><i>The mandate will consist of creating a business model and a business plan to allow the SCT to meet the aforementioned objectives. This model will allow:</i></p> <ul style="list-style-type: none"> • <i>definition of a framework for the use of free software;</i> • <i>identification of the methods for acquiring this software;</i> • <i>verification of the legal aspects of operating free software;</i> • <i>definition of a standardized method for calculating the total cost of ownership;</i> • <i>definition of the organization to be established to support free software use within the government and ensure its continuity;</i> • <i>definition of the preferred framework and process for establishing a business model to ensure this continuity;</i> • <i>elaboration of a business plan to ensure the viability of the use of free software in the Government of Québec. (1)</i>

<p>Disseminating the vision within the organisation</p>	<ul style="list-style-type: none"> • <i>In June 2004, the Sous-secrétariat à l'inforoute gouvernementale et aux ressources informationnelles launched a new program of events called Séminaires professionnels du Gouvernement en ligne. These seminars are unique in being more targeted and in their approach of fostering discussion amongst the participants. The first of these seminars, on the topic of free software, took place June 17, 2004.</i> • <i>Presentations on free software and the government were given on October 8, 2004 at the FIQ, and November 23, 2004, during the seminar Les PME et le logiciel libre.</i> • <i>The Sous-secrétariat à l'inforoute gouvernementale et aux ressources informationnelles (SSIGRI) is organizing a series of days entitled Libres échanges sur le libre.</i> • <i>"A conference on free software and government administration (conférence sur les logiciels libres et les administrations publiques (CLLAP)) will take place next May 16 and 17 at the request of the Treasury Board Secretariat of Quebec." " (2)</i>
<p>Aligning the organization's activities with the vision</p>	<ul style="list-style-type: none"> • <i>Undertaking two pilot projects in 2004–2005: the first involves the use of some free software under Windows, while the second will implement an office suite under Linux on a workstation.</i> • <i>"Le Sous-secrétariat à l'inforoute gouvernementale et aux ressources informationnelles (SSIGRI) has taken on itself to monitor and inform the government community regarding trends in the use of free software within the Government of Québec." (2)</i>

Gaining approval of upper management	<i>"In order to adequately manage this major project for the government, the Treasury Board Secretariat decided to set up an inter-departmental steering committee, the Comité directeur pour le logiciel libre (CODELL), with the purpose of administering this initiative. The objectives of the project are to achieve a governmental approach that integrates the potential and utilization methods for free software within the public administration." (2)</i>
Instilling a sense of responsibility in the staff	<ul style="list-style-type: none"> • <i>Mr. Patrice Di Marcantonio is in charge of the free software file at the SSIGRI.</i>
<p>Sources:</p> <p>(1) Secrétariat du Conseil du trésor (Government of Québec), "Offre de services avec prix, Appel d'offres", September 2004, p. 7.</p> <p>(2) Taken from the Treasury Board Secretariat (Government of Québec) Internet site dedicated to free software. http://www.logiciel-libre.gouv.qc.ca/index.php?id=311.</p> <p>(3) Di Marcantonio, October 8, 2004.</p>	

Table 5: The Vision

The processes

A migration project with a scope larger than that of the pilot project would require not only informed risk and contract management, but also change management based on the principles compiled in Appendix 2.

Managerial skills

For a more far-reaching migration project, winning the acceptance of users is at least as important, if not even more so, than it was for the pilot project. Thus, user acceptance must be obtained even from volunteers, since they will probably not be able to change their minds after a few months. One or more sufficiently powerful incentives must be found to convince them that, despite the inconveniences (learning new work methods, undergoing training, etc.), the change is worth the trouble. Within this context, specialized applications may provide base users with tangible benefits from this migration (Figure 7).

It is possible to satisfy the specialized needs expressed by the organizations with adequate measures, as follows:

- *parametering of default options;*
- *personalizing the user interface (adding/removing menus, icons);*
- *adapting for the creation of specialized documents;*
- *addition of functions on demand (macros or OO.o components reintegrated into the generic platform);*
- *deployment of specialized suites with dedicated masters.*

Source : Lefèvre, 2004.

Figure 7: Specialized applications

The champion

As well as a strategy for eliciting user acceptance of the new technology to be implemented, a champion will also improve the project’s chances for success. In fact, advocates of using free software within a government context act as the champions of this vision. Thus, the leader of the pilot project to migrate to the free office suite does not restrict his activities to this project. He becomes an emissary of the vision by suggesting other projects to focus and promulgate the vision.

Qualities of a champion	
Qualities	
Mobilizes the information and resources necessary for the project	Yes
Promotes the vision	Organizes numerous conferences and involves the public
Rallies others to the project	Wins the support of the project participants
Obtains upper management’s approval	Yes
Drive (is willing to take risks by tackling organizational obstacles?)	Yes
Adapted from Martell, 1998.	

Table 6: Qualities of a champion

The structure

A major migration project is not feasible without a solid and highly motivated team. For this, the team must be created in consideration of both the skills required for the project and the qualities and complementary nature of its members. Particular attention must also be paid to its method of functioning.

The technology

As to the characteristics of the technology, in addition to emphasizing the choice of the best distribution, the use of specialized applications (Figure 7) allows the benefits of migrating to free software to become more tangible to the users of the office software. This will help the users see this change in a positive light and limit potential resistance to it.

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Appendix 1: Methodology

The data on which success factors for the pilot project were analyzed was gathered as follows.

Meetings in Quebec City

As of the start of the project, a number of meetings were held in Quebec City with the participants. They allowed:

- preliminary discussions with some project participants, along with two training sessions;
- gathering information from various stakeholders, in particular the project manager; the project leader, members of the users group, and a Révolution Linux representative also contributed.

Telephone contacts

Several telephone conversations, particularly with the project manager and the Révolution Linux representative, enabled us to better understand certain aspects of the project and to follow its unfolding.

Documentation

The documentation phase includes:

- Official documents about the pilot project:
 - "Offre de services avec prix, Appel d'offres" (*service proposal with price, call for tender*), no. BDGE-0406-024, Secrétariat du Conseil du trésor (Government of Québec), September 2004
 - "Appel d'offres de services" (*call for tender*), no. DLAI-04-08-020, Secrétariat du Conseil du trésor (Government of Québec), August 2004
 - "Offre de service de Révolution Linux - Réponse à l'appel d'offres" (*Révolution Linux service proposal - response to call for tender*), Révolution Linux, no. DLAI-04-08-020, August 23, 2004
- Presentations given by Mr. Patrice Di Marcantonio at the:
 - "Logiciels libres au gouvernement du Québec" professional seminar on June 17, 2004;

- "Le gouvernement du Québec et le 'Logiciel libre'", conference of the Fédération Informatique du Québec on October 8, 2004.
- The Internet site developed by the *Bureau de développement du gouvernement en ligne*, whose goal is to "provide the most references and information possible in order to increase awareness and interest in government stakeholders." (authors' translation). (<http://www.logiciel-libre.gouv.qc.ca>). This watch site is dedicated to free software and includes an inventory of what is happening elsewhere in the world. Several pages are dedicated to Quebec and, in particular, to a listing of initiatives taken by the Treasury Board Secretariat.

Information on problems encountered by the participants

This information is based on messages exchanged between the participants and the contractor:

- by receiving a copy of all messages¹⁵ sent by the participants to Révolution Linux describing problems encountered, and the responses provided by the contractor;
- by registering in the discussion forum organized by Révolution Linux to allow all persons registered (project participants, contractor) to be informed of problems encountered and solutions to make to them.

¹⁵ Révolution Linux provided the participants with a support e-mail address enabling them to be promptly informed of problems encountered and respond accordingly.

Appendix 2: The constellation of success factors

The constellation of success factors comprises five broad dimensions, which have already been summarized in Figure 1¹⁶ (p. 2). It begins with a vision of the goal to be accomplished. This must permeate all other dimensions and remain front and centre throughout the project. This vision is supported by the project's structure, and in particular by the project team. The project team must implement various project management processes, the most important being managing change, risk, and contracts. The skills required to both defend the project (role of the champion) and to elicit the acceptance of future users must also be added. Finally, the characteristics of the technology to be installed play an important role in the success of a project.

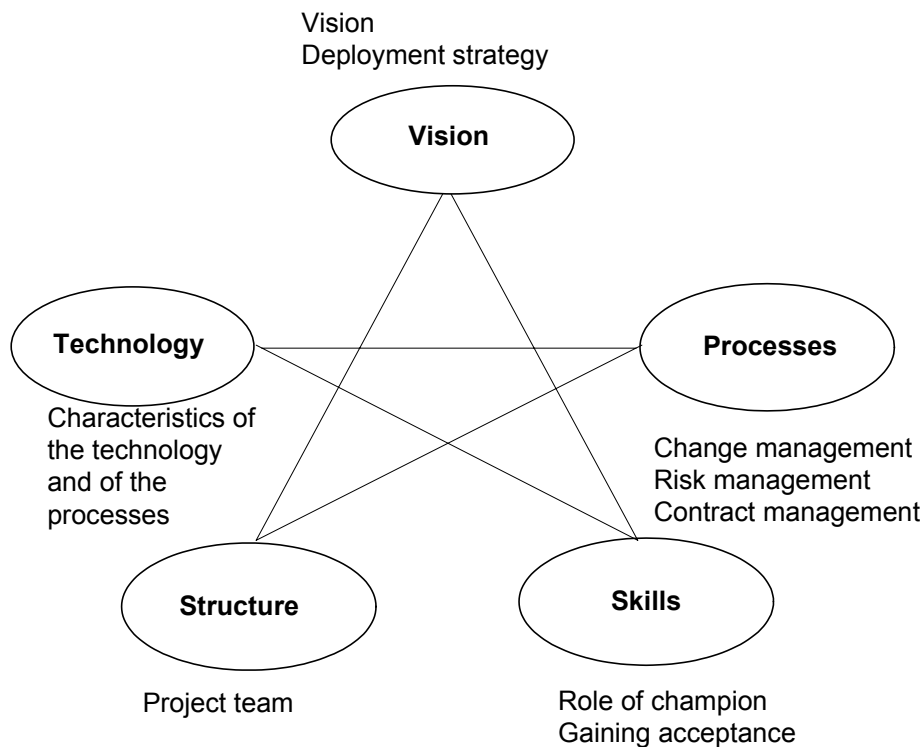


Figure 8: Key factors of success

¹⁶ Aboubekr et al., 2003.

The vision

Any project may be construed as a transition from state 1 to state 2, and its success depends to a large extent on a clear vision of how the desired future state looks. First, however, what do we mean by vision?

The characteristics of a vision

Is a vision a point of view? an opinion? an paradigm? a rationale? a goal to be achieved? or an idealized representation of the future? Martel (1998), one of the principal researchers having sought to fathom the concept of vision, describes it thus:

“Having a vision” implies:

- formulating goals in terms of a desired future state;
- elaborating a strategy allowing this state to be achieved;
- identifying resources necessary for implementing this strategy.

Source: Martel, 1998.

To be able to speak of a vision, the future state needs to be rendered concrete in terms of goals to be achieved, the resulting strategy to be implemented, and identification of the resources required. This is only possible when the many impediments are accounted for, be they organizational, technological, human, legal, or financial.

The deployment strategy

Among the elements allowing a vision to be characterized, the deployment strategy is of particular importance, since this is what allows the vision to take shape in the form of a project. Consequently, it must include a plan of action, dissemination activities, coordination of the operations, and the appropriate organizational functions. Approval from the upper management and the delegation of responsibilities to the staff are vital.

Deployment process for the vision

- *Develop a plan of action*
Development of a detailed plan of action describing the necessary stages of implementation.
- *Disseminate the vision*
Communicating the vision to the organization, including soliciting feedback through personal contact and informal networks, in order to motivate individuals to become involved in bringing the vision to fruition and to ensure their understanding of the vision.
- *Align the operations and activities of the organization with the vision*
Specific attention must be paid to the following elements: deployment of the required resources, development of functional and managerial capabilities, consistency of behaviour with the vision, in terms of both the leader and other key actors, and the development of policies and guidelines, as well as personification of the vision by administrative systems, i.e. selecting, rewarding, and motivating staff.
- *Obtain the support of upper management*
- *Instil a sense of responsibility*
Delegating accountability to the staff so that they will undertake actions that advance the vision.

Source: Adapted from Martel, 1998.

The processes

Entrenchment of the vision in a project involves establishing processes to manage its various dimensions, the most important of which are managing change, managing risk, and managing contracts.

Managing change

The management of change must be a function of the type of change that the project implies for the organization. The greater the change associated with project, the more care must be put into managing it. Many researchers have examined the issue of managing change. Benjamin and Levinson (1993) identified eight principles to guide the realization of significant changes.

Principles to consider when effecting fundamental changes

- Develop a systematic change process
- Manage the balance and trade-offs between technological, business process, and organizational elements
- Rally pro-change forces in the organization
- Analyse the scope of the change and the magnitude of the required effort
- Analyse and manage the involvement of the stakeholders
- Have a champion who knows what everyone is doing
- Conduct organizational prototyping
- Provide for periodical reviews over the course of the change

Source: Benjamin and Levinson, 1993.

Risk management

While it is true that the very act of conducting an assessment of a project's risk exposure¹⁷ is already a first step towards mitigating it, since it draws our attention to the challenges to be met, it remains that this is only a beginning. The next step is to implement appropriate risk abatement and mitigation mechanisms. Research has revealed that the importance assumed by risk factors varies with the phase of the project. Examining the very nature of the risk factors reveals how critical timely decisions are for mitigating risk. The same is true of the choice of software to implement, the choice of integrator, and the appointment of project leaders, for example. Wise choices in these matters can have a significant impact on reducing risk exposure, while poor choices will have the opposite effect. The nature of risk mitigation mechanisms must correspond to the nature of the risks they target.

Risks associated with the project

Since risk is represented by all the random factors that threaten achievement of the goals set for the project, the notion of risk exposure is central to every effort to assess a project's risk.¹⁸ The level of risk to which the project is exposed can be ascertained by using a risk exposure map and by identifying and assessing the various risk factors affecting this exposure.

¹⁷ "Évaluation de risque du projet de migration vers la suite bureautique libre sous Linux", CIRANO report 2005RP-09, February 2005.

¹⁸ The risk assessment method is discussed in detail in Appendix 3 of the aforementioned study.

Contract management

Contract management consists of evaluating both the services supplied, in terms of their compliance with the specifications, and the actual supplier. To accomplish this, criteria identified by researchers in the context of the installation of professional software were adapted to the context of migrating to free software.

<i>Elements of contract management</i>	
Previous successes	The supplier's past success in installing the same type of software
Business experience	The supplier's experience in the organization's field of activity
Service quality	The quality of the services offered by the supplier, especially training
Availability of post-installation support	The duration and availability of post-sales support
Quality of post-installation support	The quality of the service and speed of intervention
Cost of post-installation support	The cost of receiving post-installation support
Duration of warranties	The duration of the warranty provided by the supplier
Reputation	The supplier's reputation
Source: Adapted from the professional software evaluation table (Rivard, Talbot, 2001, p. 512).	

Managerial skills

The process of managing change and risk must be complemented with a knack for eliciting user acceptance of newly installed software and for defending and promoting the project. The importance of these skills lies in the role they play in the adoption and use of new technologies, in particular by users, without which the project cannot be considered a success.

Gaining acceptance

Many researchers have grappled with the factors that determine future users' acceptance. These elements, which are catalogued below, can be related to either the technology to be installed or to the users of that technology.

Factors linked to technological innovation		
Factor	Description of the factor	Author(s)
Information	Perception of the quality and availability of the information provided by the innovation	Herbig, Day 1992 Seddon, Kiew 1994
Ease of use	Perception of the ease with which it can be used	Moore, Benbasat 1991 Seddon, Kiew 1994
Possibility of trying it first	Is it possible to test the innovation before adopting it?	Rogers 1962
Support	Accessibility, speed, and quality of the support supplied	Pitt and Watson 1994
Factors linked to the adopting individual		
Factor	Description of the factor	Author(s)
Relative benefit	Perceived superiority of the innovation over the technology replaced	Hébert, Benbasat 1994
Compatibility	Ability of the innovation to smoothly integrate into the individual's values, culture, and routine activities	Rogers 1962 Tomatzky and Klein 1982
Usefulness	Perception of the innovation's relative usefulness	Moore, Benbasat 1991
Volunteerism	Perception of the individual in terms of the freedom to choose.	Moore, Benbasat 1991
Source: Aubert, Bernard, 2002, p. 81–88.		

The champion

Within an organization, the champion emerges to take ownership of, and breath life into, the vision. To accomplish this, he collects the required information and resources, promotes the vision, and then secures the necessary support and assistance. He is able to generate enthusiasm for the vision, rallying others to help him turn it to reality. Consequently, he succeeds in obtaining the necessary approvals, launching the project, stimulating creativity, and, most importantly, ensuring that the vision is adopted and brought to term. He is ready to take risks by tackling organizational obstacles in order to transform the vision into reality. Whatever his strengths, the champion must adopt a strategy for implementing the vision.

The structure

The structure of the project is also a particularly vital element of success, in the sense that its realization rests on the shoulders of the project team. Similarly, in the case of projects implemented within a partnership structure, the design of the relationship and the dynamics between the partners impacts on the unfolding of the project and, ultimately, on its success.

The project team

The project team plays a particularly vital role, since it is responsible for realizing the project and giving effect to the vision. The team is defined as a small number of people with complementary competencies who are committed to a shared goal, a set of performance targets, and an approach for which they assume collective responsibility (Katzenbach and Smith, 1993). A team can achieve higher levels of performance than other work groups (Kerzner, 1998).

The role played by the project team will be all the more positive to the extent it was assembled carefully. Decisions concerning its composition will have a pronounced impact on its performance and effectiveness. Consequently, it must be chosen in light not only of the constraints and characteristics of the project, but also the traits of the individuals on it. The team may be multidisciplinary¹⁹ and diversified,²⁰ and its members may have different profiles (technical orientation,²¹ user orientation,²² socio-political orientation²³).

The functioning of the project team

Nonetheless, a judicious selection of team members is not sufficient to ensure that it will attain a high performance standard. Indeed, a project team is also characterized by the specificity of its functioning.

¹⁹ The members of which are specialized in different fields.

²⁰ The members of which have diverse individual characteristics, for example, in terms of age, sex, race, and religion.

²¹ They will wish for the project to proceed in intermediary deliverables with set deadlines; they will put a great deal of weight on the deadlines and the commitment of professionals to the development, etc.

²² They will want to implicate users in different stages of the process; they will be very sensitive to users' acceptance of the technology, etc.

²³ They will emphasize managing change, etc.

The specificities of a team's functioning

- **Leadership roles are parceled out.** Distributing management functions amongst the team members gives them a greater stake.
- **Responsibilities are simultaneously individual and collective.** A project team integrates both the individual and collective results of the team members. The very essence of the team resides in this collective commitment to reach the goals it has set, allowing its members to leverage their individual efforts.
- **The goals are elaborated by the team members.** This facilitates their appropriation. The shared goal thus becomes the individual goal of each member. This appropriation is necessary for them to be able to leverage their individual efforts.
- **Performance is measured by evaluating the outcome of the collective labours.** This assumes a great deal of interdependence between the members of the team, which, by definition, gathers individuals with complementary competencies required for realizing the project.
- **Discussions and meetings for solving problems are encouraged.** This assumes both an ability to resolve conflicts and also real communication between the team members, as well as great confidence in each other and themselves. Indeed, communication and transparency is central to the climate of confidence within the team.

Source: Katzenbach, Smith, 1993.

The technology

The technology is also very important to the project's success, since it will determine whether or not the established goals are achieved. In a reaction to Microsoft's virtual monopoly, many organizations are examining the possibility of migrating to a free office suite these days. These questions arise both because of the growing penetration of free software, but even more because of problems encountered using the MS Office suite.

Problems Encountered with MS Office

Dependence

Organizations find themselves in a position of dependency, owing to the quasi-monopoly of Microsoft in the office suite market:

- Dependence on the software publisher: Today, Microsoft has a quasi-monopoly in the area of office suites. According to a study by Giga Group, it has cornered 96 per cent of the global market.²⁴ This dependence upon a single economic agent creates vulnerability within organizations, since they must comply with Microsoft's dictates.
- Dependence vis-à-vis the evolution of the software: One of the most controversial practices of the software publisher is that it may unilaterally decide to stop supporting a given version of the suite in favour of a more recent version, forcing all organizations using the suite to upgrade. These organizations may also be obligated to change versions for fear of incompatibility (difficulties with file sharing owing to obsolescence). Such changes involve costs incurred for purchasing new licences, but they may also imply the necessity to replace equipment (e.g. requiring more RAM or a more powerful processor).

Risks to data continuity

One of the main challenges facing organizations, in particular public administrations, is that of data continuity. It must be possible to archive and recover data seamlessly. Now, different software versions do not always allow this, especially if the software publisher discontinues a distribution. One of the solutions proposed today by software creators is the XML data format. This latter ensures data continuity by supplying a gauge of interoperability, given that its specifications are free and open.

²⁴ Quoted by T. Lévy-Abégnoli, 2005.

The absence of cost controls

Today most organizations are seeking ways to minimize expenditures on information technologies. Also, in this context, licence costs weigh more heavily in the scales, since these costs do not generate a measurable yield to investments. Indeed, in light of Microsoft's virtual monopoly, organizations have lost control of their decisions and investments.

- Licence costs linked to the use of software and the number of workstations on which they are deployed. Keeping up-to-date with the evolution of software creates costs that are direct (paying for the licence) and indirect (risks during deployment, need to update equipment, data conversion in the event of incompatibility, etc.).
- Security risks associated with the growing number of viruses, which perennial patch downloads cannot keep up with. The battle against viruses and hackers burdens budgets with burgeoning security expenditures, while never fully shielding the organizations from these threats.
- Expenditures on storage space also continue to rise with software bloat.