Defining and Building a Decision Support System: the Experience of the Bibliothèque Nationale de France

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INTRODUCTION

The Bibliothèque nationale de France (BnF) has chosen to adopt a decision support system. This paper presents the context of this choice and its goals. Secondly, it describes the process, from the needs analysis to the choice of pilot projects, covering two topics: preservation and human resources.

We define a decision support system as a set of organized data, tools and reports which provide the means to manage and plan the different activities of an institution.

WHAT IS THE CONTEXT AT THE BNF?

The core activities are well covered by the information system, but the organized delivery of results for acquisitions, cataloguing, etc. is insufficient. An objective-driven culture is developing, but we lack supporting tools. Our internal users expect us to have a single source system and our management needs good and organized data to have a better understanding of the organization now and to plan for the future. Besides that the French state has become more focused on targets and is asking for performance indicators which means that we are obliged to sign a 'performance contract'.

The objectives, which we are trying to meet, are as follows:

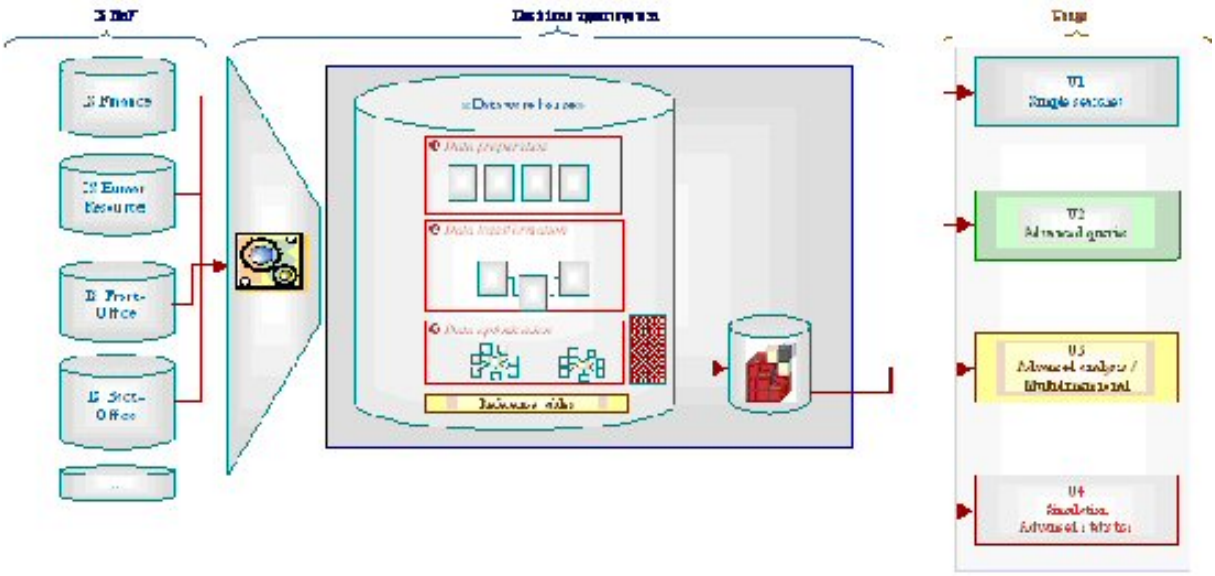
- We want to provide performance indicators to assess compliance with the strategic aims of the library over time, using:
    - alerts, trends, measurement of outcomes;
    - operational indicators;
- output performance indicators;
- activity reports.
- We need long-term historical analysis. The tool should therefore enable us to analyze the trends before deciding on appropriate action: e.g. providing complex analysis, forecasts, and simulations.
- We want to allow data and information from different computer applications to be compared, and to have simplified access to information:
    - transparent information sharing
    - speeding up dissemination of information.

Our users have a broad spectrum of expertise, ranging from simple searches to advanced statistics. We need to target users with different needs and to adapt usage to each category of users.

We can define four main categories:

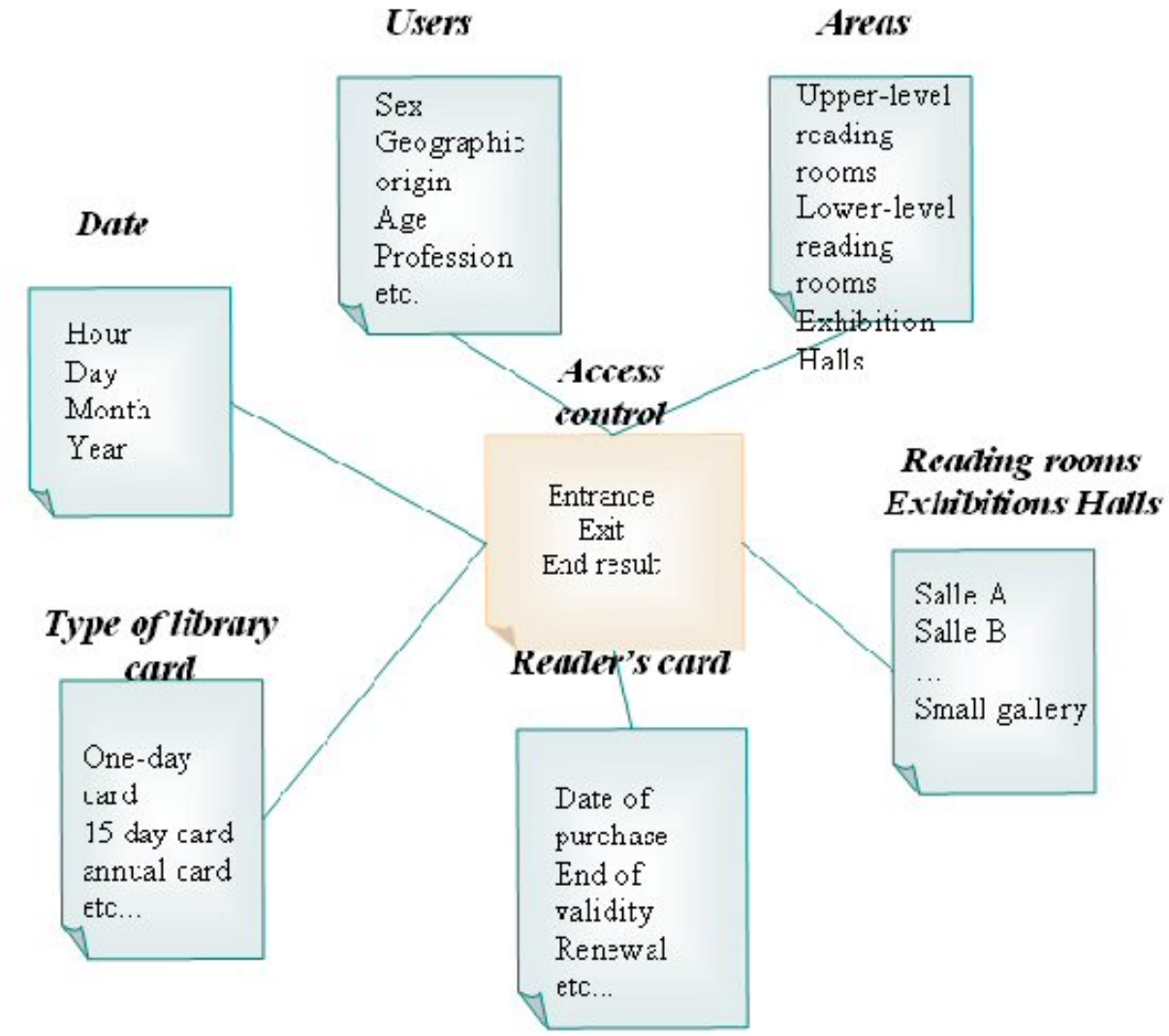
1. Simple searches (for directors, department directors etc.) producing pre-formatted reports, performance indicators, subscription reports.
2. Advanced queries (for functional experts) with tailor-made queries on demand.
3. Advanced analysis (for experts and analysts, policy-makers and administration) implying multidimensional navigation and powerful analysis functions.
4. Simulation and advanced statistics (for finance and human resources managers, strategic planners).

The simplified map presented below outlines the key points of the system. Our sources of data are all channelled through an extractor tool before being processed in the data warehouse and then supplied to the various users.



We shall use modelling, for example, to measure and analyse library attendance. We'll first define the 'box titles' (users, areas, etc.) and this will allows us to combine different categories of information over a period of time.

Example of functional modelling



We have chosen a sequential planning process for the implementation of the project to obtain a total vision of internal user needs and existing tools; to ensure we selected long lasting technology, adaptable to upcoming requirements; to allow us to monitor project implementation area by area with a gradual approach, and finally to allow us to run a limited pilot project, highlighting major needs.

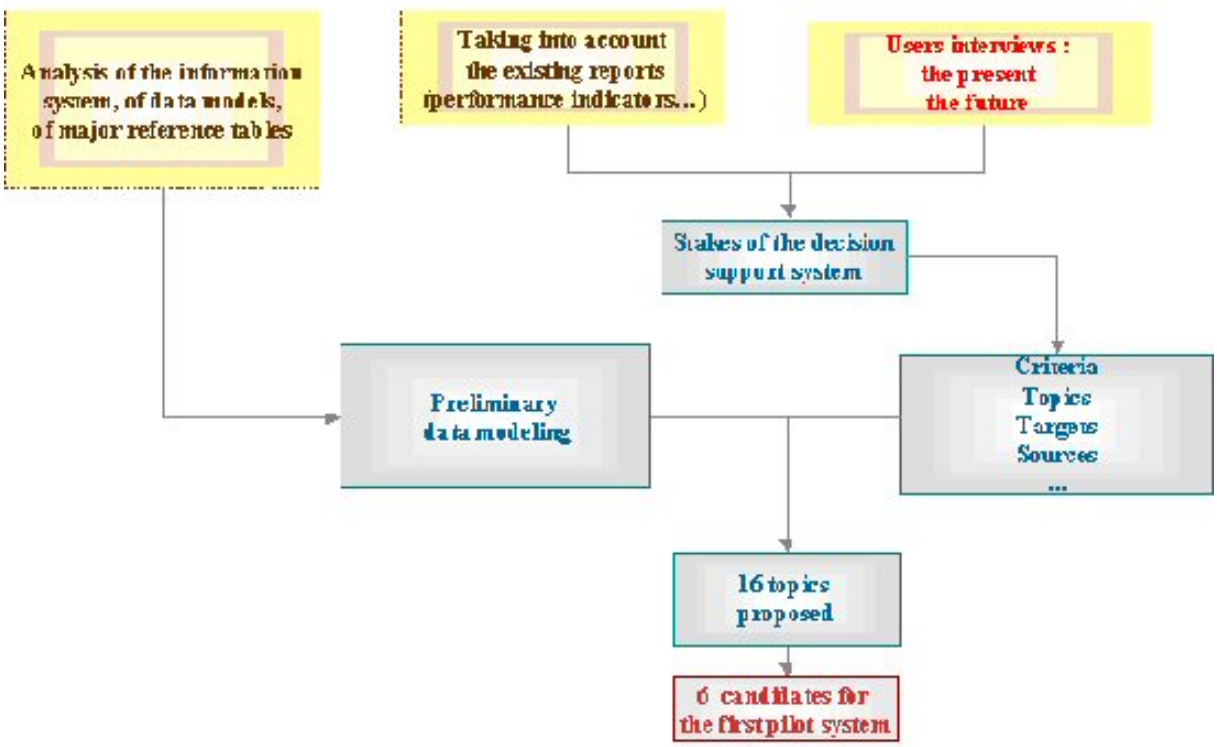
We conducted a formalized needs analysis for almost six months. The key results are as follows:

1. The library has many functional domains and faces many demands, but progress towards improvement has been slow, because it is not easy to introduce a common management culture. We often perform better in operational procedures than in coordinated evaluation and forecasting. The demands of internal users are often common across functions:
    - high demand for data related to resources allocated,
    - need for measurement and analysis of the operations in different fields: acquisitions, cataloguing, preservation, etc.
2. Priority should be given to back-office activities, because the existing information system and statistics favour the front-office (client-facing activities).
3. A lot of work to collate information (follow-up of operations; indicators; annual reports) is currently undertaken in the library but in diverse ways. The full time equivalent of 12 people are employed at the moment collecting and analysing information.

The system has to meet many challenges, some of which come from internal use, some from outside, to:

- improve user satisfaction (on and off site)
- optimise workflows
- develop a demand driven acquisition policy
- improve the preservation of collections
- diversify and increase cultural and commercial incomes
- optimise allocation of resources (human and financial)
- better communicate with partners (government bodies, other libraries).

This diagram shows the process we went through to decide what our first pilot system should be:



A good pilot system should be a good approximation to the target system.

It has to offer strong added value (answering a critical need), to be visible (services involved) and has to be representative. The choice of the BnF has been to choose two topics from the following six possible areas for improvement:

- Measuring document processing within the library.
- Measuring the volume and processing (speed?) of documents acquired.
- Measuring the documents coming through legal deposit.
- Measuring cataloguing activities.
- Managing the preservation process.
- Managing resource allocation: human and financial.

When choosing the pilot project, we considered the competing demands of acquisitions and preservation and we concluded that preservation was the area we wanted to focus on, because we need to improve our understanding of our activities in this field. We also chose human resources as a second pilot scheme.

THE PILOT PROJECT FOR PRESERVATION

The pilot system for the preservation process aims to improve management of the different types of processing: binding, reproduction, etc.; to optimise operations (do better with the same resources); to free up some resources in order to undertake new tasks (e.g. digitisation). It has to support back-office operations and production costs (staff, equipment, subcontracting). The expected outcomes are clear and insightful management information, as well as specific reports for professionals in the services concerned, allowing them to monitor annual programming, volume of work and the time spent at each step of the process, and other parameters (deadlines, quantities, stocks). The pilot process is designed to tell us what is happening at each step in the process and also inform us if the total process is effective, over what time scale and at what cost.

Monitoring the operations:

- Quantities:
    - number of documents processed at each step
    - number of documents processed internally and externally, by type of processing
    - the variance between the quantities processed and forecast
- Processing time
    - at each step
    - in total

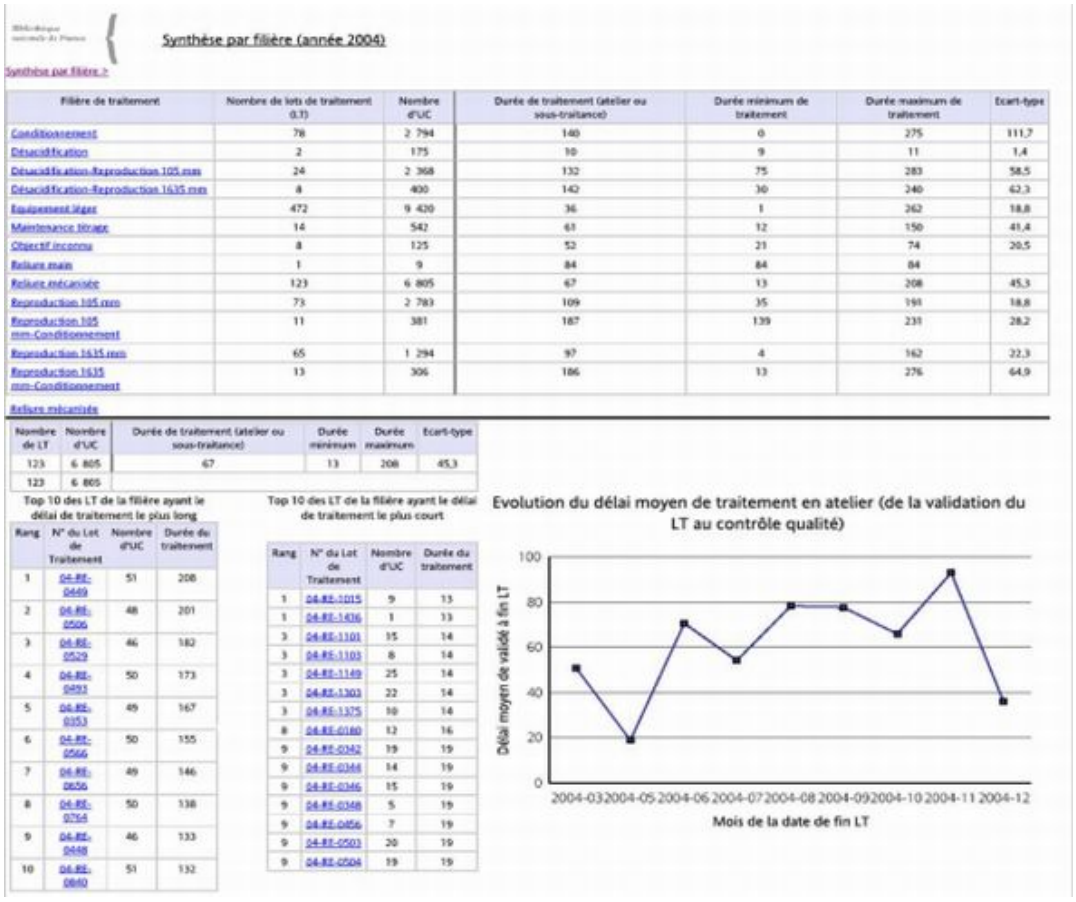
Monitoring the production costs:

- Subcontracting costs and internal costs.

A BREAKDOWN BY DATA FLOW

The system lets us know, for example, which documents take the longest time to process and also which the shortest.

Example of consolidated reporting:



Synthèse par filière (année 2004)

Synthèse par filière >

Filière de traitement	Nombre de lots de traitement (LT)	Nombre d'UC	Durée de traitement (atelier ou sous-traitance)	Durée minimum de traitement	Durée maximum de traitement	Ecart-type
Conditionnement	78	2 794	140	0	275	111,7
Désacidification	2	175	10	9	11	1,4
Désacidification-Reproduction 105 mm	24	2 368	132	75	283	58,5
Désacidification-Reproduction 1635 mm	8	400	142	30	240	62,3
Equipement léger	472	9 420	36	1	262	18,8
Maintenance hivapt	14	542	61	12	150	41,4
Objectif inconnu	8	125	52	21	74	20,5
Reliure main	1	9	84	84	84	
Reliure mécanisée	123	6 805	67	13	208	45,3
Reproduction 105 mm	73	2 783	109	35	191	18,8
Reproduction 105 mm-Conditionnement	11	381	187	139	231	28,2
Reproduction 1635 mm	65	1 294	97	4	162	22,3
Reproduction 1635 mm-Conditionnement	13	306	186	13	276	64,9

Reliure mécanisée

Nombre de LT	Nombre d'UC	Durée de traitement (atelier ou sous-traitance)	Durée minimum	Durée maximum	Ecart-type
123	6 805	67	13	208	45,3
123	6 805				

Top 10 des LT de la filière ayant le délai de traitement le plus long

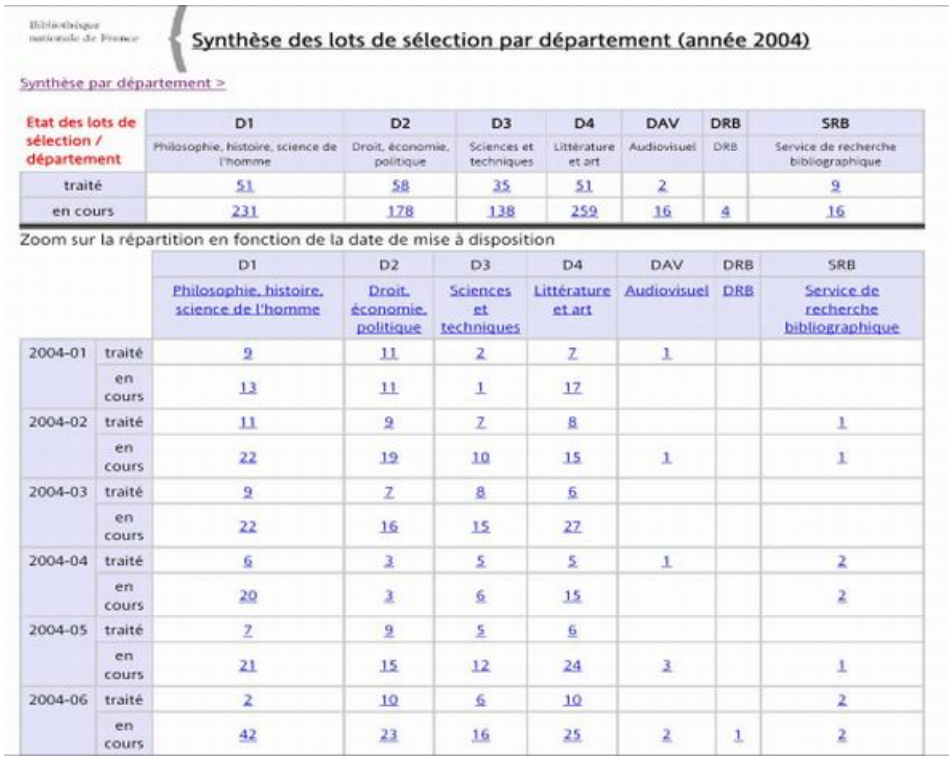
Rang	N° du Lot de Traitement	Nombre d'UC	Durée du traitement
1	04-RE-0449	51	208
2	04-RE-0506	48	201
3	04-RE-0529	46	182
4	04-RE-0493	50	173
5	04-RE-0353	49	167
6	04-RE-0566	50	155
7	04-RE-0656	49	146
8	04-RE-0764	50	138
9	04-RE-0448	46	133
10	04-RE-0840	51	132

Top 10 des LT de la filière ayant le délai de traitement le plus court

Rang	N° du Lot de Traitement	Nombre d'UC	Durée du traitement
1	04-RE-1015	9	13
1	04-RE-1436	1	13
3	04-RE-1101	15	14
3	04-RE-1103	8	14
3	04-RE-1149	25	14
3	04-RE-1303	22	14
3	04-RE-1375	10	14
8	04-RE-0180	12	16
9	04-RE-0342	19	19
9	04-RE-0344	14	19
9	04-RE-0346	15	19
9	04-RE-0348	5	19
9	04-RE-0456	7	19
9	04-RE-0503	20	19
9	04-RE-0504	19	19

Evolution du délai moyen de traitement en atelier (de la validation du LT au contrôle qualité)

The system lets us analyse performance by department and tells us which processing is complete, which is in progress.



Synthèse des lots de sélection par département (année 2004)

Synthèse par département >

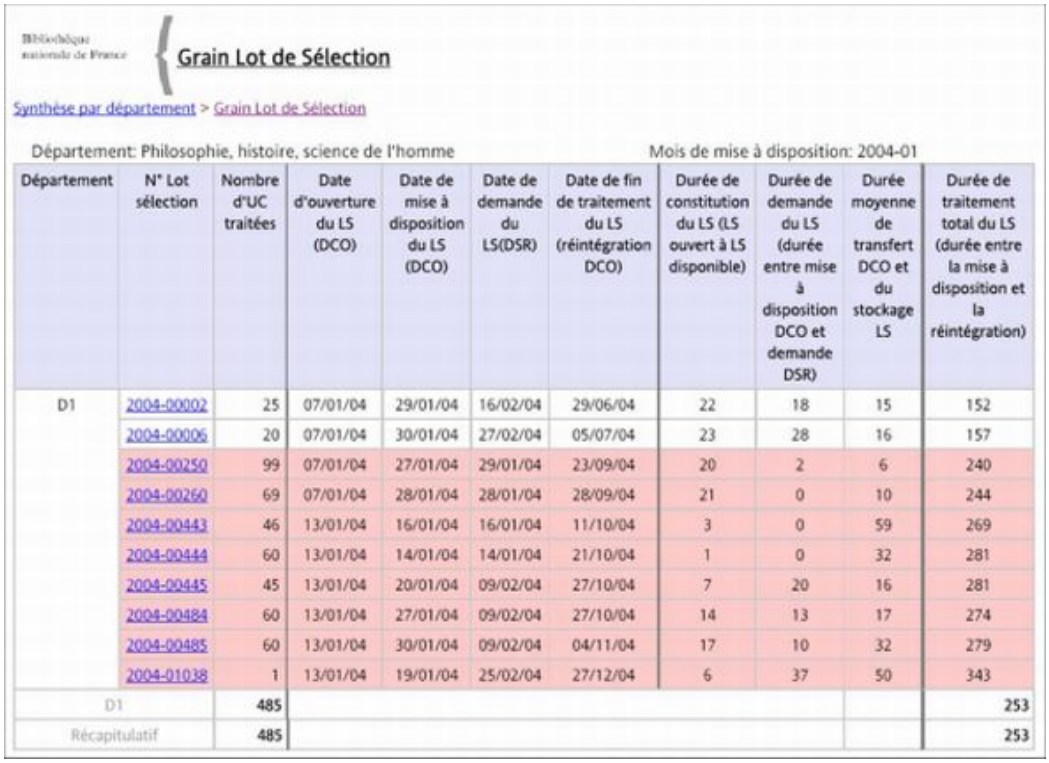
Etat des lots de sélection / département	D1 Philosophie, histoire, science de l'homme	D2 Droit, économie, politique	D3 Sciences et techniques	D4 Littérature et art	DAV Audiovisuel	DRB DRB	SRB Service de recherche bibliographique
traité	51	58	35	51	2		9
en cours	231	178	138	259	16	4	16

Zoom sur la répartition en fonction de la date de mise à disposition

		D1 Philosophie, histoire, science de l'homme	D2 Droit, économie, politique	D3 Sciences et techniques	D4 Littérature et art	DAV Audiovisuel	DRB DRB	SRB Service de recherche bibliographique
2004-01	traité	9	11	2	7	1		
	en cours	13	11	1	17			
2004-02	traité	11	9	7	8			1
	en cours	22	19	10	15	1		1
2004-03	traité	9	7	8	6			
	en cours	22	16	15	27			
2004-04	traité	6	3	5	5	1		2
	en cours	20	3	6	15			2
2004-05	traité	7	9	5	6			
	en cours	21	15	12	24	3		1
2004-06	traité	2	10	6	10			2
	en cours	42	23	16	25	2	1	2

The output reports analyse the different steps of processing for the documents sent by a department.

Example of an output report:



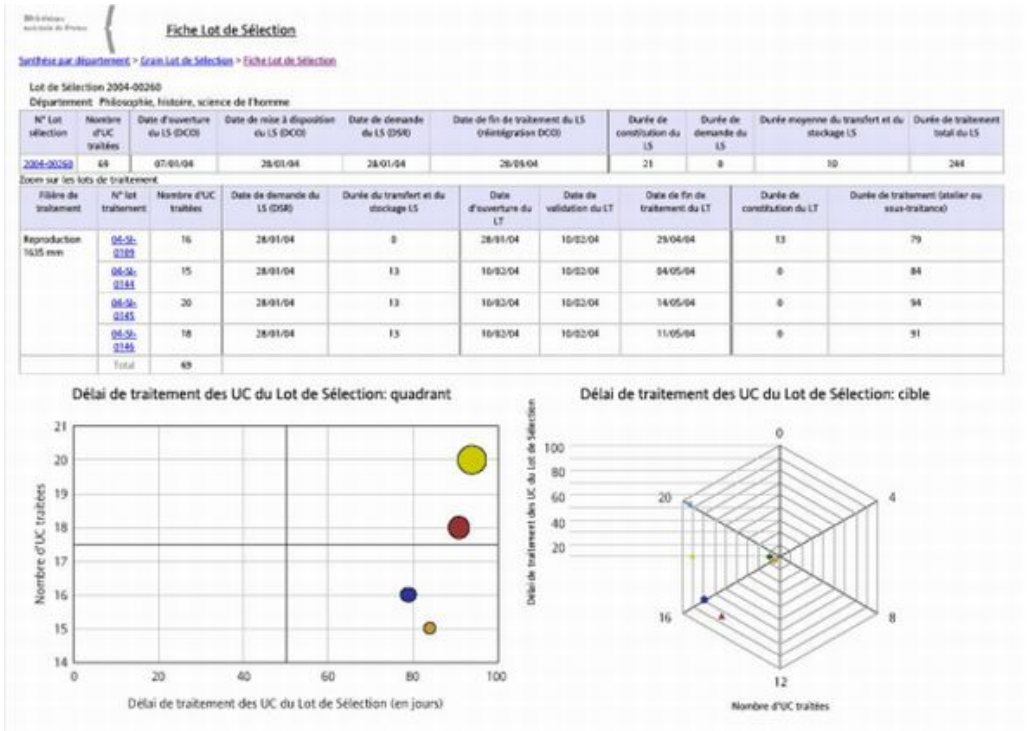
Bibliothèque nationale de France

Grain Lot de Sélection

Synthèse par département > Grain Lot de Sélection

Département: Philosophie, histoire, science de l'homme — Mois de mise à disposition: 2004-01

Département	N° Lot sélection	Nombre d'UC traitées	Date d'ouverture du LS (DCO)	Date de mise à disposition du LS (DCO)	Date de demande du LS(DSR)	Date de fin de traitement du LS (réintégration DCO)	Durée de constitution du LS (LS ouvert à LS disponible)	Durée de demande du LS (durée entre mise à disposition DCO et demande DSR)	Durée moyenne de transfert DCO et du stockage LS	Durée de traitement total du LS (durée entre la mise à disposition et la réintégration)
D1	2004-00002	25	07/01/04	29/01/04	16/02/04	29/06/04	22	18	15	152
	2004-00006	20	07/01/04	30/01/04	27/02/04	05/07/04	23	28	16	157
	2004-00250	99	07/01/04	27/01/04	29/01/04	23/09/04	20	2	6	240
	2004-00260	69	07/01/04	28/01/04	28/01/04	28/09/04	21	0	10	244
	2004-00443	46	13/01/04	16/01/04	16/01/04	11/10/04	3	0	59	269
	2004-00444	60	13/01/04	14/01/04	14/01/04	21/10/04	1	0	32	281
	2004-00445	45	13/01/04	20/01/04	09/02/04	27/10/04	7	20	16	281
	2004-00484	60	13/01/04	27/01/04	09/02/04	27/10/04	14	13	17	274
	2004-00485	60	13/01/04	30/01/04	09/02/04	04/11/04	17	10	32	279
	2004-01038	1	13/01/04	19/01/04	25/02/04	27/12/04	6	37	50	343
D1		485								253
Récapitulatif		485								253



Fiche Lot de Sélection

Synthèse par département > Grain Lot de Sélection > Fiche Lot de Sélection

Lot de Sélection 2004-00260

Département Philosophie, histoire, science de l'homme

N° Lot sélection	Nombre d'UC traitées	Date d'ouverture du LS (DCO)	Date de mise à disposition du LS (DCO)	Date de demande du LS (DSR)	Date de fin de traitement du LS (réintégration DCO)	Durée de constitution du LS	Durée de demande du LS	Durée moyenne du transfert et du stockage LS	Durée de traitement total du LS
2004-00260	69	07/01/04	28/01/04	28/01/04	28/09/04	21	0	10	244

Zoom sur les lots de traitement

Filière de traitement	N° lot traitement	Nombre d'UC traitées	Date de demande du LS (DSR)	Durée du transfert et du stockage LS	Date d'ouverture du LT	Date de validation du LT	Date de fin de traitement du LT	Durée de constitution du LT	Durée de traitement (atelier ou sous-traitance)
Reproduction 1635 mm	04-SI-0189	16	28/01/04	0	28/01/04	10/02/04	29/04/04	13	79
	04-SI-0144	15	28/01/04	13	10/02/04	10/02/04	04/05/04	0	84
	04-SI-0145	20	28/01/04	13	10/02/04	10/02/04	14/05/04	0	94
	04-SI-0146	18	28/01/04	13	10/02/04	10/02/04	11/05/04	0	91
	Total	69							

Délai de traitement des UC du Lot de Sélection: quadrant

Délai de traitement des UC du Lot de Sélection: cible

THE PILOT PROJECT FOR HUMAN RESOURCES

The pilot system for human resources is intended to supply departmental management with the human resources indicators required to better manage their activity by:

- providing awareness of the level of operational resources, and monitoring their evolution over a period of time

- identifying gaps with respect to a reference situation
- selecting indicators allowing alerts on critical situations
- avoiding duplicating local databases.

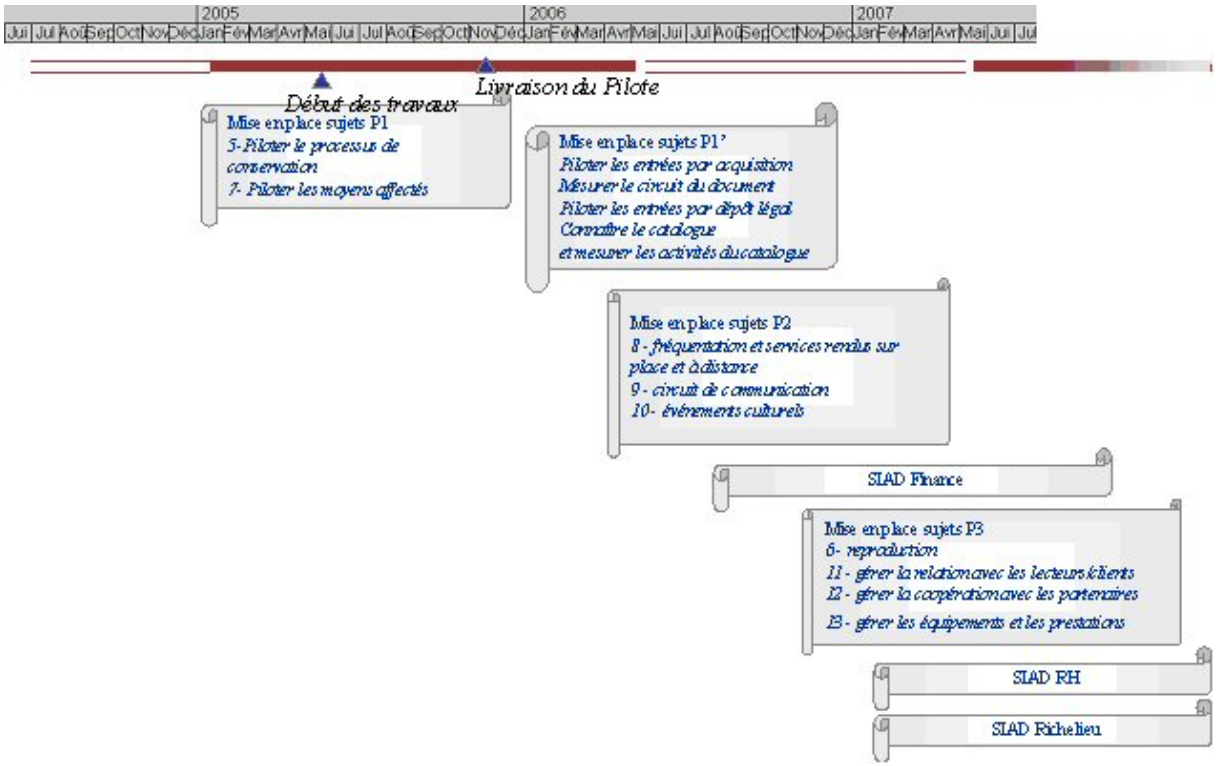
The stated needs are of three types:

- those linked to the ongoing monitoring of human resources data
- information about administrative files of staff members
- career planning information

In the human resources area, we want to get over time details of the library's staff in terms of actual numbers of posts and full time equivalents; the status of sickness and absence; the status of the age and experience profile of our staff.

PLANNING

Below is an example of planning; we hope to have the pilot systems running at the end of the year. We have just begun (in May 2005) the implementation of the first two pilot systems following an instruction phase. At the beginning of next year we shall deal with the other topics.



ORGANIZATION AND RESOURCES

For the human resources we have the following organization:

- a steering committee (one meeting every three months over three years)
- a project team of four people
- working groups with the users (~ 200 person-days)
- a consultancy (needs analysis) : ~ 140 person-days
- a subcontractor (to implement the six first topics in the system) ~ 580 person-days

For the financial resources the components during the three year period are:

- licences for decision-making tools: a technical tool for data (ETL Datastage) and a reporting tool (Reportnet from Cognos)
- consultancy
- contract for development of the system

SOME CONCLUSIONS

What are our first conclusions about this new decision making project in the context of the BnF?

- It reveals the shift to a performance-driven culture within the library.
- We need to increase the information and the ownership of these new tools by the management.
- As we implement the new system, we have to ensure it is adaptable because needs evolve according to the use of the system.
- Finally, it is a new project with its own characteristics:
    - implementation has to be shaped by users' needs and also has to meet all current and future technical requirements
    - there are also the more technical, but critical phases of data provision, modelling and storage
    - it requires our IT staff to develop their skills accordingly.

We are in the process of implementing an exciting new system. It creates many challenges for us but promises great improvements in how we perform our activities, how we understand what we are doing and what we plan to do in the future.