

## **The new SI architecture for financial management Proposal of a model: Case of Moroccan universities**

## **La nouvelle architecture SI de la gestion financière Proposition d'un modèle: Cas des universités marocaines**

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## Abstract

In an international environment marked by globalization, the desire to place economic growth and social development at the heart of national concerns gives rise to new demands and new requirements for higher education. It is clear that our society is evolving in a system of knowledge economy, within which the university must be a generator of technological innovation and must provide itself with the necessary financial means to accompany this change within the framework of an effective management. and efficient.

The aim of the paper is to recommend an up-to-date architectural information system that is financial management oriented. The case study is a restructuration project of the budget and financial affairs division, freshly created within the Moroccan universities.

The article is part of a modernization aspect of the public sector in an attempt of the implementation of a result-based management culture.

**Key words:** Information system; financial reporting system; research-intervention; public finance department; management control.

## Résumé

Dans un environnement international marqué par la mondialisation, la volonté d'inscrire la croissance économique et le développement social au cœur des préoccupations nationales, fait naître de nouvelles demandes et de nouvelles exigences envers l'enseignement supérieur. Il est clair que notre société évolue dans un système d'économie de la connaissance, au sein duquel l'université doit être génératrice d'innovation technologique et doit se doter des moyens financiers nécessaires pour accompagner ce changement dans le cadre d'une gestion efficace et efficiente.

L'objet de cet article est de proposer une nouvelle architecture d'un Système d'information orienté gestion financière. L'étude de cas est le projet de restructuration de la Division du budget et des affaires financières nouvellement créée au sein des universités marocaines.

L'article s'inscrit dans une dimension de modernisation du service public en essayant d'implanter une culture de gestion axée sur résultats.

**Mots-clés :** Système d'information ; système de remontée d'information financière ; Recherche-intervention ; département de finance public ; contrôle de gestion.

## Introduction

Public management reform state and modernization's prime mission is to alleviate the public services performance in fulfilling their missions. It first concerns the fiscal reform of 2002 aiming to launch an updated budget management focused on the diversity of results, the reform programs of the public administration sector for a favorable monitoring and controlling of the budgets (expenditure control), the public institutions and enterprises reforms regarding the improvement of their governance. These structural reforms were revisited and updated in the 2015 project of the finance law, in the hopes of refining public expenditure throughout the organic law related to the finance one.

As per, this public sector overview, taking into consideration its strong socio-economical contribution and its major role as a strategic key actor, but also aiming to address the structural deficiencies and its loopholes, 50-21 framework law sights to bring to fruition this profound reform throughout the achievement of the following core objectives:

- Cementing the strategic role of the public institutions and enterprises in the implementation of public policies and sectorial state strategies;
- Amending public sectors and **rationalizing public expenses** throughout the restructuration of the existing public enterprises and institutions and a finer future creations' molding;
- Reinforcing the public institutions and enterprises' autonomy and the management and administrative bodies' accountability;
- Enhancing the public institutions and enterprises' **governance**, improving the reorientation of **the financial control towards performance evaluation of the state**, and preventing the risks and the valorization of the patrimony;
- Improving the **performances** of the public enterprises and instructions and boosting their economical and social efficiency throughout their concrete synergies and their optimal coherences;
- Evaluating periodically the public institutions and enterprises missions and activities' pertinence.

It is in this specific perspective that we describe, in this paper, a proposition of a new architectural information system that is focused on the improvement of the financial services provided by the universities across **intervention research** within an organizational atmosphere.

In our case it is the finance management system within the universities; after the various changes and reforms and the application of the 17/10/2020 joint decision between the ministry of national education, professional training, higher education and scientific research and the ministry of economy, finance and administrative reforms, they knew focusing on the organization and the attributes of the universities' administrative structures.

The concerns of this paperwork are related to its relevancy and its originality, it sheds light on the questionings about the modernization of the public sector management and the role played by the managerial instruments, initially dedicated to the private institutions, to improve the performances of the public institutions and enterprises.

As a matter of fact, the Moroccan University, being a public institution that perceives state resources and constituted of budgetary allocations and subventions, is strained to manage effectively its resources to gain its legitimacy vis-à-vis its contributors. Hence, the budgetary configuration and the management of the public finances knew some changes and modifications following the implementation of the budgetary reform of 2002. This latest gave space to managerial programs focused on the results of the main ministerial departments and was concretized after the introduction of the logic of the projects on a suburbanized level under the scope of the contractualization between the higher educational institutions and the ministry of finances in 2009. This gave birth to a managerial system throughout results aiming the performance of the institutions replacing a managerial system throughout the means. The advertence is the following: Owing to the signing of the joint decision between the ministry of economy and finances and the higher educational institutions (adopting a brand-new flow chart), in order to supervise the entire activities of the universities and the economical and financial affairs for a better management of the budget.

Therefore, despite the management and coordination efforts carried out by the universities in terms of organization in spite of insufficient human resources and coordination and the difficulties faced with communications and reporting and the absence of information systems, the universities do not benefit from the resources granted and consequently do not reach their objectives. In here, a fundamental question arises:

**Why did the Moroccan higher educational institutions, despite all the means they have been provided, still struggle to commit their budget and reach their objectives?**

Perhaps the question may give the impression of being as « too empirical», and the answer to it may be obvious, but we judged it primordial to investigate it from a scientific standpoint by introducing a paper that is scientific research methodology driven.

To answer this problem, we will follow the following plan: a presentation of the current context of Moroccan universities, the methodology adopted, the techniques used and the results obtained.

## 1. NATIONAL CONTEXT OF THE PUBLIC SECTOR: LITERATURE REVIEW

According to two other authors, progenitors of public management, Laufer R. & Burleaud A.,



*« A binary classification of the public/private organizations does not match with the reality [...]. The law does not allow to define the extension of the public sector in a pleasant way [...] They finally come to the conclusion that the public sector should be defined as the place of application for public management methods ...»*

Bartoli A., proposes to define, belonging to the public sector, all of the organisation managed, directly or indirectly be it, by the state (either central or local), and in here, two criteria can be used:

- A dominant state decision-making power over the objectives of the organisation;
- A dominant state ownership over the means of the organisation. It is then a structural approach to be followed, which is supposed to be independent from the missions, visions, vocations, values and juridical status.

Morocco has launched since its independence, several modernisation sites apprehending the public institutions, the issue however resides in its governance, which has been a primordial perquisite in order to consolidate and reinforce the institutions belonging to the state after the new constitution<sup>1</sup> of 2011.

The Moroccan code of good governance practices of the public enterprises and institutions, clearly states:

-  The obligation to promote values of transparency, information and communication;
-  Reinforce the climate of confidence with the business stakeholders;

<sup>1</sup>The Moroccan code of good governance practices of the public enterprises and institutions, ministry of economy and finances, direction of the public enterprises and privatization, March 2008.

- ✚ Enhance the organisms' viability and their performances along with the quality of the services provided;
- ✚ The concern to contribute in the development of a competitive economic fabric.

### **1.1 The Moroccan University and the need for a change**

The Moroccan university is witnessing enormous and important organizational changes, driven either by the legislation in force or the managerial constraints imposed by the common practices.

The complexity of the Moroccan university's environment, as a public institution, explains the use of the refinement proposal of its organizational system; which is the aspiration of our humble contribution, a refinement proposal designed to instore apparatus and mechanisms permitting the Moroccan university to perform and respond to the benchmarks of the management market and good governance.

### **1.2 The advent of the NPM**

The NPM succeeded numerous unfinished public sector modernization reforms and attempts such as the « planning programming budgeting system » (PPBS) at the United States or the « rationalisation des choix budgétaires » (RCB) in France. Implemented in the 1960s, these budgetary technics' purpose was to enhance the use of public funds. They focus, once the objectives of the projects have been traced and appointed, on their evaluation through cost-benefit or cost-effectiveness studies.

Theoretically founded, these mechanisms have been however facing a multitude of hardships in their concretization, mainly due to their complexity. Additionally, quantitative evaluations have to be objective and candid to allow concrete progression. However, the information available and the methodology employed turned out to be relatively insufficient to make the PPBS and the RCB effective. And that is the reason why they were discarded in 1971 and in 1984 consecutively.

The reasons behind the emergence of the NMP are many. It may have been a desire for more coherent management in response to ineffective public sector (the case of Japan for instance), of a desire to be part of a neo-ideology (the case of the United Kingdom and the New-Zealand) to overcome the existence of financial crises (Canada from many), to resolve an economic and political crisis (the case of Italy) or a need for change or a process of imitation (the local

administrations for example). None of these reasons alone, however, explains why the NMP has been adopted, even if financial crises have often been the main triggering factors.

As a matter of fact, the NMP originated from pressures (both internal and external) of the public sector, pressures that complement and reinforce each other more or less depending on the configurations. And from a theoretical point of view, the NMP is a concept that draws its foundations from many schools of thoughts; the neoclassical flow, the organization theory, the agency theory, the property rights theory, etc..., and which, in many ways, joins the "Public Choice" ideology based on methodological individualism (meaning that the idea that the interests of a public organization must above all be analyzed through the individuals who compose it and the strategies associated with them), recourse to privatization and greater flexibility and decentralization of administrative units.

### **1.3 The shortcomings of the Moroccan public service:**

It all started with the World Bank's diagnosis in October 1995. Following its recommendations, Morocco started to put into action four aspects of the reform. The first concerns the reform of structures, with the help of a commission set up to rationalize the number, the weight and the methods of creation of the new units.

The second concerns deconcentration, resuming the logic of centralization, in fact, in Morocco it was the logic of centralization that prevailed over the logic of deconcentration, so the deconcentration effort focused on the multiplication of so-called external services through to the decree of 20 October 1993 relating to deconcentration.

Thirdly, the management of relations with users of the public service by conveying a new conception of the authority which has at the center of its concerns, the improvement of the quality of the service provided to the user, with more communication around the simplification of administrative procedures and the management of human resources, even if the administration of human resources remains the most dominant in the management of human resources, except that the human factor was taken at the center of the concerns of the reforms of the public service given that it is a component which guarantees the success of any reform.

## **2. METHODS AND TOOLS**

The approach followed was based on focusing on the direct actors of the economic service newly appointed by the last joint decision; The division of budget and financial affairs during the implementation of our proposal while maintaining the objective of having results-oriented procedures.

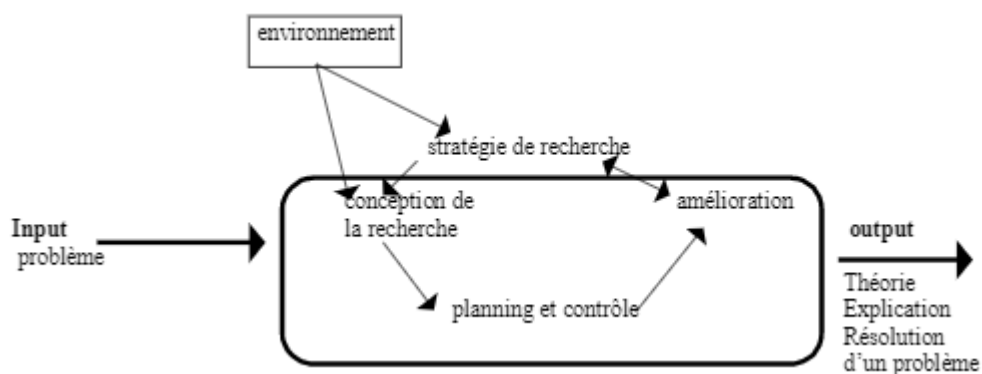
The results obtained is the fruit of a successful experience in the presidency of a Moroccan university, it demonstrates the accumulation of knowledge and skills specific to the field of application throughout the change. As well as the maturity and the great capacity to overcome resistance to organizational change for the adoption of the various compliance criteria vis-à-vis the internal control system either in relation to the legislation in force or in relation to good practices managerial responsibilities specific to the Moroccan university financial system.

### 2.1 Intervention research as an approach

Intervention research is part of the case studies where the intervening researcher is integrated and concerned by the object of the study with the final objective of transforming it and observing the resulting changes (Hazem BEN AISSA, 2013).

Thus our approach consists in intervening within the university economic and financial service in order to remedy several anomalies which hinder the achievement of the objectives set out by the organization.

**Shape 1: Model of the proposed research**



**Source:** Coughlan & Brady (1995)]

Three phases are important upstream in order to lead a research position:

- 1- Define the problem to be solved or studied (the research question);
- 2- Define and understand the scope of investigation;
- 3- Determine the methodology to be applied for the action.

The aim of the research is to provide information on the practices and understandings of the research problem but also to develop theoretical knowledge (Coughlan P. & Brady E. (1995)).



Hence, our methodological choice is based on the duality of research and intervention. Research as a source of enlightenment accompanying change, and intervention generates research data that would otherwise be difficult to collect.

## **2.2 Description of the problem / Problematic**

After an in-depth analysis of the various accounting documents making up the financial files as well as the monitoring registers in the departments concerned, we observed a set of anomalies and poor organization in processing , which can be detailed as following :

- A great ambiguity at the level of the determination of the fields of action of the actors at the level of the financial services, something which generates tensions as well as frustrations relating to the responsibilities of each one;
- The accumulation of outstanding payments reaches worrying thresholds because of the absence of actors who can focus on this aspect;
- Commitment and payment rates hardly exceed 40 to 50% annually of the open loan;
- The lack of a repository for organizational natures that could serve as a basis for the production of indicators;
- Rejections from the treasurer-payer of the university due to non-compliance with the legislation in force, overrun in kind, overrun in heading etc. ;
- The lack of control of the commitment thresholds in the capped nature of the purchase order which could cause multiple overruns on several regulatory natures;
- The lack of monitoring of specific project situations with employment programs;
- The lack of traceability of financial files without codification and without clear organizational architecture;
- The fact of having two budgetary situations, each of which is specific to a type of budget, the operating budget and the investment budget without having a controller and coordinator element, as in the case of budget and accounting entities, something which calls into question credibility and clarity.

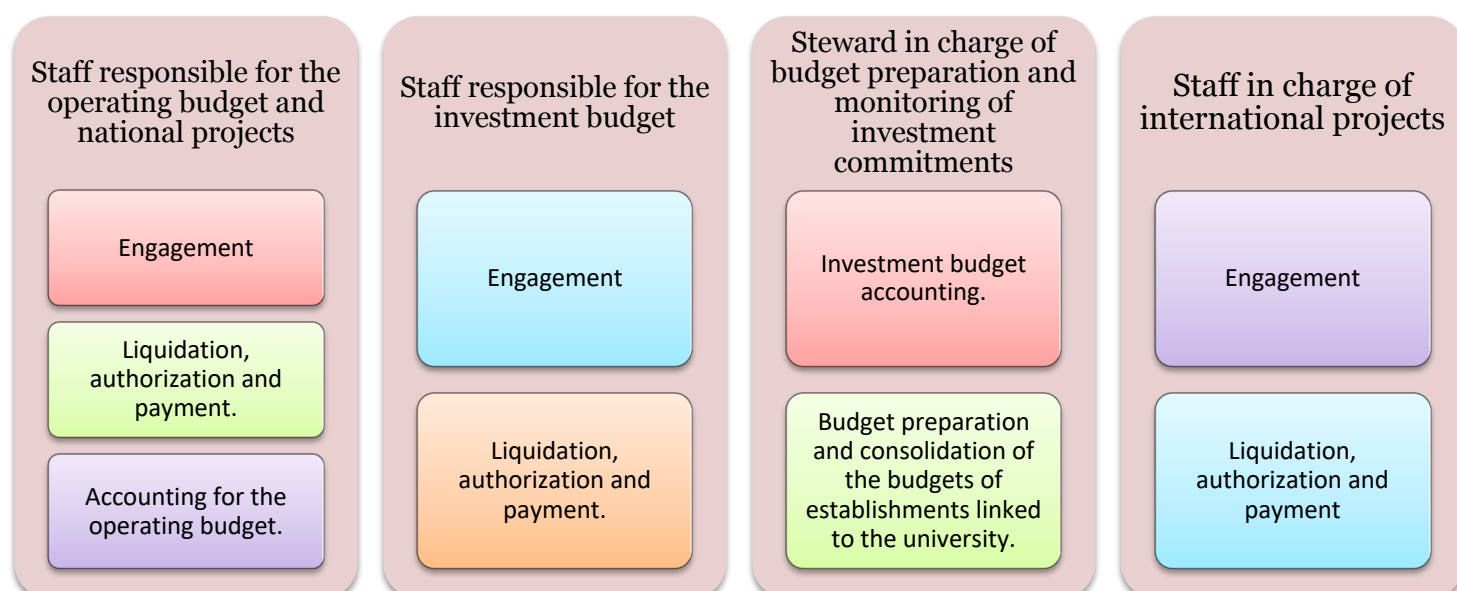
## **2.3 The Intervention Area:**

The action described throughout this work affects all the entities under the financial department at university level, including the services of the internal authorizing officer and the treasurer-payer.

### DATA collection Methods:

- Meetings with the staff responsible for each treatment;
- Interviews and daily work carried out with each person (managers and operational) in relation to their scope of action;
- Feedbacks by department and by post;
- The notes of the paying treasurer of the university;
- The instructions of the Authorizing Officer;
- The legislation in force.

**Shape 2: The current pattern of the service in question: financial department**



**Source:** Authors

With regard to the area of intervention of the current service outline, it can be delimited according to the following characteristic remarks:

- Lack of financial management dashboards;
- The intervention of the service is only recommended when the need for engagement or during hierarchical requests by the supervisory ministry in relation to the accounting situations, periodic indicators of commitment and payment, or vis-à-vis the treasurer-payer;
- No financial information feedback system is available, which makes it firstly impossible to monitor processing in real time, secondly to control or have the opportunity to detect

management anomalies, and thirdly to make decisions strategic based on financial indicators;

- The initial architecture of the operating system does not give any visibility on the actual internal flows, especially since taking an adequate decision in relation to a management situation at the level of the piloting entity requires to face the financial realities:
  - Accounting situations the operating budget;
  - Accounting situations of the investment budget;
- Lack of separation of duties, same person responsible for commitment and payment.
- Problem of follow-up of the commitments of purchase orders, several people participating in this task.

### 3. RESULTS

#### 3.1 Instauration of a codification system of similarities:

In order to avoid any similar overstepping capped to the operating budget (250,000.00 MAD), a system of codification related to the accounting lines would be useful to have a visibility over the situation per nature.

**Table 1: Codification of accounting lines**

Services of the same kind	Codification
<b>A-LABORS</b>	
Installation and Building Fitting Work	TABI
Development, maintenance and repair work of structures, tracks and networks	TAEROVR
Maintenance and repair work for administrative buildings	TERBA
Installation work of various equipment	TIMD
Development and maintenance of green spaces	TAEV
<b>B- SUPPLIES</b>	
Fertilizers, seeds & plants and the landscaping of green spaces	EGPAEV
Office supplies	FOB
Documentation	DOC
Supplies for technical and computer equipment's	FPMTI
Detergents and cleaning products.	DPN
Office equipment's	MAB
Purchase of stationery and printed matters	API
Sanitary plumbing items	APS
Fuel and lubricant	CL
Geographical, topographical and geological maps & aerial photographs	CGTGPA
Badge supplies, similar items and accessories	FBASA
Electrical supplies	FE
Laboratory supplies and tools	FOL
Supplies for teaching and scientific materials	FPMES

Computer hardware spare parts supplies	F0RMI
Apparel	HAB
Printed reproduction and photography printing service	IPIRP
Textbooks and school supplies and teaching	MFSE
Construction materials	MCON
Kitchen equipment	MCUI
Transportation equipment	MT
Teaching material	ME
Medical material	MM
Sports equipment and articles	MAS
Computer hardware and software	MIL
Scientific and laboratory equipment	MSL
Technical material	MTECH
Raw materials for laboratories and education	MPLE
Medals, effigies, flags and pennants	MEDF
Pharmaceuticals	MEDF
Office furniture	MOB
Teaching and laboratory furniture	MOBEL
Tools and hardware	OQU
Small tools and laboratory glassware	POVL
Spare parts and tires for vehicles and machinery	PRPPVE
Spare parts for technical equipment	PRPMT
Food products for animal use	PAPUA
Food products for human use	PAPUH
Chemical and laboratory product, pesticides and insecticides	PCLPI
Printing product	PI
Heating products	PCHPLCI
Firefighting product	PHCI
<b>C-SERVICES</b>	
Acquisition of plane tickets	ABA
Technical control	CT
Equipment maintenance and repair	ERMAT
Maintenance and repair of furniture	ERMOB
Maintenance and repair of the technical network	ERILCI
Maintenance and repair of fire-fighting installations	ERILCI
Study, advice and training	ECF
Technical and scientific expertise	ETS
Legal expertise	EJ
Accounting, financial and tax expertise	ECFF
Equipment and furniture rental	LMM
Software maintenance and updating	MML
Assembly and disassembly of hydraulic and electromechanical equipment	MDMHE
Organization of colloquiums, seminars, and exhibitions	OCSE
Organization of cultural events	OMC

Organization of professional competitions and recruitment competitions	OCPCR
Participation in conferences and seminars	PCS
Services of legal, fiscal and accounting assistance and advice	PACJFC
Service of installation and uninstallation of various equipment	PIDMD
Cleaning service for administrative buildings, gardening and temporary work	PNBAJI
Printing, reproduction and photography service	PIRP
Advertising services	PP
Topographic services	PT
Use of experts for the assessment of takeoffs	REEM
Repair and maintenance of medical-technical equipment	RMEMT
Repair, maintenance of equipment, material and technical apparatus	RMEMAT
Translation of documents and correspondence	TDC
Simultaneous translation	TS
Transport, stevedoring, warehousing and transit	TAMT

Source: Authors

### 3.2 Establishment of a purchase trigger process

As a follow up of our previous analysis, the lack of a purchasing procedure was noticed along with the need within the financial department, for this we created a deliverable "*Purchase requisition*" a document that will be used to establish a flow controlling over the entire procedure of purchasing.

**Table 2: Purchase requisition nomenclature**

Signature of Applicant		Decision of the head of the institution	
		Granted	Denied
Box reserved for the <b>Budget and Financial Affairs Division</b>		If granted Unique code:	
Store availability			
Budget availability			
Availability in kind			
<b>PURCHASE ORDER</b>			
Request made by			
Quality			
Department / recipient			
Designation of the requirement			Quantity

Source: Authors

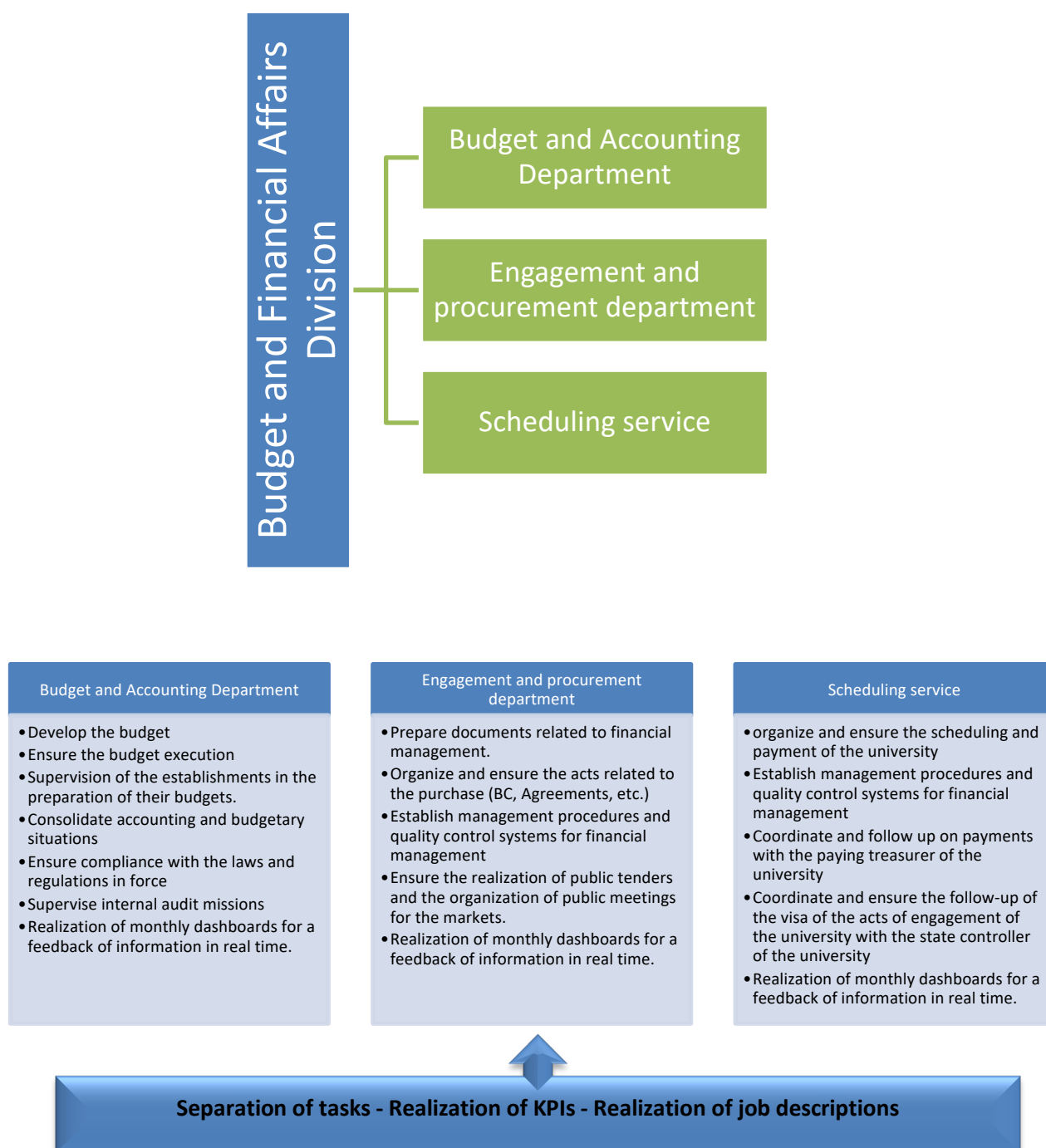
### **Purchase Order Commitment Process**

- No staff, whatever their function, has the right to undertake a hiring without the agreement of the head of the establishment;
- The commitment process is introduced by this purchase request which must be completed, signed by the applicant and then filed with the Head of the Budget and Financial Affairs Division;
- After the usage checks and approval from the head of the establishment, the purchase request is sent to the Commitments Department (operating budget) to launch the usage consultations;
- Any Purchase Order, sent to the head of the establishment for signature, must be accompanied by the purchase request.

### **3.3 Final Scheme**

The budget and financial affairs division is responsible for preparing and executing the university budget as well as all questions related to the financial management of the university and requests for information requests from the ministerial department.

#### Shape 4: Restructuring of the budget and financial affairs division



Source: Authors

❖ **Codification of financial files****Shape 5 : Code de dossier/Budget d'engagement/type d'engagement/Réf.****Morasse/exercice budgétaire**

Code de dossier	Budget d'engagement	type d'engagement	Réf. Morasse	exercice budgétaire
Code unique pour chaque dossier de paiement (Composé de 5 caractères Alphanumériques).	F ou I : (F) Fonctionnement. (I) Investissement.	BC, MA ou CO BC : Bon de commande MA : Marché CO : Convention	La ligne budgétaire de l'engagement.	Année de l'engagement.

Source: Authors

**Example:**

A financial file from a Test supplier that is committed to the investment budget by market under the budget line 907.10.13 during the 2020 year will have the codification as follows:

**T0001/I/MA/907.10.13/2020**

The unique code specific to a given commitment is granted, the affected combination serves as an identifying number throughout the life cycle of the case, going through all the stages of processing from the assembly to the level of the commitment entity, through validation control at the level of the budget entity, to then reach the payment service.

❖ **Modelisation of the final diagram of the management information system**

The old functional architecture within the financial service was based mainly on the budget typology (operation or investment); on the other hand the new diagram consists in fact of being based on well-defined job descriptions which clearly outlines the bases of intervention of each speaker and this as follows:

✓ **Budget and accounting department**

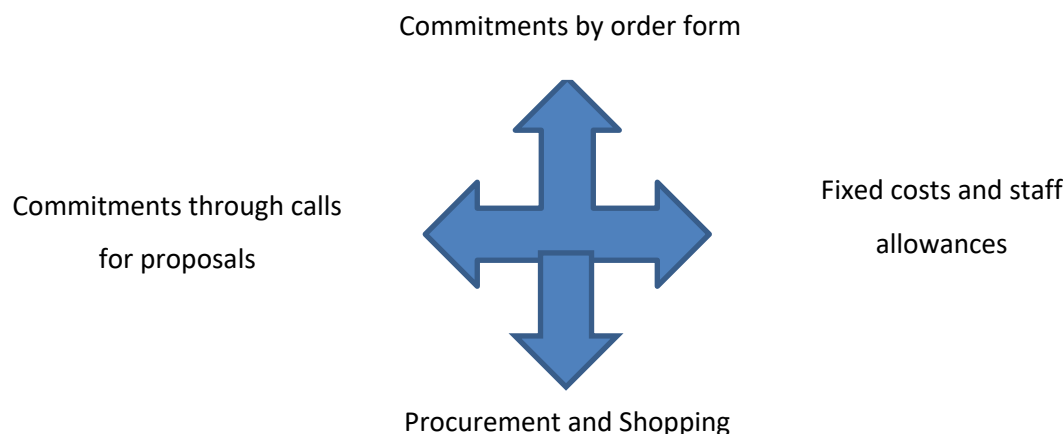
Taking into account the sensitivity and the degree of importance of the role played by this entity, the staff assigned to it must have good practical experience and functional skills in the financial field and equipped with the good reflexes of auditors or internal controllers. .

✓ **Engagement and Supply department**

It turned out to be wise to distinguish between three different entities for commitments: the unit responsible for commitments by purchase order, the unit responsible for commitments by calls for tenders and the unit responsible for commitments related to fixed costs and staff allowances. For procurement, staff capable of planning and managing flows between the university and its suppliers, including issues of ordering or delivery calls, inventory management, warehousing and logistics (Olivier BRUEL et Pascal MÉNAGE, 2015).



### Shape 6: Supply management



Source: Authors

#### ✓ Scheduling Service

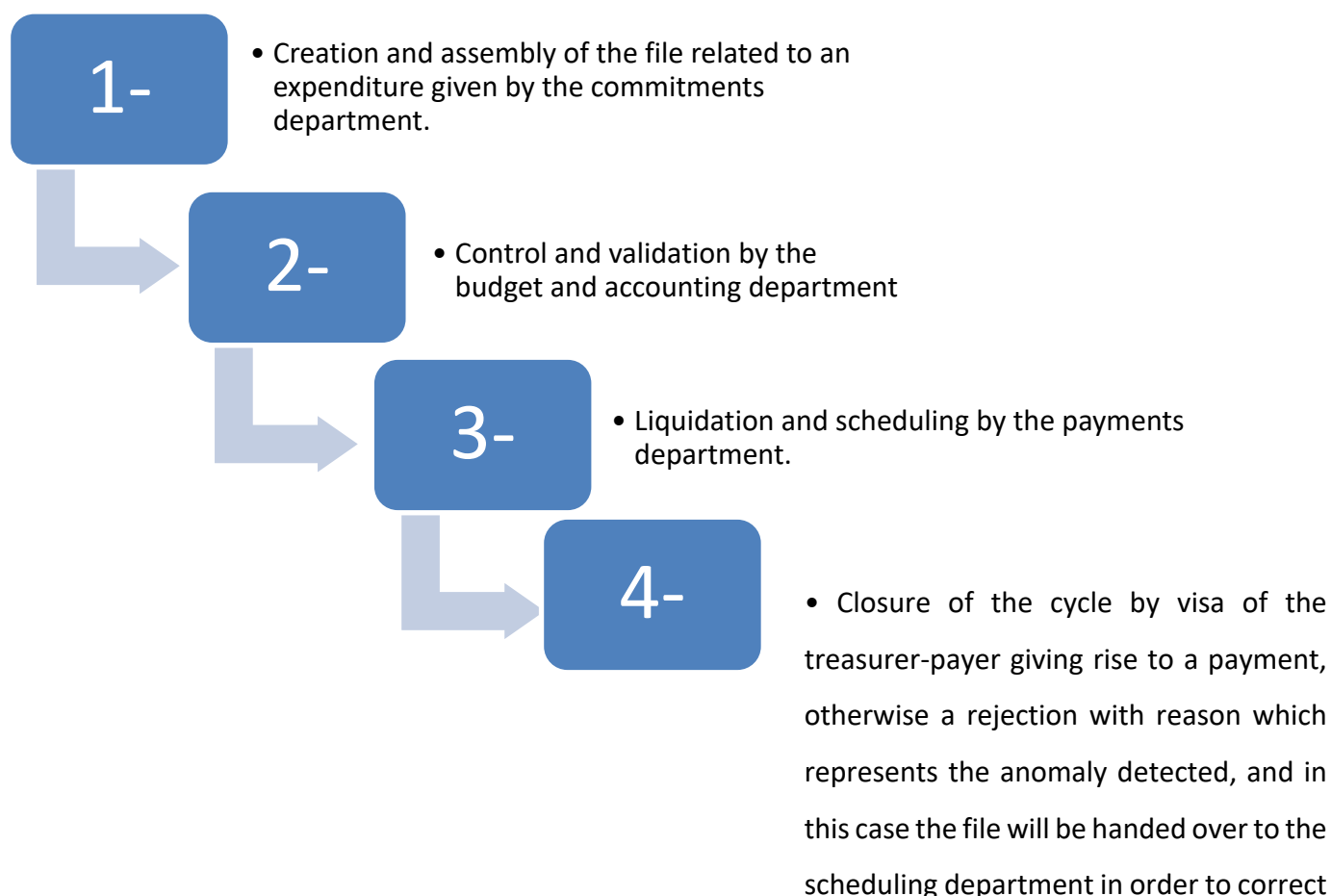
We affiliate in a similar way to the commitment service: the unit responsible for the payment of the engaged files by purchase order, the unit responsible for the payment of the tender files as well as the one responsible for the payment of fixed charges and allowances related to the staff.

#### ✓ Information system for the benefit of a good governance

The new managerial system provides top management with a platform for reporting financial information in an organized and real-time manner, these factors allow the various managers to make decisions about the strategic reorganization of the funds allocated at the levels of the budget sluggishness and this, either to start new projects or even to remedy imbalances or anomalies of any kind.

✓ **Transmission channels**

**Shape 7: Review of financial files**



**Source:** Authors

**Conclusion**

Apart from the average twirl that undertakes each financial file, it turned out to be judicious and acute to automate the developed management rules as well as the business know-how in each stage of the financial information system.

This system will be then offering the new scheme a tool with high added value, especially in relation to the accounting of commitments, control, payments and issues related to the treasurer-payer. It will ensure the automatic feedback of data related to any financial activity in the system with real-time and simultaneous activity indicators and a possibility of modern monitoring.

To have an autonomous system, our research will continue in order to involve several stakeholders in the process (Auditors, Paying Treasurers), and but also to offer intelligent tools (Alerts, performance indicators, utilization rate, etc.)

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