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EIKV-Schriftenreihe zum Wissens- und Wertemanagement

Activity Based Costing A case study of Raiffeisen Bank of Luxembourg

Julie Wing Yan Chow

Band 12

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## List of abbreviations

ABC	Activity Based Costing
ABC/M	Activity Based Cost Management
ABM	Activity Based Management
ATM	Automated Teller Machine
BCEE	Banque et Caisse d'Épargne de l'État (Spuerkeess)
BGL BNP Paribas	former Banque Générale de Luxembourg
BHW	BHW Bausparkasse AG
BIL	Banque Internationale à Luxembourg
B-O/BO	Back-Office
BSH	Bausparkasse Schwäbisch Hall
CAM-I	Consortium for Advanced Management – International
CCSS	Centre Commun de la Sécurité Sociale
Com	Commercials
CR	Caisse(s) Raiffeisen
CSSF	Commission de Surveillance du Secteur Financier
DCOAC	Direct Costs per Operating Analytical Centre
DP	Department
ECB	European Central Bank
F&S	Facility and Security
FTE	Full-Time Equivalent
GC	Green Code
GPS	Global Positioning System
HR	Human Resources
HRD	Human Resources Department
IFRS	International Financial Reporting Standards
IT	Information Technology
KPI	Key Performance Indicator
RB	Raiffeisen Bank
S.C.	Société Coopérative
Struc	Structure
user ID	user identifier

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## **1** Scope of the Thesis

### 1.1 Thesis Context and Problem

Luxembourg is worldwide known for its expertise in finance and it represents one of the main financial centres in the world. On March 31<sup>st</sup> 2016, the financial centre of Luxembourg altogether counts 144 banks, subsidiaries or branches of major bank institutions from 28 different countries<sup>1</sup> focusing their activities on the international markets.

With such a high number of financial institutions, competitiveness in this industry is unquestionable. Furthermore, since the introduction of the negative interest rate by the ECB, financial institutions have to find profit in an environment of low interest rates, and thus low net interest margins. Hence, banks are under high pressure and in order to withstand the competition, it is important for a financial institution to continuously introduce new products and services that better satisfy the market requirements and to raise funds that serve as the "raw material" for its product portfolio. Besides, banks also have to adapt themselves to the new technologies that allow them to keep up with the pace of the fast moving digital economy.

In order to succeed in the competitive world, a major challenge for a bank in today's environment constitutes in finding an accurate and cost-effective way to measure and manage its product portfolio and its customers. Thus, it is required for a bank to have the ability to assign its costs to the products and services it offers and to the customers it serves. Only with the accomplishment of this task, a bank can considerably control its costs, which is required due to the decline of the revenues, and understand its profit zone, which helps the bank's management to make rational decisions and formulate plans to provide new services, improve existing services and measure performances in order to achieve sustainable competitive advantages.

<sup>&</sup>lt;sup>1</sup> Cf. CSSF (2016, April 30)

#### **1.2** Thesis Objective

The following thesis gives an overview about the complex topic of activity-based costing (ABC). In order to understand the concept of ABC, it is necessary to define cost allocation as well as the various methods of cost allocation. Furthermore, there will be a description of the benefits and the limitations of ABC and in order to further understand the ABC, an analysis of the differences between the traditional costing system and the ABC system will be included in this assignment.

In addition, as the author is working in the Luxembourg banking sector, the Raiffeisen Bank of Luxembourg, the assignment includes a case study of the process of implementation of the ABC in Raiffeisen Bank of Luxembourg for the purpose of assisting the bank's management in their decision-making in order to succeed in today's business environment. The case study doesn't necessarily have to be exhaustive and include all individual components, but it should reflect the relevant elements of Raiffeisen Bank. In other words, the author will chose four major selling points of Raiffeisen Bank, one of each region, that are prone to represent the whole range of agencies of Raiffeisen bank for the establishment of the process of implementation of the ABC in Raiffeisen Bank. Last but not least, the author doesn't intend to suggest new elements and variables that haven't yet been analysed in literature.

#### **1.3** Course of the Investigation

To begin, the author has provided a general introduction explaining the context of the paper and the problem it tries to solve. The following section explains the methodology of the literature selection and the problems related to this process.

Next, Chapter two will provide the theoretical foundation for the thesis and definitions of key concepts, such as the different types of cost.

Chapter three focuses on the existing theory of cost allocation. The chapter illustrates the three various cost allocation methods and the purpose these methods are designed for. Moreover, it also includes an analysis of the advantages and disadvantages for the application of the three methods. Chapter four focuses on the Activity-Based Costing model, starting with the fundamentals before explaining the benefits for applying this model as well as the limitations that the model comprises. Thereafter, the chapter includes a study of the differences between the traditional costing model and the ABC model. The chapter then concludes by the approach of activity-based management, which draws on the ABC model as its major source of data.

Chapter five constitutes the starting point for the empirical study of the thesis by describing the company of Raiffeisen Bank of Luxembourg. It comprises an analysis of the industry in which Raiffeisen Bank is operating. This section terminates with a description of the various products and services offered by Raiffeisen Bank to its customers.

Chapter six describes the whole process of ABC implementation to Raiffeisen Bank. It includes a step-by-step analysis, from the determination of the various costs to the assignment of the activity costs to the products using a cost driver related to the cause of the cost.

Lastly, chapter seven recapitulates the most important findings and explains the limitations of the paper. The chapter concludes with an overview of additional research related to this thesis.

#### **1.4 Literature Research Methodology**

This thesis relies on a literature review of academic papers, books and websites. The sources are either in English, in French or in German. By analysing managerial accounting literature, the author creates the theoretical foundation of the topic. Moreover, due to time constraints, it was impossible to do a systematic literature review by analysing all contributions to important research papers and journals on ABC and thus, the author adopted a more focused approach by searching for articles and passages in books containing specific key phrases, such as type of costs, cost allocation models, or activity-based costing.

#### **1.5** Research Limitation

The case study of the paper deals with the implementation of the ABC to Raiffeisen Bank of Luxembourg. Yet, due to time limit and in order to conduct a predicative analysis, the author decides to apply the selective sampling method for the analysis, meaning that the author will select a sample of Raiffeisen Bank's major selling points in which the commercial activities are performed for the accomplishment of the case study. Hence, the case study won't correspond to the whole company of Raiffeisen Bank but only to an important part of Raiffeisen Bank's activities.

For all that, the study is still representative as it still takes into consideration of Raiffeisen Bank's primary agencies so that the case study only makes up a few differences in comparison to the complete analysis of Raiffeisen Bank's ABC.

## 2 Theoretical foundations

Chapter Two provides the theoretical foundation for the thesis. Different literature sources diverge on the specific meaning of various key concepts, and so there is a need to immediately clarify their meaning. This chapter begins by defining the expression of cost before illustrating some of the types of cost and completing with the definition of cost allocation.

#### 2.1 Definition of Costs

The Chartered Institute of Management Accountants (CIMA) of London defines cost as the amount of expenditure (actual or notional) incurred on, or attributable to, a specified thing or activity.<sup>1</sup> In other words, cost constitutes the resources scarified or forgone to achieve a specific objective, such as the acquisition of a good or service. To a noneconomist, the cost represents the price that an individual has to pay for a good or a service, whereas to an economist, cost is referred to as the forgone benefit that could have been realised from the best forgone alternative use of a resource.<sup>2</sup> Hence, by using a resource for a specific purpose, the person is forgoing his opportunity of utilising that resource somewhere else and thus, for an economist the cost represents an opportunity cost.

The term "cost" itself doesn't have any significant meaning and therefore it is rarely used without a preceding adjective to specify the type of cost being considered. With a prefix, the term "cost" bears multiple meanings and different types of costs are applied in different situations.<sup>3</sup> Thus, cost has to be studied in relation to the purpose, the different conditions and the context in which it is used. In the recent years, a large terminology has emerged in order to clearly indicate which cost meaning is being conveyed such as variable cost, fixed cost, direct cost, indirect cost, opportunity cost, labour cost, etc.

<sup>&</sup>lt;sup>1</sup> Cf. Rajasekaran V., Lalitha R. (2011), p.5

<sup>&</sup>lt;sup>2</sup> Cf. David R. Henderson (2008)

<sup>&</sup>lt;sup>3</sup> Cf. Drury Colin (2008), p.27

The term "cost" and "expense" are often used interchangeably. However, these two terms should be distinguished one from another as they bear different meanings. Cost is the amount of resources given up in exchange for a good or a service, whereas an expense represents an expired cost that incurred and that is totally used up in generation of revenue. Moreover, expenses don't necessarily need to be immediately paid in cash because even a promise to pay could be made for the obtained benefits.<sup>1</sup>

#### 2.2 Types of Costs

Managerial accounting constitutes the art of planning, decision-making and controlling in business.<sup>2</sup> In managerial accounting, costs are classified according to the decision-making needs of management. Hence, there exist various types of costs.

A cost object is any activity or item for which separate measurement of costs is desired. In other words, if a person wants to know the cost of something, this "something" is called a cost object. Costs identified with cost objects can be divided into two categories: direct costs and indirect costs.<sup>3</sup> The variable costs and the fixed costs are traditionally used in managerial accounting for the description of the reactions of a cost to the change of activity. Thus, in the following, the four types of costs, direct costs, indirect costs, variable costs and fixed costs, will be discussed more in detail.

#### 2.2.1 Direct vs. Indirect Costs

Direct costs represent costs that are easily and accurately traceable to an analytical centre or a cost object, whereas indirect costs can neither be physically traced to a cost object nor to an analytical centre but instead they are assigned to them by means of cost allocation.<sup>4</sup> In other words, the indirect costs cover all the costs that are not direct costs. For example, if a car represents the cost object, then all the accessory of the car such as the audio player, the leather seats, the felloe and the GPS, etc. are part of the direct costs. On the contrary, the research and development expenses used for the

<sup>&</sup>lt;sup>1</sup> Cf. Jawahar Lal (2007), pp. 22-23

<sup>&</sup>lt;sup>2</sup> Cf. Accounting In Focus, 2016

<sup>&</sup>lt;sup>3</sup> Cf. Drury Colin (2008), p.28

<sup>&</sup>lt;sup>4</sup> Cf. Kinney Michael R., Raiborn Cecily A. (2013), p.26

manufacturing or improvement of the air conditioning of the car represent indirect costs as they can't be directly traced to an analytical centre.

The costs assigned to any cost object can be classified according to their relationship to the cost object. The ability to assign costs directly to a cost object is called traceability. The accuracy of the cost assignment is greater if the cost can be more easily traced to the cost object. Depending on the cost object, it is possible to classify a cost as either a direct cost or an indirect cost.<sup>1</sup>

There are two kinds of direct costs: direct material costs and direct labour costs. Direct material cost represents the cost of the raw materials that are used for the manufacturing of the finished goods.<sup>2</sup> Thus, the raw materials become part of the finished goods like for example wood that is used for the manufacturing of a chair. As for the direct labour costs, these constitute the cost of wages paid to the workers who are directly involved in the manufacturing process of the goods.<sup>3</sup> The direct labour costs include all wage and non-wage labour<sup>4</sup> costs like insurance, holiday and vacation pay, pension, labour taxes and other retirement benefits and these costs are directly traceable to the final product cost. The non-wage labour costs are some sort of indirect costs, which however counts to the direct labour costs.

Statec, the government statistics service provider of Luxembourg, conducted a labour cost analysis in 2014 in which it analysed the direct labour costs of the various activity sectors of Luxembourg between 2008 and 2012. According to this study, in 2012, the proportion of wage labour cost (direct costs) and non-wage labour cost (indirect costs) in Luxembourg was 86% (direct cost) to 14% (indirect cost).<sup>5</sup> By analysing the individual activity sectors, it turns out that the percentage of the direct and indirect costs of the financial sector was 85% to 15%. As for the education sector, the proportion was 87% to 13%.<sup>6</sup> In comparison to Germany, the proportion of direct and indirect cost in 2012 was 79% to 21%. Hence, this shows that in Luxembourg, the employers have to pay a lower proportion of non-wage labour costs in comparison to Germany.

<sup>&</sup>lt;sup>1</sup> Cf. Hansen Don R., Mowen Maryanne M., Guan Liming (2009), p.25

<sup>&</sup>lt;sup>2</sup> Cf. Hart Jill, Fergus Chris and Wilson Clive (2012), p.10

<sup>&</sup>lt;sup>3</sup> Cf. Pandey I. M. (2009), p.195

<sup>&</sup>lt;sup>4</sup> Cf. OECD (2014), p.32

<sup>&</sup>lt;sup>5</sup> Cf. Europaforum (2014, November 11)

<sup>&</sup>lt;sup>6</sup> Cf. Le portail des statistiques, 2016a.; Le portail des statistiques, 2016b.

Concerning the indirect costs, they are known as manufacturing overheads and they include indirect material costs, indirect labour costs and other overhead costs. Indirect material costs are cost of materials that can't be identified with one particular product as they are used for the benefit of all products instead of one specific product so that they need to be treated accordingly. The indirect labour costs constitutes the salaries of all the employees who don't participate in the process of manufacturing of the finished goods but who only assist in the manufacturing operation or service delivery process.<sup>1</sup> As for the other overhead costs, these comprise all the other indirect manufacturing expenses besides of the indirect material and indirect labour costs. These costs include expenses like supplies, rent, depreciation, electricity, taxes, etc.<sup>2</sup>

#### 2.2.2 Variable vs. Fixed Costs

Costs generally change in response to the change in a cost driver (a factor that causes a change in the cost of an activity or volume). In decision-making, it is important to know how costs behave in relation to the change in an activity measure. Activity measure incorporates production, service and sales volume, number of purchase order processed, hours of working time consumed, etc.<sup>3</sup> There are two kind of costs behaviour: variable cost and fixed cost.



Figure 1: Variable Costs<sup>4</sup>

The variable costs vary in direct proportion with the level of production output (volume of output). This is shown on the left in Figure 1, where one can see that if there is no

<sup>&</sup>lt;sup>1</sup> Cf. Drury Colin (2008), p.29

<sup>&</sup>lt;sup>2</sup> Cf. Lianabel Olivier (2000), p.169

<sup>&</sup>lt;sup>3</sup> Cf. Drury Colin (2008), p.31

<sup>&</sup>lt;sup>4</sup> Cf. Hart Jill, Fergus Chris and Wilson Clive (2012), p.17

output (0) then there are no variable costs and if the units of output increase then the variable costs also increase and vice versa. However, in reality, in the view of an economist, the costs don't increase as straight as shown on the left graph of Figure 1 but they will start at a steeper pace and afterwards they will stay steadily for a relevant range of output before that they continue to rise as illustrated on the right of Figure 1. The relevant range represents the area of feasible outcomes given the available resources of a company. An example of the variable costs constitutes the commissions that a bank perceives for selling the collaborating products to its customers, like for example house-saving and loan products of BHW or BSH.

In contrast to the variable costs stand the fixed costs, which are costs that remain stable over a wide range of activity for a specified time period. This is shown on the left graph of Figure 2:



Figure 2: Fixed Costs<sup>1</sup>

The right graphic of Figure 2 depicts the situation where production (output units) is expanded beyond the relevant range of output. In this case, the costs will also increase as additional investment is required in order to achieve a higher level of production. An example of fixed costs would be the lease payment, which has to be monthly paid for the building that an organisation leases, irrespective of the operational state of the business.

In general, direct costs are variable, whereas the manufacturing overhead costs (indirect costs) can either be variable or fixed.<sup>2</sup> An example would be the repairing costs and the depreciation costs who both constitute manufacturing overhead costs but the repairing costs are variable costs as they can vary depending on what needs to be repaired,

<sup>&</sup>lt;sup>1</sup> Cf. Hart Jill, Fergus Chris and Wilson Clive (2012), p.16

<sup>&</sup>lt;sup>2</sup> Cf. Ordelheide Dieter and KPMG (1995), p.1494

whereas the depreciation costs are fixed costs as they recur in the same amount each year throughout the useful life of an asset.

## 2.3 Definition of Cost Allocation

As stated above, direct costs can be easily traced to cost objects or analytical centres, whereas overhead manufacturing costs are indirect costs that must be collected and assigned to a cost object. The collection of indirect costs for allocation purpose is called a cash pool. Hence, cost allocation constitutes the process of identifying and assigning indirect costs to a specific cost object by means of an allocation base, known as the cost driver. <sup>1</sup>

It is to note that cost allocation represents an important process through which the indirect costs are accumulated and assigned. This implies that if the indirect costs are not accurately calculated then a company won't be able to know which products and areas of activity are profitable and which aren't. Furthermore, if the overhead manufacturing costs are misallocated, this could result in a waste of resources as the resources are used on products that are mistakenly considered to be profitable and consequently this could lead to the charging of the wrong prices to the customers.

<sup>10</sup> 

<sup>&</sup>lt;sup>1</sup> Cf. Crosson Susan, Needles Belverd (2008), p.75

## **3** Concept of Cost Allocation

This chapter begins by explaining the fundamentals cost allocation. Next, the author defines the various methods of cost allocation and afterwards, the author will analyse the advantages and disadvantages of each of these methods.

#### 3.1 Fundamentals of Cost Allocation

Cost allocation is the process of assignment of an indirect cost to a cost object (products or service) or an analytical centre (divisions inside the organisation to which activities are related) of an organisation. The process requires the pooling of the indirect costs to a cost pool and the selection of a cost driver (allocation base) whose activity base will cause a change in the cost pool. There exist three methods of cost allocation, however, before choosing the right method, it is necessary to define the purpose of cost allocation as the purpose will determine the complexity and the level of precision required. There are four essential purposes for allocating indirect costs: the economic-decision purpose, the motivation purpose, the legal and management reporting purpose and the cost-reimbursement purpose.<sup>1</sup>

In the economic-decision purpose, cost allocation allows decision makers to make trade-off decisions to use their resources more effectively as costs provide an estimated measurement of the resources that the organization is using for the provision of a product or service. For example, it allows managers of banks with many selling points to decide if a selling point should be reorganised or whether processes analysis should be undertaken in order to increase efficiency.

Cost allocation used for the motivation purpose is applied for encouraging or discouraging specific behaviours of the various services within a company. Moreover, this purpose emphasizes to decision makers how costs in the various functions are related one another.<sup>2</sup> For example to discourage the behaviour of absenteeism at training seminars, the human resources department could charge department managers a certain amount of fees for unjustified absence. Yet, this purpose can lead to unintended

<sup>&</sup>lt;sup>1</sup> Cf. Lianabel Olivier (2000), pp.201-202

<sup>&</sup>lt;sup>2</sup> Cf. Bhimani Alnoor, Horngren Charles T., Foster George (2008), p.139

consequences like signing for attendance at the beginning of the course but still not participating in the training session. Thus, this purpose should be applied with caution.

The legal and management reporting purpose goes by the principle that cost allocation is important for companies to meet financial (external regulatory and legal) reporting obligations. For example banks need to yearly publish their financial reporting to the shareholders of the bank.

Concerning, the cost-reimbursement purpose, cost allocation allows an organisation to justify costs or calculate reimbursement. With cost allocation, an organization can recover the direct costs of the products or services and a fair amount of the indirect costs that are necessary for the management of the organisation. <sup>1</sup> The cost-reimbursement contract is used when there is uncertainty about the final cost or project success and by applying these type of contracts, some risk of successful contract performance is transferred from the contractor to the buyer.<sup>2</sup> For example small regional banks could apply cost allocation in order to determine whether they should continue to offer current operation services (money transfer or withdrawal) that large commercial banks also offer.

After identifying the purposes of cost allocation it is also necessary to decide on the criterion used for cost allocation. There are four criterion of cost allocation: cause-effect relationship, benefits received, fairness or equity and ability to bear.<sup>3</sup> By allocating costs by means of a cause-effect relationship, the variables that cause resources to be consumed are identified. Costs may be allocated based on the services provided. This relationship can easily be established when dealing with direct costs. The cause-effect relationship constitutes the primary criterion used in the implementation of ABC as the ABC system uses the concept of a cost hierarchy to identify the cost drivers that best demonstrate the cause-effect relationship between each activity and the costs in the related cost pool. Using the benefits received criterion, costs are assigned based on the benefits received. The costs of the cost object are allocated among the beneficiaries in proportion to the benefits each receives. The equity or fairness criterion is often applied when cost allocation is the basis for establishing a mutual agreeable price between the

<sup>&</sup>lt;sup>1</sup> Cf. McWatters Cheryl S, Zimmerman Jerold L. (2016), p.324

<sup>&</sup>lt;sup>2</sup> Cf. Balakrishnan Ramji, Sivaramakrishnan Konduru, Sprinkle Geoffrey B. (2009), p.368

<sup>&</sup>lt;sup>3</sup> Cf. Horngren T. Charles, Datar Srikant M., Rajan Madhav. Rajan (2012), pp. 504-505; Shim Jae K., Siegel Joel G. (2009), pp. 80-81

contractor and its supplier. Thus, costs are allocated in a reasonable way for justifying a selling price in the minds of the contracting parties. Last but not least, the ability to bear criterion advocates allocating costs in proportion to the cost object's ability to bear the costs that are allocated to it.<sup>1</sup>

#### **3.2** Cost allocation methods

For an organisation to run efficiently and cost effectively, it is required to own an appropriate cost allocation method. Cost allocation affects the product cost, which is used for decision-making like the determination of the product mix, the establishing of the product price and the determination of discontinuance of a product line. For this purpose, various methods have been developed to allocate costs appropriately within the organisation. Cost allocation methods include: single plantwide rate, multiple production department rate and activity based costing.

#### 3.2.1 Single Plantwide Overhead Rate

The single plantwide overhead rate method constitutes the simplest approach to assign all of a company's overhead costs to cost objects (production outputs) using a single overhead rate<sup>2</sup>, which is calculated by using all estimated overhead costs for a company divided by the estimated activity level across the entire company.<sup>3</sup> The distinction between service departments and production departments is ignored and the entire plant is treated as a single department. Companies using a single plantwide overhead rate generally use a volume-based cost driver (direct labour hours, machine hours).<sup>4</sup> This simple, one stage approach will only provide accurate product costs in cases where the company produces a single product, or a few similar products that consume all services and other indirect resources in the same proportions in every department.<sup>5</sup>

<sup>&</sup>lt;sup>1</sup> Cf. Horngren T. Charles, Datar Srikant M., Rajan Madhav. Rajan (2012), pp. 504-505; Shim Jae K., Siegel Joel G. (2009), pp. 80-81

<sup>&</sup>lt;sup>2</sup> Cf. Warren Carl S., Reeve James M., Duchac Jonathan (2016), p.1201

<sup>&</sup>lt;sup>3</sup> Cf. Heitger Dan L., Mowen Maryanne M., Hansen Don R. (2008), p.152

<sup>&</sup>lt;sup>4</sup> Cf. Weil Roman L., Maher Michael W. (2005), p. 219

<sup>&</sup>lt;sup>5</sup> Cf. Martin James. R. (2016)

#### **3.2.2 Departmental Overhead Rate**

The departmental overhead rate method is also referred to as the traditional two stage allocation approach. This method recognises that within a company, there are service departments and production departments. When production departments differ significantly in their manufacturing processes, the company's overhead costs are normally incurred differently in each department. In such cases, it would be more accurate to allocate a company's overhead rate by means of departmental overhead rates, which implies that different rates are used for each production department to allocate the overhead costs to the cost object.<sup>1</sup>



Figure 3: A Conceptual View of the Traditional Two Stage Allocation Approach<sup>2</sup>

The costs are allocated after a waterfall principle because in the first stage, the overhead costs (service department's costs) are allocated to the cost pools (production departments) and afterwards the costs accumulated in the cost pools are allocated to the different cost objects (products) using a small number of selected cost drivers, which vary with the volume of products produced.<sup>3</sup> However, it is to note that within a company, there are also some production departments such as the assembly departments that are directly associated with the products or services that a company provides. In this case, the production departments represent the intermediate cost objects and the products and services constitute the final cost objects.<sup>4</sup>

<sup>&</sup>lt;sup>1</sup> Cf. Warren Carl S., Reeve James M., Duchac Jonathan (2016), p.1203

<sup>&</sup>lt;sup>2</sup> Cf. Martin James. R. (2016)

<sup>&</sup>lt;sup>3</sup> Cf. Drury Colin (2008), pp.52-53

<sup>&</sup>lt;sup>4</sup> Cf. McWatters Cheryl S, Zimmerman Jerold L. (2016), p.334

#### 3.2.3 Activity based Costing

A third method is called the activity based costing method of cost allocation. The ABC approach also allocates overhead costs to cost objects using the two stage allocation process as the departmental overhead rate method. The ABC method focuses on the cost of activities and then allocates these costs to products using a variety of activity bases. In the ABC approach, a company's overhead costs are initially accounted for in activity cash pools, which are related to a given activity.<sup>1</sup> Thus, the ABC method measures the actual performance of an organisation by taking into consideration every cost associated with its activities instead of its departments. Furthermore, it assigns overhead costs to products by the use of numerous different cost drivers. In the ABC system, cost drivers are best chosen to capture the cause-effect relationship between the cost object and the incurrence of overhead cost.<sup>2</sup>

#### 3.3 Advantages and disadvantages of the various cost allocation methods

The single plantwide overhead rate is a single overhead rate that a company applies to allocate all of its manufacturing overhead costs to cost objects. This can be of advantage if the company only has few departments with little variety in products. Moreover, this approach is simple and inexpensive to implement as all the information is already available and the method doesn't take into account of every single department in a company. The disadvantage is that this method is only valid for small companies that manufacture one or few products because if a company has a large amount of overhead costs to allocate or if the services provided by the various departments are highly differentiated then this method would be inappropriate as a single rate would be insufficient for allocating all the overhead costs to the costs objects.

Concerning the departmental overhead rate method, the advantage of this method is that it constitutes a more accurate and equitable approach for allocating costs as a separate overhead allocation rate is established for each department and each production department constitutes a separate cost pool. This is important for companies with

<sup>&</sup>lt;sup>1</sup> Cf. Warren Carl S., Reeve James M., Duchac Jonathan (2016), pp. 1207-1209

<sup>&</sup>lt;sup>2</sup> Cf. Caplan Dennis (2005)

multiple departments using significantly different types of work effort <sup>1</sup>. The disadvantage of the two stage overhead rate is that it is more time consuming than the single plantwide overhead rate as more equations are required for the calculation of the product. Another disadvantage that this approach entails is the fact that as a single departmental overhead rate is established for each department, this could lead to the distortion of the product costs as a single departmental overhead rate can only represent one activity within a department. Hence, if a department has multiple activities then the departmental overhead rates can only trace one of the activity to the cost object and consequently, the cost object would be overcharged with the costs of the other activities.<sup>2</sup>

The activity based costing method represents the most accurate method among the three approaches. The ABC system allocates costs to operations through the various activities in place that can be measured by cost drivers. In other words, cost units are assigned to individual activities.<sup>3</sup> With the ABC method, it is also possible to adjust and control the process of service provision by analysing the individual activities. Unfortunately, this method requires a lot of information and therefore, it is relatively complex and costly in comparison to the two other approaches. Thus, it is inconvenient to keep the results up to date according to the changing circumstances.

The benefits and limitations of the ABC system will be further analysed in the following chapter.

<sup>&</sup>lt;sup>1</sup> Cf. Kinney Michael R., Raiborn Cecily A. (2013), p.72

<sup>&</sup>lt;sup>2</sup> Cf. Martin James. R. (2016)

<sup>&</sup>lt;sup>3</sup> Cf. Popesko Boris (2009), p.94

## 4 Activity Based Costing

This chapter deals with the concept of activity based costing. The author will begin with detailing the fundamentals and the procedure of ABC. Next, the section will analyse the benefits and the limits of the ABC model. Moreover, a comparison of the ABC approach with the traditional costing approach will be illustrated. The chapter ends by pointing out the activity based management, which is derived from the ABC.

#### 4.1. Fundamentals of ABC

The activity based costing model was developed by Robin Cooper and Robert Kaplan at the end of the eighties. The two authors described ABC as a solution to problems occurred with the traditional costing system that provided somewhat a distorted picture of the true profits realised from the products sold and services rendered and thus, leading to problems in decision-making.<sup>1</sup> Due to the competitive constraints that exposed inaccurateness in cost accounting, the ABC system emerged as an efficient profit analysis tool. With this tool, organisations are able to disclose the hidden sources of profitability and the embedded costs and this model contributes to decision-making that improved profitability. As for today, the ABC model constitutes the foundation of performance management.<sup>2</sup>

According to Consortium for Advanced Management – International (CAM-I), ABC constitutes a methodology that measures the cost and performance of activities, resources, and cost objects. Resources are assigned to activities, then activities are assigned to cost objects based on their use. ABC recognises the causal relationships of cost drivers to activities.<sup>3</sup> Thus, ABC is a two-step procedure for cost allocation. The model, with embedded cause-effect logic, assigns the overhead costs via activities to final cost objects. The rationale behind is that activities constitute the real consumer of company resources so that overhead costs have to be distributed to activities first and afterwards to specific products, services or customers.

<sup>&</sup>lt;sup>1</sup> Cf. Jeyaraj S.S. (2015), p.39

<sup>&</sup>lt;sup>2</sup> Cf. Turney Peter B.B., (2008), p.1

<sup>&</sup>lt;sup>3</sup> Cf. Pember Anthony, Lemon Mark (2012)



Figure 4: CAM-I ABC/M Cross<sup>1</sup>

The above-illustrated figure shows the ABC/M Cross, which was originally presented by CAM-I in 1990. It presents the way how costs flow through an ABC model. The vertical cost assignment view relates to ABC, whereas the horizontal process view correlates to ABM. In this sense, the vertical axis explains "What things cost?" and the horizontal axis provides answers on "Why things have cost?".

The ABC method uses drivers to assign costs throughout the cost-consumption chain, which implies that the resource drivers trace overheads to work activities and the activity drivers trace activity costs to cost objects and thus accumulating all the resource expenses to the final cost object. Hence, this approach provides a much more accurate provision of product and customer costs than the traditional allocation method.

Concerning the process view of the ABC/M Cross, it sequences the work activities in time and accumulates the build-up of activity costs from start to end of a business process.<sup>2</sup> Business process can be defined as a network of activities with a common purpose, where activity costs belong to the business processes. In this regard, the ABC/M provides the cost elements for process costing that are not available from the general ledger.<sup>3</sup>

<sup>&</sup>lt;sup>1</sup> Cf. Cokins Gary (2001), p.15

<sup>&</sup>lt;sup>2</sup> Cf. Lawson Raef (2006), p.9

<sup>&</sup>lt;sup>3</sup> Cf. Cokins Gary (2001), p.17



Figure 5: Cost Assignment Network<sup>1</sup>

Figure 5 shows the typical ABC assignment diagram that provides traceability to segment costs, where expenses are traced from resources to work activities and then to specific products, services and customers, who ultimately constitute the origin for all costs and expenses. The diversity and the variation in how cost objects uniquely consume resource and activities are clearly reflected by this diagram. However, when looking at the bottom left of the diagram, there is written "(1) Demands on work" and "(2) Costs" with two arrows, one showing upwards and the other downwards. The arrow showing downwards exhibits the cost allocation process, which has just been explained. As for the first arrow, which is facing upwards, it reveals that all the expenses originate from the demands of the customers and thus, the calculated costs simply measure the effect of the demands.<sup>2</sup> Thus, this clearly shows the cause-effect logic of ABC. Moreover, it is also to note that in order to avoid distortion of the results regarding the profitability of the product costs (in an industrial point of view), some parts of the activity's costs like legal and administrative costs aren't assigned to the final cost objects as they are not related to the productions and customers.

<sup>&</sup>lt;sup>1</sup> Cf. Cokins Gary (2001), p.53

<sup>&</sup>lt;sup>2</sup> Cf. Cokins Gary (2001), p.53; Lawson Raef (2006), p.14



In order to implement ABC, a five-step process needs to be operated:

Figure 6: ABC Implementation<sup>1</sup>

The first step of the ABC system consists in analysing all the resource-consuming activities performed in order to manufacture a product or to provide a service.<sup>2</sup> An activity constitutes an action that is undertaken and performed by equipment or people for other people. Identifying activities is usually accomplished by means of interviews with managers or representatives of functional departments. In the interview, questions are asked for the purpose of gathering the needed data for the ABC system. Moreover, in order to avoid that the number of activities are getting unmanageably broad, activities that require less than 5% of a worker's time are ignored.<sup>3</sup>

Activities are then classified according to a cost hierarchy that classifies activities based on the level of costs incurrence. The cost hierarchy incorporates four different levels: unit-level, batch-level, product-level and facility-level. The unit-level activities represent primary activities performed on each unit of production and its costs tend to increase in proportion to the number of units produced. On the contrary, the batch-level activities refer to activities executed for each batch of products and the volume varies directly with the number of batches instead of the number of units in a batch. Concerning the product-level activities, they constitute activities that are carried out to support a whole production line and they don't need to be executed each time in combination with the unit-level activities and the batch-level activities as they are operated by the manufacture of a new product line and its maintenance. Lastly, the facility-level activities, as well as the batch-level and product-line activities can easily be traced to products, while facility-level activities are difficult to trace and hence, they are kept separately form the product costs.<sup>5</sup>

<sup>&</sup>lt;sup>1</sup> Source: own representation

<sup>&</sup>lt;sup>2</sup> Cf. Weygandt Jerry J., Kimmel Paul D., Kieso Donald E. (2010), p.156

<sup>&</sup>lt;sup>3</sup> Cf. Mowen Maryanne M., Hansen Don R., Heitger Dan L. (2016), pp.291-292

<sup>&</sup>lt;sup>4</sup> Cf. Crosson Susan, Needles Belverd (2008), p.208; Sahaf M.A. (2013), p.430

<sup>&</sup>lt;sup>5</sup> Cf. CliffsNotes, 2016

Next, the second step consists in assigning the overhead costs to activities, meaning to determine the costs of the resources consumed by each activity, and thereby forming a cost pool for each activity.<sup>1</sup> Labour, material, capital and energy are resources consumed by activities. Resources cost must be assigned to activities by means of direct tracing or driver tracing. For various resources, it is possible to apply a work distribution matrix, which identifies the amount of resources consumed by each activity. If an activity consumes 100% of the resources then the direct tracing method is applied while driver tracing is used in case that several activities share a common resource. These drivers are called resource drivers and they represent factors that measure the consumption of overhead resources by activities.<sup>2</sup>

The third stage comprises the identification of cost drivers. Cost drivers need to be identified for each activity and they represent factors that measure the output of the activity that causes costs to change.<sup>3</sup> They should be easily measured and they should be linked to products. There are three types of cost drivers: transaction driver, duration driver and intensity driver. The transaction driver measures the number of times an activity is carried out, whereas duration driver measures the amount of time required for performing an activity. As for the intensity driver, it directly charges for the resources that are used each time an activity is carried out and it is applied in case that the duration driver fails to provide accurate results.<sup>4</sup>

After that the cost drivers have been identified, the next step consists in determining a predetermined overhead rate for each activity (cost pool).<sup>5</sup> The predetermined overhead rate, also referred to as the budgeted overhead rate, is obtained with the following formula<sup>6</sup>:

$$Predetermined overhead rate = \frac{Estimated total Overhead Cost per Activity}{Expected Use of Cost Drivers per Activity}$$

For the computation of the predetermined overhead rate, the estimated/expected numbers are applied instead of the actual ones in order to ensure timely information because the actual figures retain unknown until the end of the accounting period and

<sup>&</sup>lt;sup>1</sup> Cf. Heisinger Kurt (2010), p.103

<sup>&</sup>lt;sup>2</sup> Cf. Hansen Don R., Mowen Maryanne M., Guan Liming (2009), pp. 99-100

<sup>&</sup>lt;sup>3</sup> Cf. Mowen Maryanne M., Hansen Don R., Heitger Dan L. (2016), p.68

<sup>&</sup>lt;sup>4</sup> Cf. Kaplan Robert S., Cooper Robin (1998), p.97

<sup>&</sup>lt;sup>5</sup> Cf. Jiambalvo James (2010), pp. 54-55

<sup>&</sup>lt;sup>6</sup> Cf. Weygandt Jerry J., Kimmel Paul D., Kieso Donald E. (2010), p.157

therefore it is impossible to determine these numerals up to that time.<sup>1</sup> Thus, if a company chose to wait till the end of the accounting period then the allocated overheads would be accurate but not timely. And since an effective decision-making can only be achieved through timely reporting, it is therefore required to use the estimated/expected numbers for determining the overhead rates.

Finally, the ABC system provides the assignment of overhead costs to products based on the level of activity required to manufacture the product or to provide the service. In order to allocate the overhead costs to products, the predetermined overhead rate (obtained in Step 4) is multiplied by the level of cost driver per activity used by the product.<sup>2</sup>

By successfully implementing the ABC system, management can get accurate cost information for strategic decision-making and operational improvement. Moreover, thanks to this system, it is also possible to detect the need of process improvement as well as quality improvements of the employees of an organisation.

#### 4.2 Benefits of ABC

Like every costing system, the ABC also comprises some advantages and disadvantages. The ABC helps a company to make better decisions in terms of monitoring of the ratio of cost/income and to implement its strategies and hence, it can contribute to a company's competitive abilities.

First of all, ABC can increase the accuracy of product costs as costs are directly assigned by means of multiple cost drivers used to produce each product. In this sense, ABC leads to more cost pools used for assigning overhead costs to products, which constitute a more accurate way of assigning overhead costs than the single plantwide overhead method.<sup>3</sup>

Moreover, ABC provides accurate and informative product costs that allow management to conduct accurate profitability analyses. By focusing on the activities of

<sup>&</sup>lt;sup>1</sup> Cf. Warren Carl S., Reeve James M., Duchac Jonathan (2016), pp. 798-799

<sup>&</sup>lt;sup>2</sup> Cf. Heisinger Kurt (2010), p.103

<sup>&</sup>lt;sup>3</sup> Cf. Weygandt Jerry J., Kimmel Paul D., Kieso Donald E. (2010), p.161

an organisation and the demands those activities make on the organisation's resources, ABC provides a clear picture of how products, facilities, distribution channels or customers generate revenues and consume resources. Managers can use this information to conduct product profitability analysis of the various facilities or customers and thereby, they can run managerial efforts to improve activities that have the biggest impact on the bottom line.<sup>1</sup> Besides product profitability, ABC also provides valuable insights for customer profitability analysis, which involves the identification of revenue streams and service costs associated with specific customers or customer groups.<sup>2</sup> Due to the fact that customers use different amounts of an organisation's activities, but not all of them, various customer profitability profiles are built up so that customers are charged according to the cost used to serve them.<sup>3</sup>

Another advantage of ABC system constitutes in its ability of process improvement and cost management as it provides useful information for supervising the various activities that generate costs. The ABC system provides management with a better view of the detailed activities involved and the cost of each activity.<sup>4</sup> By carrying out the analysis, organisations can focus on improving efficiency in the most costly activities and thereby it allows them to reduce costs.<sup>5</sup>

ABC also guides better management of decisions. By getting more accurate product costing information, this can help setting selling prices that allow achievement of the desired product profitability levels.<sup>6</sup> Depending on the obtained cost data, managers can also decide whether to continue to produce a product or eliminate the product. Thus, ABC allows manager to make accurate strategic decision and pricing decisions.

In addition, ABC allows improvement of internal performance of an organisation. Performance measurement constitutes the process that quantifies how effective and efficient the actions of an organisation are.<sup>7</sup> Performance measurement is important in strategy execution because it is a process that ensures that an organisation is pursuing strategies that lead to achievement of overall goals and objectives.

<sup>&</sup>lt;sup>1</sup> Cf. Cooper Robin, Kaplan Robert S. (1991)

<sup>&</sup>lt;sup>2</sup> Cf. Eaton Graham (2005), p.17

<sup>&</sup>lt;sup>3</sup> Cf. Wilks Colin, Burke Louise (2006), pp. 306-307

<sup>&</sup>lt;sup>4</sup> Cf. Heisinger Kurt (2010), p.110

<sup>&</sup>lt;sup>5</sup> Cf. Wilks Colin, Burke Louise (2006), p.304

<sup>&</sup>lt;sup>6</sup> Cf. Weygandt Jerry J., Kimmel Paul D., Kieso Donald E. (2010), p.161

<sup>&</sup>lt;sup>7</sup> Cf. Neely Andy, Gregory Mike, Platts Ken (1995), p. 1229

Last but not least, the ABC system constitutes a tool in financial planning and budgeting. ABC can lead to activity-based budgeting, which relates activities and cost drivers to the underlying costs and as such supports continuous improvement and process management.<sup>1</sup> Due to the ABC's predictive ability, it is possible to utilise the ABC model for the preparation of budgets that are consistent with the strategic goals and the resource capacities of a company. Therefore, by knowing the activity-based cost of the activities performed by an organisation, managers can include the appropriate level of resources in the budget.<sup>2</sup>

#### 4.3 Limitations of ABC

Although ABC constitutes one of the most accurate methods to allocate costs, it still comprises some limitations and disadvantages. One of the major disadvantages of ABC is that although the ABC approach represents a scientific method, this method is still complex, time consuming and expensive to implement. ABC is time consuming as it requires teamwork across the organisation, meaning that managers and accountants have to take their time out from their daily activities in order to assist in the ABC process.<sup>3</sup> Moreover, ABC is costly to maintain as the process of data collection and data entry requires substantial resources.

Even though with ABC, overhead costs are directly allocated to products through cost drivers, there are still certain overhead costs that can't be easily assigned to products or customers. These costs are called "business-sustaining costs" and they represent activity costs that aren't caused by the manufacturing of products or the supply of services to customers and they include unused capacity expenses<sup>4</sup>. As there is no logical way to trace business-sustaining costs to products, services, customers or channels on a proportionate basis, these costs have to be equally distributed among the various costs objects.<sup>5</sup>

<sup>&</sup>lt;sup>1</sup> Cf. Mowen Maryanne M., Hansen Don R., Heitger Dan L. (2016), p.494

<sup>&</sup>lt;sup>2</sup> Cf. Davis Charles E., Davis Elizabeth (2012), p.381

<sup>&</sup>lt;sup>3</sup> Cf. Heisinger Kurt (2010), p.110

<sup>&</sup>lt;sup>4</sup> Cf. Northrup Lynn (2004), p.69

<sup>&</sup>lt;sup>5</sup> Cf. Lawson Raef (2006), p. 13

In practice, the ABC system is applied to develop the full cost of products. However, since full costs also include allocation of fixed costs (like the depreciation cost), which constitute sunk costs, the cost per unit generated by the ABC system doesn't incorporate the measurement of additional costs required for the manufacturing of a product.<sup>1</sup> Since sunk costs are costs that have already been incurred and that cannot be recovered<sup>2</sup>, these costs are therefore not appropriate for decision-making.

Lastly, another point to mention is that the ABC doesn't conform to the generally accepted accounting principles (like the IFRS) and hence, as a result, companies that have implemented the ABC system still need to own another costing system, which is used for the preparation of external reports.<sup>3</sup>

#### 4.4 Traditional Costing vs. ABC

	Traditional Costing System	Activity-Based Costing System
Concept	Cost objects consume resources	Cost objects consume activities and activities consume resources → Cause-effect relationship
Overheads	Assigned to departments, then to cost objects	Assigned to activities, then to cost objects
Cost pools	Limited number of cost pools	Many cost pools
Cost drivers	Restraint number of cost drivers	Multiple cost drivers
Focus	Managing costs of departments or cost centres	Managing cost impact of cross-functional activities

There is a philosophical difference between the traditional and the ABC approaches.

Table 1: Elements of Traditional Costing and ABC<sup>4</sup>

The traditional view of cost accounting is that cost objects (products, services, customers, etc.) consume resources while in an ABC system, every cost assignment to an activity should be transparent and traceable, by means of cause-effect relationships, to the demand for resources by the cost object. <sup>5</sup> In this sense, the logic of ABC is that cost objects consume activities and activities consume resources, thus in other words, costs are driven by activities. For both systems, the allocation of the overheads is undertaken by means of a two stage allocation process.

<sup>&</sup>lt;sup>1</sup> Cf. Khan M. Y., Jain P. K. (2010), p.12-17

<sup>&</sup>lt;sup>2</sup> Cf. Investopedia, 2016

<sup>&</sup>lt;sup>3</sup> Cf. Garrison Ray H., Noreen Eric W., Brewer Peter C. (2009), p.338

<sup>&</sup>lt;sup>4</sup> Source: own representation

<sup>&</sup>lt;sup>5</sup> Cf. Kaplan Robert S., Cooper Robin (1998), p.100



Figure 7: Two stage allocation process for traditional and ABC systems<sup>1</sup>

The figure above illustrates the traditional and the ABC approach of cost allocation. In the traditional approach, overheads are firstly allocated to product cost centres, which generally represent production and service departments. Next, overheads are traced to cost objects via small number of predetermined overhead allocation rates, typically

<sup>&</sup>lt;sup>1</sup> Source: own representation, adapted from Drury Colin (2008), p.224

overheads per direct labour hour or machine hours, that vary directly with the volume produced.<sup>1</sup> In other words, the traditional approach assumes that all overheads are proportional to production volume. On the contrary, in the ABC system, the overhead costs are apportioned into cost pools, with one cost pool for each cost-driving activity. And afterwards, the overheads are allocated to the cost objects through activity cost driver rates that attempt to show the extent to which each particular cost object is believed to cause the particular part of the overheads (as shown on Figure 5).<sup>2</sup> It is to note that cost centres are similar to cost pools, except that each cost pool is

linked to a particular activity, rather than to general departments.

As stated above, in the traditional costing system, overhead costs are apportioned to few cost pools as they are assigned to service or production departments, whereas in ABC, many activity-based cost pools are created. Concerning the allocation of the overheads to the cost object, which is processed by means of cost drivers, in the traditional costing system only one or a few volume-related cost allocation bases are used. This is different in the ABC system, which aims to establish a causal relationship between the costs and activities in order to assign costs more objectively<sup>3</sup>. ABC provides additional insights into the factors that guide indirect costs by defining multiple cost drivers that constitute either a linear or a non-linear relationship between the cost objects and their demand for resources.<sup>4</sup>

Another difference between the traditional and the ABC system consists in their focus. In the traditional costing system, the obtained results allow a company to manage its costs of departments or costs centres as it assigns the overheads to the cost objects via costs centres. Hence, the traditional costing approach enables a company to trace all expenses related to a certain department and thereupon to monitor the effectiveness of all aspects within a company. Regarding the ABC approach, it allows to measure the cost impact of the cross-functional activities of a company. ABC identifies the true drivers of cost and the areas of extreme high overhead costs per unit for particular products, services, or customers. By identifying activities without adding value, this allows a company to focus their effort on reducing the cost drivers of these activities. At

<sup>&</sup>lt;sup>1</sup> Cf. Drury Colin (2008) pp. 223-224

<sup>&</sup>lt;sup>2</sup> Cf. Atrill Peter, McLaney Eddie (2009), p.140

<sup>&</sup>lt;sup>3</sup> Cf. Spitzer Dean R. (2007), p.241

<sup>&</sup>lt;sup>4</sup> Cf. Budding Tjerk, Grossi Giuseppe, Tagesson Torbjörn (2015), p.108

the same time, ABC also helps to determine the costs associated with specific customers or customer segments that turn out to be unprofitable. Therefore, ABC constitutes a cross-functional measurement process, which facilitates decision making.<sup>1</sup>

### 4.5 Activity Based Management

Activity-based management is defined by CAM-I as a discipline that focuses on the management of activities as the route to improving the value received by the customer and the profit achieved by providing this value. ABM includes cost driver analysis, activity analysis, and performance measurement, drawing on ABC as its major source of data.<sup>2</sup>. The two terms ABC and ABM shouldn't be used interchangeably. The ABC approach identifies the costs of activities and the outputs produced by those activities, which is however insufficient for continuous improvement of the company. On the contrary, ABM represents a management tool that facilitates process improvement, innovation and the realignment of resources<sup>3</sup> by means of the data obtained through ABC in order to reduce or eliminate the unprofitable activities and thereby, improve the overall process of a company.

The relationship between ABC and ABM is best illustrated in the CAM-I ABC/M Cross (Figure 4) on page 18. The vertical cost view serves as an important input to the process view. The process view illustrates the ABM approach, which decomposes a business process model into activities and then to performance measure. In this sense, cost drivers drive the cause for activities and the effort that is required to engage the activities and performance measures drive the achieved results of activities, meaning the efficiency, the required completion time and the quality of activities that were performed.<sup>4</sup>

ABM can be divided into two categories: the operational ABM and the strategic ABM.

<sup>&</sup>lt;sup>1</sup> Cf. Spitzer Dean R. (2007), p.241

<sup>&</sup>lt;sup>2</sup> Cf. Lawson Raef (2006), p.2

<sup>&</sup>lt;sup>3</sup> Cf. Cogent (2016)

<sup>&</sup>lt;sup>4</sup> Cf. SAS Institute (2007), p.6


Figure 8: Operational and Strategic ABM<sup>1</sup>

The operational ABM emphasizes on doing things right in order to execute activities more efficiently. In the operational ABM, the ABC information helps to perform value added analysis in which the focus is put on identifying value adding activities that need to be improved and reducing or eliminating non-value adding activities for cost cutting.<sup>2</sup> The goal of the operational ABM is to improve efficiency, to enhance the use of asset and to reduce costs. <sup>3</sup> To achieve these objectives, the operational ABM utilises management tools like activity analysis, process improvement, total quality management and performance measurement.<sup>4</sup>

The strategic ABM is about doing the right things for the purpose of performing activities in a more effective way. The strategic ABM strives to increase the occurrence of high-profitability activities and to decrease the occurrence of low-profitability ones.<sup>5</sup> The data obtained through the ABC approach provides information about the profitability of individual products and customers and therefore, the strategic ABM can be used to identify which products and customers are the most profitable and for which sales volume should be developed.<sup>6</sup> Strategic ABM focuses on process design, value-chain analysis and product and customer profitability analysis with the purpose of supporting the decisions and increasing the overall profitability of the company.<sup>7</sup>

<sup>&</sup>lt;sup>1</sup> Source: own representation

<sup>&</sup>lt;sup>2</sup> Cf. Gupta K. P. (2009), p.90

<sup>&</sup>lt;sup>3</sup> Cf. Kaplan Robert S., Cooper Robin (1998), p.137

<sup>&</sup>lt;sup>4</sup> Cf. Gill Suveera (2015), p.301

<sup>&</sup>lt;sup>5</sup> Cf. Proctor Ray (2009), p.260

<sup>&</sup>lt;sup>6</sup> Cf. Maher Michael W., Stickney Clyde P., Weil Roman L. (2012), p.76

<sup>&</sup>lt;sup>7</sup> Cf. Gill Suveera (2015), p.301

# 5 Case Study: Implementation of ABC to Raiffeisen Bank of Luxembourg

From this chapter on begins the practical part of the assignment. In this chapter, the author will present the company in which the ABC will be implemented, namely the Raiffeisen Bank of Luxembourg (RB). The chapter starts with a description of the company profile and organisation, how the bank started and its evolution. Afterwards, an industry analysis will be executed in order to understand the threats of RB in the financial industry. The chapter will then end with a presentation of the various products and services offered by RB.

#### 5.1 Company Profile and Organization

The first cooperative banks were founded in the 19<sup>th</sup> century under the concept of Friedrich Wilhelm Raiffeisen and Hermann Schulze-Delitzsch, the founders of the first rural cooperative banks in Germany. The first credit union systems and cooperative banks were founded in 1925 in Luxembourg. RB of Luxembourg was founded in 1926 and it constitutes the first independent cooperative bank in Luxembourg covering the entire national territory. Moreover, Luxembourg's RB doesn't have any relation to the other Raiffeisen Banks of abroad.



Figure 9: Evolution of the number of Caisses Raiffeisen<sup>1</sup>

<sup>&</sup>lt;sup>1</sup> Source: own representation, adapted from HRD (Human Resources Department) of RB

In 1960, RB regrouped 138 Caisses Raiffeisen<sup>1</sup> (CR) across the country that reduced over the years as illustrated on Figure 9. CR are independent legal entities that belong to RB. Altogether, RB consists of 14 entities, 13 CR and the bank Raiffeisen, who are all controlled by RB. As of May 2016, RB counts 42 sales points all over the country; 13 of them depending directly from the bank and the other 29 belonging to the 13 CR. Moreover, beside the sales points, there are also 52 ATM's distributed over the whole region of Luxembourg.

The administration as well as the legal and extra-legal representation of the local Caisse is provided by a board of directors and the supervision is entrusted to a board of auditors. Under the control of the board of directors, the manager leads and develops the activities of the Caisse within the context of legal and statutory provisions, the decisions of the bodies of the Caisse as well as the regulations and requirements of RB. Moreover, the General Assembly of the Caisse represents the universality of the associates of the Caisse, which must at least meet up once a year in an ordinary general meeting.

All the CR, the Raiffeisen Members S.C. and several agricultural, viticultural and horticultural organisations are associates of the RB. RB's decision-making body is composed of the General Assembly, the supervisory board and the board of management.

Nowadays, RB has evolved from a rural union system to a universal financial institution and it covers not only retail activities but it also has good expertise in private banking, wealth management and small, medium enterprise segments.

On 31<sup>st</sup> May 2016, RB has more than 22.000 members<sup>2</sup> in all the entities combined.

Regarding the finances of Raiffeisen Bank, it is well placed. With an increase of the total balance sheet by 8.5%, increasing deposits of non-banking customers and granted loans in progression by 4.8%, the bank shows a net profit of 17.55 million euros in 2015 versus 17.96 million euros in 2014.<sup>3</sup>

The organisation chart of RB is presented as follow:

<sup>&</sup>lt;sup>1</sup> Source: HRD of RB

<sup>&</sup>lt;sup>2</sup> Source: Commercial Support Department of RB, Status on 31.05.2016

<sup>&</sup>lt;sup>3</sup> Cf. Banque Raffeisen (2016) : Rapport annuel 2015



Figure 10: Organisation chart of RB<sup>1</sup>

The board of management is ensured by a president, a vice-president and three members of the management board who each has their own responsibility over several metiers.

In the recent years, with the increase of the RB's activities, the number of employees has also increased steadily in order to support the sustained development of the Bank's activities:



Figure 11: Evolution of the number of employees 2000-2015<sup>2</sup>

# 5.2 Industry Analysis

<sup>&</sup>lt;sup>1</sup> Source: own representation

<sup>&</sup>lt;sup>2</sup> Source: own representation, adapted from HRD of RB

In Luxembourg financial industry, there are around 144 banks, subsidiaries or branches, including RB, that come from 28 different countries like Germany, France, Belgium, the United Kingdom and China.<sup>1</sup> The market in this branch is rather static as there weren't a lot of new entrants during the last five years<sup>2</sup>.

The five forces that threaten the performance of RB are rivalry, buyers, substitutes, new entry, and suppliers.

Substitutes constitute rather a strong threat, as almost all the retail banks offer the same categories of products and services. Consumer will therefore have the possibility to choose among a large range of products. Moreover, as RB constitutes a regional cooperative bank, it doesn't have diversification with any branches in other countries and thus its products are pricier than some of its competitors like the BCEE who operates under the influence of Luxembourg's government.

New entrants pose a low to medium threat to the organisation of RB because as mentioned above, there weren't many financial institutions that entered the market in the last five years. As for the industry's rivalry, the rivals of RB consist of all the banks that offer the same products and services like RB. RB main competitors are BCEE, BIL, BGL BNP Paribas and ING. Moreover, with the development of technology, an additional threat consists in the digital banking, in the sense that more initially nonfinancial institutions offer financial services to their customers like for example the technology company Apple Inc. who offers the Apple Pay service, which constitutes a mobile payment and digital wallet service.

Suppliers in view of the collaboration partners pose a medium to high threat to RB. The major cooperating corporations of RB are Foyer, Schwäbisch Hall, Vontobel and Post. As RB's profit primarily comes from the net interest margin (difference between the interest paid out to customers for their deposits and the interest generated by loans granted to the customers) and the commissions earned through its various collaborations, this could be a menace to RB if one of its collaborating companies decide to cease the collaboration with RB.

<sup>&</sup>lt;sup>1</sup> Cf. CSSF (2016, April 30) <sup>2</sup> Cf. CSSF (2012), p.52

Buyers exert a somewhat strong force in the financial industry. In this case the buyers are the customers who demand and consume the various products and services offered by RB. The consumers have the option of choosing among a large range of products, whether it is a saving account, a credit card, a credit loan, an insurance product, an investment product, etc. Fortunately, the number of buyers is increasing because the number of population and foreign employees are also rising in Luxembourg.

# 5.3 Company's Products and Services

RB offers a large range of products and services. It goes from basic current accounts to special investment products and each product is categorised as per age, purpose, use and needs of the customers.



Figure 12: GC Flyers of RB<sup>1</sup>

RB has a product line named Green Code (GC), which is designated for children of less than 12 years (GC Kids) up to young adults (GC Study or GC Job). Green Code products feature current accounts and saving accounts with special interest rates. The GC Kids also allows parent to save money for their children as children can't access their accounts until their majority age. For children between 12 and 18 years, RB offers the GC 12 -18 package. The GC 12-18 as well as the GC Study/ Job, which is destined for young adults between 18 and 30, offers the customer the possibility to get a debit card, respectively a credit card with different limitations. Moreover, GC debit card holders receive special discounts at various places such as the cinema, the fast food

<sup>&</sup>lt;sup>1</sup> Source : Flyers of RB

restaurant and the fitness or wellness centres. Furthermore, they also have the possibility to use the e-banking service of RB named R-NET.

As for the retail customers, RB also offers a wide range of products. It provides not only current operations services like transactions with the current account (transfers or withdrawals) but also saving products, investment products, insurance and precaution products and credit services. In addition, RB proposes customers to become member either of the CR or of Raiffeisen Members S.C.. By becoming a member of RB, the member participates in the OPERA program where he gets more privileges than an ordinary customer and the member has the right to attend the general assembly that takes place at least once a year.

In terms of the saving products, RB offers not only saving accounts, but also time deposits and sight deposits. Moreover, it offers housing-saving and loan products named BSH in collaboration with Schwäbisch Hall, a German home savings and loan association situated in Baden-Württemberg. As for the insurance and precaution products, RB provides some of these products in cooperation with Raiffeisen Vie, a joint-venture of the insurance company Foyer. Moreover, RB provides investment products in collaboration of Vontobel, a Swiss private bank. Last but not least, the new partnership with POST gives POST customers the possibility to subscribe and use the products and services rendered by RB like the execution of current operations services.

Concerning the credit services, the bank provides various types of loans such as personal loans, housing loans, student loans, financial leasing and investment loans.



Figure 13: Tax Optimisation Products<sup>1</sup>

<sup>&</sup>lt;sup>1</sup> Source: Flyers of RB

RB also offers tax optimisation products such as R-Vie Protect, R-Junior, R-Pension or housing saving and loan products. By subscribing to one of these products, customers can enjoy interesting tax reductions and at the same time they can build a solid financial reserve for their future. Moreover, depending on their personal situation (single or married, with or without children), customers have the possibility to combine the different deductible amounts.

Besides the retail products, RB also supplies products and services for small and medium enterprises and freelance works like the Multiline, which constitutes a solution of multi-bank e-banking service specifically designed for professionals, regardless of the size of the company. This service provides a maximum of security as it establishes a secure link between the enterprise's computer and the one of the bank in order to transmit the financial data in a structured, compressed and encrypted form.

# 6 Process of Implementation of ABC in Raiffeisen Bank

This chapter studies the process of implementation of the ABC in Raiffeisen Bank. The author will start with identifying the resources, the direct and indirect costs of RB, following by a description of the activity and process mapping, which includes the establishment of a dashboard and a matrix table. Next, the costs will be assigned to activities by means of a waterfall model and cost drivers will be determined. Lastly, an example of activity costs assignment to cost objects will be delineated in order to give a complete view of the process of implementation of ABC in RB.

## 6.1 Determination of the Resources

In order to identify the various resources of RB, it is first required to determine the different operational source systems of RB that provide financial and non-financial data.

Systems	Description
T24	T24 (Temenos) : Activities of customers (current accounts, securities accounts, current operations, credits,), provisions of the Bank and accounting system
TriBank	Costs of the bank (charges, rent, insurances, materials) and amortisation
Apsal	Salaries et advantages of the employees
MyGesper	Organisation of the Bank
DSKNet	(annual) leaves, absences,
Excel file	Other information

Table 2: Source systems of RB<sup>1</sup>

The Temenos system, also called T24, represents an operational system that manages the activities of the customers as well as the accounting of the various expenses generated by the ordinary and exceptional activity of the bank. The system provides all the financial movements, transactions and portfolios of the private and institutional customers. Hence, exploiting the information of this system will be appropriate in the case of a further cost-benefit analysis (comparison of costs/income, outstanding customers, evolution, trend, etc.).

Tribank constitutes an invoicing tool, which covers all the expenses of the bank, including the amortisation costs and the costs related to the development of new projects. The extraction of the data from this tool is relevant in case where the

<sup>&</sup>lt;sup>1</sup> Source: own representation

information obtained through T24 isn't accurate enough for the determination of all the expenses of the bank. Another system with which it is possible to retrieve the financial data of RB is the Apsal system. This program contains all the information related to the personnel costs of the bank like the salaries.

Concerning the MyGesper tool, it manages the organisation of RB by means of a hierarchical view of the employees and the services within the entities of the Bank. In addition, it also registers training sessions in which an employee is inscribed. As for the DSKNet, this system provides information related to the employees of the bank like their attendance, their leaves, absences due to sickness or absences due to training sessions, etc. These data allow the allocation of the provisions for paid leaves by comparing the taken leaves and the balance of the leaves.

It is to note that for information that aren't contained in the source systems, a separate data file (for ex. Excel file) will be established in which complementary information are comprised. These represent data that are either not presented in the operational systems or that require manual processing as it is impossible to directly rectify these data in the source system.

After determining the source systems, it is now possible to identify the foundation of the direct costs per analytical centre.

The Direct costs constitute the costs that are derived from the operational systems and that are accurately attached to analytical centres (DCOAC (Direct Costs per Operating Analytical Centre). However, as there are some costs that can't be easily attached to an analytical centre of the operational system, it would be appropriate to define a default value for each dimension that corresponds to a centre, category or project. An example would be the bill of the Blackberry phones that are placed at the disposal to the directors and managers of the bank. And therefore, the parameterisation of allocation keys/bases is required in order to isolate certain costs that need to be allocated.

The indirect costs arise from the reallocation of certain costs that can't be directly allocated to an analytical centre. The determination of the indirect costs constitutes the primary stage of identification of the overhead expenses of the bank in order to subsequently be able to allocate these costs to activities/centres.

For costs that are assigned to a generic or insufficient specific level, it is possible, via allocation bases, to reallocate these costs to other departments, categories, rubric, segments, etc. The principle of definition and application of the allocation keys is based on two areas: source perimeter (range of amounts to be reallocated) and target perimeter (range of members receiving the new amount). The first scope is clearly defined in the definition of the allocation bases, that is to say, the class, the centre and the period that allow the recovering of the distributed amount is specified. The second perimeter isn't directly specified but it is defined through the applied allocation key.

Allocation key	Description	Source
Nb FTE	Number of FTE	MyGesper
Nb T24 Licences	Number of T24 Licences	T24
Nb Customers	Number of customers	T24
Nb Current Accounts	Number of current accounts	T24
Nb Total cards	Total number of cards	T24

Table 3: Example of allocation keys<sup>1</sup>

The "FTE" key gives information about the number of employees working fulltime (1 FTE) or halftime (0.5 FTE). Hence, all the cost centres involved in the FTE will receive a proportion of the original amount. This also counts for other allocation keys that involve the equipment rate of the customers. For example, the number of customers, as well as the subscribed products of customers can be evenly assigned to the employees of an agency via the FTE key. Moreover, the number of T24 licences can also be equally distributed to the employees through the FTE's within RB.

Take the maintenance expenses of T24. Suppose that the maintenance expenses for three agencies is 25.500 €and each agency own the following number of T24 licences:

Allocation key	Centre	Value
Nb T24 Licences	Agency Centre	5
Nb T24 Licences	Agency Mamer	4
Nb T24 Licences	Agency Wasserbillig	3

Table 4: Number of T24 Licences<sup>2</sup>

In order to assess the maintenance expenses to each agency, the following formula will be applied:

<sup>&</sup>lt;sup>1</sup> Source: own representation

<sup>&</sup>lt;sup>2</sup> Source: own representation

# Amount of allocation centre $x \frac{KPI Allocation of Centre}{\sum KPI Allocation} x \% of allocation^{1}$

Thus, the maintenance expenses of each agency will be:

Denomination	Allocation key	Centre	Amount
Maintenance T24	Nb T24 Licences	Agency Centre	25.500 x (5/12) = 10.625 €
Maintenance T24	Nb T24 Licences	Agency Mamer	25.500 x (4/12) = 8.500 €
Maintenance T24	Nb T24 Licences	Agency Wasserbillig	25.500 x (3/12) = 6.375 €

Table 5: Allocated amount of maintenance expenses<sup>2</sup>

To get a complete overview of the direct and indirect costs of RB as well as the method of allocation of these costs, a dashboard uniting all the information will be established.

Category	Sub-category	Components	Allocation Method	Allocation base	Source	Responsible Department
Personnel costs						
	Labour costs					
		Fixed labour costs	Allocation Base & DCOAC	Number of FTE	Apsal	HR
		Variable labour costs	Allocation Base & DCOAC	Number of FTE	Apsal & 124	HK
	Social charges	Mutual fisurance Scheme Refund (CCSS)	Allocation base & DCOAC	Number of FTE	Apsai	пк
		Accident Insurance Contribution	Allocation Base & DCOAC	Number of FTE	Apsal &T24	HR
		Health Insurance Contribution	Allocation Base & DCOAC	Number of FTE	Apsal &T24	HR
		Mutual Insurance Scheme Contribution	Allocation Base & DCOAC	Number of FTE	Apsal &T24	HR
		Mutual Insurance Scheme Refund - Social charges	Allocation Base & DCOAC	Number of FTE	Apsal &T24	HR
Informatic system						
	Production					
	T24	T24 Expenses	Allocation base	Number of users	Trilog	IT
	Blackberry	Blackberry Expenses	Direct Cost Analytical Centre	User of the Blackberry	Trilog	IT
	DWH	Datawarehouse Expenses	Allocation base	Number of reports	Trilog	IT
	DMS	Document Management System Expenses	Direct Cost Analytical Centre	TUP payments	Trilog	IT
	Mosel	Mosel Monitoring of ATM's Expenses	Allocation base	Agencies and Caisse RB	Trilog	IT
	Internet	Internet Expenses	Allocation base	Digital Banking	Trilog	IT
Advertising						
		"Molconcours" Raiffeisen Expenses	Allocation Base & DCOAC	Number of customers	Trilog	Marketing
		Advertising Expenses	Allocation Base & DCOAC	Number of customers	Trilog	Marketing
		Sponsoring Expenses	Allocation Base & DCOAC	Number of customers	Trilog	Marketing
		Customer Events Expenses	Allocation Base & DCOAC	Number of customers	Trilog	Marketing
Audit						
		Internal Audit Expenses	Direct Cost Analytical Centre		Trilog	Internal Audit
		External Audit Expenses	Allocation Base & DCOAC		Trilog	Management Board
		Consulting Expenses	Allocation Base & DCOAC		Trilog	Management Board
Training			D:			
		External Training Session Expenses	Direct Cost Analytical Centre		Trilog	HR
		RB Training Session Expenses	Allocation base	All-Inclusive Price per FTE	Excel	HR
G 15		Training - Catering Expenses	Direct Cost Analytical Centre	All-Inclusive Price per FTE	Excel	HR
Card Payments	Bronostry Even					
	Property Expenses		A 11 - C - 1		T 1 0 TD 4	0
		A INI Exepenses	Allocation base	Number of cards	100g& 124	Operation
		Debit Card Expenses	Allocation base	Number of V-Pay cards	1110g& 124	Operation
		Credit Card Expenses	Allocation base	Number of credit cards	Trilog& 124	Operation
L		A INI Maintenance Fees	Direct Cost Analytical Centre		Trilog& 124	Operation

Table 6: Fraction of the dashboard of RB<sup>3</sup>

The dashboard represents the reporting that retraces by analytical centre the revenues and costs over which the manager of the department/service has a decisive, real and direct impact on it. For example, the manager of the marketing department is

40

<sup>&</sup>lt;sup>1</sup> The percentage of allocation (% of allocation) allows the allocation of a portion of the selected costs using the appropriate KPI.

<sup>&</sup>lt;sup>2</sup> Source: own representation

<sup>&</sup>lt;sup>3</sup> Source: own representation

responsible for the advertising expenses, which is related to the costs beard for an advertisement campaign. Thus, the objective of the dashboard is to perceive the actual cost of each activity and the result will serve as a basis for the cascade of the direct costs to business units.

#### 6.2 Activity and Process Mapping

As stated above, several sources system will be analysed in order to determine the resources of RB. Unfortunately, these systems don't necessarily have the same framework, the same granularity or the same attributes and therefore, it is necessary to provide a common reference system for all data in order to ensure the coherence and standardisation of the received information. This reference system should allow the shift of the data from one category to another one like for example the shift from the financial accounting system to the managerial accounting system. The reference system, called Mapping, is based on the criteria that vary according to the source application providing the data. Thus, it is required to establish a mapping per application and for each dimension that requires a mapping.

Invoice	Denomination	Account	Product	Sub-Product	Centre	Amount
2016-0001	Car Leasing RB9999	61521	100	A32	USR00033	- 425,56 €
2016-0002	Fuel RB9999	61522	100	A20	USR00033	- 123,50 €
2016-0003	Internet Box – Employee	62217	200	A15	Agency Centre	-75,00 €
2016-0004	Internet Box – Customers	62217	300	A23	Agency Centre	- 30,00 €
2016-0005	Meal Vouchers	62059	200	B12	USR0099	- 36,00 €
2016-0006	Purchase Reimbursement	62059	300	B12	Agency Mamer	- 45,25 €
2016-0007	T24 Maintenance	62228	400	C30	Bank	- 25 500 00 €

Consider the following encoding of the invoices in the TrikBank system:

Table 7: Bills encoded in TriBank<sup>1</sup>

The table illustrated above contains a lot of information and the goal is to get a view by category, without any details concerning the invoice or the product as these data will only hinder and impair the analysis. The objective is to provide an exploitable granularity per category by hiding an excessive level of detail. A possibility would be to regroup the vehicle charges, which include the rent, insurance, maintenance and fuel, to a category "Leasing Charges". Moreover, it would also be appropriate to assort all the

<sup>&</sup>lt;sup>1</sup> Source: own representation, data obtained from Management Control Department

charges related to the advantages of the employees such as the meal vouchers or the purchase reimbursement.

Thus, the table will look like following:

Category	Amount	Remark
Leasing Charges	- 549,06 €	Invoice 2016-0001 & 2016-0002
Internet Employee	- 75,00 €	Invoice 2016-0003
Internet offered to the customers in the agency	- 30,00 €	Invoice 2016-0004
Other advantages of the employees	- 81,25 €	Invoice 2016-0005 & 2016-0006
Temenos T24	-25.500,00 €	Invoice 2016-0007

i delle et i coning et eddegentes	Table	8:	Pooling	of cat	egories
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The Mapping framework can also be of use for the enumeration of the salaries of the employees as it allows the encryption of the details of each employee, respectively of the managers and executive assistants (attaché de direction) of the bank. The following table shows an example of the encoded salaries of the managers/attachés in Apsal.

Account	Denomination	Centre	<b>Denomination Centre</b>	Amount
9514037	Salary Executive Assistant	USR1216	Mr XXX	-1.000,00€
9527037	Bonus	USR1216	Mr XXX	-100,00 €
9514357	Salary Executive Assistant	USR 2687	Mr YYY	-1.000,00€
9527357	Bonus	USR 2687	Mr YYY	-250,00 €
9514357	Salary Manager	USR 7563	Mr ZZZ	-1.500,00€
9527357	Bonus	USR 7563	Mr ZZZ	-1.000,00€

Table 9: Details of the salaries and bonuses perceived by each manager/attaché<sup>2</sup>

Beside the mapping of the categories, it is also possible to proceed through the mapping of the accounts:

Application	Order	Account (IN)	Category (OUT)
Apsal	10	9514xxx	Manager Expenses
Apsal	20	9527xxx	Bonus Expenses

Table 10: Account Mapping<sup>3</sup>

The first four digits of the account represent a group of an account, thus it is possible to regroup the accounts with the same numbers and apply them on the bank level in order to create a mapping with several categories.

<sup>&</sup>lt;sup>1</sup> Source: own representation

<sup>&</sup>lt;sup>2</sup> Source: own representation

<sup>&</sup>lt;sup>3</sup> Source: own representation

Category	Denomination	Centre	Amount
Manager Expenses	Salary	Bank	-3.500,00€
Bonus Expenses	Bonus	Bank	-1.350,00 €

Table 11: Applied Categories<sup>1</sup>

Next, these amounts can be distributed to the various departments of the bank via a FTE manager key so that the confidentiality of the salaries and bonuses perceived by the managers/attachés will be conserved.

The definition of the various rules for the Mapping framework constitutes the basis of the cost allocation module. The establishment of the components for each dimension allows the development of a base of raw data that facilitates the allocation of the costs to the various departments.

Domain	Example	Description
Application	Tribank / Apsal / NovaBank	Application of a different mapping according to
		the source file
Dimension	Centre / Rubric / Entity	Dimension defined in the mapping
Criteria IN 1	621578 / USR042536 / LU0010000	Selection of 1 <sup>st</sup> element (category, centre,)
Criteria IN 2	Category / Product	Selection of sub-element: Category
Criteria IN 3	Sub-category / Sub-Product	Selection of sub-element: Sub-Category
Criteria IN 5	Original Entity	Selection of sub-element: Entity
Criteria IN 6	Direction/Course	Selection of sub-element: Direction
Criteria IN		Selection of sub-element:
Value OUT	Salaries / USRxxx / Agency Kirchberg	
Direction OUT	Direction/Course	Possible to inverse the direction of the operation

Table 12: Example of Mapping<sup>2</sup>

In order to establish a mapping, it is required to first determine the various domains that are essential for the mapping like the source application, the various important dimensions, the various criteria applied in the bank, etc. For the creation of the mapping, it is possible to either create a separate file for each domain of analysis or define a unique mapping for all the domains of analysis.

Moreover, it is important to eliminate the duplications of the data and to keep the initial data. As there exists interactions between the various applied source systems, it is possible that some of the same factors reside in these applications. For example the bills of the bank are recorded in the TriBank system in its very details. These bills are afterwards transmitted by the TriBank system to T24 system (with less details) in order

<sup>&</sup>lt;sup>1</sup> Source: own representation

<sup>&</sup>lt;sup>2</sup> Source: own representation

to affect the profit and lost account of RB. This goes the same with the depreciation expenses, which will be registered in the TriBank system and thereafter transferred to the T24 system. Thus, in order to avoid duplication of the data, it is necessary to filter or combine the diverse data of analysis.

The notion of budgetary responsibility also plays an important role in the determination of the centre of attribution of the invoice expenses. There are two cases of budgetary responsibility: the standard case and the particular case. The standard case takes the various basic data (of the source system) and the information gathered via the mapping tables (for the relevant dimensions, taking into account the input source application) and discharges the invoice expenses on the indicated centres. As for the particular case, it follows the same logic as the standard case, except for the category dimension, where it is appropriate to define an attachment centre for the various invoice expenses as these expenses are directly attached to the costs of the bank instead to the initiator centre of the expenses. Thus, in order to manage this problem, the notion of budgetary responsibility is required as it corresponds to an attachment centre that constitute the default attachment centre of an invoice and that will be specific to each category.

In the previous example of table 7 (p.40), the maintenance expenses of T24 are attached to the Bank Centre. However, by applying the budgetary responsibility, the maintenance expenses of T24 are attributed to the IT service as T24 constitute an informatics tool. And after this stage, it is now possible to distribute these expenses to the T24 users within the bank by means of the allocation bases explained in the following section.

An additional point to mention is that it is important to define in the mapping not only a category but also its sub-category as it is essential to be able to trace the sub-category to the category. This also counts for the agencies and Caisses of RB, as the tracing of the agencies to the Caisses is crucial for the problematic of cost distribution for the managers/assistant managers of the CR. In the organisational structure of RB, the managers and assistant managers are directly attached to the Caisse that they manage. As a consequence, their costs will be systematically affiliated to the Caisse without affecting the agencies that compose the Caisse. The objective is to better distribute the charges on the entire structure that the manager manages in order to best reflect the management task on the agency, the department and the team that he supervises. Hence,

it is important to identify the employees with this function and in this sense to know the organisational structure of the bank (via the MyGesper system).

The MyGesper system defines various levels within the RB: function, activity, metier, region, department, service and user ID. In order to find out if an employee manages other departments, services or employees, it is required to proceed through an analysis of the hierarchical structure of the employee. If the employee is directly attached to the department, than he is considered as having a management position.

As an illustration, take the following example:

Function	Activity	Metier	Region	Department	Service	User ID
<b>Business lines</b>	Commercial Bank	Retail	Centre-West	CR Mamer	CR Mamer	USR001
Business lines	Commercial Bank	Retail	Centre-West	CR Mamer	CR Mamer	USR002
Business lines	Commercial Bank	Retail	Centre-West	CR Mamer	Agency Mamer	USR003
Business lines	Commercial Bank	Retail	Centre-West	CR Mamer	Agency Bertrange	USR004
Business lines	Commercial Bank	Retail	Centre-West	CR Mamer	Agency Bertrange	USR005
Business lines	Commercial Bank	Retail	Centre-West	CR Mamer	Agency Steinfort	USR006
Business lines	Commercial Bank	Retail	Centre-West	CR Mamer	Agency Steinfort	USR007

Table 13: Organisational structure of CR Mamer<sup>1</sup>

The first and the second user IDs (USR001 and USR002) correspond to the ones of the manager and the assistant manager. The hierarchical superior of the two users constitute the Service CR Mamer, which itself is considered as a department within the bank that concerns all the employees USR001up to USR007. Moreover, the department disposes three different sub-departments (services): Agency Mamer, Agency Bertrange and Agency Steinfort. Due to the fact that the two first users are directly attached to the service, which is equal to the department, they are both considered as the employees managing the three services and thus also the other five employees that are linked to these services.

The organisational structure (analytical centres) of RB is defined as follow:

<sup>&</sup>lt;sup>1</sup> Source: own representation

Function	Department
Commercials	Retail
	Wealth Management
	Enterprises
	Treasury and Asset Liability Management
Back Office	Back Office Securities
	Back Office Payments
	Back Office Clienteles
	Back Office Credit
Structure	Management
	Finance & Control
	Legal
	Compliance
	Risk Management
	Internal Audit
	Marketing
Support	Facility Management
	Human Resources
	IT
	Internal Control
	Organisation

Table 14: Organisational Structure of RB<sup>1</sup>

The organisational structure of bank is divided into four different functions/services: commercials, back-office, structure and support. The commercial service incorporates all the divisions of the bank that are in direct contact with the customers, whereas the three other services generally don't need to directly come in contact with the customers. The various back-offices need to collaborate with the commercial services in order for the business to function effectively, whereas the structure and support services represents services that cover the legal, fiscal, operational, administrative and managerial aspect of the bank.

#### 6.3 Cost Allocation to the Activities

In order to allocate the various overhead costs to the activities of the bank, it is required to establish a matrix that includes all the processes consumed by each department and that reflects all the activities of the bank. Thus, it is important to retrieve the integral existing processes within the Bank and the interactions (participation or consumption) of the departments on these processes.

<sup>&</sup>lt;sup>1</sup> Source: own representation

Macro-process	Process	Elementary process	Proprietary	Category	Owner of Process
Customer relationship	Accounts and customer deposits	Customer Account - Opening	Retail	Realisation	Retail
Customer relationship	Accounts and customer deposits	Customer Account - Monitoring	Retail	Realisation	Retail
Customer relationship	Creation and monitoring the business relation	Customer Address - Modification	Retail	Realisation	Retail
Accounts and customer depos	Accounts and customer deposits	Young Adults Account - funds liberation	Legal	Realisation	Retail
Customer relationship	Creation and monitoring the business relation	Current Account - Green Code - Processing at maturity	Retail	Realisation	Retail
Current operations	Till management	Cash Tills - Processing of dysfunctions	Retail	Realisation	Retail
Current operations	Till management	Cash management - Ordering of money by Agencies	Operational Support	Realisation	Retail
Current operations	Till management	Cash management - Sending of money by Agencies	Retail	Realisation	Retail
Current operations	Till management	Falsified money - Declaration	Retail	Realisation	Retail
Distribution channels	ATM	ATM - Refilling	Retail	Realisation	Retail
Distribution channels	ATM	ATM - Monitoring	Retail	Realisation	Retail
Distribution channels	ATM	ATM - New installation	Facility Management	Realisation	Retail
Distribution channels	Retail Management	Safe of the agency - Management	Retail	Realisation	Retail
Customer relationship	Customer complaints Management	Complaints of customers - Processing	Compliance	Realisation	Retail
Credit	Student Loans	Student Loans CEDIES - Request	Credit	Realisation	Credit
Credit	Student Loans	Student Loans CEDIES - Implementation of repayment	1Credit	Realisation	Credit
Credit	Student Loans	Student Loans CEDIES - Modification	Credit	Realisation	Credit
Credit	Student Loans	Student Loans CEDIES - Anticipated repayment	Credit	Realisation	Credit
Credit	Housing Loans	Consumer Housing Loan - Request	Credit	Realisation	Credit
Credit	Housing Loans	Consumer Housing Loan - Modification	Credit	Realisation	Credit
Credit	Housing Loans	Consumer Housing Loan - Anticipated repayment	Credit	Realisation	Credit
Credit	Housing Loans	Consumer Housing Loan - Closing at maturity	Credit	Realisation	Credit
Credit	Housing Loans	Mortgages with state subsidies - Management	Credit	Realisation	Credit
Risk and internal control	Bank Insurance Management	Insurance of the bank - Management of claims	Risk Management	Steering	Risk Management
Risk and internal control	Bank Insurance Management	Insurance of the bank - Modification / Renewal of a con-	r Risk Management	Steering	Risk Management
Risk and internal control	Gestion des missions d'audit	Audit - Progress of a mission	Internal Audit	Steering	Internal Audit
Risk and internal control	Gestion des missions d'audit	Audit - Monitoring of recommendations	Internal Audit	Steering	Internal Audit
Human Ressources	Personnel Administration	Personnel Management - Accident at work or on the ro	Human Ressources	Support	Human Ressources
Human Ressources	Personnel Administration	Personnel Management - Calculation of wages and sala	Human Ressources	Support	Human Ressources
Human Ressources	Personnel Administration	Personnel Management - Management of meal voucher	r Human Ressources	Support	Human Ressources
Human Ressources	Training	Personnel Management - Needs of trainings	Human Ressources	Support	Human Ressources
General services	Logistics	Ordering of materials	Facility Management	Support	Facility Management
General services	Logistics	Outgoing post	Facility Management	Support	Facility Management
General services	Logistics	Relocation - Organisation	Facility Management	Support	Facility Management
Information systems	Administration of technical infrastructure	Informatic Materials - Management	Informatics	Support	Informatics
Information systems	Maintenance of information systems	Platform R-Net and Mobilebanking - Administration	Informatics	Support	Informatics
Information systems	Maintenance of information systems	Platform T24 - Administration	Informatics	Support	Informatics
Customer relationship	Litigations and recoveries management	Bankruptcy and liquidation - Processing	Legal	Support	Legal
Customer relationship	Litigations and recoveries management	Recovery - Monitoring of litigation files	Legal	Support	Legal

Table 15: List of Processes<sup>1</sup>

Before establishing the matrix process, the resource drivers have to be identified by means of a table listing all the processes within RB that needs to be assembled. This list has been distributed to each service of the bank so that each service can allocate 100% of its charges on all the processes within its scope of work.

By retrieving these data, it allows the identification of the cost of each process and consequently the cost of each department. This approach necessitates the collaboration of the various services of the bank in order to obtain information about the participation of each service in the existing processes (Who is involved in which process?) and information about the usage of the processes by the various services of the bank (In favour of whom is the process rendered? Who uses the process?).

By getting information about the participants of the processes, it allows the determination of the services (analytical centre) that intervene in the processes and to what extent in relation to their total workload. In general, several departments can be involved in one single process. If the establishment or the development of a product

<sup>&</sup>lt;sup>1</sup> Source: own representation

requires the use of multiple processes, it is possible to get the total production cost of the analysed product by summing up the participation of each service to each requisite process. Moreover, by knowing the constitution of the direct costs of each service, it enables the identification of the variable as well as the fixed components that influence the price of the production of the product.

The calculation of the process matrix confronts each process with a ratio between the participating centre and the consumer centre and it is also possible to calculate a cost per process that is related to the cost of the various services involved in the establishment of this process.

#### 6.4 Determination of Cost Drivers

In the presentation of the process matrix, the structure of the bank is limited to six services among which three of the services belong to the support activity of the bank: HR, IT and Facility and Security (F&S). These six services participate in the composition of the process so that for a service who is working at 100% on a specific list of process, it is possible to directly allocate the service charges on these clearly defined processes. And in other cases, the duration driver will be applied in order to determine the amount of time employed for performing the process.

Consider that there are four isolated processes that are consumed by the six services: HR, IT, F&S, B-O, Structure and Commercials.

Process		HR			IT		Faci	lity-Se	ecurity	B	ack-O	ffice		Struct	ure	Co	mmer	cials	Total costs
	Co	sts .	500€	Cost	ts 1	€ 000	Co	sts .	500€	Cos	ts 1	€ 000	Co	osts :	500€	Cos	ts 2	500€	
	Partici- pation	%	Amount	Partici- pation	%	Amount	Partici- pation	%	Amount	Partici- pation	%	Amount	Partici- pation	%	Amount	Partici- pation	%	Amount	
1	x	70%	350 €	x	50%	500€	x	10%	50 €	x	10%	100 €	x	10%	50 €	x	5%	125 €	1 175 €
2	x	20%	100€	x	30%	300€	x	60%	300€	x	-	-	x	-	-	x	-	-	700 €
3	x	5%	25 €	x	10%	100€	x	-	-	x	20%	200 €	x	20%	100€	x	40%	1 000 €	1 425 €
4	x	5%	25 €	x	10%	100€	x	30%	150 €	x	70%	700€	x	70%	350€	x	55%	1 375 €	2 700 €
Total		100%	500 €		100%	1 000 €		100%	500 €		100%	1 000 €		100%	500 €		100%	2 500 €	6 000 €

Table 16: Participation in the processes<sup>1</sup>

In the above illustrated table, the HR is involved in all the four processes with different levels of contributions allowing the allocation of the total direct costs of 500€ to the process 1 for 350€ process 2 for 100€ process 3 for 25€ and process 4 for 25€ In

<sup>&</sup>lt;sup>1</sup> Source: own representation

addition, the chart also shows the total production cost of each process. For the first process, the total production cost is worth  $1.175 \in$  This amount comes from the contributions of all the six services. In order to get the contribution of the HR component on the production cost of this process, it is required to take the labour costs of each service (defined in the dashboard) and to apply the percentage relative to the first process (in this case: 70% HR, 50% IT, 10% F&S, 10% B-O, 10% Structure and 5% Commercials). It is also to note that the total percentage of each service corresponds to 100%, meaning that there is no loss of the charges for each service and hence, it is possible to deduct a cost for each process.

In the following table, which describes the usage of the processes within the Bank, the entire process is considered to be consumed within the Bank's services.

Process		HR			IT		Faci	lity-Se	curity	Ba	ack-O	ffice	5	Struct	ure	Co	mmer	cials	Total costs	Control
	Usage	%	Amount	Usage	%	Amount	Usage	%	Amount	Usage	%	Amount	Usage	%	Amount	Usage	%	Amount		
1	x	25%	294 €	x	5%	59 €	x	10%	118€	x	30%	352 €	x	30%	352€		-	-	1 175 €	100%
2	x	5%	35 €	x	5%	35 €	x	70%	490€	x	5%	35 €	x	5%	35 €	x	10%	70€	700 €	100%
3		-	-	x	5%	71 €		-	-	x	35%	499 €	x	30%	428 €	x	30%	428 €	1 425 €	100%
4	x	5%	135 €		-	-		-	-	x	15%	405 €	x	10%	270 €	x	70%	1 890 €	2 700 €	100%

Table 17: Consumption of the processes<sup>1</sup>

By combining the two tables, it allows to determine the participant of a service in the establishment of a process that is consumed by another service (or by itself). The formula used for the determination of the relation between the participant centre and the consumer centre is as follow:

Amount overloading the Consumer Centre for Process A

= Cost of Participant Centre × % of Participant Centre of Process A × % of Consumer Centre of Process A

By applying this formula on table 16 and 17, the following results will be obtained:

			Н	R					r	т					Fð	¢S					Back	Office					Stru	cture					Comm	ercials		
Proc\Part.	HR	IT	F&S	B-O	STR	COM	HR	IT	F&S	B-O	STR	COM	HR	IT	F&S	B-O	STR	COM	HR	IT	F&S	B-O	STR	COM	HR	IT	F&S	B-O	STR	COM	HR	IT	F&S	B-O	STR	COM
1	88	125	13	25	13	31	18	25	3	5	3	6	35	50	5	10	5	13	105	150	15	30	15	38	105	150	15	30	15	38	-	-	-	-	-	-
2	5	15	15	-	-	-	5	15	15	-	-	-	70	210	210	-	-	-	5	15	15	-	-	-	5	15	15	-	-	-	10	30	30	-	-	-
3	-	-	-	-	-	-	1	5	-	10	5	50	-	-	-	-	-	-	9	35	-	70	35	350	8	30	-	60	30	300	8	30	-	60	30	300
4	1	5	8	35	18	69	-	-	-	-	-	-	-	-	-	-	-	-	4	15	23	105	53	206	3	10	15	70	35	138	18	70	105	490	245	963
Total	94	145	35	60	30	100	24	45	17	15	8	56	105	260	215	10	5	13	122	215	53	205	102	594	120	205	45	160	80	475	35	130	135	550	275	1262
6000	Total         94         145         35         60         30         1           6000         464					10	65					6	)8					12	91					10	85					23	87					

Table 18: Amount of the relation between the consumer and participant centre<sup>2</sup>

The first line of table 18 constitutes the consumption services of RB and the second line represents the various participation services of the bank.

<sup>&</sup>lt;sup>1</sup> Source: own representation

<sup>&</sup>lt;sup>2</sup> Source: own representation

The cost of the second process charged on the HR service is equal to  $35 \in$  These costs arise directly from the  $5 \in$  of the HR (=  $500 \in x \ 20\%$  (participation of the HR for the process 2) x 5% (consumed by the HR service)),  $15 \in$  of IT ( $1.000 \in x \ 30\% \ x \ 5\%$ ) and  $15 \in$  of facility ( $500 \in x \ 60\% \ x \ 5\%$ ).

Beside of the calculation of the amount, it is also possible to calculate the ratio of the relation between the participant centre and the consumer centre via the same formula, except that the amount of the cost of the participant centre will be excluded:

Ratio overloading the Consumer Centre for Process A = %Participant Centre of Process A  $\times$  %Consumer Centre of Process A

Hence, the following table will be established:

				Н	R					]	T					F	&S					Back	-Office					Stru	cture					Comn	ne rciale	\$	
Proc\P:	art. I	HR	IT	F&S	B-O	STR	СОМ	HR	IT	F&S	B-O	STR	СОМ	HR	IT	F&S	B-O	STR	СОМ	HR	IT	F&S	B-O	STR	СОМ	HR	IT	F&S	B-O	STR	СОМ	HR	IT	F&S	B-O	STR	COM
1	1	7,50	12,50	2,50	2,50	2,50	1,25	3,50	2,50	0,50	0,50	0,50	0,25	7,00	5,00	1,00	1,00	1,00	0,50	21,00	15,00	3,00	3,00	3,00	1,50	21,00	15,00	3,00	3,00	3,00	1,50	0,00	0,00	0,00	0,00	0,00	-
2		1,00	1,50	3,00	-	-	-	1,00	1,50	3,00	-	-	-	14,00	21,00	42,00	-	-	-	1,00	1,50	3,00	-	-	-	1,00	1,50	3,00	-	-	-	2,00	3,00	6,00	0,00	0,00	-
3		-	-	-	-	-	-	0,25	0,50	-	1,00	1,00	2,00	-	-	-	-	-	-	1,75	3,50	0,00	7,00	7,00	14,00	1,50	3,00	0,00	6,00	6,00	12,00	1,50	3,00	0,00	6,00	6,00	12,00
4		0,25	0,50	1,50	3,50	3,50	2,75	-	-	-	-	-	-	-	-	-	-	-	-	0,75	1,50	4,50	10,50	10,50	8,25	0,50	1,00	3,00	7,00	7,00	5,50	3,50	7,00	21,00	49,00	49,00	38,50
Tota	<b>d</b> 1	8,75	14,50	7,00	6,00	6,00	4,00	4,75	4,50	3,50	1,50	1,50	2,25	21,00	26,00	43,00	1,00	1,00	0,50	24,50	21,50	10,50	20,50	20,50	23,75	24,00	20,50	9,00	16,00	16,00	19,00	7,00	13,00	27,00	55,00	55,00	50,5

Table 19: Ratio of the relation between the consumer and participant centre<sup>1</sup>

The results of the table states that the HR service works at 18,8% for themselves, 4,8% for the IT, 21,0% for F&S, 24,6% for Back-Office, 24,0% for Structure and 7,0% for the Commercials services.

This chart has the objective to identify the relation between the participant centre of the costs and the consumer centre to which the costs are allocated. Thus, the consumer centre will be retained and this method underlines the impacts of a particular centre to another one.

Next comes the principle of the cascade, which consists to discharge the costs of several functions of the bank to other functions by respecting a particular chronology and via the provided allocation bases.

<sup>&</sup>lt;sup>1</sup> Source: own representation

## 6.5 Assignment of the Activity Costs to Cost Objects

Before starting with the assignment of the activity costs to cost object, the following chart resumes the whole process of cost allocation by means of the ABC:



Figure 14: Procedure of ABC of RB<sup>1</sup>

The first three phases have already been dealt with in the previous sections so that now, the fourth to the sixth phase will be examined. As stated above, the cascade principle

<sup>&</sup>lt;sup>1</sup> Source: own representation

will be applied for the allocation of the activity costs of one department to the other departments of the bank so that they will be reduced to zero one by one. The objective consists in cascading the costs to the commercial department. To do this, it is advised to follow a chronological order by starting with the allocation of the costs of the support department to the structure department, the back-office department and the commercials department. When all the costs of the support department have been distributed, it is then the turn of the back-office department to allocate its costs to the commercials department and lastly, the costs of the structure department will be allocated to the commercials department, so that at the end, only the costs of the commercials department remain. By doing this, it allows the identification of the total cost of the commercial department's activities.

As the support department is subdivided into three services, HR, IT and F&S, it is necessary to start with the calculation of the costs of the services within the support department (intra-support allocation).

By applying the following formula, it allows to calculate the benefits for the services rendered to the different departments:

# $\sum$ Cost of the Participant Centre imes Ratio overloading the Consumer Centre

In addition, if a cost represents a benefit for one department, this implies that the same amount will constitute a cost for another department.

	HR		IT		F&S	
Direct Costs	Cost	500 €	Cost	1.000 €	Cost	500 €
Indiract costs (to			Service to HR	-145,00 €	Service to HR	-35,00€
subtract)	Service to IT	-23,75 €			Service to IT	-17,50 €
Subtracty	Service to F&S	-105,00 €	Service to F&S	-260,00 €		
			Charge from		Charge from	
			HR	23,75 €	HR	105,00 €
Indiract costs (to add)					Charge from	
multeet costs (to add)	Charge from IT	145,00 €			IT	260,00 €
	Charge from		Charge from			
	F&S	35,00 €	F&S	17,50 €		
Total		551,25		636,25		812,50

Table 20: Intra-Support Allocation<sup>1</sup>

<sup>&</sup>lt;sup>1</sup> Source: own representation

In the previous section, the ratio of the relation between the participant centre and the user centre has been identified. In table 19, it is exhibited that IT renders at 14.5% of its services to the HR. As the cost of IT constitutes  $1.000 \in$  this implies that the expenses of the service rendered from IT to HR represent  $145 \in (1.000 \in x \ 14.5\%)$ . As  $145 \in$  constitutes a benefit for IT, this amount has to be abstracted from the IT's costs and charged to the HR's costs. This goes the same for F&S, where the ratio IT/F&S accounts for 26%, and thus the expense of  $260 \in (1000 \in x \ 26\%)$ . In other words, this means that F&S consumes for  $260 \in$  the services rendered by IT and hence, this cost has to be abstracted from IT's costs and contributed to F&S's costs. This calculation works the same for the other two services of the support department. By adding the additional costs occurred from the other services and by subtracting the costs charged to other services, it allows obtaining the actual cost of each service after the intra-support allocation. This also shows that in the bank, one service has to work for another service in order to facilitate their work or to provide suitable tools required for doing their work. Thus, these expenses have to be borne by the service requesting for the support.

Now that the actual cost of each service of the support department has been identified, it is possible to further proceed with the allocation of the support department's costs to the other three departments so that all the cost of the support department will be zeroed. To calculate the distribution of the various costs to each process, which means the portion of the participant centre affecting the consumer centre, the following formula will be applied:

```
Cost of participant
```

#### ratio **Participant/Consumer**

```
\times \frac{1}{1 - \sum (ratio Participant/Consumer (non allocated dep) - \sum ratio Participant/Consumer (allocated dep)}{1 - \sum (ratio Participant/Consumer (allocated dep) - \sum ratio Participant/Consumer (allocated dep)}
```

The denominator of the formula implies that the ratio of the previous allocated department has to be subtracted from the ratio of the departments that still have to be allocated.

By applying this formula, it is possible to calculate the amount of the service consumed by each department (B-O, Structure and Commercials) in the allocation of the support department's costs to the other departments. The following results will be obtained:

	HR	IT	F&S
Cost	551,25 €	636,25 €	812,50 €
Support to Back Office			
Process 1	-208,58 €	-173,52 €	-52,42 €
Process 2	-9,93 €	-17,35 €	-52,42 €
Process 3	-17,38 €	-40,49 €	0,00 €
Process 4	-7,45 €	-17,35 €	-78,63 €
Support to Structure			
Process 1	-208,58 €	-173,52 €	-52,42 €
Process 2	-9,93 €	-17,35 €	-52,42 €
Process 3	-14,90 €	-34,70 €	0,00 €
Process 4	-4,97 €	-11,57 €	-52,42 €
Support to Commercials			
Process 1	0,00€	0,00 €	0,00 €
Process 2	-19,86 €	-34,70 €	-104,84 €
Process 3	-14,90 €	-34,70 €	0,00 €
Process 4	-34,76 €	-80,98 €	-366,94 €
Control Support zeroed	0,00 €	0,00 €	0,00€

Table 21: Allocation of Support to B-O, Structure and Commercials<sup>1</sup>

The table is understood in the following way; for process 1, the B-O department consumes for 208,58  $\in$  the services rendered by the HR support department. At the same time, for the same process, the Structure department also uses for 208,58  $\in$  the services provided by the HR support department and the commercials department doesn't participate in process 1. This amount of 208,58  $\in$  for the B-O department is obtained via the above-mentioned formula:

Cost of participant

 $\times \frac{\text{ratio Participant/Consumer}}{1 - \sum(\text{ratio Participant/Consumer (non allocated DP)} - \sum \text{ratio Participant/Consumer (allocated DP)}}$ Or in other words: Cost of participant % of Participation of HR in Back – Office

$$1 - \sum 0 - \sum (Participation of HR in HR + Participation of HR in IT + Participation of HR in F&S)$$

$$= 551.25 € × \frac{21 %}{1 - 0 - Σ(18.75% + 4.75% + 21%)} = -551.25 € × \frac{21 %}{55.50\%} = 208.58 €$$

The ratio Participant/Consumer (non allocated DP) is 0 because the support department's costs will be allocated to all the other departments (B-O, Structure and Commercials). As for the ratio Participant/Consumer (allocated DP), this represents the participation of each individual service in the support department as the allocation of the support department's costs has already been executed in the intra-support allocation stage.

<sup>&</sup>lt;sup>1</sup> Source: own representation

As 208,58 € consists a cost charged to the Back-Office, this cost should be subtracted from the support department. This calculation is executed for each process and each department, so that at the end the support department's costs are zeroed. Therefore as a summary, the total cost of each department is:

	Direct Cost	Additio	nal Cost of C	entres	
	Direct Cost	HR	IT	F&S	Total
Back-Office	1.000 €	243,34 €	248,72 €	183,47 €	1.675,53 €
Structure	500 €	238,38 €	237,14 €	157,26 €	1.132,78 €
Commercials	2.500 €	69,53 €	150,38 €	471,78 €	3.191,69 €
T 11 0	$\mathbf{A} = \mathbf{A} + \mathbf{A} \mathbf{A}$			10	· 1 1

Table 22: Total Costs of B-O, Structure and Commercials

This table clearly shows that the costs of the bank haven't changed as the sum of the total is still 6.000€

The same allocation procedure will also be applied for the allocation of the Back-Office's costs to the commercials department and afterwards the allocation of the Structure's costs to the commercials department. Thus, the following results will be obtained:

Back Offi	ce to Commercials	Part HR	Part IT	Part F&S	Part BO
Cost		243,34 €	248,72 €	183,47 €	1.000 €
Process 1		0,00€	0,00€	0,00€	0,00€
Process 2		0,00€	0,00€	0,00€	0,00€
Process 3		-26,55 €	-27,13 €	-20,01 €	-109,09€
Process 4		-216,80 €	-221,59 €	-163,45 €	-890,91 €
	Back Office zeroed	0,00 €	0,00 €	0,00€	0,00€

Table 23: Allocation of Back-Office to Commercials<sup>2</sup>

Structure to Comm	ercials	Part HR	Part IT	Part F&S	Part Struc
Cost		238,38 €	237,14 €	157,26 €	500 €
Process 1		0,00€	0,00€	0,00€	0,00 €
Process 2		0,00 €	0,00€	0,00€	0,00€
Process 3		-26,01 €	-25,87 €	-17,16 €	-54,55 €
Process 4		-212,37 €	-211,27 €	-140,10 €	-445,45 €
Struct	ure zeroed	0,00€	0,00 €	0,00€	0,00 €

Table 24: Allocation of Structure to Commercials<sup>3</sup>

In Table 23, the ratio Participant/Consumer (non allocated DP) isn't equal to zero because the department back-office is allocated to the commercials, so that the structure department still hasn't been allocated in this stage. In this sense, this ratio is equal to zero in table 24 as the structure department consists the last stage that has to be allocated to the commercials department.

<sup>&</sup>lt;sup>1</sup> Source: own representation

<sup>&</sup>lt;sup>2</sup> Source: own representation

<sup>&</sup>lt;sup>3</sup> Source: own representation

Total Commercials Costs		Part HR	Part IT	Part F&S	Part BO	Part Struc
Direct Cost	2.500,00€					
Additional cost of Support		69,53€	150,38 €	471,78 €		
Additional cost of Back Office		243,34 €	248,72 €	183,47 €	1.000,00€	
Additional cost of Structure		238,38 €	237,14 €	157,26 €		500,00 €
Table 25: Total Commercials Costs <sup>1</sup>						

By combining all the tables of cost allocation of the three departments to the commercials department, the following matrix is obtained:

At this stage, it is to note that the cost of the bank still hasn't changed because by summing up all the costs, the result is still  $6.000 \in$  Now that the commercials costs have been determined, a last stage consists in the allocation of the commercials costs on each process it consumes in order to get a cost per process.

Commercials	to Commercials	Part Com
Cost		2.500 €
Process 1		0,00€
Process 2		0,00 €
Process 3		-594,06 €
Process 4		-1.905,94 €
(	Commercials zeroed	0,00 €

Table 26: Allocation of Commercials to Commercials<sup>2</sup>

Now that all the costs of each department have been allocated, it allows getting the cost of each process and hence the production cost of each product.

Total Commercials Costs	Part HR	Part IT	Part F&S	Part BO	Part Struc	Part Com
Additional Cost of Support	69,53 €	150,38 €	471,78 €			
Process 1						
Process 2	19,86 €	34,70 €	104,84 €			
Process 3	14,90 €	34,70 €				
Process 4	34,76 €	80,98 €	366,94 €			
Additional Cost of Back-Office	243,34 €	248,72 €	183,47 €	1.000 €		
Process 1						
Process 2						
Process 3	26,55 €	27,13 €	20,01 €	109,09€		
Process 4	216,80 €	221,59 €	163,45 €	890,91 €		
Additional Cost of Structure	238,38 €	237,14 €	157,26 €		500,00 €	
Process 1						
Process 2						
Process 3	26,01 €	25,87 €	17,16 €		54,55 €	
Process 4	212,37 €	211,27 €	140,10 €		445,45 €	
Additional Cost of Commercials						2.500 €
Process 1						
Process 2						
Process 3	26,55 €	27,13 €	20,01 €	109,09 €		594,06 €
Process 4	216,80 €	221,59 €	163,45 €	890,91 €		1.905,94 €
Table 27: Details of process costs <sup>3</sup>						

Table 27: Details of process costs

<sup>1</sup> Source: own representation <sup>2</sup> Source: own representation

<sup>3</sup> Source : own representation

Thus, by summing up the various costs of a process, the total cost of a process (activity) will be obtained. Moreover, it is now also possible to determine the production cost of a product because if a product/service is made up of several processes, it suffices to sum up all the costs of the processes with the direct costs of the product and thereafter the production cost will be obtained.

#### Exemplification

The personal loan for consumption is composed of the four following processes:

Macro-					
process	Process	Elementary process	Proprietary	Category	Owner
Credit	Personal loan for consumption	Personal loan - Demand	Credit	Realisation	Credit
Credit	Personal loan for consumption	Personal loan - Modification	Credit	Realisation	Credit
Credit	Personal loan for consumption	Personal loan - Early Repayment	Credit	Realisation	Credit
Credit	Personal loan for consumption	Personal loan - Closing at maturity	Credit	Realisation	Credit
			. 1		

Table 28: Processes of Personal loan for consumption<sup>1</sup>

In the first process of personal loan inquiry, the participant of this process constitutes the commercials department as they represent the direct contact person of the customers, whereas for the other three remaining processes, the participants to these processes are only the back-office (credit) department. As there is only one department that participates in each process, the costs will be directly assigned on these clearly defined departments. Let's assume that the total cost for each process is as follow:

Total Commercials costs	Part BO	Part Commercials
Additional Cost B-O	250 €	
Pers loan - Demand	250 €	
Pers loan - Modification	-	
Pers loan - Early Repayment	-	
Pers loan - Closing at maturity	-	
Additional Cost Commercials		1.500 €
Pers loan - Demand		-
Pers loan - Modification		650 €
Pers loan - Early Repayment		400 €
Pers loan - Closing at maturity		450 €

Table 29: Details of Personal loan for consumption costs<sup>2</sup>

Moreover, the direct cost of the personal loan is  $300 \in By$  summing up the costs of the four processes that make up the personal loan for consumption product and its direct cost, the production cost of the product will be obtained. Here, in our example, the total production cost of the personal loan is  $2.050 \in$ 

<sup>&</sup>lt;sup>1</sup> Source : own representation

<sup>&</sup>lt;sup>2</sup> Source : own representation

# 7 Conclusion

This chapter will summarize the findings regarding the ABC model of RB. To begin, the author will briefly enumerate the key findings of the paper before explaining the limitations. The second section focuses on how this paper can act as a starting point for further areas of research.

#### 7.1 Findings and Limitations

The research analysis of ABC found that, although there exist different approaches of cost allocation, the ABC is the most accurate allocation method as it allows the identification of the cost and the performance of the activities, resources and cost objects of a company. The only inconveniences of this model are that it is very expensive, complex and time consuming because it requires a lot of resources, calculations and updating, which is illustrated in the implementation process of RB. The more processes and departments a company owns, the more complicated the calculations will be. Thus, once the process has been established, in order to facilitate the maintenance of this methodology, it is required to constantly (monthly) keep the data up to date so that the whole process doesn't need to be repeated every year.

The ABC methodology allows the determination of the cost of each activity. By summing up the costs of the processes required for the establishment of a product and by adding the direct cost related to the product, the final production cost of a product is identified. This information provides the management the idea of cost-efficiency and cost-effectiveness of a process and a product and thereby also the need for improvement and adjustment.

Moreover, with the application of ABC, the controlling and reporting process could attain some additional perspectives as one of the conceptual elements of the ABC consists in its attempt to convert the usually fixed overhead costs into variable costs. This provides a different perspective on RB's cost structure and cost behaviour in case of changing volume of sales and activities. Thus, the ABC doesn't only represent a base in the process of analysing the historical and actual cost but it also constitutes a base for the budgeting process. The proposed process of implementation of the ABC in RB illustrates the procedure of how the cost of each activity within the bank can be determined. However, at some stages, it was also possible to take a different approach. For example, for the assignment of the activity cost to the cost objects, each department's costs have been individually allocated to the same final destination, the commercials department. Yet, another possibility of allocating the costs would be to proceed through a linear flow, meaning that the cost of the first department will be allocated to the second and then the second to the third and so on until that the costs arrive at the final department, which constitutes the commercials department.

In addition, for the establishment of the process, only four major selling points of each region have been taken into consideration due to time constraint. Yet to be accurate, each individual selling point should be taken into consideration because in order to get the right numbers, every element needs to be included.

#### 7.2 Areas for Further Research

The objective of this thesis was not to create a complete tool with which companies can measure the costs associated with their activities within their company, but to provide a proof of concept of how this goal could be achieved. Consequently, several areas of this study require further research.

During the establishment of the process of ABC, there were times when different approaches could have been applied for the same purpose. Thus, one of the difficulties was to determine the most effective approach and therefore some further analysis need to be executed in order to find the most accurate approach.

The results of the ABC model of RB disclose the hidden sources of profitability and the embedded costs and this model contributes to decision-making of the management allowing improvement of the profitability. Unfortunately, the ABC model stops at the identification of the cost of the activities and the products. A further step of analysis that isn't included in the ABC but that the ABC contributes to is the possibility to determine the net profitability of each commercial entity, respectively of each selling point of RB, in other words to identify if an agency is operating in a cost-effective way or not.

Moreover, by going yet another step further, a research on the profitability of each employee could be determined thanks to the ABC model.

In the end, the ABC provides a vast range of possible further researches that aren't included in the basic ABC model but that are profitable for an organisation when executed. Hence, the ABC only constitutes the first step for further research.

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## Annexe

Function	Activity	Metier	Region	<b>Department</b>	Service	Dashboard Matrice	6.1
Business Lin-	9					х х	
	Commercial Bank					x	
		Ketail	Cantral East Darrian			× ,	
			Celluar-Last Neglou	Caisse Musel - Sauerdall		× × ×	
					Agency Grevenmacher	: ×	
					Agency Wasserbillig	х х	
					Agency Wormeldange	x	
			Central-West Region			x	
				Caisse Mamer	Agancu Rattanga	×	
					Agency Detuange Agency Mamer	<	
					Agency Manuel Agency Steinfort	<	
			North Region			x	
				Agency Centre	Agency Centre	х х	
			South Region			х х	
		Consisting Chantels		Agency Esch/Alzette	Agency Esch/Alzette	x ,	
		specialised Chentele	Enterprises			× × ×	
				Enterprise consultancy	Enterprise consultancy	. ×	
		Promote Sector	Wealth Management	Wealth Management	Wealth Management	x x	
Omenetions		Commercial Support	Commercial Support	Commercial Support	Commercial Support	x	
Operations	Credit					x x	
		Analysis and Intensive Care	Analysis and Intensive Care	Analysis and Intensive Care	Analysis and Intensive Care	×	
		Realisation and Administration	Realisation and Administration	Realisation and Administration	Realisation and Administration	х	
	Operational Support	BO Securities & Canital Market				××	
			Securities transactions of customers	Securities transactions of customers	Securities transactions of customers	< ×	
		Opening & Monitoring of accounts				××	
		) )	Controlling of Customers Documents Scanning of Customers Documents	Controlling of Customers Documents Scanning of Customers Documents	Controlling of Customers Documents Scanning of Customers Documents	××	
Structure				3	,	×	
	Legal					×	
		Legal Affairs	Legal Affairs	Legal Affairs	Legal Affairs	x	
	Internal Audit	Internal Audit	Internal Andit	Internal Andit	Internal Andit	×	
	Compliance					<	
		Compliance	Compliance	Compliance	Compliance	×	
	Finance & Control					x	
		Accounting Information Management	Accounting Information Management	Accounting Information Management	Accounting Information Management	×	
		Management Control	Management Control	Management Control	Management Control	× ×	
	Risk Management					×	
		Risk Management	Risk Management	Risk Management	Risk Management	×	
	Public Relations, Marketing & Communication	Comminication	Communication	Communication	Communication	×	
		Marketing	Marketing	Marketing	Marketing	x	
Support	Information					×	
		IT Operations	IT Operations	IT Operations	IT Operations	×	
		Steering & Support	Steering & Support	Steering & Support	Steering & Support	х	
	Human Resources	Utimore Discontract	Utraces Decomposed	II	Utimos Daconsoco	x	
		Human Resources	Human Kesources	Human Resources	Human Resources	x	

## Annexe 1: Distribution of Organisation of RB

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