

A Review of Activity-Based Costing Application Prospects in Algeria -case study-

ZOUBIRI Izzeddine¹, AMARA Amine ²

¹ University of Mohamed Elbachir Al-Ibrahimi-BBA (Algeria)

² University of Mohamed Elbachir Al-Ibrahimi-BBA, LEZINRU (Algeria)

Received: 2022-02-03

Accepted: 2023-03-16

Published: 2023-03-31

Abstract:

This study aims to review the application prospects of activity-based costing system in Algeria, and in order to achieve the objective of the study and answer the following main question “can activity-based costing add value to the company management in Algeria?”, we conducted a study case in an industrial company based in the province of M’sila (Algeria) where we implemented an Activity-based costing system.

Based on the results obtained we conclude that Activity-based costing can provide information about the activities that can be a decision-making base for the company management in Algeria, and concluded from the application of activity-based costing that the existence of a transparent business environment is mandatory for the proper application of cost accounting in general.

Keywords: Accounting; Management; Cost; ABC; Production.

JEL Classification Codes: M410, M110, M100

1. Introduction :

The challenge of getting out of the Algerian economy's dependence on hydrocarbon exports, which represent 30% of the gross domestic product, requires the need to push for strong reforms in order to diversify the country economy and support growth and create new jobs for an ever-increasing young population.

And one of the reforms that can be of a great value in order to diversify and support the country economy is to support the establishment of start-ups under the supervision of experts in order to ensure their continuity, due their role in driving economic stability and growth by providing valuable services, products and taxes that contribute directly to the health of the community. They also provide jobs, strengthening the economic health, and employing people contributes to the success of that region, as with the wages they earn, people buy property, work, shop and otherwise invest in where they live.

But the key point here is not creation but sustainability of companies that's why it is mandatory to these start-ups to control their products or services costing in order to improve their competitiveness and improve its chances of continuity in the market, and in order to achieve that the company should implement efficient costing systems. And in view of that many academics and practitioners considered Activity-based costing (ABC) as one of the most important innovations in management accounting of the twentieth century (Gosselin, 2007, p. 641), and that's why we strive to study in this paper the prospects of applying ABC system in Algeria.

1.1. The research main-question:

In view of that, and in order to examine the prospects for the application of Activity-based Costing in Algeria the study seeks to answer the following main question:

“can Activity-based Costing method add value to the company management in Algeria?”

1.2. The research sub-questions:

The sub questions that can be delivered from the previous question are:

- What are the benefits of cost and profit measurement?
- Can Activity-based costing provide benefits that can't be provided by other cost measurement ways?
- Is Activity-based costing an effective cost measurement method in Algeria?

1.3. Study hypotheses:

Based on the previous questions, we developed the following main hypothesis and sub-hypotheses:

- Cost and profit measurement provide the company management necessary information's about the business they are running;
- Yes Activity-based costing can provide information's that are not delivered by other cost measurement methods;
- Activity based costing is not an effective cost measurement method in Algeria.

1.4. Literature review:

from our literature study we can mention some memorable studies that have a relationship with our theme, as follow:

The study of GHOUZI Mohamed Larbi (Larbi, 2021) Activity Based-Costing System through three generation: ABC-TDABC- PFABC, this study aimed to review the most important features, characteristics and shortcomings of three approaches or tributaries of the Activity Based Costing system: ABC, TDABC and PFABC.

This paper concluded that these approaches constitute three (03) generations of the ABC system because the common denominator is the concept of "activity", and that activities consume resources, even if they differ in dependence on a single cost driver (time) for TDABC or multiple cost drivers for ABC or measure performance by calculating the productivity of each activity (calculating variance on the price of activity), and that the ABC's three generations were born, raised, sustained and regressed as a result of the demands of the business environment.

The study of Derya Eren Akyol, Gonca Tuncel, and G. Mirac Bayhan (Akyol, Tuncel, & Bayhan, 2005) A comparative analysis of activity-based costing and traditional costing the objective of this paper is to illustrate an application of ABC method and to compare the results of ABC with traditional costing methods.

The results of the application highlight the weak points of traditional costing methods and an S-Curve obtained is used to identify the undercosted and overcosted products of the firm.

The study of Gongmeng Chen, Michael Firth, and Kyungjoo Park (Gongmeng, Michael, & Kyungjoo, 2001) The Implementation and Benefits of Activity-Based Costing: A Hong Kong Study the objective of this paper is to evaluate the adoption of ABC in Hong Kong and investigate the factors that might lead to its adoption and also surveyed whether companies are satisfied with the new system.

The findings of the study reveal a low adoption rate of ABC. There is directional support for companies with diverse product lines and those facing intense competition using activity-based costing. Companies that have adopted ABC report high satisfaction with the new system.

2. Theoretical Framework:

2.1. Introduction to cost measurement:

Cost measurement is not a standard term. Accountants, who are the experts in this domain, call it "cost accounting". But this word does not speak so much outside their world. What we want to do is to put a cost value on all the "objects" we manufacture, from observations of the efforts devoted to the manufacturing process. Any technician or engineer knows what measurement means: it is part of their day-to-day activity. The same thing has to be done for costs and it is the reason we use the word "cost measurement". (Foussier, 2006, p. 13)

In order to judge the value of ABC, it is helpful to identify commonly reported benefits of cost and profit measurement systems and their prevalence. The most frequently reported benefits include: (William, Denis, & Raef, 2009, p. 33)

- Useful for product decisions, such as pricing, design, and outsourcing.
- Helpful for product/service profitability analysis.
- Helpful for making operational improvements.
- Useful for performing budgeting, planning, and performance evaluation.

2.2. The concept of Activity-Based Costing:

First, we note that the Activity Based Costing System is originally a modern cost system (Larbi, 2021, p. 93), and ABC systems differ from traditional costing systems in how they are able to model the use of all resources in all the activities performed by these resources, and then link the cost of these activities to products. (Tsai, et al., 2012, p. 104) and it's an economic model that identifies the cost pools or activity centers in an organization and assigns costs to cost drivers based on the number of each activity used. Since the cost drivers are related to the activities, they occur on several levels: (Akyol, Tuncel, & Bayhan, 2005, p. 44)

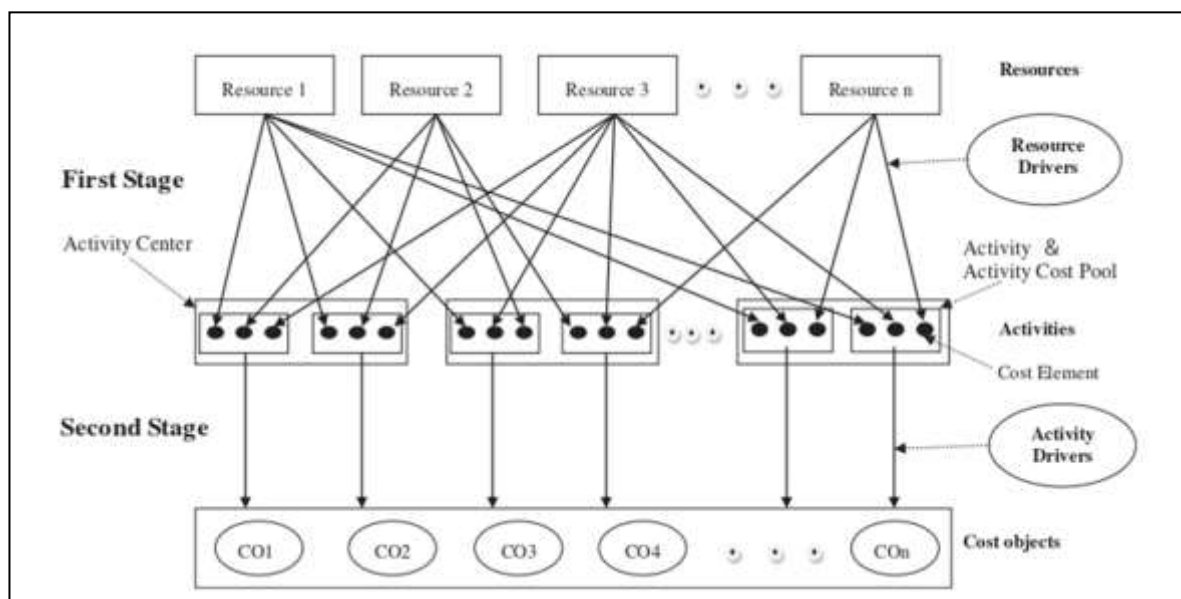
- Unit level drivers which assume the increase of the inputs for every unit that is being produced.
- Batch level drivers which assume the variation of the inputs for every batch that is being produced.
- Product level drivers which assume the necessity of the inputs to support the production of each different type of product.
- Facility level drivers are the drivers which are related to the facility's manufacturing process. Users of the ABC system will need to identify the activities which generate cost and then match the activities to the level bases used to assign costs to the products.

While using the ABC system, the activities which generate cost must be determined and then should be matched to the level drivers used to assign costs to the products. And its implementation consists of the following steps: (Akyol, Tuncel, & Bayhan, 2005)

- Step 1) Identifying the activities such as engineering, machining, inspection...etc;
- Step 2) Determining the activity costs;
- Step 3) Determining the cost drivers such as machining hours, number of setups, engineering hours...etc;
- Step 4) Collecting the activity data;
- Step 5) Computing the product cost.

A detailed cost assignment view of ABC is shown in Figure (1) below:

Figure (1): Detailed cost assignment view of ABC



The source: (Tsai, et al., 2012, p. 105)

2.3. Differences between ABC and the traditional based costing:

Both costing systems serve the same purpose of allocating production costs in relation to the cost driver rate. But the major differences lie in the complexity, and accuracy of allocating costs. The traditional costing is easier and simpler to interpret as compared to the activity costing which is difficult to comprehend. However, the activity costing method provides managers with accurate information, needed for decision making while the traditional costing is less accurate. The Table below provides a summary of the differences in traditional and ABC methods. (Raqeeb & Nawzad, 2020, p. 5918)

Table (1): Differences between ABC and the traditional based costing

	Traditional based costing	ABC
1. Cost pools	One or a limited number	Many, to reflect different activities
2. Applied rate	Volume based cost drivers	Activity based, non-financial
3. Suited for	Labor-intensive, low-overhead companies	Capital-intensive, product-diverse, widely diverse set of operating activities, variation in numbers of production runs, high-overhead companies
4. Benefits	Simple, inexpensive	Accurate product costing, possible elimination of non-value-added activities
5. Cost assignment	Allocate overhead costs first to departments and second to products or services	Assign overhead costs first to activity cost pools and second to products or services
6. Focus	Focuses on managing costs of functional departments or responsibility center	Focuses on managing process and activities and solutions of cross functional problems

The source: (Raqeeb & Nawzad, 2020, p. 5918)

2.4. Conditions for a successful ABC implementation:

In order to implement ABC in practice successfully in a company there are a few conditions that must be filled up, and we present the details of the conditions below: (Gunasekaran & Sarhadi, 1998, p. 241)

- **Top management commitment:** The top management should commit to a change in the cost accounting system. This change program will require suitable guidance, motivation and financial and technical support. The top management should encourage the implementation of ABC by providing these supports.
- **Education and training of employees on ABC:** The concerned employees of the organization should be equipped with the knowledge of ABC and the benefits that could be derived from them. This will lead to open communication and better co-operation for implementing ABC in a cost-effective manner. Seminars should be arranged to teach and discuss the concepts of ABC and its implementation issues in the factory. Another important aspect of the implementation of ABC is to empower the employees in the change efforts with the objective to motivate them in the implementation process.
- **Incentives to motivate the employees in implementing ABC:** A suitable incentive scheme should be formulated both for the accounting personnel and the people from other functional areas such as marketing, design and engineering and production with an objective to obtain the co-operation for the implementation of ABC in manufacturing.

3. Implementation of the ABC Method: A case study

The main objective of this case study is to demonstrate the method of designing an ABC system in a company environment and the implication of ABC on operations control and the performance of the whole company.

3.1. Background of the company object of the case study

The SARL MK is a medium company and one of the leading mill industries in the province of M'sila (Algeria). With a turnover of 314.350 KDZD in the last year, composed of: flour selling: 251.232 KDA, semolina selling: 14.748 KDZD And 36.352 KDZD from selling Bran. The company employs about 30 people.

The production of the company in the year under study are as follow:

Table (1): SARL MK production information (unit 100 Kg)

Designation	Soft wheat		Durum wheat	
Bought	173.155		10.724	
Cleaning waste (2%)	3.463		214	
Consumed	169.692		10.510	
Production:				
- Bran	23%	39.029	18%	1.892
- Flour	77%	130.663		
- Semolina			82%	8.618

The source: realized by the researchers according to the information provided by the company.

3.2. Implementation steps of the ABC method in the company

In order to implement the Activity-Based costing in our case study the company SARL MK provided us with the necessary activity information about the last financial year.

the Objective of implementing the ABC method in the company is to calculate the accurate cost of the "bran".

A. Identifying the activities

Identifying the activities is the first step when trying to implement ABC in any company, and it requires the identification of all the activities in the company and classified them into main-activities and sub-activities.

We should note that the greater the number of activities, the application of the system gets more complex, due to the degree of difficulty in determining the relationship between the product and the activity. which leads to a rise in the costs of implementing the system .

When implementing the ABC system in the company object of the case study we got the following results presented in Table (2) below:

Table (2): Identifying the activities in SARL MK

Activity	Sub-Activity	Costs
Supplying	Preparing Orders	45.740
	Transportation	4.667.356
	Storage	1.182.530
Production	Preparing Production Orders	23.740
	Cleaning raw materials	1.961.958
	Grinding	13.366.846
	Storage	1.240.931
	Packing	2.061.489
Quality Control	Products quality control	37.150
Distribution	Customer Management	164.562
	Invoice preparation	114.238
	Products loading	714.085
Maintenance	Maintenance of machinery	393.126
HR & Inventory Management	Human ressources Management	184.400
	Inventory Management	207.810
Accounting	Accounting	400.000
	Auditing	120.000
Safeguarding	Company Guarding	538.272
Management	Company management	2.283.918

The source: realized by the researchers according to the information provided by the company.

B. Determining the activity costs

The next stage in the implementation of ABC system in the company, after the identification of activities is to determine the activity costs.

Through the analysis of costs and activities in the company, we noticed that the company costs were formed from different expenses related to wage expenses, consumable supplies and other expenses that are not related to wages or consumable supplies such as (depreciations, electricity consumption, water consumption, phone and telecommunication...etc).

And we present the results reached from the previous analysis in Table (3), as shown below:

Table (3): Determining the activity costs in SARL MK

Activity	Wage expenses	Consumable supplies	Other expenses	Total
Preparing Orders	45.360	380		45.740
Transportation	1.088.640	535.954	3.042.762	4.667.356
Storage	143.025		1.039.505	1.182.530
Preparing Production Orders	22.680	1.060		23.740
Cleaning raw materials	572.103		1.389.855	1.961.958
Grinding	1.430.258		11.936.588	13.366.846
Storage	143.025		1.097.906	1.240.931
Packing	759.780	10.180	1.291.529	2.061.489
Products quality control			37.150	37.150
Customer Management	163.296	1.266		164.562
Invoice preparation	108.864	3.124	2.250	114.238
Products loading	374.220		339.865	714.085
Maintenance of machinery			393.126	393.126
HR Management	181.440	2.960		184.400
Inventory Management	204.120	1.440	2.250	207.810
Accounting			400.000	400.000
Auditing			120.000	120.000
Company Guarding	538.272			538.272
Company management	907.200	71.039	1.305.679	2.283.918

The source: realized by the researchers according to the information provided by the company.

C. Determining the cost drivers

An activity cost driver is an accounting term. A cost driver affects the cost of specific business activities. In activity-based costing (ABC), an activity cost driver influences the costs of labor, maintenance, or other variable costs. Cost drivers are essential in ABC, a branch of managerial accounting that allocates the indirect costs, or overheads, of an activity. (investopedia, 2022)

The results of table (4) indicate the results of determining the cost drivers our case study:

Table (4): Determining the cost drivers in SARL MK

Activity	Total expenses	Cost driver	Cost driver size
Preparing Orders	45.740	work hours	480
Transportation	4.667.356	mobility	220
Storage	1.182.530	Purchased Units	183.879
Preparing Production Orders	23.740	work hours	240
Cleaning raw materials	1.961.958	Consumed Units	1180.20
Grinding	13.366.846	Consumed Units	1180.20
Storage	1.240.931	Producted Units	180.222
Packing	2.061.489	Producted Units	180.222
Products quality control	37.150	Interventions	9
Customer Management	164.562	work hours	1.728
Invoice preparation	114.238	work hours	1.152
Products loading	714.085	Sold units	180.222
Maintenance of machinery	393.126	Interventions	8
HR Management	184.400	work hours	1.152
Inventory Management	207.810	work hours	1.296
Accounting	400.000	Task size	314.350
Auditing	120.000	Task size	314.350
Company Guarding	538.272	work hours	8.532
Company management	2.283.918	work hours	2.880

The source: realized by the researchers according to the information provided by the company

from the analysis of activities in SARL MK we extracted what we judge to be the most influential causes to overhead costs, where we “work hours” to be the cost driver for the following activities: Preparing Orders, Preparing Production Orders, Customer Management, Invoice preparation, HR Management, Inventory Management, Company Guarding and company management, because according to our vision we see that working hours are the most influential driver that effect the costs size in the previously named activities. And in other hands we allocated the factor “consumed units” as a cost driver for cleaning raw materials and grinding, because more “consumed units” lead us to more expenses of cleaning raw materials and grinding gets. and we summarized all of the cost drivers allocated to each activity in the table (4) above.

D. Collecting the activity data

This step consists to gather all the sub-activities that contains the same cost driver in order to calculate the cost driver cost by dividing the total expenses of the activities with same cost driver to the total size of the appointed cost driver, like shown in the following equation:

$$\text{Cost driver cost} = \text{total expenses of the activity} / \text{cost driver size}$$

And the results obtained from collecting the activity data in our case study in order to calculate the cost drivers cost are presented in the following table (5) below:

Table (5): Collecting the activity data in SARL MK

Activity	Total expenses	Cost driver	Cost driver size	Cost driver cost
Transportation	4.667.356	Mobility	220	21.215,25
Supplying	1.182.530	Purchased Units	183.879	6,43
Production Input	15.328.804	Consumed Units	180.201	85,07
Production Output	4.016.505	Producted Units	180.222	22,29
Quality Control	37.150	Interventions	9	4.127,77
Selling	714.085	Sold units	180.222	3,96
Accounting & Audit	520.000	Task size	314.350.000	1,65
Machinery Maintenance	393.126	Interventions	8	49.140,75
Management	3.562.680	work hours	17.460	204,05

The source: realized by the researchers according to the information provided by the company

E. Computing the product cost

The ultimate purpose of ABC system is to assign every activity cost incurred to product or service (Krishnan, 2006, p. 87), And in this final step of implementing ABC system in our case study in the SARL MK company, after calculating the cost drivers cost we determined the cost driver size allocated to the production of “the bran” according to the information given by the company itself, and we obtained the following results presented in the table (6) below, by the multiplication of the cost driver size of the bran by the cost drivers cost calculated in table (5) above.

And by analyzing the results obtained and presented in table (6) we see that the ABC system implemented in SARL MK provide precious information to the company management about the activity consumptions by a given products (the bran in our case) where we can see that it consumes the activity “production input” in the first place with an amount of 3.481.149,47 DZD, which is an important cost with over 50% of the total product indirect costs. What provides the company management with a clear view to decide if this amount is acceptable or reconsider to reduce it to its minimum or acceptable grades at least.

Table (6): Determining the “Bran” cost driver consumption

Activity	Cost driver size	Cost driver cost	Product Cost
Transportation	50	21.215,25	1.060.762,50
Supplying	41.756	6,43	268.491,08
Production Input	40.921	85,07	3.481.149,47
Production Output	40.944	22,29	912.641,76
Quality Control	2	4.127,77	8.255,54
Selling	40.944	3,96	162.138,24
Accounting & Audit	36.352	1,65	59.980,80
Machinery Maintenance	2	49.140,75	98.281,50
Management	3.967	204,05	809.466,35

Source: realized by the researchers according to the information provided by the company

After determining the indirect costs allocated to the production of “the bran” using the ABC method it’s time to calculate the whole product cost using ABC in this by adding the direct cost allocated to the production of “bran” which are meanly represented by the consumption of raw materials (Soft wheat, Hard wheat) and the packaging of the final product, and this according to the information given to us by the company management itself whether it’s true or not.

And we presented in table (7) below the calculation made in order to obtain the total “bran” cost using the ABC system in The SARL MK company, where we obtained a cost per unit of 1.552,52 DZD.

Table (7): Computing the “Bran” cost using ABC

Direct costs	Quantity	Cost per unit	Total cost
Soft wheat	39.029,00	1.285,00	50.152.265,00
Hard wheat	1.892,00	2.880,00	5.448.960,00
Packages	40.944,00	27,00	1.105.488,00
Direct costs: Total	40.944,00	1.384,98	56.706.713,00
Indirect costs	Quantity	Cost per unit	Total cost
Transportation	50	21.215,25	1.060.762,50
Supplying	41.756	6,43	268.491,08
Production Input	40.921	85,07	3.481.149,47
Production Output	40.944	22,29	912.641,76
Quality Control	2	4.127,77	8.255,54
Selling	40.944	3,96	162.138,24
Accounting & Audit	36.352	1,65	59.980,80
Machinery Maintenance	2	49.140,75	98.281,50
Management	3.967	204,05	809.466,35
Indirect costs: Total	40.944,00	167,57	6.861.167,24
Total	40.944,00	1.552,56	63.567.880,24

The source: realized by the researchers according to the information provided by the company

3.3. Comparison between ABC and traditional costs:

After calculating the product cost using Activity-based costing and order to preview the differences between it and the traditional costing method we decided to compare the cost of the calculated product “bran” using the two mentioned methods, us presented in table (8) below:

Table (8): cost comparison between ABC and traditional costing method

Activity-Based Costing	Traditional costing	Difference (DZD)	Difference (%)
1.552,56	1.549,82	2,74	0,18

The source: realized by the researchers according to the information provided by the company

From the comparison of the product “bran” cost using the two methods ABC and traditional costing above, we can see that the difference between the two methods is nearly the same with a difference of 0,18% or 2,74 DZD.

In the analysis, the cost calculation using ABC provide the management with the privilege of cost tracking by activity, and by the help of this analysis the company can monitor the hidden costs and gain more competitive advantages. but when the calculated costs using the two different methods are identical or nearly identical, we suggest to avoid ABC method due to its consumption of time and efforts.

4. Conclusion:

In this paper an attempt has been made to study the prospects of implementing activity-based costing system in an Algerian industrial company in order to achieve the objective of this study to examine if activity-based costing can add value to the company management in Algeria, and through the theoretical study of the subject and the implementation of the system in a company, we reached the main following results:

- Cost and profit measurement provide company management with useful information for product decisions, such as pricing, design, and outsourcing, product/service profitability analysis, for making operational improvements, and for performing budgeting, planning, and performance evaluation;
- Activity-based costing provide the company management with the privilege of costs traceability;
- Activity-based costing can provide company management with accurate information about cost of activities in the company what leads to possible elimination of non-value-added activities;
- In comparison with the traditional way of cost measurement ABC provide more precise information about products costs;
- The implementation of Activity-based costing system in a company requires the education and the training of the concerned employees on ABC system and the benefits that could be delivered from it, and requires more time compared to traditional costing system;
- The implementation of any cost measurement system requires the existence of a transparent business environment, in order to ensure precise inputs to the system, which means the precision of the outputs as well.

and from this previous point, we see the need to entice the following recommendations:

- The necessity of searching for the necessary mechanisms to instill confidence in the official market and the banking system in the country;
- The need to reconsider the tax system due to the tendency of most economic operators to tax evasion, which leads to the inaccuracy of the financial information;
- The necessity of punishing dealing without an invoice, or dealing with counterfeit invoices, due to its effect to the imprecision of the company information in the first stage and to its effect to the economy in general.

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