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# Resource Consumption Accounting with Cost Dimension and an Application in a Glass Factory

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## Abstract

Resource Consumption Accounting (RCA), which combines the systems of activity based costing and German cost accounting was developed as a result of the fact that traditional accounting systems remain insufficient especially in the dimension of managerial accounting and the managers cannot provide the necessary information for the period of making decisions. RCA was defined as a system of managerial accounting, which categorises costs as fixed and variable and supports managerial decision making with real cost data by determining the idle capacity. The definition of the costs of the operating business using the resource consumption accounting as fixed and variable is to determine the idle capacity, provide the real cost data without distributing the idle capacity and the fixed parts analysing the variable costs to the goods or products, and back up the period of making decision. In this study, the idle capacity was calculated by using the costs for the products and with the application of resource consumption accounting.

**Keywords:** Managerial Accounting, Cost Accounting, Resource Consumption Accounting, Activity Based Costing

## Introduction

A number of accounting systems have been developed since 1990s as a result of the insufficiency of the traditional accounting system. Technological developments affected development of production technologies, usage of flexible production systems, and change in the cost structures, which as a result is required the new systems for the managerial accounting besides financial accounting and cost accounting (Ashfaq *et al.*, 2014:105). One of these systems is activity based cost accounting (ABC). ABC was not widely used in application. Because it is complicated and difficult to use although it has been studied on much, and gives better and more meaningful data. However, the periodical ABC system has been developed.

While ABC which originally comes from and is commonly used in the US, Grenzplankostenrechnung (GPK) which is called German cost accounting is used in Europe. GPK was developed by Plaut in order to correct the mistakes in distribution of the costs to the products and to support managerial decision making. In other words, ABC was used in the US, whereas GPK was used in Europe because of inefficiencies in traditional cost systems. However, both systems give the necessary data in terms of cost accounting of the costs, yet

it has remained deficient with regards of difficulties in practice. As a result, the resource consumption costing has been developed by combining the advantages of two systems.

RCA is defined as amount based managerial accounting system advocates that the reasons of the costs are the resources, distributes the cost according to resource consumption, and supports the decision making process of managers.

The aim of the study is to define the costs of operating management as fixed and variable using the RCA, determine the idle capacity, provide the real cost data without distributing the idle capacity and fixed parts analysing the variable costs, and backs up period of making decision of the managers. The study aims to fill the gap in the Turkish literature by bearing in mind the lack of available studies on RCA. Moreover, in order to prevent problems with application and calculation of ABC, an application has been presented.

### **Resource Consumption Accounting (RCA)**

The fact that in the traditional accounting systems, cost data are insufficient especially with the managerial aims, and there is no reason and result relation between activities and costs affect the period of making decision and control function negatively (White *et al.*, 2011:42). The ABC system which was developed as a result of the fact that traditional volume based costing methods are insufficient could not draw attention because it is complicated, cannot easily be formed, sustained and changed; instead new cost methods have been recommended. RCA which is one of them is a system which is formed with combining the German marginal cost accounting and ABC (Aksu, 2013:167; Aktas, 2013; 55; Zhang *et al.*, 2011; 2481), and includes the whole chargeable costs in the distribution determining the relation between resources. Moreover, it defines monitoring the cost flows based on amount, and resource consumption (Clinton and Webber, 2004; 24).

International Federation of Accountants defines RCA as a developed costing method which enables the opportunity of proportional costing in expenses, and benefits from ABC (Cengiz, 2012:218). RCA is defined as a managerial accounting method which supports the decision making period by providing data. The main idea of the system is that resources are the reasons of all costs and costs occur as a result of distribution of the resources for an operation (building, equipment, labour) (White, 2009, 65-71).

RCA is based on the cost distribution according to resource consumption, and accounts are made as amount centred (Aksu, 2013:165). RCA consists of three basics (White, 2009:64; Merwe and Keys, 2002:31).

- Resources are regarded as the starting point,
- Cost structure is monitored perpetually, and
- Amount based approach is used in modelling the costs.

### **(A) Comparison of the Resource Consumption Accounting With ABC and GPK**

Today, the researches about the managerial accounting in terms of managers have made them insufficient related to cost and resource management, and such methods as ABC and lean accounting could not enable the target achievement. So, the recommended system is the RCA which is formed combining the advantageous methods of ABC and GPK which is also called German marginal cost accounting (Cengiz, 2012:215; Merwe and Keys, 2002:31; Krumwiede and Suessmair, 2008: 37; White, 2009: 71). The system is a modern accounting method which uses the activity advantage of ABC (Merwe and Keys, 2002:31; Krumwiede and Suessmair, 2008:37; White, 2009:71).

The biggest problem in ABC and the most important difference between RCA and ABC is that all costs are confirmed as variable, and so this situation impedes data of the idle capacity (Keys and Merwe, 2002: 3). While the activities are seen as the resource of costs in ABC, the costs are reasons of the resources in RCA. Moreover, in RCA the resource costs are categorized as fixed and variable according to cost behaviours, and the idle capacity costs can be calculated. Accounted idle capacity costs are not distributed to the products and services, and they do not obtain shares from resources which they do not utilize (Aktas, 2013:55).

ABC distributes the resource costs into activities and then products and services as cost object; RCA does not distribute the resource costs directly to the activities; assigns them in resource pools, and distributes them to the activities. The distribution of the costs to the products and services are assigned in the activity pools (Aktaş, 2013:60). The second stage in ABC, the distribution from activity pools to cost objects, is comparatively easy, the first stage, the distribution of the resources to the activities is a hard process because of the resource variety. However, RCA makes the distribution of resources to the activities ease assigning the ones belonging to the different departments of a management in a more limited amount (Wegmann, 2009:14-15).

ABC and GPK play an important role in the development of RCA (Krumwiede and Suessmair, 2008:1). RCA is formed by combining resources and marginal costs which GPK focuses on (Gurowka and Lawson, 2007:31).

GPK which is the most commonly used managerial accounting system in Germany and defined as marginal costing is designed and based on supporting the period of making decision of the managers and correction of the mistakes in distribution of costs to the products by Hans George Plaut (Sharman and Vikas, 2004: 29-30; Friedl *et al.*, 2005: 56).

### **(B) The Features and Benefits of Resource Consumption Accounting**

The features of RCA system are summarized as presented below (White, 2009: 76; Fisher and Krumwiede, 2012:48). They are to:

- Model how the resources are used by outputs,
- Categorize the costs in the cost centres into two as fixed and variable,
- Use flexible budgeting in the level of cost centre,
- Charge the responsibility of the costs on the managers of cost centre,
- Provide high quality cost data in the short-term decisions,
- Clearly show the causative relations between operating resources,
- Enable the cost management data related to the final product or services,
- Provide directly understanding the capacity costs and resource capacity management,
- Enable the management of complicated cost models.

### **(C) The Functioning Of Resource Consumption Accounting**

RCA which looks at the management with a source-based viewpoint monitors closely the amount of the consumed resources and structure of these resources and costs. Moreover, it checks the idle capacity, uses the replacement costs instead of historical costs and utilizes monitoring the cost data in various levels (Peacock and Juras, 2006:55).

The resources in RCA system are reasons of all costs and revenues, and revenues come out when they are directed to a specific investment. Even if an activity is halted, it doesn't save up as much as the resource assigned to the activity does not appear or is removed to another place. Resource Consumption Model is shown in Figure 1 (White, 2009:65):

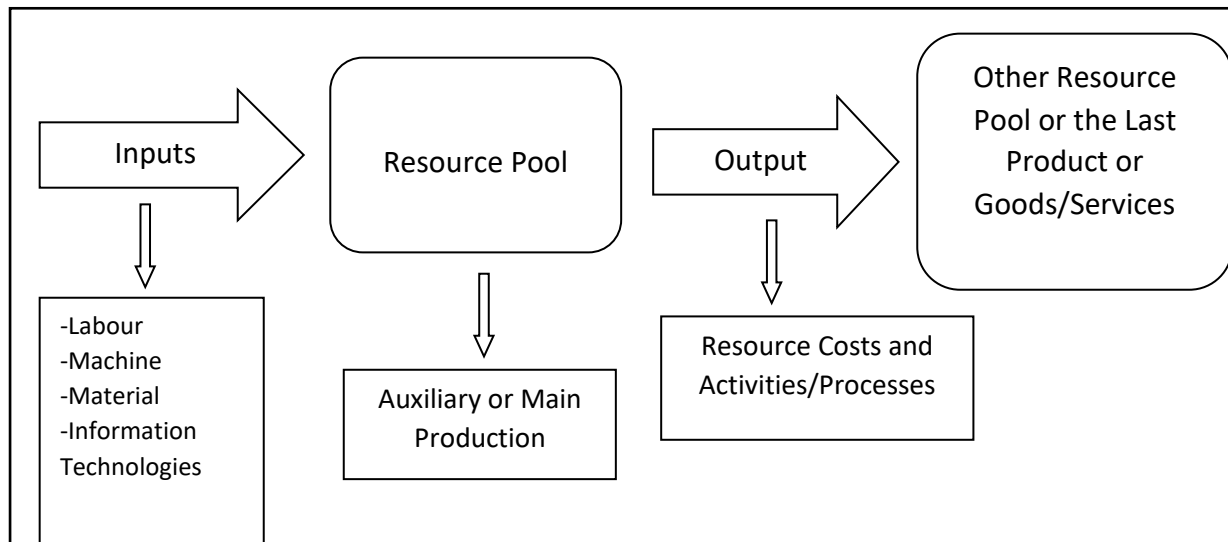


Figure 1. Resource Consumption Model (White, 2009:65)

When the data enters the system in RCA, amount and total are combined; the accounting When the information entered the system, it is combined as amount and total price, then accounting system categorizes this data gradually as amount and total price. So, RCA focuses on a model which amount and total price are not separated from resource documents (White, 2009:72).

RCA system has three basic stages which are the analyses of resources, the qualifications of the costs, and the method based on amount (Merwe and Keys, 2002:31). The definition of resource in RCA includes not only the resources consumed by activities but also the ones which are consumed by them. RCA takes into account the resource consumption in the cost calculation. On the other hand, it distributes the costs to cost objects according to the resources (Wang *et al.*, 2009: 84). It is very important to determine the relations between the resources in the system and the cost objects which consume the resources (Webber and Clinton, 2004: 3-4). This principle known as the causality requires the costs related to the resources and resource flows to be modelled reflecting the relation of the costs. If a resource flow and a causality relation between costs are not formed, this resource flow and costs are distributed to upper levels of the management. For instance, if there is an idle capacity in cost centre, the costs are distributed to the products and services which are outputs of this center and they are sent to a point in charge of the idle capacity. These costs should not be transferred to the products any way in order not to lead high product costs (White, 2009:67).

In the cost distribution of RCA system the amount is used instead of percentage or total price, all processes are based on scales, and resource and activity consumptions are made according to the measurable standards. So, the causality between resource consumption and cost distribution is determined according to amount (Wang *et al.*, 2009: 84). In this sense, it is necessary that the activities be stated as amount that provides capacity data and costs are consumed as amount (White, 2009:70).

Resource costs in RCA are monitored by categorizing as primary and secondary costs after assigned in the cost pools (Aktas, 2013:64). Primary costs are ones occurring in a cost centre, therefore the cost centre have the primary control on these costs. The secondary costs are defined as the ones which are transferred or directed to a cost centre (Keys and Merwe, 2002:4). The secondary costs are explained as the ones that can reflect directly on the

consuming object, and occur in the back-up or other resource costs (Webber and Clinton, 2004: 4). Consuming cost centre, namely the cost centre which benefits from the service, has a secondary control on the costs. For example, while the amount of the service demanded from the supplying cost centre is under the control of the cost centre, the rate for each unit and price is not under the control of consuming cost centre. This situation enables the managers to have responsibilities related to what they can take under control in the cost centres (Keys and Merwe, 2002:5).

The primary costs are ones which are produced in the resource pool while the secondary costs are consist of the ones that support the resource pool and are transferred from the other resource pools. The primary and secondary costs are exposed to another categorization as fixed and variable considering the relation to the output of resource pool (White, 2009:74-75). The fixed consumption relation occurs unless the output amount that has been consumed changes with the amount of output that the cost objects consumes, and the cost of this output is stable. Variable consumption relation turns out if the output amount consumed changes with the amount of output, the cost of this output is variable (SAP University Alliances, 2011:7). For instance, the amortization of a machine that takes place in a resource pool is stable because it does not change with the level of cost output. However, the electricity cost of this machine will be variable because kw per hour is different from the direct machine usage, namely from the output level (Aktas, 2013:64).

Fixed expenses state the fixed ones in the traditional costing system while the variable expenses determine how the resource pool output which the expenses are belonged to is consumed not according to relation with the final products or services of the expenses. In the system stable expenses remain stable, but the variable expenses can form a stable structure based on the consumption form of the output (Cengiz, 2012:227). Cost distribution rates for the stable costs are made according to the available theoretical capacity while planned amounts are focused on the variable costs (White, 2009:65). For instance, direct labour cost is accepted generally as variable cost, but the system regards the time spent on the employee training as stable based on the output of resource pool. This situation happens due to the fact that the employee does not produce any output during the training. This part of the labour reflects an unproductive capacity, so it is the planned stable cost (Webber and Clinton, 2004:3-4).

The use of theoretical capacity provides the managers that the idle capacity is seen in the frame of theoretical capacity that is not consumed (Merwe and Keys, 2002:35). It is required that the cost assigned in the resource pools are categorized as stable and variable in order to determine the idle capacity (Perkins and Stovall, 2011:47). The resource pool means various resource elements, and defines the production capacity of a management (Zhang *et al.*, 2011:2482).

The costs are distributed to the cost objects in the system when the resources are in fact consumed, but the whole resource costs related with idle capacity which is not distributed to the cost objects are remained in the resource pools (Tse and Gong, 2009:42-43).

Using the replacement cost in RCA instead of historical cost in the amortization calculation provides more updated production cost, and enables the management to set up a balance in the decisions of using resources decreasing the decision of keep using the machines (Krumwiede and Suessmair, 2007b:55). Moreover, the mistakes resulted from the deviation in the costs disappear Krumwiede and Suessmair, 2007a: 8).

The results shown below are expected from RCA (Webber and Clinton, 2004:12):

- To define the causative relation between the expenses in the auxiliary expense environments differently from the other systems and consumption objects,
  - To determine the expenses relation which is originally variable, but shown as the fixed expense in the other systems,
  - Amortization calculation and the usage of theoretical capacity via the replacement cost come to an end forming criss-crossing effects. (The usage of the replacement cost increases the unit cost while the labour volume calculated according to the theoretical capacity decreases etc.).
  - The distribution of the resources used only in the cost centers with expense distribution made according to the theoretical capacity.
  - Fair value in distribution cost occurs because the costs which appear due to idle capacity are not distributed to the product or services.
  - To provide the manager the opportunity of categorization and monitoring the costs in each level different from other systems.
  - The costs of product and services are only consisting of resource cost consumed.
- RCA determines the relation between many resources, includes all the loadable expenses in the cost distribution, and forms a frame for the capacity management. Monitoring and determining the structure of cost basically defines the fact that variable costs can turn into a fixed cost based on the consumption behaviours of the costs. Monitoring the amount based cost flows based on the amount relations means separation of cost value from the relations by explaining resource consumption (Clinton and Webber, 2004: 24).

### **3. RCA Application in a Glass Production Management<sup>1</sup>**

#### **(A) Introduction of the management<sup>2</sup>**

The operating firm is a big-scale one which produces double glazing glass and was founded in Antalya. The main buyers of the firm are hotels, construction sector, glass wholesalers, glass retailers and plastic joinery manufacturers. The firm manufactures strained glass, normal glass, mirrors, bizote glass, relief glass, sandblasting glass and decorative glass besides the double-glazing glass. It produces its products in the direction of the buyers by providing the proper glass for manufacturing from the provider. In this study, only focused on double glazing glass. All the expenses and other elements are calculated in the value of double-glazing glass. For instance, only the amortizations of the machines used in the production of double glazing glass while taking into consideration of the amortizations.

#### **(B) Production processes**

The glass to be produced is designed when the demand from glass such as normal, strained, frosted, plate, and insulated comes out.

**Clipping:** When the production demands that come with order arrive the firm, the production planning is transferred to the data processing department considering the features such as amount, meter square, and glass type. Production order transferred to the data processing attains the clipping department, and then clipping process is realized properly for the limitation of production planning.

**Montage:** The glasses are sent into the montage department after clipping process made via the machines. This process consists of three stages. At first, aluminium intermediary

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<sup>1</sup> At the application of the research, articles of Aksu (2013); Aktas (2013) and Basik (2012) are used.

<sup>2</sup> This application has been conducted in the glass production firm which is in the city of Antalya. Name of the firm is not revealed due to the confidentiality of datas and competition in the sector.

lathes<sup>3</sup> are cut according to glass scales (25mm). Silica-gel is filled between the lathes in order to prevent the moisturizing, and lathes are combined in the proper scales for the glass. They are covered with a strong material called butyl. The basic feature of butyl enables the glass to stick to the lathes. After this process, the glass clipped is washed with pure water to purify from the unwanted materials. The glass which will form the double-glazing is combined with the aluminium lath using a machine.

**Disinfection:** The sides of the glass combined are covered with a polyurethane material in the disinfection department, and they are shrouded by putting corks between them to protect them to stick to each other. Through-dry time of the polyurethane material is 1 or 2 hours depending on the climate.

**Quality control:** The double-glazing glass whose production is completed is checked using hand and eyes by a controller. The main target of the control is to determine whether the glass has crack, breakage, scratch, stain, dimensional variance or not.

### **(C) Double-glazing Production Output Types**

Double-glazing production type is basically the same, carolingian or jalousie is put between two glasses. In this production type, carolingian or jalousie are montaged during the combination stage between two glasses, the production is complete with the other stages.

Facade double-glazing glasses are added into the aluminium or plastic joinery, and the product is completed. Aluminium or plastic joinery is sent from the buyer companies, the produced double glazing is placed in this joinery.

As for the insulated glass, all the production phases are the same as the standard double-glazing. Only the type of the glass is different (sun-proofed).

Standart double glazing glass production is also realized besides these four types.

On the other hand, double glazing glass is produced in the levels of colour, width and durability.

The firm finishes the production at this stage, and is not interested in the setup or montage of the production.

### **(D) RCA Application**

The process of RCA Application which is applied in the management of double-glazing glass is presented in Figure 2. As shown in Figure 2, there are four resources as salary and prices, amortizations, electricity and water bills, indirect material and equipment expenses. Salary and prices are assigned in the labour resource pool; amortizations in the machine resource pool, indirect material and equipment expenses in the indirect material and equipment resource pool. The costs assigned in the resource pools are distributed to the activities of clipping, montage, disinfection, and quality control with labour hours, machine hours and kilogram resource factors. The costs assigned in the activity pools are loaded on the cost objects with production amount and time clock factors. On the other hand, costs are charged to the products. In the firm, the data belonging to November 2014 are grounded on. Overhead manufacturing expenses which occur in November are presented in Table 1 below.

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<sup>3</sup> Aluminium lathes are the piece that combines two glasses.



Table 1

Actual Costs

Expense Types	Sum
Salary and prices	23.690,00
Amortizations	10.300,00
Electricity	1.000,00
Water	1.000,00
Indirect Material & Equipment	19.439,96
<b>Total</b>	<b>55.429,96</b>

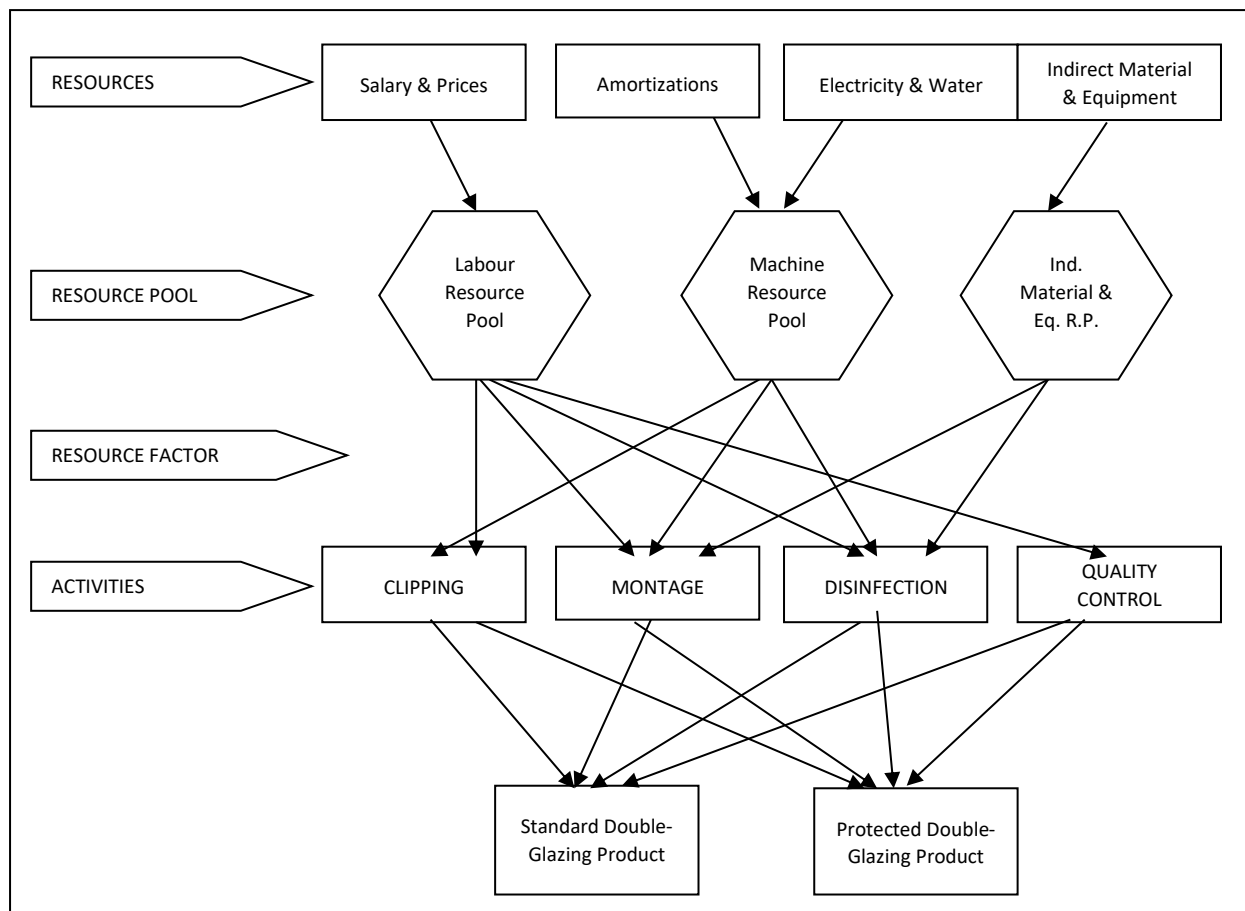
As shown in Table 1, indirect costs of the management in November 2014 are 55.429.96 Turkish Liras.

Table 2

Fixed and Variable Costs According to the Resource Pools

Resource Pool	Total Cost	Fixed Cost	Variable Cost	Resource Unit
Labour	23.690,00	1.371,20	12.318,80	Labour Hour
Machines	2.300,00	10.300,00	2.000,00	Machine. Hour
Ind. Mt.& Eq.	9.439,96	-	9.439,96	Kg

As shown in Table 2 there are three resource pools in the firm. These are the labour, machines and indirect material and equipment. The costs of the management are distributed into the pools according to the resource units by fractioning as fixed and variable costs.



**Labour:** The staff number is 10 in the manufacturing department. Four of them are masters, and their gross prices are regarded as fixed cost. The gross prices of the rest are seen as variable.

**Machines:** The amortization expenses related to the machines are stable while the expenses of electricity and water are evaluated as variable.

**Indirect material or equipment:** It is stated as the element of variable cost because it increases with the production in the direct proportion.

Considering Table 2 presented above, the resource units take place in this table so as to use later.

RCA points out that fixed costs should be distributed with theoretical capacity while the variable ones with the practical capacity. In this sense, it is a requirement that the theoretical and practical capacities of the management in RCA application. Theoretical capacity explains that for instance a machine works without problem for 24 hours, whereas the practical capacity shows the duration of usage of the machines for the production.

Table 3

*Theoretical and Practical Capacities and Ratios of the Resource Pools*

Resource Pool	Theoretical Capacity	Practical Capacity	Fixed Cost Ratio	Variable Cost Ratio
Labour	2.400 lab.h	2.000 lab.h	4,74	6,16
Machines	720mac.h.	558 mac.h.	14,31	3,58
Ind. Mat/Eq.	-	3.214 kg.	0	6,05

Table 3 presents the theoretical and practical capacities of the firm according to the resource pools. They are calculated as shown below.

**Labour:** If a worker works 8 hours a day for 30 days, the theoretical capacity of ten workers will be 2400 labour hours. As for the practical capacity calculation, it is assumed that a worker works 8 hours a day for 25 days. So the practical capacity for ten workers is 2000 labour hours.

**Machines:** The theoretical capacity of the machines will be 720 hours for 30 days assuming that it works non-stop 24 hours. In the practical capacity, 206 metre-square which is the amount of daily production is multiplied to 6.50 minutes which is the total production time of the machines for 1 metre-square glass production. So the daily machine practical capacity is found as minute (1.339 minutes). This result is multiplied to 25 which is the working day of the management, and it gives the monthly practical capacity. The practical capacity based on monthly minute is divided to 60, and the monthly practical capacity of the machine is found as hour (558). Formula is given below.

The monthly practical capacity (hour) =  $206 * 6.5 = 1339 * 25 \text{ days} = 33475 \text{ minutes} / 60 = 558$

**Indirect material/equipment:** There is no theoretical capacity of this resource pool. The practical capacity is 3.214 kilograms which is the total of polyurethane materials and butyl used during the month.

In table 3, we can see the ratios of the fixed costs to the theoretical capacity and variable costs to the practical capacity. These are calculated as shown below.

$$\begin{aligned} \text{Labour Fixed Cost Ratio} &= \text{Labour Fixed Cost/Labour Theoretical Capacity} = 11.371,20/2400 = 4,74 \\ \text{Labour Variable Cost Ratio} &= \text{Labour Variable Cost/Labour Practical Capacity} = 12.318,80/2000 = 6,16 \\ \text{Machine Fixed Cost Ratio} &= \text{Machine Fixed Cost/Machine Theoretical Capacity} = 10.300/720 = 14,31 \\ \text{Machine Variable Cost Ratio} &= \text{Machine Variable Cost/Machine Practical Capacity} = 2000/558 = 3,58 \\ \text{Ind. Mat./Eq.Fixed Cost Ratio} &= \text{Ind. Mat./Eq.Fixed Cost/ Ind. Mat./Eq.Theoretical c.} = 0/0 = 0 \\ \text{Ind.Mat./Eq.Variable Cost Ratio} &= \text{Ind.Mat./Eq.Variable Cost/Ind. Mat./Eq.Practical c.} = 19.439,96/3214 = 6,05 \end{aligned}$$

Table 4

*The Resources that the activities consumes from the pools*

Resource pool	Clipping	Montage	Disinfection	Quality Control	Total
Labour (lab. Hour)	600,00	600,00	600,00	200,00	2000,00
Machines (mac.hour)	128,77	171,69	257,54	0,00	558,00
Ind. Mat./Eq. (kg)	0,00	123,60	3090,00	0,00	3213,60

In table 4, consumed resources according to the activities from the resource pools, namely the practical capacity (table 3) values are shown in detail. The calculations are given below one by one to be able to give an example from each activity zone.

$$\text{Consumed Resource} = (\text{Labour Practical Capacity/Total Worker Number}^4) * \text{Clipping (Clipping/Labour)} \\ \text{Process Worker Number} = (2000/10) * 3 = 600 \text{ lab.h.}$$

$$\text{Consumed Resource} = (\text{Machine Practical Capacity/Total Mac. Hour}^5) * \text{Montage (Montage/Machine)} \\ \text{Process Mac. Hour} (558/6,50) * 2 = 171,69 \text{ mac.h.}$$

$$\text{Consumed Resource} = \text{Indirect material used in the disinfection} = 3.090 \text{ kg. (Ind. Mat.Disinf.)}^6$$

Table 5

*The activity distribution of the costs in the resource pools*

Resource Pool	Clipping	Montage	Disinfection	Quality Control	Total
Labour (lab.hour)	6.538,44	6.538,44	6.538,44	2.179,48	21.794,80
Machines (mac.hour)	2.303,65	3.071,54	4.607,31	-	9.982,50
Ind.Mat./ Eq. (kg)	-	747,60	18.689,94	-	19.437,54
Total	8.842,09	10.357,58	29.835,69	2.179,48	51.214,84

In table 5, the distribution of the costs in the resource pools to the activities are shown below. The calculations are given below one by one to be able to give an example from each activity zone.

<sup>4</sup> Worker numbers according to activities: clipping 3, montage 3, disinfection 3, quality control 1, so total worker in the firm is 10.

<sup>5</sup> Product production durations according to activities: clipping 1.5 min, montage 2 min, disinfection 3 min, so for 1 m<sup>2</sup> double-glazing glass can be produced in 6.5 min.

<sup>6</sup> Kg is used as the distribution cost driver of the resources consumed by disinfection activity of indirect material. Polyurethane is only used as indirect material at the disinfection department. Beside that, 3.090 kg polyurethane is seen as indirect material/disinfection because it doesn't have theoretical capacity.

Dist.of the products = [Clipping labour hour (Table 4)\* Fixed CostLab. Ratio (Table 3)] +  
to the act. [Clipping labour hour(Table 4)\* Variable CostLab. Ratio (Table 3)]  
(Clipping/Labour) = (600\*4,74) + (600\*6,16) = 6.538,44

Dist.of the products = [Montage Mac. Hour (Table 4)\* Fixed Cost Mac. Ratio (Table 3)] +  
to the act. + [Montage Mac. Hour (Table 4)\* Variable Cost Mac. Ratio (Table  
(Montage/Mac.) 3)] = (171,69\*14,31) + (171,69\*3,58) = 3.071,54

Dist.of the products = [Disinf./Ind. Material. Kg. (Table 4)\* Fixed Cost. Ind. Mat. Ratio  
to the act. (Table 3)] + [Disinf./Ind. Material. Kg. (Table 4)\* Variable Cost.  
(Disinf./Ind. Ind. Mat. Ratio(Table 3)) (3.090\*0) + (3.090\*6,05) = 18.689,94  
Material.)

Table 6

*Activities and Resources that they consume (m<sup>2</sup>)*

Activities	Activity Factor	Standard double-glazing product	Protected double-glazing product	Total
Clipping	Production Amount	2.781	3.399	6.180
Montage	Production Amount	2.781	3.399	6.180
Disinfection	Production Amount	2.781	3.399	6.180
Quality Control	Control Time	108	132	240

In table 6, we can see that the production amount is used as activity factor at clipping, montage, and disinfection activities, and control time is used as activity factor at the quality control activity. In November 2014, 6.180 double-glazing glass was produced in the firm: 2.871 was standard double glazing while 3.399 was protected one. Moreover, in November 240 hours were spent for the quality control activity in total in the firm: 108 hours were spent on the standard double glazing glass, 132 hours on the protected one.

Table 7

*Charging of the costs which is assigned in the resources pools to the products*

Activities	Charge Ratio	Standard double-glazing product	Protected double-glazing product
Clipping	1,43	3.978,94	4.863,15
Montage	1,68	4.660,91	5.696,67
Disinfection	4,83	13.426,06	16.409,63
Quality Control	9,08	980,77	1.198,71
Total		23.046,68	28.168,16

In table 7, the costs assigned in the activity pools are charged to the products. The charging ratios of the activity pools of clipping, montage and disinfection are calculated as result of dividing the activity factor to the costs assigned in the activity pools. The charging ratio of the quality control pool is found by dividing the costs assigned in the quality control pool to the total control time. The distribution of the costs assigned in the activity pools to the standard and protected double-glazing glass is calculated below with one example.

Dist. of the costs to the = Charging Ratio of Clipping\* Std. double-gl. Amount  
 products (Std. double- 1,43\*2.781 (Table 6) = 3.978,94  
 gl/Clipping)

Dist. of the costs to the = Charging Ratio of Disinfection\* Protected double-gl  
 products(Protected double- amount  
 gl/Disinfection) 4,83\*3.399 (Table 6) = 16.409,63

Table 8

*The results of Cost distribution acc. To RCA*

Resource Pool	Incurred Costs	Distributed Costs	The cost of the idle capacity
Labour	23.690,00	21.794,80	1.895,20
Machines	12.300,00	9.982,50	2.317,50
Ind. Mat./Eq.	19.439,96	19.437,54	2,42
Total	55.429,96	51.214,84	4.215,12

The table 8 presents the costs of the idle capacity formed relating to the costs that the firm incurs and distributes. As shown in Table 8, in the labour resource pool 1.895.20, in machine resource pool 2.317,50, in the indirect material/equipment resource pool 2.42; total cost of the idle capacity is 4.215,12 in the firm. With the RCA distribution, 51.214,84 of the total cost which 55.429,96 is charged on the products. In other words, the total cost of 4.215,12 is not consumed by the products, so we can say that resource cost of 4.215,12 is not charged on the products.

### Conclusions

Globalization and high competition have resulted in the quick change in the expectations of the customers and organizations of the firms, production processes and types. Especially changes in the technology and high competition have compelled the accounting data system to change, and the traditional methods have been insufficient against this change. For instance, determination of the prices of the market in the high competitive environment has led to the obligation of statement according to the rival firm and market, and the pressure on the profit by the partners for the firms forced to focus on the costs. These developments have enabled the firms to develop new methods in order to calculate the costs correctly and make decisions by taking into consideration of the cost and management accounting methods.

Direct labour expenses are decreased because of the technological developments in the accounting and cost management, therefore as a result of the increase of the automation systems in the production overhead manufacturing expenses increase, and transition to the new methods which can provide more correct cost data is required. One of these methods is RCA which combines German cost accounting and ABC methods.

RCA sustains the basic functioning of the ABC, and focuses on the idle capacity differently from ABC considering the fixed and variable dimensions and overhead manufacturing expenses.

In a RCA study which is applied in a glass production management founded in Antalya region:

The resource pools which assign the costs of the resources forming the overhead manufacturing expenses in the firm, resource factors that will be used in the distribution of

the costs assigned in the pools to the activities, main activities which are made in the management, and the activity factors which are used in charging the costs to the products are determined.

The overhead manufacturing expenses in the firm are separated as fixed and variable; and theoretical and practical capacities of the firm are stated in order to distribute the fixed and variable costs to the activities. Fixed and variable cost ratios of the resource pools are calculated by proportioning the fixed costs to the theoretical capacity of the resource pools, and variable ones to the practical capacity of that.

The theoretical and practical capacity of the firm is determined, and then the practical capacities of each resource pool is determined; the costs assigned in the resource pools are related to the practical capacities of the pools with variable and fixed cost ratios, and assigned to the activity pools. 55.429,96 which is assigned in the resource pools is distributed in fixed and variable cost ratios of the practical capacity, and the total cost in the activity pools is 51.214,84. So, the idle capacity which is the focus of RCA is reached.

According to the findings obtained from the study, in the labour resource pool in the firm 1.895,20, in machine resource pool 2.317,50, in the indirect material/equipment resource pool 2.42; the cost of the idle capacity is 4.215,12. This result is not charged to the products. In other words, the products do not get any share from the resources that they do not consume, and real cost data associated with the product costs is provided.

The calculation of the idle capacity and its loading on the responsible unit or person, increase the effectiveness and productiveness of the firm by providing real cost data.

Academics will be able to contribute to the literature and the sector by studying the integration of RCA with other cost methods. And the applicators in this sector will be able to develop their own systems by benefiting from this study.

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