THE CASE FOR RCA: UNDERSTANDING RESOURCE INTERRELATIONSHIPS.

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FROM THE EDITORS

Cathrine and Joe Stenzel

RESOURCE CONSUMPTION ACCOUNTING

In the last issue, the *Journal* presented several ways that standard cost models were evolving. This issue extends the theme with an article that looks beyond the perspectives of activity-based costing (ABC). Without throwing the baby out with the bathwater, Anton van der Merwe of PricewaterhouseCoopers and David E. Keys of Northern Illinois University describe the way in which resource consumption accounting (RCA) complements the management perspectives of ABC. They demonstrate the RCA mapping methodology and its significant impact on the resource side of ABC.

EXECUTIVE SUMMARY

- *The first article in this series on resource consumption accounting (RCA) proposed a mapping method to analyze and manage the resource side of ABC*

(activity-based costing) – that is the investments made to provide useable capacity.

- *In this second article, the presentation of the RCA solution continues. The three shortfalls of ABC addressed are: 1.) the interrelationships between resource pools are only indirectly expressed, 2.) the changing nature of cost at the time of consumption is not reflected, and 3) the fully burdened resource costs are not provided*
- *The characteristics of resource pool interrelationships and the demands they place on the cost management system are highlighted, including an exploration of cost dynamics at the time of consumption and an evaluation of resource pool interrelationships from an ABC perspective. In addition, the RCA solution to these shortfalls is explained and evaluated.*
- *Finally the need for fully burdened resource costs is discussed and its advantages highlighted.*

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Interrelationships of resources refer to dependencies between resources that enable them to proide their respective services. Managers need to clearly understand resource interrelationships and dependencies or they may make decisions that are more costly and less efficient than they at first appear. Four characteristics of these interrelationships are identified:[1]

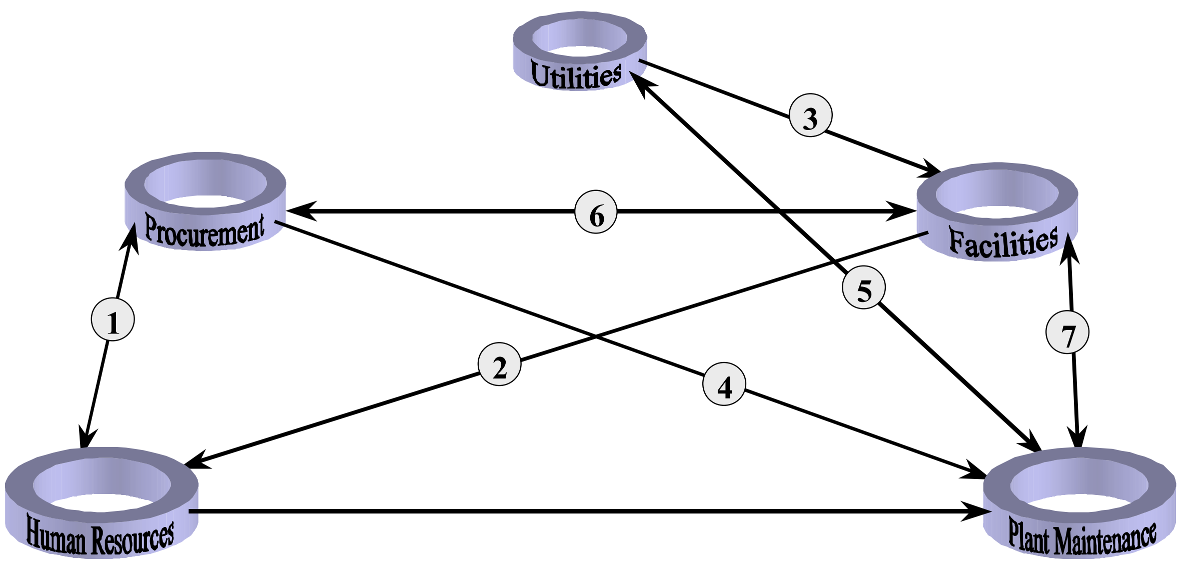
- They are functions of the resources deployed,
- They are often reciprocal,
- They are resource-output-quantity based, and
- They affect the nature of cost.

Each characteristic is discussed in detail in the following sections.

FUNCTIONS OF THE RESOURCES DEPLOYED

The deployment of a particular resource for a desired function will also require the deployment of support services with their respective functions. Before the advent of computers, for example, information technology (IT) departments did not exist; nowadays, the fact that employees are provided with desktop computers necessitates IT support. Exhibit 1 illustrates typical resource interrelationships. Two methods can be used to reflect these: the direct method and the intermediary object method. The first expresses the relationship directly. For example, relationship 2 in Exhibit 1, square footage is provided to the human resources department. Many resource interdependencies are direct and obvious; however, it is not always practical to establish direct relationships, hence the need for a second method.

EXHIBIT 1: EXAMPLE RESOURCE INTERRELATIONSHIPS



An activity, as defined in activity-based costing (ABC) models, isolates a discrete portion of the output of a resource and is well suited to reflect the relationship. In relationship 1 Exhibit 1, for example, procurement purchases furniture for human resources. The second method uses the purchase order to charge human resources for services rendered. This first characteristic requires the accurate reflection of resource interrelationships. Moreover, it requires that the causal relationship be taken to its logical conclusion by placing the burden on the actual consumer of the resources.

RESOURCE INTERRELATIONSHIPS ARE OFTEN RECIPROCAL

Resources also perform services for each other, and often indirectly. Even within the limited representation in Exhibit 1, relationships can be complex. For example:

- Relationship 5 – Plant maintenance repairs utilities infrastructure.
- Relationship 3 – Utilities are consumed by facilities for lighting.
- Relationship 1 – Human resources performs payroll processing for procurement.
- Relationship 6 – procurement purchases cleaning materials for facilities.

This characteristic dictates a simultaneous, rather than a sequential, cost model to accurately model cost flows and correctly burden consumers of resources.

RESOURCE INTERRELATIONSHIPS ARE OUTPUT-QUANTITY BASED

Interrelationships are resource-output-quantity based as opposed to value based. For example, the number of hours a machine is used determines the number of kilowatt-hours it consumes, which in turn determines electricity cost.

Hence a causal relationship exists between the consuming resource pool output quantity (i.e., number of machine hours) and the supporting resource pool output quantity (i.e., the number of kilowatt-hours). (It should be noted that some resource-pool to resource-pool relationships can be expressed in output quantities that are not as entirely proportional as those in the illustrations used. These are discretionary and fixed-quantity consumptions of support resource output, which will be discussed in a later section.)

This output-quantity to output-quantity relationship applies to all resource relationships, even those not traditionally viewed as quantity based. In relationship 4, for Exhibit 1, for example, as plant maintenance output increases demand for general materials - that technicians use in executing work – will increase, demand for procurement activities will also increase. This leads to more purchase orders and, therefore more procurement labor hours. Consequently, the same output quantity correlation exists between plant maintenance hours and procurement hours. To reflect this third characteristic output quantities must be used to define relationships.

CHANGING NATURE OF COST AT THE TIME OF CONSUMPTION

Interrelationships affect the nature of cost as quantities flow through the cost model. It should be noted that all consumers of resources, such as other resources, products, and profitability segments, can cause changes in the nature of cost at the time of consumption. Even the classic variable cost – electricity – is affected. Consider an automotive manufacturer, for example, that invested in a furnace to melt aluminum ingots for casting of gearbox housings.

The furnace produces molten metal for only two eight-hour shifts. As a result of the cost incurred to reheat the furnace before the first shift, it is kept running around the clock. During the third shift, a temperature is maintained just above the melting point for aluminum, and electricity cost incurred during this time is considered a fixed cost. During regular production shifts, electricity consumed over and above the fixed amount is proportional to furnace output.

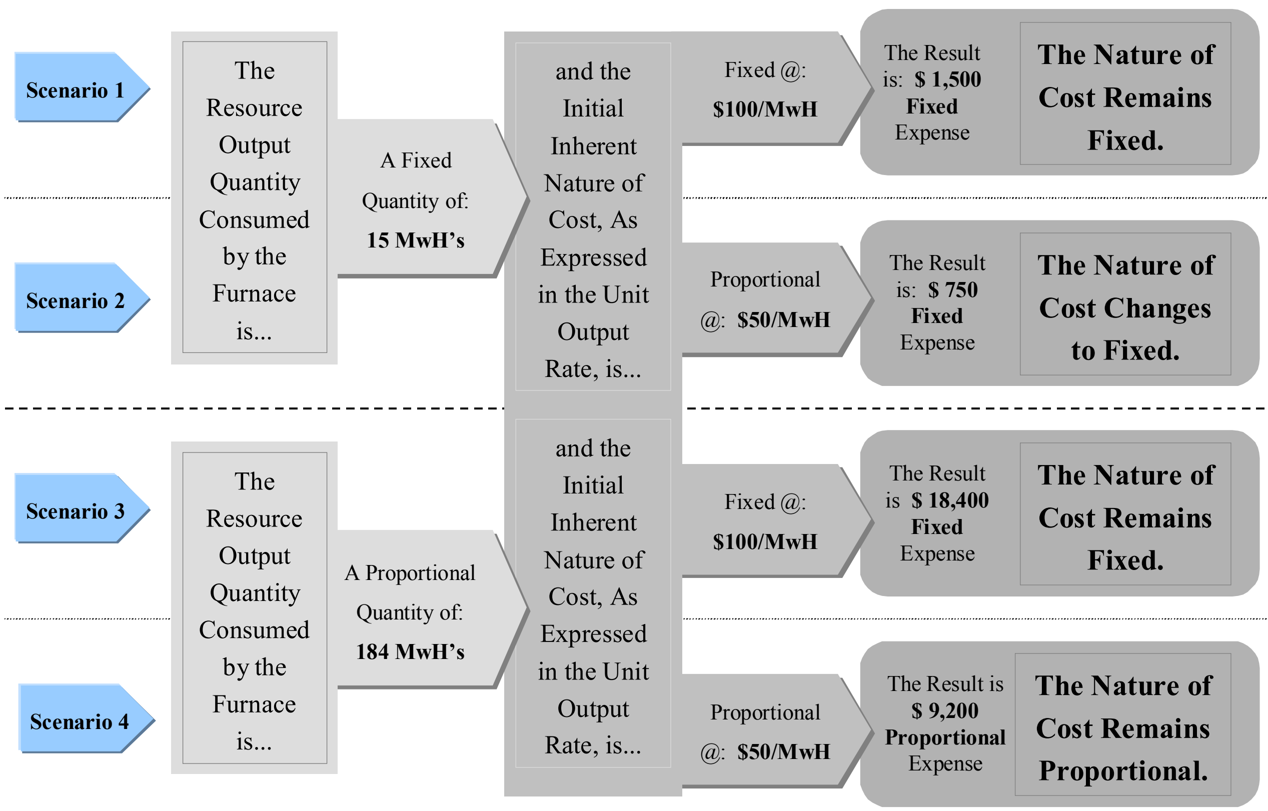
The furnace consumes megawatt-hours (MwH's) from utilities; 15 MwH's during the third shift and 184 MwH's during the shifts in which it is actually being used. Utility output has a fixed cost rate of $100 per MwH and a proportional cost rate of $50 per MwH. Exhibit 2 illustrates the following four possible scenarios and the impact on the nature of cost during consumption for each:

- **SCENARIO 1** – The MwH's consumed is fixed (Qty 15) and the cost rate is fixed (i.e., $100 per MwH). The result is $1,500 of fixed cost. Because the MwH quantity consumed is fixed and the initial inherent nature of cost is fixed, the cost is a fixed cost to the furnace. Under Scenario 1 the nature of cost remains fixed.
- **SCENARIO 2** – The MwH's consumed is fixed (Qty 15) and the cost rate is proportional (i.e., $50 per MwH). The result is $750 of fixed cost. Because the MwH quantity consumed is fixed the cost becomes a fixed cost to the furnace. Under Scenario 2 the initial inherent nature of cost changes from proportional to fixed.
- **SCENARIO 3** – The MwH's consumed is proportional (i.e., 184 MwH's) and the cost rate is fixed (i.e., $100 per MwH). The result is $18,400 of fixed cost. Although the MwH quantity

consumed is proportional the cost for utilities is a fixed cost to the furnace because the initial inherent nature of cost is fixed. Under Scenario 3 the nature of cost remains fixed.

- **SCENARIO 4** – The MwH's consumed is proportional (i.e., 184 MwH's) and the cost rate is proportional (i.e., $50 per MwH). The result is $9,200 of proportional cost. Since both the MwH quantity consumed and the initial inherent nature of cost are proportional the cost remains a proportional cost to the furnace. Under Scenario 4 the nature of cost remains proportional.

EXHIBIT 2: THE NATURE OF COST CHANGES DURING CONSUMPTION



Note, costs can only become more fixed as they flow through the cost model. In addition, building on the process cost curve introduced in the first article (see "The Case for RCA: Excess and Idle Capacity," Journal of Cost Management Volume 15, Number 4), Sidebar A highlights the implications for ABC information in light of the changing nature of cost. This fourth characteristic of resource interrelationships requires the accurate reflection of the changing nature of cost.

SIDEBAR A: THE CHANGING NATURE OF COST AND ABC INFORMATION

The principles inherent in resource consumption accounting have two implications for activities and the nature of cost. First, the consuming resource pool alone determines the change in the nature of cost. Therefore in relationships expressed in terms of activities, the nature of cost is not influenced by the activity. As illustrated, in the first article in this series, activities serve as vessels for resource cost transmission, both for value and the nature of cost according to resource interrelationships.

Secondly, since the value chain does not influence the nature of cost, the resource output that activities consume is proportional quantity consumption. The costs of a process are not 100% proportional/variable. Instead the resource output quantity being consumed carries inherent proportionality. This is in accordance with the recognition that resources can be fungible. Resources typically used to perform a particular activity, that is not currently being performed, are available to perform other activities or the resources remain idle. ABC correctly focused on operationally meaningful units – activities, but could benefit from a more accurate understanding of the resources those activities consume in order to function. If activities are the smoke, then resources are the fire.

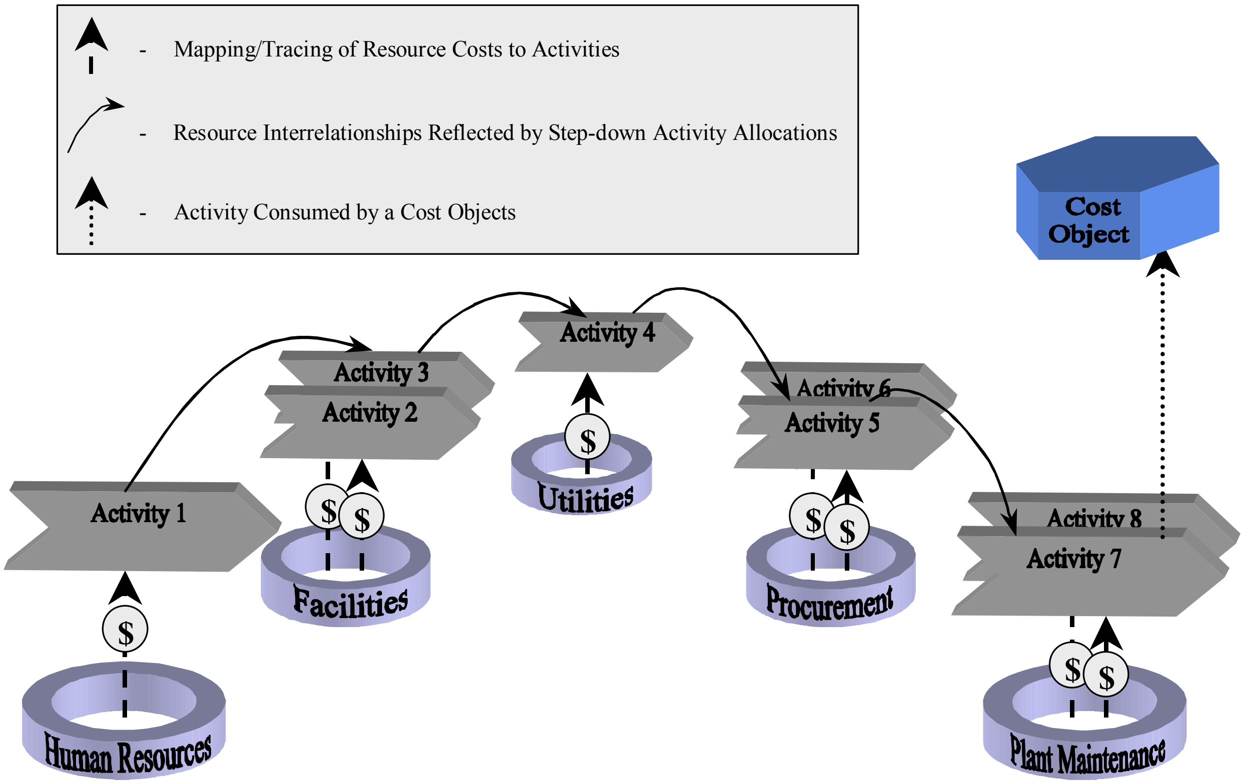
EXPRESSING RESOURCE INTERRELATIONSHIPS THROUGH ABC

As activity-based practices developed, a range of approaches surfaced to assign and allocate costs to reflect resource interrelationships. These vary from very simple, initially, to more advanced later in the 1990's. The two extremes on this continuum are:

- A simple two-phase method that maps/traces resources to activities and charges cost objects for the activities consumed.
- A four-phased method transfers expenses between cost centers, in cases where an activity adds no value (e.g., floor space), assign expenses to activities (i.e., mapping/tracing or quantities are used) allocates costs between activities (using either a step-down or simultaneous approach) and charges primary activities to objects.

A popular approach maps/traces resources to activities and allocates secondary activities to primary activities, before finally charging primary activities to cost objects (see Exhibit 3). Evaluating ABC's effectiveness to reflect resource interrelationships considers only the two extremes on the allocation continuum listed previously. The points made can be extrapolated to other ABC assignment and allocation methods.

EXHIBIT 3: REFLECTING RESOURCE INTERRELATIONSHIPS IN ABC



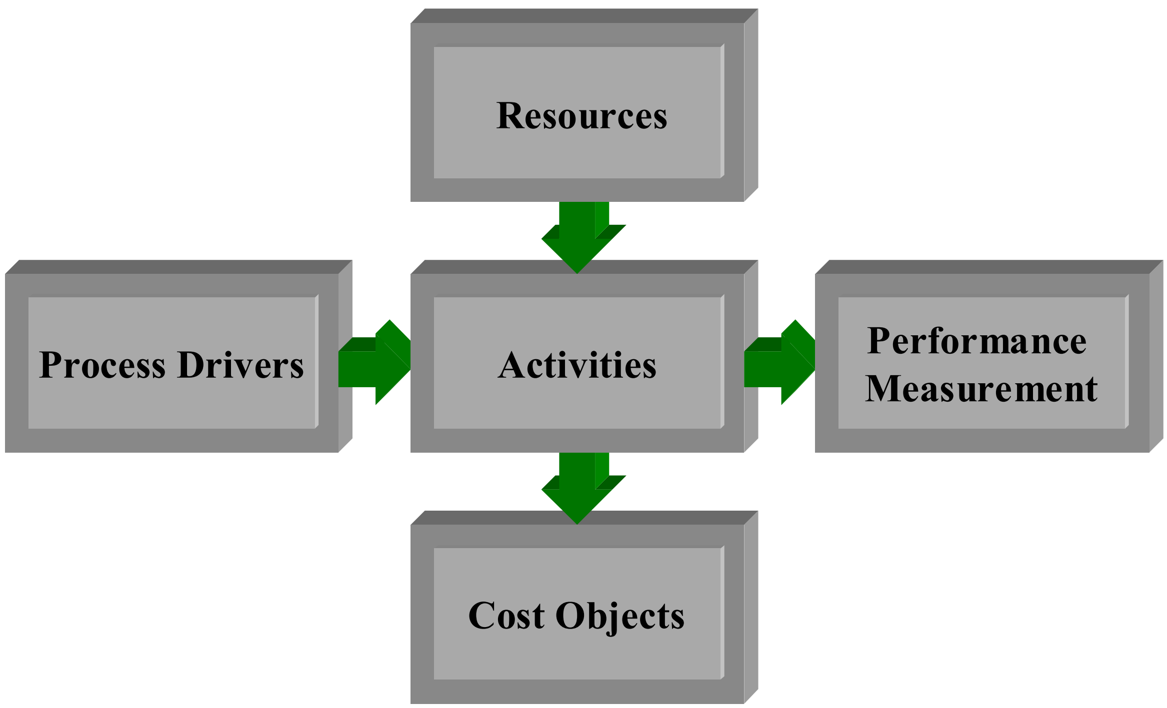
EVALUATING THE TWO-PHASE METHOD

The archetypal reference of this approach is the CAM-I cross, see Exhibit 4.[2] This method remains popular due to its simplicity and theoretical appeal. It reflects the four characteristics of resource interrelationships as follows:

- **Interrelationships are functions of the resources deployed** – Note that attention is focused on activities without attendant consideration being given to resource interrelationships. Costs are mapped/traced to activities and then activities are charged to cost objects.

- **Interrelationships are often reciprocal** – These relationships are not reflected.
- **Interrelationships are resource-output-quantity based** – Mapping/tracing seldom if ever uses carefully understood resource output quantities.
- **Interrelationships affect the nature of cost** – The changing nature of cost is not considered.

EXHIBIT 4: THE CAM-I CROSS



EVALUATING THE FOUR-PHASE METHOD

This method evolved from the two-phase method as the theoretical simplicity of the two-phase method was overwhelmed by the complexity of actual operational practice. This evolution happened gradually and is represented by movement along the allocation continuum from overtly simplistic to more realistic and sophisticated. The four-phased method more accurately reflects resource interrelationships but still falls short of sufficient resource insight:

- **Interrelationships are functions of the resources deployed** – Frequently, only limited direct consumption of services occur. Resource interrelationships are primarily reflected by allocations between activities.
- **Interrelationships are often reciprocal** – The need for simultaneous allocations is recognized. An activity focus prevails, however, and simultaneous allocations usually occur only between activities and not between resources and also not between activities and resources.
- **Interrelationships are resource-output-quantity based** – Recognition for quantity-based relationships has surfaced among the best ABC thought leaders, however it is not widely used in practice.[3]
- **Interrelationships affect the nature of cost** – The changing nature of cost is not reflected.

INACCURATELY REFLECTING RESOURCE INTERRELATIONSHIPS

If resource interrelationships are insufficiently reflected, several implications exist for ABC relating to:

- Cost model complexity.
- Cost model flexibility.

- Cost model maintenance.
- Accuracy of data and quality of decision support.

These items are discussed in the following section.

Implications Relating to Cost Model Complexity

If an ABC model were to reflect resource interrelationships, the model would quickly become more complex. Reflecting the interrelationships at the activity level leads to a proliferation of associations. For example, in a one-way relationship between two resource pools, where each resource pool performs 5 activities, 25 relationships must be established – that is, five senders to each of five consumers compared to the original single relationship. In a reciprocal relationship, this number doubles to 50 compared to 2. In a full-blown simultaneous cost model the number of relationships becomes prohibitively large.

Implications Relating to Cost Model Flexibility

A complex cost model is inherently less flexible, a problem exacerbated by mapping/tracing costs, a method akin to hard coding variables in computer code. This rigidity results from using percentages, ratios or fixed amounts for allocating costs. Once the relationship is defined, for example 40% of account 123 to activity ‘XYZ’, it is cast in stone, until a model redesign is discussed and approved.

In practice, resource-to-resource and resource-to-activity relationships change continuously, but typical ABC cost models only change when human intervention redefines and recodes the relationship. In addition, using the ABC method, this inflexibility can apply to relationships established among activities. Moreover, normal fluctuations occur in the mix of activities that a department performs and the cost model quickly becomes outdated.

Implications Relating to Cost Model Maintenance

A cost model, unable to adjust automatically to change, demands high maintenance to remain current. Using an ABC approach, cost models are arrived at through a project-sized effort of interviews, documentation, reconciliations, and test models. If some or all of these tasks must be revisited, frequent updates become cost prohibitive, if not impossible. ABC models are therefore updated infrequently in practice (e.g., every 3 to 6 months and in some cases, annually).

Implications Relating to Data Accuracy and Decision Support

Attempting to strike a balance between maintenance and inflexibility, ABC models can compromise accuracy; therefore, at any point in time, the model may not reflect the environment that it strives to mirror. Moreover, a typical ABC model has the primary aim (almost a preoccupation) of flowing costs to activities. This means that the real consumers of support services (i.e., resource pools) are not burdened with all attributable costs.

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Each resource pool serves as the source of costs for its own activities and is unable to pass fully burdened costs onto them. This has negative implications for accuracy of costs on activities and products. Also, the lack of a simultaneous cost model negatively impacts accuracy. Finally, ABC does not reflect the changing nature of cost at the time of consumption. (As shown in the final article in this series, these factors have considerable implications for decision support.)

RCA AND RESOURCE INTERRELATIONSHIPS

The question remains whether RCA methods can resolve these issues. To begin to answer that question examples of the direct and the intermediary object methods of expressing resource interrelationships are discussed next. Before presenting these, two further classifications of resource pools and costs are introduced - namely, primary and secondary resource pools and primary and secondary costs. As an integral part of the solution their application is demonstrated in subsequent sections and in the final article in the series. (For more information on these concepts, see Sidebar B.)

RCA: The Direct Method of Expressing Resource Interrelationships

Returning to the automotive manufacturer example cited earlier, the following discussion details the RCA solution for the direct method of expressing interrelationships. – see Exhibit 5 If the planned output quantity of the utility resource pool is measured in MwH's and the total planned output is 500 MwH's, and the proportional amount of primary electricity cost is $75,000 (no fixed amount) then the utility cost per MwH is $150 ($75,000/500 = $150).

SIDEBAR B: PRIMARY AND SECONDARY RESOURCE POOLS AND COSTS

Primary resource pools perform activities that result in saleable goods and services or contribute directly to saleable goods and services, for example, production departments, marketing, distribution and customer complaint departments. [See W. Kilger *Flexible Plankostenrechnung und Deckungsbeitragsrechnung,* 10th edition updated by K. Vikas. (Gabler, Wiesbaden, Germany. First published in 1961), p. 316.]

Secondary resource pools provide support services to primary and other secondary resource pools. (See Kilger: 330.) Examples include human resources, IT support and facilities.

Primary costs are costs that are incurred initially and directly in a resource pool. (See Kilger: 570.) For each resource pool with people, salaries and fringe benefit are examples. For machines, depreciation is an example.

Secondary costs are costs that a resource pool incurs because of resource output consumed from secondary resource pools. (See Kilger: 566.) Note that primary expense elements reflect the initial inherent nature of cost, as illustrated in the first article. Secondary expense elements reflect the changing nature of costs at the time of consumption.

If the planned output for the furnace resource pool is measured in kilograms (Kgs), of molten aluminum and the planned output is 2,000 Kgs, the fixed amount of equipment depreciation, is $125,000 (no proportional amount).

EXHIBIT 5: QUANTITY-BASED RELATIONSHIPS BETWEEN TWO RESOURCE POOLS

Section A: The Utility Resource Pool			Output Measure: **Megawatt-hours** Output Quantity: **500 MwH's**	
Primary Costs:			*Fixed Amount*	*Proportional Amount*
Electricity Cost			0	$ 75,000
Secondary Costs:				
None	-	-	0	0
			$0	**$75,000**
		Utility Output Unit Cost Rates:	$ 0	$ 150
Section B: The Furnace Resource Pool			Output Measure: **Kgs of Molten Aluminum** Output Quantity: **2,000 kgs**	
Primary Costs:			*Fixed Amount*	*Proportional Amount*
Equipment Depreciation			$ 125,000	$ 0
Secondary Costs:	*Fixed Qty*	*Proportional Qty*		
Utilities: Megawatt-hours	45	184	$ 6,750	$ 27,600
			$ 131,750	**$ 27,600**
		Furnace Output Unit Cost Rates:	$ 65.88	$ 13.80

Consumption rates are key to RCA calculations. In this example for every kilogram of molten aluminum produced, the furnace consumes 0.092 MwH's i.e. (0.092 x 2000 = 184) - a proportional quantity consumption. The relationship between the two resource pools is expressed in output quantities in the secondary cost section. Proportional electricity cost is calculated as $27,600 (184 MwH's x $150). The furnace proportional rate, therefore, is $13.80 ($27,600/2,000 Kgs). Moving to the fixed calculation, the previously mentioned "third shift" comes into play. The furnace is left switched on during the third shift and consumes 15 MwH's during this time - a fixed quantity consumption.

Therefore, in addition to fixed equipment depreciation cost ($125,000), fixed electricity cost per shift is calculated as $2,250 (15 x $150). For the three shifts fixed electricity cost is $6,750 (45 x $150). Since the quantity consumed is fixed, all of the dollars associated with this quantity become a fixed cost. Thus the total fixed cost comes to $131,750 and the furnace fixed rate is $65.88 ($131,750/2,000 Kgs).

RCA: The Intermediary Object Method of Expressing Resource Interrelationships

Exhibit 6 illustrates the plant maintenance and procurement example introduced above. In Section A, the procurement resource pool has an output measure 'procurement labor hours' and an output quantity of 15,000 hours. Primary cost is for personnel salaries, fixed salary is for the manager. The 3,000 square feet of floor space occupied results in $75,000 of fixed secondary cost. Procurement labor hours have unit cost rates of $9 fixed and $40 proportional.

Section B shows the activity ‘procure general materials’, with a planned activity output of 210 purchase orders. No primary cost is incurred. The activity consumes 0.5 procurement labor hours per purchase order, a total planned consumption of 105 procurement labor hours. The unit cost rates per purchase order for general materials are $4.50 fixed and $20 proportional.

In Section C plant maintenance has an output measure of maintenance labor hours and a planned output quantity of 20,000 hours. Primary costs for wages of $900,000 are planned, the fixed amount is for crew chief salaries. Secondary costs are incurred from procurement for general material purchase orders, both fixed and proportional quantities are consumed. The fixed quantity consumed (Qty 10) is for the machines in the maintenance workshop that must be maintained even if maintenance output drops significantly. The proportional quantity consumed is for general materials technicians use in executing their work. One purchase order is required for every 100 maintenance hours worked. Secondary costs are calculated as follows. Costs associated with the 10 fixed units consumed become a fixed cost, i.e. 10 x ($4.50 + $20) = $245. Moreover, the proportional quantity consumed also bears fixed costs i.e. 200 x ($4.50) = $900. Thus total secondary fixed procurement cost is $1,145 ($245 + $900). The total proportional procurement cost is calculated as 200 x $20 = $4,000.

EXHIBIT 6: QUANTITY-BASED RELATIONSHIP WITH AN ACTIVITY TO A RESOURCE POOL

Section A: Procurement Resource Pool			Output Measure: **Procurem. Labor Hrs** Output Quantity: **15,000 hours**	
Primary Costs:			*Fixed Amount*	*Proportional Amount*
Procurement Salaries			$ 60,000	$ 600,000
Secondary Costs:	*Fixed Qty*	*Proportional Qty*		
Facilities: Square Feet	3,000	-	$75,000	$ 0
			$135,000	**$600,000**
		Output Unit Cost Rates:	$ 9.00	$ 40.00
Section B: Activity – Procure General Materials			Activity Driver: # **of Purchase Orders** Driver Quantity: **210 units**	
Primary Costs:			*Fixed Amount*	*Proportional Amount*
-			$ 0	$ 0
Secondary Costs:	*Fixed Qty*	*Proportional Qty*		
Procure: Labor Hours	0	105	$ 945	$ 4,200
			$ 945	**$ 4,200**
		Activity Output Unit Cost Rates:	$ 4.50	$ 20.00
Section C: Plant Maintenance Resource Pool			Output Measure : **Maint. Labor Hours** Output Quantity: **20,000 hours**	
Primary Costs:			*Fixed Amount*	*Proportional Amount*
Maintenance Technician Wages			$100,000	$ 800,000
Secondary Costs:	*Fixed Qty*	*Proportional Qty*		
Procure: # Purchase Orders	10	200	$ 1,145	$ 4,000
			$ 101, 145	**$ 804,000**
		Output Unit Cost Rates:	$ 5.06	$ 40.20

Similar to the interrelationships between resource elements introduced in the first article, more complex relationships can also exist between resource pools. One such example is the relationship between plant maintenance and HR for the activity 'Process Overtime Tickets'. This relationship depends on plant maintenance first exceeding its standard capacity before overtime applies. Hence, the relationship is linear depending on reaching a threshold value of output.

RESULTS FOR RCA

For both methods of expressing the interrelationships RCA is able to reflect all the characteristics of resource pool interrelationships effectively. It does so by

- reflecting the initial inherent nature of cost,
- using quantities to express the relationships, and
- accurately reflecting the changing nature of cost at the time of consumption in a simultaneous cost model.

ADVANTAGES OF THE RCA APPROACH

The implications of ABC's current inability to fully reflect resource interrelationships were discussed above. In the next sections, the advantages of the RCA approach are discussed under the same categories.

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Implications Relating to Cost Model Complexity

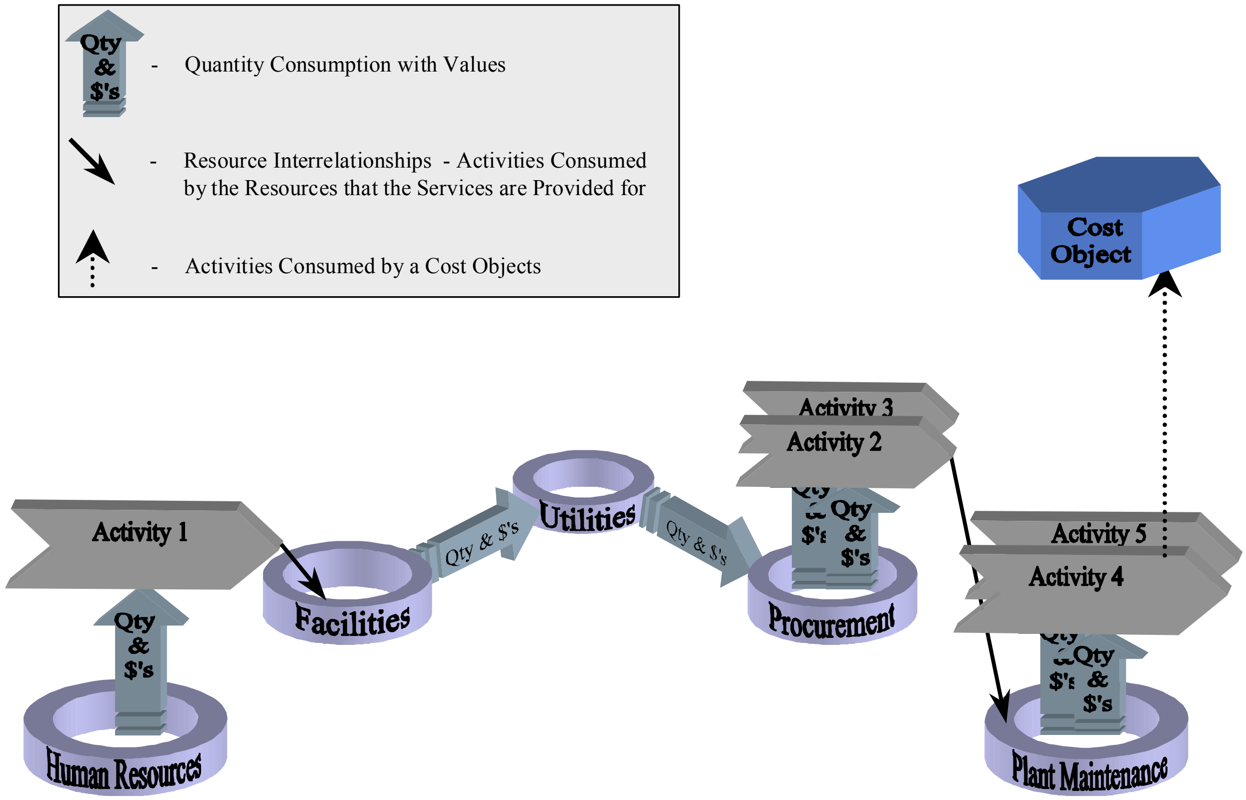
RCA will require fewer relationships to be defined. Use can be made of direct resource-to-resource relationships. Moreover, activities will charge their consumers directly, one consumer per resource pool instead of many activities in ABC, leading to a significantly reduced number of consumers and relationships to be defined and maintained (see Exhibit 7). Because individual relationships are quantity based, however, they will be more complex.

Implications Relating to Cost Model Flexibility

Contrasting ABC, an RCA model does not depend on redefinition of relationships to keep the model current. Instead, relationships are based on unit quantity standards for output-to-output correlation. For example, in Exhibit 6, if maintenance output declines from 20,000 to 18,000 hours, only 180 proportional purchase orders will be required, demand for procurement output hours will likewise decrease.

Consequently, only one driver in a chain of events needs to be collected (e.g. maintenance output). Other drivers (number of purchase orders and procurement hours) can be imputed as needed. Moreover, to the extent that unit quantity standards are used throughout a cost model, one dependent variable leads to a series of related adjustments. A cost model based on RCA principles is therefore inherently more flexible and able to adapt to changes in the environment without the need for human intervention.

EXHIBIT 7: REFLECTING RESOURCE INTERRELATIONSHIPS IN RCA



IMPLICATIONS RELATING TO COST MODEL MAINTENANCE

As a result of reduced complexity and enhanced flexibility, RCA eliminates the ABC problems in keeping relationships current and dynamically assigning costs where they are consumed. From a systems perspective it is possible to introduce a set-and-forget-environment, (i.e. SAFE system), where the model is defined once and thereafter adapts to changes automatically, within certain parameters.

Implications Relating to Data Accuracy and Decision Support Quality

All four of the characteristics of resource pool interrelationships are reflected in a comprehensive simultaneous model, which provides more accurate data. Moreover, having eliminated the ABC compromise; balancing maintenance and inflexibility RCA enables accurate ABC information on a perpetual basis. Highly relevant data is supplied and decision support is enhanced.

PROCESS VIEW OF COSTS AND FULLY BURDENED RESOURCES

If the RCA approach is examined from a purely ABC perspective, the likely reaction is that the process view of cost is lost to some degree. Costs flow directly between resource pools without going through activities and, worse still, resources consume activities. Two challenges of the process view warrant more discussion. First, the process view of costs and causal cost flows are not synonymous. Second, it is a serious oversight to fail to provide fully burdened resource costs.

The Process View of Costs and Causal Cost Flows are not Synonymous

Attempts to mimic the causal consumption patterns that are the result of resource interrelationships within activities is cumbersome and, at best, results in an approximation. On the other hand, in resource consumption accounting, with interrelationships explicitly reflected, more accurate fully burdened activity costs are obtained. Hence, not only is the process view of costs and causal relationships not synonymous, the accuracy of the former is dependent on not equating causal cost flows to perceived direct process interrelationships.

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Fully Burdened Resource Costs are Essential

Explicitly reflecting resource interrelationships results in resource pool with all attributable costs assigned. These serve as the source of costs for their respective activities. The resultant fully burdened activities have the following advantages:

- More accurate activity costs.
- More accurate product costs.
- More effective decision support.

More effective decision support is particularly crucial because it is closely related to the fixed cost death spiral, an area in which ABC has been known to fail to supply adequate information.

CONCLUSION

In the previous sections, three shortfalls of ABC related to resource interrelationships have been addressed. Eight shortfalls were examined in the first article in the series; therefore one shortfall remains - ABC provides inferior information for effective resource management and certain strategic decisions. This final point will be addressed in the last article in this series. A fully developed example of a resource pool within the resource consumption accounting solution will be used to illustrate how fully burdened resource costs can be used for enhanced product make-buy and resource outsourcing decision support.

EDITORS' NOTE:

This is the second in a series of articles on RCA by Anton van der Merwe and David Keys. The introductory article, "The Case for RCA: Excess and Idle Capacity," appeared in the July/August 2001 issue of the Journal of Cost Management (Volume 15, Number 4). In the introductory article, the authors built on predecessors' developments in German cost accounting, and on seminal work by such industry theorists as Robert S. Kaplan and Robin Cooper. Kaplan and Cooper set the foundations for measuring and managing activities that consume an organization's resources in several articles from 1990 to 1995 and in their 1998 book, *Cost and Effect*.

The first RCA article highlighted the following eight shortfalls of viewing resources from an activity-based costing perspective:

1. Visibility of a homogeneous measure of capacity is not incorporated.
2. The interrelationships between resource elements are only indirectly expressed.
3. The initial inherent nature of cost is not reflected.
4. Excess/idle capacity is not properly accounted for.
5. Interrelationships between resource pools are only indirectly expressed.
6. The changing nature of cost at the time of consumption is not reflected.
7. Fully burdened resource costs are not provided.
8. Inferior information is provided for effective resource management and certain strategic decisions.

In the first article, the authors address the first four shortfalls by introducing RCA as the complementary solution that provides focus on and more direct expression of the interrelationships between resource elements.

This second article in the series will be especially helpful for managers who are using ABC systems first implemented 5 to 10 years ago, and that have undergone minimal design changes since then. RCA concepts can assist in updating such models to deliver more valuable decision-making information.

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2. *The CAM-I Glossary of Activity Based Management.* Edited by Norm Raffish and Peter B.B Turney. Arlington, TX. 1991.
3. *Driving Value Using Activity Based Budgeting.* James A. Brimson and John Antos. New York. John Wiley and Sons. 1999. p. 78 – 86. In particular p.79 and 80 where a rate per machine hour is calculated before costs are charged to activities. See also Chapter 8 'Creating An Activity Budget with Features.'

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