

*Activity-based costing is better for long-term decision making while a leading German cost accounting method supports short-term decisions more effectively.*

# Relevance Added: Combining ABC with German Cost Accounting

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### Are you familiar with Grenzplankostenrechnung?

Translated from German, it roughly means “flexible margin costing.” Flexible margin costing, or GPK, is a time-tested cost accounting system used by many companies in German-speaking countries. GPK is about marginal costing instead of full costing, short-term decision support instead of long-term, and cost centers instead of activities and processes. And by combining activity-based costing (ABC) with GPK, you can add relevance to your cost accounting system.

Management accounting has long been more important to companies in German-speaking countries, such as Germany, Austria, and Switzerland, than to companies in the United States. This perhaps can be attributed to the external accounting rules in German-speaking countries, which put the interests of creditors before those of shareholders. In contrast, financial accounting provides little guidance for management decision making. Thus the need for a sophisticated cost accounting system—explicitly for management decision making—is paramount.

Meanwhile, in the U.S., the cost accounting system that has attracted the most attention since the mid-

1980s has been ABC.

In this article, we’re going to describe the principles of both GPK and ABC and analyze the differences between the two. First, let’s delve into the details of GPK.

### GPK UNPACKED

GPK was developed in the 1950s and 1960s by Hans-Georg Plaut, a practitioner, and Wolfgang Kilger, a cost accounting researcher. Both Plaut and Kilger were focused on developing cost accounting methods to support decision making. After its development, GPK became arguably the most important cost accounting system for industrial firms in German-speaking countries. In the past 20 years, its success can be at least partly attributed to the advent of SAP’s enterprise resource planning (ERP) software because SAP offers the conceptual framework of GPK for cost accounting as part of its management accounting module.

Similar to direct costing, the most important idea behind GPK is that fixed costs aren’t charged to products. If they were, managers would be induced to make incorrect short-term decisions, such as for pricing and make-



or-buy decisions. In practice, however, GPK can be combined with a multilevel allocation of fixed costs.

The fundamental structure of GPK, shown in Figure 1, follows the structure of basic cost accounting systems taught in the business schools of universities in German-speaking countries. GPK consists of four important elements: cost-type accounting, cost center accounting, product cost accounting, and contribution margin accounting for profitability analysis.

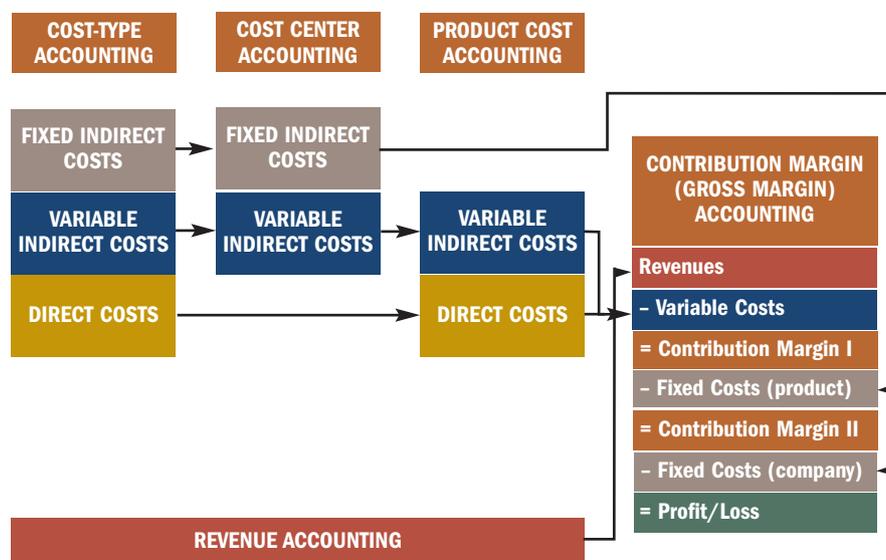
Cost-type accounting, seen in Table 1, separates different cost types, such as labor, material, and depreciation. In contrast to most U.S. cost accounting systems, GPK and other German systems also include interest as a cost type. Each cost type is decomposed into variable and fixed costs along with the assignment of costs to cost centers. As linear cost functions are assumed, variable unit costs are constant with respect to output. Obviously, this decomposition can't be done for each cost type, but it has to be made for each accounting transaction.

Cost-type accounting leads us to one of the most important elements of GPK: cost center accounting. A cost center is a relatively small entity with a robust and

quantifiable relationship between its costs and a single activity, and it is typically composed of around 10 workers or less. Firms usually have multiple cost centers for such areas as manufacturing, material, administration, sales, and R&D. Cost centers usually have one or a few cost drivers, and they determine the relationship between variable costs and the output of the cost center. This simplicity allows for detailed cost planning of each cost center, with cost functions that describe the relationship between costs and output. Aggregating this data over all cost centers allows for flexible, output-dependent planning scenarios. This detailed planning procedure also has advantages for monitoring cost centers, something GPK emphasizes. Comparing planned and realized costs at the cost-center level provides early and detailed information about emerging problems. You can determine the causes and measures of those variations by using sophisticated variance analysis instruments, and human behavior can be influenced effectively at the cost-center level by tying a manager's compensation and advancement to the performance of his or her cost center.

GPK uses two different types of cost centers: primary

Figure 1: The Basic Structure of GPK



to products the cost of direct labor and direct material as well as the variable costs of the final cost centers—the latter assigned using specific charge rates. As a result, only the variable costs of each product are shown in product cost accounting. Although this contradicts the basic principles of GPK, fixed costs can also be allocated to products in a parallel calculation for mid- and long-term purposes. To keep the distinction between variable and fixed costs, the fixed-cost calculation is separate from the variable cost calculation. Fixed costs usually are allocated by a sur-

charge as a percentage of variable costs. The final element of GPK is contribution margin accounting, shown in Table 2. In the U.S., the contribution margin after accounting for fixed product costs is normally referred to as gross margin. This completes the cost accounting system by adding the revenues and the fixed costs to product cost accounting. Here the contribu-

cost centers and final cost centers. Primary cost centers cover activities that are relatively far away from the manufacturing process, such as plant management. Final cost centers are closely connected to the manufacturing process. This distinction is necessary because it isn't possible to assign the costs of a primary cost center directly to products. Therefore, costs of primary cost centers are charged to final cost centers, which are connected more closely to products. This gradual assignment allows for a more precise calculation of product costs. Among the costs of the primary cost centers, only variable costs are charged to final cost centers. In Table 1, the variable costs of Maintenance, a primary cost center, are \$77,000. This is charged to Manufacturing, a final cost center. Otherwise, the distinction between variable and fixed costs would blur during the allocation process.

After this cost assignment, there are no longer variable costs on primary cost centers, yet the variable costs of each final cost center can still be obtained easily by adding them together. Only the variable costs of the final cost centers are charged to cost objects in product cost accounting.

Product cost accounting assigns

charge as a percentage of variable costs.

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Table 1: Cost Assignments to Primary and Final Cost Centers

Primary Cost Center: Maintenance						
COST TYPE	UNIT OF MEASURE	QUANTITY	COST PER QUANTITY	TOTAL COSTS	VARIABLE COSTS	FIXED COSTS
Labor	hours	1,800	20	36,000	36,000	
Benefits	\$	36,000	0.5	18,000	18,000	
Tools	\$			12,000	8,000	4,000
Depreciation	\$			40,000	15,000	25,000
Interest Costs	\$			10,000		10,000
<b>Total</b>				<b>116,000</b>	<b>77,000</b>	<b>39,000</b>

Final Cost Center: Manufacturing I						
COST TYPE	UNIT OF MEASURE	QUANTITY	COST PER QUANTITY	TOTAL COSTS	VARIABLE COSTS	FIXED COSTS
Labor	hours	3,600	20	72,000	72,000	
Benefits	\$	72,000	0.5	36,000	36,000	
Tools	\$			15,000	8,000	7,000
Depreciation	\$			70,000	30,000	40,000
Interest Costs	\$			22,000		22,000
<b>Total</b>				<b>215,000</b>	<b>146,000</b>	<b>69,000</b>
Assigned Costs from Maintenance				77,000	77,000	
<b>Total</b>				<b>292,000</b>	<b>223,000</b>	<b>69,000</b>

**Table 2: Layered Contribution Margin Analysis**

	DIVISION I			DIVISION II	
	PRODUCT GROUP A		PRODUCT GROUP B	PRODUCT GROUP C	
	PRODUCT 1	PRODUCT 2	PRODUCT 3	PRODUCT 4	PRODUCT 5
Revenues	14,960	5,760	13,800	12,840	9,800
Variable Costs	10,259	2,257	9,278	8,021	4,791
Contribution Margin I	4,701	3,503	4,522	4,819	5,009
Fixed Costs, Product	0	0	100	0	0
Contribution Margin II	4,701	3,503	4,422	4,819	5,009
Fixed Costs, Product Group	150		0	250	
Contribution Margin III	8,054		4,422	9,578	
Fixed Costs, Division	4,295			4,795	
Contribution Margin IV	8,181			4,783	
Fixed Costs, Company	690				
Profit	12,274				

tion margin of each product can be obtained by subtracting variable costs from product revenues. This supports many short-term management decisions because they are based on contribution margin rather than product costs. Moreover, the structure of GPK allows for more detailed analyses. By subsequently subtracting the relevant fixed costs from the contribution margin, different contribution margins on different layers can be obtained. For example, if there are fixed research and development or advertising costs for a small product group, these costs are subtracted from the product group's contribution margins. This type of layered contribution margin analysis not only supports short-term decision making, but it gives recommendations for long-term decisions.

Based on the principles and structure described above, GPK is able to support many short-term management decisions, such as the optimal production plan, make-or-buy decisions, pricing decisions, or internal transfer pricing. Moreover, costs are highly transparent, which helps influence the behavior of employees and identify potential weaknesses. These advantages are a major reason for the prevalence of GPK in large industrial firms in German-speaking countries.

### ACTIVITY-BASED COSTING

In the mid-1980s, significant changes made to the cost structures of U.S. companies left managers unhappy with traditional management accounting systems. According to two *Harvard Business Review* articles, written by Jeffrey G. Miller and Thomas E. Vollman and Robin Cooper and Robert S. Kaplan, respectively, these changes served as the impetus for the development of ABC. It's worth noting that Germany already had a range of fully developed cost accounting systems at the time, including GPK. But before

ABC was developed, most companies in the U.S. used simple methods of overhead allocation and calculation. The most commonly used cost-allocation bases were direct labor hours, direct labor dollars, direct material, and machine hours (or a combination). With indirect activities such as production planning, quality control, maintenance, and R&D becoming more important, and, consequently, overhead costs capturing a larger share of total costs, overhead rates on direct labor would, in some instances, far exceed 1,000%.

Because of these sharply higher direct labor overhead rates, minor errors in assessing direct labor costs of individual products resulted in large errors of total costs of these products. Furthermore, a systematic error in the calculation of costs of different products is made when total costs aren't proportional to the cost allocation base employed. In particular, cost allocation bias results when output drives the allocation base but the allocated costs aren't proportional to output. This was less of a problem as long as direct labor and direct material represented the major part of costs and that products' cost structures remained relatively the same. But overhead costs don't depend predominantly on output. To a large extent, they depend on other cost drivers, such as number of product variants, product complexity, diversity of parts, and degree of automation. If overhead costs are allocated as a percentage surcharge on direct costs, the influence of these cost drivers isn't accounted for adequately. As a consequence, some products would be undercharged: those with product variants that are produced in small volumes; those that are very complex; those that are produced in highly automated, capital-intensive processes; or those that are marketed in small order sizes and distributed through expensive distribution channels.

ABC addresses this problem by linking overhead allocation to the activities that are carried out to produce and sell a product instead of to output or output-related measures. The basic idea is that overhead costs are caused by activities directly, not by products. The process for implementing ABC comprises the following steps:

- ◆ **Assess and develop a hierarchy of activities.** This can be done by conducting interviews with employees, such as cost center or department managers.
- ◆ **Determine the cost drivers for the different activities.** A cost driver measures the process output and the

**Table 3: Determining Activity Cost Rates**

PROCESS	COST DRIVER	COST-DRIVER VOLUME	ACTIVITY COSTS	ACTIVITY COST RATE
Production	Machine hours	5,000	200,000	40
Purchase order management	Number of purchase orders	1,200	9,600	8
Production planning	Number of production operations	2,000	10,000	5
Sales order management	Number of sales orders	1,500	22,500	15

process coefficients are computed by one over the corresponding lot or order size: They are averaged. The activity-oriented calculation of product costs aims at displaying the long-term costs created by a product. See Table 4.

use of an activity by a product. It serves as an allocation measure for products' process costs. The assessment of activities and the identification of their cost drivers are practicable for standardized repeated processes.

◆ **Estimate the planned costs of activities.** The costs of cost centers or departments are allocated to the different activities within the cost centers. This can be done by analytical cost planning or dividing costs proportionally based on a particular measure, such as labor time. Adding up the planned costs of activities yields the costs of aggregated processes.

◆ **Activity cost control.** Planned and realized costs of business activities are compared. Deviations are analyzed together with the responsible process owners. The responsibility for processes across cost centers is supposed to improve the overhead cost management.

◆ **Determination of activity cost rates.** Before product costs can be calculated, activity cost rates are determined. These are computed by the costs of the activities over cost-driver volume, which, again, involves dividing costs proportionally based on a particular measure. See Table 3.

◆ **Calculation of product costs.** Product costs are calculated by adding up direct costs, such as labor and material, and the process coefficients of a product—that is, the volume of a process used by a certain product—times the corresponding process cost rates. If one unit of a process is used by a single customer order of several products, the

ABC is used in Germany as well, though somewhat differently. In Germany, its application is concentrated on services and indirect processes though, even then, it is used infrequently. A 2002 study conducted by Klaus-Peter Franz and Peter Kajüter found that 47% of the large German companies used ABC in 2001, (compared to 52% in 1996), and half of these companies applied it only occasionally.

There are also different ABC approaches in Germany. As originally proposed by Cooper and Kaplan, ABC doesn't link activities and products. Consequently, cost allocations based on activities might be misleading. An alternative approach to ABC—known in Germany as process cost accounting (PCA)—only considers costs outside the manufacturing department. PCA pools activities with processes that produce some form of output, such as order fulfillment or procurement of raw material. And instead of single activities being assigned to products, the costs of these processes are assigned.

### GPK AND ABC COMPARED

Since GPK applies the marginal costing principle and, accordingly, allocates only variable costs to products, it provides adequate information for short-term decisions, such as a decision to accept or reject an additional order based on contribution margin information. It's also common for GPK to be extended by an additional full-cost calculation to add a long-term perspective. ABC, on the other hand, aims at allocating all the costs required to

produce and market a product in the long run. It focuses on long-term decisions such as product design and production, as shown in Table 5, and involves allocations of fixed costs that use assumptions about the proportionality of costs that normally won't be fulfilled, which makes ABC less suited for short-term decision making.

Though GPK allocates overhead costs on products via cost centers and ABC does it via activities and processes, the underlying formal structure of cost pools and cost drivers is similar. In fact, some companies use

**Table 4: Activity-Oriented Calculation of Product Costs**

COST ELEMENT	ACTIVITY COST RATE	ALLOCATED COEFFICIENT	ALLOCATED COSTS
Direct material	—	—	16
Production	40	2	80
Purchase order management	8	4 parts with purchase order size 16 6 parts with purchase order size 12	2 4
Production planning	5	12 operations with lot size 10	6
Sales order management	15	1 product with sales order size 3	5
Product unit costs			113

the cost center module of SAP for implementing ABC. This shows that the differences between GPK and ABC aren't about the structure of the systems but instead involve the types and number of cost drivers and the allocation of fixed costs. Both systems use direct cost drivers in production-related areas to measure the performance of cost centers and their activities, but ABC also employs nonoutput-related cost drivers such as product complexity and number of product variants, which is supposed to improve the manufacturing design and reduce the number of parts used. ABC also uses these cost drivers to allocate total costs on products. GPK, however, doesn't because charging fixed costs to products isn't in line with its principles.

In practice, GPK can be expanded by a multilayered allocation of fixed costs, which it often is. For example, this could be done at the product-variants level, which would account for this cost driver but wouldn't apportion fixed costs. If fixed costs are allocated in GPK for mid- and long-term purposes in a multilayered fashion, they are strictly separated from variable costs.

Both management accounting systems stress the issue of cost and profitability control, such as through variance analysis. An important difference between GPK and ABC is the distinct focus of ABC on the process owners' responsibility for their processes across cost centers and departments. This implies a horizontal, process orientation compared to GPK's vertical, functional one.

### SUPERIOR DECISION-SUPPORT ACCOUNTING?

All things considered, we think GPK is superior to ABC for making short-term decisions, primarily for short-run production decisions as well as short-run pricing, particularly for manufacturing companies. ABC's long-term perspective gives recommendations for product design and long-run production programs, yet long-term investment decisions actually require net present value analysis, restricting the relevance of ABC to a mid-term horizon. Combining GPK and ABC covers the short-term and the mid-term horizon. ABC emphasizes indirect areas of manufacturing and services. When it comes to cost control and cost management, GPK focuses on cost centers while ABC addresses process owners across functions.

ABC has the advantage here because it ensures continuous responsibility across interdependent activities. By combining GPK and ABC, cost control and cost management have a cost center and process perspective.

There are advantages in combining GPK and ABC, especially as the importance of indirect costs increases. But a permanent ABC system that delivers detailed cost information of single activities on a monthly basis like GPK would be very expensive in most instances. An alter-

**Table 5: Comparison of GPK and ABC**

	GPK	ABC
Character of cost accounting system regarding cost separation	Marginal costing	Full costing
Decision relevance	Short-term decisions	Mid-term orientation
Allocation of overhead costs on products is via	Cost centers	Activities and processes
Cost drivers	Output-related	Also nonoutput related cost drivers such as product complexity and product variants
Cost responsibility/cost consciousness	Cost center managers	Process owners across cost centers
Implied form of organization	Vertical	Horizontal

native solution for companies already using GPK could be to define cost centers in indirect areas in order to improve planning and control of the principal activities' costs. Yet another widely practiced alternative is to employ ABC on a case-by-case basis only, such as for the development of new products.

For U.S. companies with an ABC-system in place, there would be substantial costs for adopting a new GPK system. But having a look at the existing ERP system could bring a pleasant surprise. If its functionality already comprises elements of GPK, the necessary investment for a GPK system may be manageable. ■

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