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SPOTLIGHT ON ACTIVITY-BASED COSTING
CLAIRE LEE, GRACE TAYLOR, GARY KAPANOWSKI, AND GARY COKINS
Welcome to this November/December special issue of Cost Management, which centers on activity-based costing (ABC). For most accountants there is confusion with how to allocate costs to products, service lines, channels, and customers. In 1987, the famous Harvard Business School Professor Robert S. Kaplan co-authored the book Relevance Lost — The Rise and Fall of Management Accounting. The authors describe ABC as the solution to standard costing for reliable and reasonably cost allocations. Without ABC the reported costs are flawed and misleading. Most organizations allocate indirect expenses, commonly referred to as overhead, like spreading butter across bread using non-causal and broadly averaged cost allocation factors. Examples are the number of direct labor input hours, sales volume, or head count. None of those reflect the true consumption of the indirect expenses. Sadly, the adoption rate of ABC, where it is applicable, has been slow. The purpose of this Cost Management issue is to shed light on this problem.

Many organization managers are moving away from reporting outcomes after the fact and shifting toward reports that predict the future — put another way, they are transitioning from descriptive information to predictive information. In his article, Gary Cokins outlines the various ways that ABC can assist in this newer predictive process. He describes management accounting as being essentially comprised of three categories: cost accounting, cost reporting and analysis, and decision support with cost planning. The last category in particular is about examining future possibilities. ABC is able to trace and assign expenses into work activities, which are then converted into final cost objects. Therefore, an ABC system creates the groundwork for managers to make intelligent decisions about future allocation of resources because it allows for accurate prediction not only of what items cost, but why.

In order to successfully sustain an ABC system, two models have often been created: the “bottom-up” and “top-down.” In his article, Douglas D. Paul explains how to determine the ideal times to undertake each approach to maximize the effectiveness of an organization’s decision-making process. The first step is to identify how much detail must be pursued while keeping in mind the trade-off between accuracy versus effort and calculation performance. Another consideration is whether time-driven or driver rate–based ABC is the more appropriate approach toward ABC for the given situation. The article also describes certain scenarios where it might be best to utilize a two-model approach. The bottom line, Paul notes, is that the benefits of greater accuracy associated with detailed high volume cost objects do not come without a cost; this must be factored into any decisions modelers and managers might make about the best way to pursue an ABC system.

When creating a conceptual framework for managerial costing, what principles should be involved with the costing methods? In his article, Larry R. White attempts to answer this question. The first step, he explains, is to answer several other questions, such as: What is a conceptual framework? What does the term of “managerial costing” mean? The next step, White explains, is to look at two major principles identified for internal decision support: causality and analogy. Scientific decision-making, White notes, requires strong adherence to both of these principles. The article concludes with a discussion about why the use of principles for problem-solving purposes goes far above and beyond merely providing methods to do so.

CLAIRE LEE AND GRACE TAYLOR are coordinating editors of Cost Management. They can be reached at zmcm at tehniciaeditorial.com or 919.869.7977.

GARY KAPANOWSKI is a contributing editor of Cost Management. He can be reached at kapanowskig@gmail.com.

GARY COKINS is the founder of Analytics-based Performance Management, LLC. He can be reached at www.garycokins.com.
The closer a model matches certain phenomena, the better the preparation is to make quality decisions necessary to deal with those phenomena. Douglas T. Hicks explains how the economics involved in making internal business decisions constitute one such phenomenon. He begins by explaining how this concept relates to the importance of maintaining a valid and effective cost model that includes causality — the cause-and-effect relationships among the various model elements. The article also explains the difference between “weak” and “strong” causality, along with why the latter is required for effective decision-making and realistic cost projections. Strong causality, Hicks argues, should be used in certain types of cost assignments; weak causality, however, does have some useful applications, such as assigning costs that seem “unassignable,” such as product line support costs. Without any kind of causality, however, an organization’s cost model will have fundamental flaws in its perception of economic reality. In a worst-case scenario, this could eventually mean business failure.

As those in the health-care industry make continuous efforts to keep costs manageable without sacrificing quality of patient care, Susanna Gallani and Gregory L. Sabin discuss how ABC can serve as a helpful tool in this goal — specifically, time-driven ABC (TDABC). The use of TDABC has many proven benefits, such as eliminating redundancies in care delivery processes and streamlining workflows. However, its implementation is not without challenges, particularly in health care. The authors offer insight as to how to get around these potential roadblocks, emphasizing the fact that when properly used, TDABC can be a good fit for health-care provider organizations because of its power, versatility, and ability to adapt well to production processes.

In the past, ABC has developed a reputation among some business professionals as being too complex to be helpful. However, Morten Zeihlund explains how it is often the companies, and not ABC itself, that can make the process overly complicated. Instead, ABC, when wisely applied, produces numerous derived benefits, which include: clarifying financial definitions; identifying weaknesses in one’s enterprise resource planning (ERP) systems; forcing one to see across financial, sales, customer, and production systems; showing that nobody really knows what is done; and reducing cheating. The bottom line, Zeihlund notes, is that too many data can be crippling, and an ABC system can help make sense of those data in ways that might be difficult for other business models.

Put simply, there are five ways to increase profitability: increasing the average selling price for a product/service; reducing customer defections; improving customer acquisition rate; increasing wallet share; and decreasing costs. In his article, Tom Bayer explores each of these methods in detail while simultaneously examining how ABC methods might enter the picture. He notes that when in-increasing average selling price, a business must always be focused on building a strong relationship with the customer base and providing superior service to meet their needs. Meanwhile, when it comes to reducing customer defections, ABC costing models might be helpful in identifying which customers a business should not necessarily be serving. In creating a strategy, it is crucial to retain and grow revenues from existing customers by making it a high priority to taking care of an organization’s best customers.

The long-term effects of COVID-19 on business operations are unclear, but one thing is certain: Routine tasks using structured data will likely be automated using robotic process automation. Nick Grenfell discusses the implications of this development for cost management, along with the steps that organizations should take. Financial professionals must reskill and create value for their organizations. It starts with increasing the value of cost management in an organization by establishing the connection between strategy, management decisions, and utilization of cost information needed for support. Building a costing model will also be crucial, and artificial intelligence will improve that costing model with its capability to efficiently go through large amounts of data, identifying relationships that human personnel would likely be unable to recognize without technological assistance.

We hope you enjoy this issue, and if you want to contribute your own article, you can e-mail your submission to zmcm at techникаeditorial.com. We look forward to hearing from you!
Managers are increasingly shifting from reacting to after-the-fact reported outcomes to anticipating the future with predictive analysis and proactively making adjustments with better decisions. Despite some advances in the application of new costing techniques such as activity-based costing (ABC), are management accountants adequately satisfying the needs of managers and employee teams for decision-based cost information? Or is the gap widening? That is, are the accountants still just counting the beans, or are they helping by growing the beans?

There is a difference between what management accountants report and what managers and employee teams want. This does not mean the information produced by accountants is of little value. In the last few decades, accountants have made significant strides in improving the utility and accuracy of the costs they calculate and report. The gap is being caused by a shift in the needs of executives and managers. The shift is from needing to know what things cost (such as a product or service-line costs) and what already happened to a need for more purposeful information about what their future costs might be and why — what can happen?

What is the purpose of management accounting?
Contrary to beliefs that the only purpose of managerial accounting is to collect, validate, transform, and report data, its primary purpose is first and foremost to influence behavior at all levels — from the desk of the CEO down to each employee — and it should do so by supporting decisions. A secondary purpose is to stimulate
investigation and discovery by signaling relevant information (and consequently bringing focus) and generating questions.

The widening gap between what accountants report and what decision-makers need involves the shift from analyzing descriptive historical information to analyzing predictive information, such as budgets, rolling financial forecasts, cost estimates, and “what-if” scenarios. Obviously, all decisions can only impact the future because the past is already history. However, there is much that can be learned and gained from historical information. Although accountants are gradually improving the quality of reported history, decision-makers are shifting their view toward better understanding the future.

This change is a response to a more overarching shift in executive management styles — from a command-and-control emphasis that is reactive (such as scrutinizing cost variance analysis of actual versus planned outcomes) to an anticipatory, proactive style where organizational changes and adjustments, such as staffing levels, can be made before things happen and minor problems become big ones.

**An accounting framework and taxonomy**

The large domain of accounting has three components: tax accounting, financial accounting, and managerial accounting. Exhibit 1 was created for the International Federation of Accountants (IFAC). IFAC is like the United Nations of global accounting institutes (e.g., the American Institute of Certified Public Accountants and Institute of Management Accountants in the United States). IFAC has approximately 180 members.
In Exhibit 1, there are two types of data sources. One source is from financial transactions and bookkeeping, such as purchases and payroll. The other source is nonfinancial measures, such as payroll hours worked, retail items sold, or gallons of liquid produced.

The financial accounting component is intended for external statutory compliance reporting, such as for regulatory agencies, banks, stockholders, and the investment community. Financial accounting follows compliance rules aimed at economic valuation. As such, it is typically not adequate or sufficient for internal decision-making within an organization. (The tax accounting component is its own world of legislated rules.)

My area of concern — the management accounting component — can be broken into three categories: cost accounting, cost reporting and analysis, and decision support with cost planning. To oversimplify a distinction between external financial and internal management accounting, financial accounting is about *valuation* and management accounting is about *value creation* through good decision-making.

The managerial accounting component is comprised of three categories that are all recipients of inputs from the “cost measurement” procedure of transforming incurred expenses (or their obligations) into calculated costs:

- **Cost accounting** represents the assignment of expenses into outputs, such as the cost of goods sold and the value of inventories. It primarily provides external reporting to comply with regulatory agencies using GAAP.
- **Cost reporting and analysis** represents the insights, inferences, and analysis of what has already taken place in the business in order to track and understand performance.
- **Decision support with cost planning** involves decision-making and taking. It also represents using the historical cost reporting information in combination with other economic information, including forecasts and planned changes (e.g., processes, products, services, channels, and customers) in order to make the types of decisions that lead to financial success.

The last two categories offer diagnostic support to interpret and draw inferences from what has already taken place and what can happen in the future, respectively. **Cost reporting and analysis** is about explanation. **Decision support with cost planning** is about possibilities.

**ABC**

Where, and how, does ABC play a role? It resolves the problem with traditional cost allocations of expenses — especially indirect expenses commonly referred to as “overhead” — to calculate costs of products and standard service lines (and ultimately of customers). Most organizations allocate their expenses like spreading butter across bread. They use cost allocation factors and bases such as the number of direct labor hours with manufacturers, the number of units made, the amount of sales revenue, the number of employees in departments, and the number of square feet or meters, just to name a few. None of these reflect the consumption of expenses in the end-to-end business processes and work activities that belong to each process. They violate costing’s *causality principle* — that is, the cause-and-effect relationship between the outputs that consume the expenses of the resources (e.g., employees and assets). This traditional costing practice is convenient for the accountants to calculate and report costs for the external financial statutory reporting, because it is simple and the general ledger expenses exactly reconcile with the calculated costs. However, it is inaccurate with individual costs for each of the outputs, commonly referred to as “final cost objects.”

ABC resolves this by tracing and assigning the expenses into the work activities (of both employees and assets), and it then further traces the work activity costs into the final cost objects (e.g., products, service lines, distribution channels, and customers.) ABC uses what are referred to as “resource drivers” and “activity drivers,” both of which satisfy costing’s *causality principle*.

Exhibit 2 displays the results from using ABC. The vertical axis is the magnitude of the error that is corrected with ABC. The horizontal line is the traditional “butter spreading” cost allocation. The swerving
line is from ABC. Note to the left side of Exhibit 2 are typically simple products and services. They have been over-costed by the traditional cost allocations that are in effect subsidizing the more complex products and service lines in the right side of the Exhibit 2; those have been under-costed by the traditional cost allocations.

What does this mean? It means that the CFO and the accountants are providing flawed and misleading information to their executives, managers, and employee teams who are making arguably poor decisions with these inaccurate data. The types of decisions may include pricing choices and determining which types of customers are more attractive to retain, grow, win back, and acquire — along with which types of customers are not attractive. ABC not only brings reasonable accuracy to what things cost, but it also brings visibility and transparency to why they cost what they cost by viewing the quantity of the drivers that are the root causes of the costs.

What? So what? Then what?
The message at the bottom of Exhibit 1 is that the value and usefulness of the information increases, arguably at an exponential rate, from the left side to the right side. Cost reporting displays the reality of what has happened, and it provides answers to “what” — that is, what did things cost last period?

However, an obvious follow-up question should be “so what” — that is, based on any questionable or bothersome observations, is there merit to making changes and interventions? How relevant to improving performance is the outcome we are seeing? But this leads to the more critical need to propose actions — to make and take decisions — surfacing from cost planning. This answers the question of, “Then what?” For example, what change can be made or what action taken (such as a distributor altering its distribution routes), and what is the ultimate financial impact? Should we internally make a product or deliver a service, or should we purchase or outsource it?

Business analytics and cost modeling
Of course, any proposed changes will lead to multiple effects on customer service levels, quality, and delivery times; still, the economic effects of profits and costs should
also be considered. This gets to the heart of the widening gap between accountants and decision-makers who use accounting data. To close the gap, accountants must change their mindset from managerial accounting to managerial economics, which I refer to as “decision-based costing.”

This is where business analytics, especially predictive analytics, comes into play. The ultimate way that managers can test the outcomes of decisions is to deploy robust methods of forecasting combined with valid-cost-estimating techniques based on reliably measured past-period “calibrated” cost consumption rates, such as from an ABC system. I learned this during my 1967 freshman year at Cornell University’s School of Operations Research and Information Engineering. The equation is: The demand volume and mix multiplied by the unit-level activity cost consumption rates equals the required capacity — the amount and type of labor and purchase from suppliers. Accountants need to think more like engineers.

With ABC information, executives and managers will better understand where they make or lose money — and by how much — and be more confident that what they want to change will have the effects that they expect and desire.
ONE MODEL OR TWO? CONSIDERATIONS FOR HIGH-VOLUME ACTIVITY-BASED COSTING

DOUGLAS D. PAUL

The convergence of interest in activity-based costing (ABC) as a methodology and the rise of the desktop computer in the 1990s paved the way for a new industry: that of the ABC software vendor. In rapid succession, multiple companies emerged offering software applications with the ABC method embedded and the competence to produce results comparatively quickly.

These early forays into ABC were undertaken by many organizations in multiple industries. The ABC software programs provided results that were insightful to the point that almost as soon as these initiatives had started, there was a yearning for more of these results. In this context, “more” meant that consumers of the information sought more details, more granularity, a broader scope, frequent update intervals, improved reporting, improved analysis, and further assimilation of the findings into official management-performance measurement.

For too long, managers’ intuition as to what was costly was in conflict with what official results from their existing management accounting system indicated. Now, their intuition could be proven because the prevailing cost information was potentially flawed and misleading.

To answer the call for “more” ABC, companies organized teams, some official and some peripheral, of multifunctional resources from finance/accounting, operations, and information technology to collaborate and construct (or cobble together) technologies to retrieve expenses and driver data, model and calculate the costs, and then export the results to multidimensional databases for analysis and exploration. User Groups of the various software vendors would assemble each year and presentations were made to engage audiences on how

DOUGLAS D. PAUL is currently a manager with the Oracle Practice of Alithya, an enterprise solutions and strategy consulting firm based in the United States and Canada. He has spent the past 30 years engaged in a variety of roles in corporate, software, and consulting environments. His primary areas of focus have been in the subject of cost and profitability management, including ABC, and to enable organizations to create better quality information in order to make more informed decisions. Recent publications include articles in Strategic Finance in 2016 and 2020. Mr. Paul holds an MBA from Cornell University and a BSE from the University of Pennsylvania. He can be reached at doug.paul@alithya.com or ddpaulpm@yahoo.com.
XYZ company solved the technical and business issues that many of them were experiencing.

Alas, many ABC practitioners started to hit a wall. Models were getting too large and too complicated. The level of detail was getting to be so granular that system performance was stalling. There were too much data being loaded, too much data being calculated, and too much data being exported. The software vendors realized this and began offering increasingly more scalable solutions, but by the new century, the initial euphoria had worn off; efforts were shifting to new priorities such as e-commerce and other internet/web-based applications, and eventually, ABC efforts diminished or at least stagnated. Many ABC software vendors were either acquired by larger companies or faded away. ABC initiatives evolved to a relative steady-state existence with little growth.

Contributing to the stagnation and limited growth was the question that arose in the early days and continues to even the present day: How does one manage a costing model to create an ideal blend of meaningful details but do so with acceptable calculation performance and digestible outputs? What emerged is a realization that some parts of the process require highly variable, complex sets of calculations, whereas other parts can use repetitive and simple calculations. The complex calculations need to be limited to a manageable level of volume, but the simpler, repetitive calculations can be subjected to hundreds of thousands or millions of records. Therefore, if one wants to cost out every financial transaction, health-care patient encounter, SKU, order, or shipment, there invariably needs to be a split of the heavy lifting.

Combining bottom-up and top-down approaches

For those who have been successful in sustaining their ABC system, what has been frequently undertaken is the creation of two models. In the common parlance, a model with more detailed complex calculations contributes to a “bottom-up” development of the cost, whereas a high-volume (also called “microcosting”), simpler calculation, such as a rate multiplied by a volume, is referred to as “top-down.” It is the combination of these two approaches that appears to be ideal. This article explores the criteria for the delineation of when to undertake each approach in order to create an optimal sustainable ABC system that is appropriately detailed for meaningful decision-making.
The cost of detail

The first step that one must consider in determining how to split the workload of ABC models is to identify the level of detail to be pursued as there is a trade-off between accuracy, effort, and calculation performance. Typically, the answer to how much one should expend resources to achieve a benefit would be obtained via an incremental cost–benefit analysis. In the case of the level of detail of ABC efforts, one would look at the gain associated with increasing details and compare that to the cost. The difference would be the net benefit, and wherever the net benefit was maximized would be the ideal level to aim. The evaluation would look something like Exhibit 1, with a plot of benefit and cost as a function of model detail.

Experience would suggest that the benefits would initially grow rapidly as model detail grows but that they would eventually taper off and head toward an asymptote. Conversely, the costs of modeling would act more like an exponential function and grow slowly at first, but after a certain point, they would increase rapidly as incremental details were added. As such, this relationship would enable one to find an optimum level by plotting (benefit minus cost) as a function of detail, and this would produce a convenient chart as shown in Exhibit 2.

In such an analysis, there would be a clear winner as to what level of detail to pursue: wherever the net benefit curve peaks. Unfortunately, there is a problem. These curves do not have any measurable numbers on them, and there is a reason for that. Obtaining such values is not practical. It may require its own ABC study!

As such, this analysis cannot be relied upon to answer the question of how much detail to pursue. However, the shape of the theoretical net benefit curve does provide some insight. It offers a framework to suggest the idea that the “bottom-up” effort should go just so far, at which point the “top-down” effort should take over. It becomes incumbent on the analyst to find that point.

Before proceeding further, one may ask, “If the effort of accumulating cost data at extremely granular levels is so great, why undertake it all?” Nobody would suggest that a significant business decision would or should be made about a product or service offering based on a single bank transaction, health-care encounter, or retail order. However, one could argue that costs can meaningfully vary at these levels of detail, and it is through their aggregation at actionable levels that decisions can be meaningfully made. Consider distribution and warehousing activities such as picking items from inventory, packing them for shipment, and

![EXHIBIT 2 Net Benefit of Model Detail](image-url)
loading them for transport. A product level of detail would not capture the cost differences of situations when there are several small orders of individual pieces to be processed versus single orders that can be fulfilled by the pallet-load. It is only at the order-line level that these impacts can be calculated. Then, these values can be aggregated by product and customer, and informed decisions can be made.

**Time-driven versus driver rate-based ABC: Isn’t that sufficient?**

In the February 2016 issue of *Strategic Finance*, Gary Cokins and the author of this article published “Time-driven or driver rate-based ABC: How do you choose?” In that article, we discussed the trade-offs between using the more “traditional ABC” of detailed activity and cost object drivers versus the time-driven ABC (TDABC) “time equation” approach which employs activity unit times and cost object driver volumes. Directionally, we concluded that driver rate-based ABC, which is the older of the two approaches of ABC, is useful in rapid prototyping and early initiatives where activity details can predominate and cost objects are smaller. But as data volumes grow and interest in additional topics such as capacity management emerge, the trade-off moves toward TDABC.

Some may consider this trade-off or transition point to be the same question that is being evaluated here. In fact, TDABC was developed as a means to create a single bottom-up model that could handle high-volume cost objects. Under TDABC, cost objects behave less like hierarchal dimensions that change slowly over time and more like data that is dynamic and ephemeral. For example, in a single month, a retailer or distributor could have tens of thousands of orders associated with hundreds of thousands of order lines. These orders and order lines would disappear forever in the following month and be replaced with all new ones. In this case, one cannot load a driver to a fixed list of members, so one needs to create a formula to calculate the driver values associated with a dynamic list of data elements. Under TDABC, activities like “pick,” “pack,” and “ship” could be evaluated by product and configuration, such as “piece,” “case,” or “pallet.” Each product could have a unit time for those three activities and the number of pieces, cases, and pallets would be determined by the quantity on the order line. A compound formula can (1) derive the number of pieces, cases, and pallets based on the product and order line volume, and (2) multiply the applicable unit-times of the activities by those volumes. This yields the total time of each activity by order line. This becomes the order-line level driver and allows a simultaneous calculation of the cost of each order line and a backward derivation of the costs of activities, all based on time.

As such, acolytes of TDABC would say that the answer is not to create two models but simply to use TDABC in one bottom-up model. This, however, is often insufficient. TDABC models eventually face the same limitations as driver rate-based ABC models. These models have also suffered from the same wall in performance as volumes have grown to extreme levels. Some TDABC models may have had a higher threshold to undertake the bottom-up portion of the process, but they also usually need to move part of the calculation to the top-down approach.

**Splitting up the heavy lifting: A two-model approach**

A two-model approach is employed in those cases where the net benefit trade-off has been undertaken in some form, perhaps somewhat subjectively, and it is determined that costs are needed at very granular details. However, this level of costing cannot all be done at once. As mentioned previously, distribution, financial services, and health care are among the industries for which this has been applicable.

In these cases, the costing process initially occurs at a segment level of detail, such as product, service, customer, vendor, or channel; but subsequently, costs are pushed to much lower levels of detail such as order, order line, shipment, transaction, or encounter. The first step should result in costs that have been calculated using ABC principles (i.e., based on cause-and-effect consumption relationships, typically in purpose-built multidimensional software). These costs are then divided into overall
volumes at the segment level, either in that software or external to that software, thereby producing unit-level cost rates. These rates are then applied in a relational database environment with rate x volume calculations. In this framework, the work is split into appropriate parts: ABC principles are utilized for high-complexity calculations across manageable volumes in multidimensional database "cubes," whereas simpler calculations are performed at extremely high volumes using relational databases.

Where to draw the line

Now that a case has been made for a two-model approach — one in which the heavy lifting of calculation complexity and volume processing has been split — the question becomes where to delineate the two approaches. How far does one go with a bottom-up model, and where does the high-volume, top-down model take over the process? The answer lies in the consideration of the following: (1) the point at which the loss of accuracy becomes materially impaired by moving from ABC principles (complex calculations) to rate x volume methods (simple calculations), and (2) when the calculation performance times become impractical or inconvenient. The result of these two considerations would graphically be depicted as in Exhibit 3.

The diagram in Exhibit 3 indicates that high levels of costing calculation complexity should occur when the number of members in a cost object is relatively low. As the number of cost object members increases, there is a resulting reduction in the practical ability to do complex calculations. This reduction is lesser at first, but at a certain point (somewhat exaggerated as a vertical line) the volumes become so great that in order for the model to be practical and viable, it must revert to simpler calculations. This is the line of demarcation, at which point the first model needs to yield to a second model. The first model should use ABC principles, and the second model will take those results and spread those values on a broader basis. This point of transition is not a fixed line and will be highly variable, subject to what the actual calculation volumes are and what loss of "accuracy" arises when crossing over at the point represented by the dotted line.

For example, in health-care costing, assigning costs to thousands of different charge codes may require a detailed methodology to distinguish each charge code's relative consumption of resources. However, when going to the encounter level of detail,
a well-derived unit cost and associated volume may be sufficient. Thus, charge-code costing could be accomplished with Model 1 (ideally ABC-principled) followed by encounter-level costing that would take those results and use them in a subsequent high-volume Model 2. For example, a radiological test such as an X-ray, CT scan, or MRI may need to factor in particular usage of equipment, utilities, and specialized technicians. However, when applying this cost to an individual encounter that consumed one of these tests, each encounter could reasonably assume the same unit cost. However, some medical charges, such as a particular surgical procedure, may vary at the encounter level due to patient attributes or comorbidities. In that case, a unit cost spread to encounter by volume would detract from accuracy and less complicated encounters would subsidize more complicated ones. This would resemble the situation that for decades has been used to describe the need for ABC.

In other industries there could also be similar cases, such as in retailing and distribution where orders, shipments, and individual parts of orders and shipments drive complexity. In these cases, TDABC may be an option to extend the use of Model 1, but there will still come a point where the volumes will dictate the need for Model 2.

**Conclusion**

This article has attempted to create some degree of a framework around the question of how best to manage ABC models with trade-off considerations for complexity and volume in the pursuit of accuracy versus calculation performance and overall viability and sustainability. The benefits of greater accuracy associated with detailed high-volume cost objects come at a cost, and at some point, this cost is either not affordable, or its impracticality threatens the vitality and sustainability of the initiative. The old adage of the superiority of being approximately right to being precisely wrong is always prevalent.

A two-model approach can be an effective way to find the right point at which the predominant consideration in high-volume costing moves from accuracy to performance. In so doing, ABC initiatives can improve their prospects for sustainment and use within an organization, and thereby find their way into influencing better decisions and behaviors. Although no specific technical architecture has been shown, it is suggested that Model 1 would be a detailed ABC model developed in purpose-built multidimensional software, and that it would produce meaningfully derived costs by moderate levels of detailed products, services, customers, brands, channels, vendors, etc. These costs would be divided into periodic output quantities or volumes of production or sales to produce unit cost rates that would be exported to Model 2. The second model would be of relational technology and would apply these rates to very granular transactional or near-transactional cost objects to get results at a level of detail that would then provide the most flexibility in re-aggregating to levels suitable for decision-making. A benefit to this approach is that today’s technologies allow for Model 1 to handle larger amounts of volumes than in the past, allowing the transition point to Model 2 to shift.

Ultimately, the points of decision as to how the ABC process is designed, implemented, and sustained must be addressed by modelers and managers. There is a finite limit to the practical capacity of software, hardware, money, budget, the brainpower to devise and absorb information, and of course, time. The two-model approach is offered as a way to navigate these barriers and constraints. This framework enables the decision makers with an informed approach to yield the most favorable outcomes with regard to model details and calculation performance.

**Notes**

Accountants and other managers often discover they need better cost information about their organization, operations, products/services, and customers. Questions arise: What's the “true” cost? I need a “relevant” cost — how can that cost make any sense? I improved my process, why is the product cost the same? The answers provided are not very convincing or are long in coming.

So, you launch a search for a solution. Sadly, your accounting knowledge comes up short: You didn’t learn much beyond standard costing in college or for certification exams. So, you move on to internet searches for books, consultants, and software vendors. What you find is methodologies: activity-based costing (ABC), time-driven ABC, life cycle costing, lean accounting, throughput accounting, theory of constraints, Grenzplankostenrechnung (GPK) — a German management accounting or controlling application, resource consumption accounting, etc. How do you sort all this out? You listen to presentations on YouTube, set up meetings with vendors, schedule software demonstrations, call your network, look for best practice companies, etc. The result? You are more confused than when you started. You cannot find any consistency of approach, no unifying guidance, theory, or principle.

Isn’t there a core or foundational theory or set of principles for costing to address my internal decision support and strategic needs? Why am I, an otherwise competent professional, playing “eeny, meeny, miny, moe” with something so important to my business? It seems like I should have learned more about costing approaches in college or with experience. Did I miss something?

If the above story has a familiar ring to you, sadly you are not alone. “Cost phobia” is an all too common financial and accounting disorder. Until very recently, there was
no cohesive theory or guidance for creating cost information for internal decision support. And although it now exists, it has not been embraced by the broader accounting profession, which is far too busy trying to beef up external financial and business reporting and naturally, the associated audit revenue.

Enter: The conceptual framework for managerial costing

About 2010, the Institute of Management Accountants (IMA) established a task force to construct a set of principles and concepts for creating cost information for internal decision support. The idea was to set aside financial standards, GAAP, and external financial reporting requirements; and focus on the foundational principles that create value for the long term and connect operations (administrative, support, and production/service providers) to monetary outcomes for internal decision support. This answers the question: What principles should underlie costing methods and approaches that endeavor to provide information purely for internal management decision-making?

Before we explore that answer, let's get a few peripheral issues explained in the following sections.

**What is a conceptual framework?** Why that name? All major financial standards — United States, international, government, commercial — have conceptual frameworks that present their principles and concepts and state the ideals for external financial reporting. Similar language and structure were employed in defining costing principles and concepts for internal decision support. The IMA Conceptual Framework for Managerial Costing (CFMC) spells out the basics needed to achieve good internal decision support models and information. As such, the CFMC is an important body of knowledge to assist accountants in taking their organizations to higher levels of insight and performance. Cost Management was instrumental in this effort when it published *The Management Accounting Philosophy* series of articles by Anton van der Merwe. This series proposed a set of principles and concepts for managerial costing that led to the conceptual framework.²

**Why the term “managerial costing?”** Management accounting is used very broadly as a profession or to describe all the tasks completed by an accountant working in business. Cost accounting has been defined by the International Federation of Accountants as costing done purely for external financial reporting (i.e., costing for GAAP-based inventory valuation). A new term was needed, and after extensive searching, “managerial costing” was substantially undefined and little used. So, the IMA defined managerial costing as costing done purely for internal decision support.³

**What is the CFMC meant to achieve?** “The objective of managerial costing is to: (1) provide a monetary reflection of the utilization of business resources, and (2) relate cause-and-effect insights into past, present, or future enterprise economic activities. Managerial costing aids managers in their analysis and decision-making and supports optimizing the achievement of an enterprise’s strategic objectives.”⁴

The CFMC is meant to serve multiple purposes:

- It provides guidance for designing cost models based on the principle of causality that accurately reflect operations and processes for the decisions that organizations need to make most frequently.

- It establishes a reliable reference for generating cost information for internal management use that clarifies why this cost information is different from external financial reporting, tax, and regulatory cost information.

- It details guidelines for comparing the strengths and weaknesses of existing and alternate approaches [i.e., methodologies] for generating decision-relevant cost information.⁵

Since the publication of the CFMC, several other IMA Statements on Management Accounting (SMA) have been written supporting its use. An important SMA for evaluating both a company’s cost requirements and how well a solution matches their needs is Costing System Attributes that Support Good Decision Making.⁶ It defines 5 assessment levels for the 10 concepts for cost modeling and can be used to evaluate company
requirements, the current costing system, and solutions or methods under consideration.

What are the principles for costing for internal decision support?
The principles codified in the CFMC govern the application of fundamental truth of costing for internal decision support. “Truth” is confusing for accountants since accounting professional ethics spend a great deal of time and effort supporting financial reporting standards as a form of “truth.” And it is a form of truth—a consensus-based “truth” that allows for the comparison of entity-level financial results. However, it is not the only form of truth.

In Wikipedia, truth is explained as having five major theories:
- correspondence theory: truth corresponds to facts;
- coherence theory: proper fit of elements within a whole system;
- constructivist theory: constructed by social processes;
- consensus theory: whatever is agreed upon; and
- pragmatic theory: putting concepts into practice.

Only the correspondence theory is relevant to science and the scientific method, and it is the necessary truth for objective decision science. All the other theories contain social/human compromises. What type of truth do you want to use for decision-making? Unless you are only looking at a quarterly bonus tied to financial statement results, you want to use the correspondence theory to make long-term, value-creating decisions. And that truth is what the IMA’s CFMC uses for modeling operations and cost for internal decision support. The correspondence theory of truth is what operational systems use to help you optimize operations. (No operational systems are beholden to a group of people like the five accountants in Norwalk, CT, i.e., the U.S. Financial Accounting Stan-
The principles the IMA CFMC identifies for internal decision support are:

• Causality: the principle for operational and cost modeling.
• Definition: the relation between a managerial objective’s quantitative output and the input quantities consumed if the output is to be achieved.

• Analogy (or the logical use of information): the principle for decision-making.
• Definition: the use of causal insights to infer past or future causes or effects.

The core diagram from the IMA CFMC (see Exhibit 1) shows the operation of the principles. It also introduces the 10 concepts that support the 2 principles as well as the constraints, which limit the application of each principle.

**Diagram overview**

An organization is composed of resources that produce work and generate costs. The principle of causality (cause and effect) is used to create a model of the organization’s resources and processes — guided by 10 concepts related to causality on the left of the “U.” The result of applying the concepts is the creation of a model composed of operational quantities and how these are consumed in an organization’s processes, products, and services. The operational model is then costed (i.e., integrating the values of the quantities). The cost model forms the baseline information for management to improve and optimize operations and the associated resources usage. The use of the information is guided by four concepts shown on the right of the “U.” These concepts do not address behavioral or management issues, but rather are logical considerations when using managerial costing information. The key principle for information use is analogy, which emphasizes that information should be presented and used for decision support in an analogous manner. Both causality and analogy are subject to constraints that cannot be totally overcome. They are always present and must be considered and managed when one creates a model and uses its information.

The CFMC is not a costing approach or method (such as standard costing, process costing, ABC, resource consumption accounting, etc.). Instead, it defines the principles, concepts, and constraints that must be considered when evaluating an organization’s costing needs, selecting a costing approach, and designing a costing system. Nor is the CFMC a best practice. As a framework, the CFMC serves as the foundation for all managerial costing practice and application.

### A decision science orientation is critical to credibility

Decision makers use models of the system they seek to optimize. They simulate changes in resources and processes to confirm their inferences. Alfred R. Oxenfeldt, a long-time professor at Columbia University, captures the importance of these optimization models in his book *Cost-Benefit Analysis for Executive Decision-Making*. He states, “The validity of our decisions depends upon our perception and understanding of reality. Good decisions require good models, and the caliber of our decisions reflects the quality and validity of our models.”

For a model to support optimization decision-making, it must incorporate causality in a robust manner. Causality is fundamentally about resources and processes, not money. Causality expresses the relationships between an output quantity and the quantities of inputs required to produce that output; these are the solid facts of a business decision. Money is a parity measure. Decisions always require selecting from two or more alternatives. Integrating money as a reflection of causal operational relationships enhances the usefulness of the information. It informs decision makers as to the financial benefits of desirable outcomes and provides insight into the financial damage that would result from undesirable outcomes. However, changes in monetary outcomes require changes to resources and processes.

Scientific decision-making requires reasonably robust adherence to the concepts of causality and analogy. Some sloppy costing practices destroy managerial costing model credibility. Examples include:

- modeling fixed resource use and costs as variable, thereby creating a “fixed cost death spiral” as less profitable products are dropped;
• failing to incorporate robust capacity information and clearly identifying idle/excess capacity; and
• allocating non-causal business support resources to final products or services.

ABC, resource consumption accounting, and many other costing solutions have been around for decades, but their use is not widespread. Those companies and individuals that take the time and effort to learn managerial costing find their models extremely valuable; but few take the time or effort. Most muddle through relying on hotshot financial planning and analysis departments to do “special” analyses or use convoluted standard costing models. They hesitate to stray from their external reporting-oriented financial accounting systems, which they look at as “the one or sole version of the truth.”

There are other approaches used around the world. Germany has a long history and a specific discipline that looks at cost and other information from a purely internal decision support point of view. This discipline is known as “controlling” and historically has been considered more of an operational discipline than a finance and accounting discipline.

China’s Ministry of Finance adopted managerial costing guidance (based on the IMA’s CFMC) for governmental reporting, which includes China’s 300 state-owned corporations. After the Ministry of Finance spent billions implementing financial reporting and audit standards, it was frustrated that it still lacked the type of information it needed to assess, manage, and control the performance or efficiency of operations. It found the external financial reporting perspective severely lacking and needed a more in-depth internal decision support perspective.

The complexity, speed of change, and increasing need to take more and larger risks in business will require better cost models for internal decision support. The COVID-19 pandemic showed the weakness of historical projections and limited cost information. However, acceptance of managerial costing solutions will not happen unless the confidence in and credibility of managerial cost models vastly increases.

This can only occur based on principle-based practice and the recognition that solid decision science is the foundation of internal decision support. Improvements in data and computer systems, artificial intelligence, and analytics are creating an opportunity. First, many rule-based financial activities will be automated; and second, accountants will need to shift focus to analytics and business partnering, which are all about internal decision support information. The IMA’s CFMC codifies the foundation for growing a highly credible and successful new era of costing for internal decision support and optimization.

What’s the issue with principles versus methods?
The CFMC establishes a solid, foundational body of knowledge for creating internal decision support cost models and solutions. It defines the “internal” decision support and managerial costing perspective as separate and distinct from financial accounting and reporting. It is a perspective requiring different models and different principles. It shines the light on a world of information, an endeavor that has been under-resourced, erratically practiced, poorly defined, and poorly understood. It focuses attention on the core elements of decision science and optimization to improve important economic decisions throughout the organization. This is far more than providing a method to solve a problem.

When implementing methodologies (and the associated consultants and software products), we need to start specifically defining their capabilities in the language of the CFMC’s principles, concepts, and constraints. The framework provides a common language for practitioners (customers) to evaluate solutions. It also paves the road through the jungle (or jumble) of management accounting cost methodologies by advocating, educating, and using a common language based on solid principles of decision science. The CFMC is a major step toward making the search for and evaluation of costing solutions a much more professional endeavor, and much less of an advertising and salesmanship contest. Practitioners and solution vendors should study the CFMC and its supporting SMAs and use its common language to define user

THE COMPLEXITY, SPEED OF CHANGE, AND INCREASING NEED TO TAKE MORE AND LARGER RISKS IN BUSINESS WILL REQUIRE BETTER COST MODELS FOR INTERNAL DECISION SUPPORT.
needs and portray solutions. And looking more broadly, wouldn't it be great if academia would teach a solid theory for internal decision support costing to a new generation of accountants?

NOTES


4 Ibid. p. 7.


9 Ibid.


12 It was the Shanghai National Accounting Institute and the Beijing National Accounting Institute. My speeches in China and meetings with the Ministry of Finance were in August 2014. I also reviewed and commented on the Ministry of Finance’s managerial costing standards for state owned enterprises in 2019 which have since been published and reflect many of the concepts in the Conceptual Framework of Managerial Costing I wrote with Doug Clinton for IMA.

The world in which we live is filled with phenomena too complex for human beings to fully understand. Whether it is understanding how the economy works, how markets behave, how dietary habits impact one’s health, or how best to raise children, these phenomena affect our lives. As a result, we must develop an effective understanding of how these phenomena work so we are better equipped to deal with them.

One way to gain an effective understanding of such phenomena is to create models of them. We break the phenomena down into what we believe are their critical elements, determine how those elements relate to one another, and then put the elements back together to construct models of them. These models can take on many forms: from simple mental constructs to physical representations, and from back-of-the-envelope calculations to complex computer programs. Once the models are established, they are what guide our actions and decisions, not reality. It should be obvious that the closer our models match the phenomena, the more prepared we are to make the quality decisions necessary to manage them.

An example of one such phenomenon is the economics involved in making internal business decisions. What is the economic impact of reducing prices by 5 percent? What mix of products or services provides the best return? How much money will be saved by combining five independent operations into a manufacturing cell? What is the impact on profitability of dropping a marginal customer? All of these questions require an accurate measurement of a decision’s economic impact. These decisions are being considered by a complex business organization with multiple, interconnecting parts that operate within a complex marketplace. If we are to base such decisions on accurate and relevant information, there must be valid models of the various phenomena being measured.

**Cost models and causality**

Almost all business decisions impact an organization’s costs. To measure the impact...
those decisions have on costs, the organization must have a valid cost model that reflects the fundamental cost economics of their operation. However, as economist John Maurice Clark pointed out nearly a century ago, “There are different kinds of problems for which we need information about costs, and ... the particular information we need differs from one problem to another.” Different types of decisions require different views of cost. An effective cost model must be able to not only measure product and service costs, but accurately measure the different types of cost information required to support a wide variety of business decisions.

The key to an effective cost model is causality, which is the cause-and-effect relationship among the various elements of the cost model. Simply put, in building cost models, cause-and-effect relationships must be used to describe and quantify the relationships that exist between the key elements of the model. This is true whether you are predicting the cost outcomes of potential decisions or assigning costs to processes, products, services, or customers. If the model’s elements are not linked using causality, the model will not reflect the business’ operational reality. In the end, the result will be specious; it will be superficially plausible, but wrong.

Causality comes in two varieties: strong causality and weak causality. In strong causality, the cause-and-effect relationships can be traced using measurables such as hours, units, transactions, headcounts, etc. In weak causality, the relationships can be inferred, but there is no direct measurable that links them together. Although the relationships are not traceable, they are clearly attributable. As shown on the left side of Exhibit 1, strong causality is required to effectively project the results of decisions and actions considered by decision makers, to forecast future results, and to support both forecasting and planning. As shown on the right side of the exhibit, causality — both strong and weak — is used to assign costs to resources (processes and activities). It is also used to assign the accumulated cost of said resources to products, services, customers, and more.

Causality in cost projections
Developing realistic cost projections is only possible because of strong causality. Certain measures of an organization’s output (equipment hours, resident days, loans processed, orders filled, etc.) lead to a “causality chain reaction,” placing high demand on the organization’s resources. As a result, those resources can then be monetized. For exam-
ple, equipment hours at a manufacturer trigger a causality chain reaction that makes it possible to project the variable costs required to operate equipment, as well as the wage, benefit, and tax cost of the required production workers. Exhibit 2 maps out such a causality chain reaction. By modeling these relationships using causality, any change in the data used to measure the causality chain (and the impact on cost) will be realized and accurately projected.

Exhibit 3 is an Excel worksheet that incorporates the causality chain shown in Exhibit 2 and populates it with base data. (You can download a copy of the file from https://www.profitability-analytics.org/excelcostmodel and manipulate the data yourself.) Using the causality-based worksheet, you can see the ripple effect that occurs when equipment uptime hours change; it affects both equipment-related costs and production labor-related costs. In the base case, 10,000 uptime hours creates a demand of 28,000 production labor hours. To keep overtime within a targeted range of 4 percent to 10 percent, 14 production workers are required. The result is a total equipment cost of $500k (or $50.00 per hour) and total production labor cost of $959,448 (or $47.97 per hour).

Increasing equipment uptime hours to 12,000 raises the required production labor hours to 33,600. This requires the addition of three workers to remain within the pre-
EXHIBIT 3 Causality-Based Cost Model Worksheet

<table>
<thead>
<tr>
<th>Category</th>
<th>Calculation</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Hours</td>
<td>Employee Yr</td>
<td>2,080</td>
</tr>
<tr>
<td>Average Crew Size</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>Theoretical Prod Hours</td>
<td>10,000</td>
<td></td>
</tr>
<tr>
<td>Ind Activity Allowance</td>
<td>40%</td>
<td></td>
</tr>
<tr>
<td>Overtime Percentage</td>
<td>5.3%</td>
<td></td>
</tr>
<tr>
<td>ST/OT Balancing</td>
<td>26,600 OT Hours</td>
<td>1,400</td>
</tr>
<tr>
<td>Required Prod Hours</td>
<td>28,000</td>
<td></td>
</tr>
<tr>
<td>Variable Electric Cost</td>
<td>$40,000</td>
<td></td>
</tr>
<tr>
<td>Variable Gas Cost</td>
<td>$50,000</td>
<td></td>
</tr>
<tr>
<td>Purchased Maint</td>
<td>$60,000</td>
<td></td>
</tr>
<tr>
<td>Operating Supplies</td>
<td>$50,000</td>
<td></td>
</tr>
<tr>
<td>Fixed, Budgeted &amp; Distributed</td>
<td>$300,000</td>
<td></td>
</tr>
<tr>
<td>Straight-Time Wage Rate</td>
<td>$20.00</td>
<td></td>
</tr>
<tr>
<td>Overtime Premium</td>
<td>51%</td>
<td></td>
</tr>
<tr>
<td>Benefits &amp; Taxes</td>
<td>Per Head $10,000, % of Wages 10.00%</td>
<td></td>
</tr>
<tr>
<td>Production Headcount</td>
<td>$40,000</td>
<td></td>
</tr>
<tr>
<td>Up time Hours</td>
<td>10,000</td>
<td></td>
</tr>
<tr>
<td>Uptime</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Equipment Cost</td>
<td></td>
<td>$500,000</td>
</tr>
<tr>
<td>Equipmnet Cost per Hour</td>
<td></td>
<td>$50.00</td>
</tr>
<tr>
<td>Total Production Labor Cost</td>
<td></td>
<td>$595,448</td>
</tr>
<tr>
<td>Production Labor Cost per Hour</td>
<td></td>
<td>$47.97</td>
</tr>
</tbody>
</table>

Data resulting from causality-based calculations
Costs resulting from causality-based calculations
Costs distributed from other resources
scribed overtime range. Causality then measures an increase in equipment cost of $40k to $540k, and an increase in production labor cost of $192,396 to $1,151,844. The equipment’s hourly rate is then reduced to $45.00 per hour, while the hourly production cost remains relatively steady at $47.99 per hour.

Should the indirect activity allowance be reduced from 40 percent to 20 percent, 3 fewer production workers would be required in order to remain within the prescribed overtime range, and labor costs would reduce to $985,848, or $41.08 per hour. Equipment costs would not be affected by the indirect activity allowance reduction.

Since the model is based on causality, a change in any of the factors along the causality chain (paid time off hours, headcount-related benefits and taxes, electric consumption per hour, etc.) would result in an accurate projection of both equipment and production labor costs.

Although this example is for manufacturing, a similar causality-based model can be established for any organization. Causality ensures that the most critical factors that lead to an outcome are considered, and those that do not lead to an outcome are excluded from decision-making.

Causality provides a roadmap for spotting factors than can be modified to improve performance. Without causality behind a projection, a company will not have the information required to determine why their results vary from the projections. As a result, they will not be able to improve their results.

**EXHIBIT 4 Activity Analysis-Based Cost Assignment**

<table>
<thead>
<tr>
<th>Activity Center</th>
<th>Activity Analysis</th>
<th>Purchasing Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deco Plastics</td>
<td>15%</td>
<td>$45,000</td>
</tr>
<tr>
<td>Electronics</td>
<td>5%</td>
<td>$15,000</td>
</tr>
<tr>
<td>Circuit Boards</td>
<td>12%</td>
<td>$36,000</td>
</tr>
<tr>
<td>Corrugated</td>
<td>3%</td>
<td>$9,000</td>
</tr>
<tr>
<td>Resins</td>
<td>2%</td>
<td>$6,000</td>
</tr>
<tr>
<td>Fiber Optics</td>
<td>5%</td>
<td>$15,000</td>
</tr>
<tr>
<td>Outside Inspection</td>
<td>5%</td>
<td>$15,000</td>
</tr>
<tr>
<td>Stampings</td>
<td>10%</td>
<td>$30,000</td>
</tr>
<tr>
<td>Sub-Assemblies</td>
<td>25%</td>
<td>$75,000</td>
</tr>
<tr>
<td>Adv Adhesive</td>
<td>3%</td>
<td>$9,000</td>
</tr>
<tr>
<td>Tooling — Moldings</td>
<td>10%</td>
<td>$30,000</td>
</tr>
<tr>
<td>Tooling — Other</td>
<td>5%</td>
<td>$15,000</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>100%</strong></td>
<td><strong>$300,000</strong></td>
</tr>
</tbody>
</table>

Causality in cost assignments

Strong causality can also be used to assign operational quantities and cost of support resources to those that require their support when there is a measurable (output/input) link. This does not imply that a linear relationship always exists between resources, but that the support resource is merely a function of the consuming resource. For example, human resource support can be assigned using headcount, building and grounds costs according to square footage, and equipment maintenance according to weighted equipment hours. In these cases, a clear and measurable relationship exists between the support resource and the resource requiring that support.

Weak causality, then, should be used to assign the cost of support resources to the resources that require their support when
causality can only be inferred. In these cases, either there is no measurable operational quantity, or operational quantities become overkill because of materiality. When this occurs, cost assignments can be made using a best estimate (or an activity analysis) by those most qualified to make them. Exhibit 4 shows an activity analysis distribution of various purchasing costs for a purchasing department. These distribution percentages were determined through interviews with various employees involved in purchasing.

Weak causality can also be used to assign seemingly “unassignable” costs, such as product line support costs and general and administration (G&A) costs. For example, a company with two product lines that generate equal sales spends $500k on product engineering. Twenty percent of that effort supports product line A and 80 percent supports product line B. Obviously, both product lines should not be assigned the same amount of product engineering costs, as would be the case if they were included in an overall G&A rate or were not assigned at all. $100k should be assigned to products in product line A and $400k to those in product line B.

Even the nebulous category of cost, G&A, has weak causality. In most cases, G&A costs are added as a percentage of total cost. However, G&A is a cost related to running a business; it has nothing to do with the amount spent on materials, components, or outside services. The effort involved in running a business with a product consisting of $2 of material and $8 of company activities is not the same as running a business with a product consisting of $8 of material and $2 of company activities. The first product requires four times more effort that the second. Should not four times more G&A be attributed to the first product? Assigning such G&A costs as a percentage of internal cost or activity cost would qualify it as weak causality. These costs are a measure of how much business activity was required to produce the product.

If a cost model is to be considered valid, it must avoid using the same simple, arbitrary, non-causality-based cost assignments that are permitted in financial accounting. “Allocating” costs based on measures — such as sales, total costs, or direct labor hours or dollars — when those measures reflect neither weak nor strong causality degrades a model and produces inaccurate and misleading information.

The model versus the data

There are many organizations that pride themselves on the completeness and precision of their data; however, the quality of the data does not matter if the model does not reflect reality. A valid, causality-based cost model populated with reasonably good data will provide decision makers with an accurate view of economic reality, whereas an invalid model populated with precise data will not. It will provide a very precise, but totally inaccurate, result.

Consider an individual who wants to know the area of a circle. He knows that the data required to perform that calculation are the value of π and the radius of the circle. If he makes a precise measurement of the circle’s radius using a laser distance finder, values π at 3.1415927, and enters both into the formula $\pi r^2$, he is entering extremely accurate data into an invalid model and will arrive at an answer that is wrong. On the other hand, if he makes a reasonable “guesstimate” of the circle’s radius, values π at 3.14, and enters both into the formula $\pi r^2$, his answer will be reasonably accurate. In the end, it comes down to the question of which is more important: the data or the model?

The same holds true for cost models. If they are valid, causality-based cost models, they will provide accurate and relevant information on which an organization’s management can base their decisions. If they are invalid, the information will be wrong regardless of the accuracy of the data that populate them.

Using causality-based cost information

There are some decisions for which the distribution of resources and their costs are essential, and many others for which they are irrelevant — or, even worse, deceptive. Most types of management decisions require a measurement of incremental costs, not fully assigned costs. Make versus buy, lease versus purchase, capital expenditure, and short-term operational decisions are exam-
ples of relevant incremental costs that make the distribution of resources and their costs irrelevant. It does not matter how they are distributed; the only thing that matters is the change in total costs. Using strong causality to project these changes provides decision makers with quality decision support information. On the other hand, distributions are essential in making core business pricing decisions, managing an organization’s portfolio, and understanding product, service, and customer profitability. Combining strong and weak causality when making these distributions ensures the quality of the decision support information.

If cost models are to be effective in supporting business decisions, they must reflect economic reality. To reflect economic reality, they must use causality and focus on how all elements of an organization link together to drive its costs. Without causality, an organization’s cost model will be specious and offer a distorted view of economic reality. This will lead to inappropriate business decisions, financial and operational underachievement, and worst case, the failure of the business. Quality decisions require quality cost information, and the only way to obtain quality cost information is to base it on causality.

NOTES
SUCCESSFULLY IMPLEMENTING

TDABC IN HEALTH-CARE PROVIDER ORGANIZATIONS

SUSANNA GALLANI AND GREGORY L. SABIN

The U.S. health-care industry is undergoing a pervasive transformation toward value-based health care, which aims at maximizing patient outcomes while containing costs. Regulatory reforms, starting with the Affordable Care Act signed into law in 2010, have elevated goals such as expanding access, reducing costs, and improving quality of service; these are high priorities for all market participants. For example, the Centers for Medicare & Medicaid Services (CMS) has introduced several programs, such as the Merit-based Incentive Payment System (MIPS), Value-based Purchasing (VBP), Hospital Compare, and so forth. These programs aim to measure and reward provider efforts to increase service value and improve transparency and patient access to information about provider quality and prices. In addition, alternative payment models — such as bundled payments, capitation schemes, and recent innovations in contractual arrangements among providers (e.g., accountable care organizations) — further incentivize providers to improve outcomes and contain costs. The resulting downward pressure on prices and the expectation of higher quality services pushes providers to analyze how they provide their services and search for opportunities to improve efficacy and efficiency.

The statement generally attributed to Peter Drucker that “only what gets measured gets done” summarizes one of the major challenges health-care provider organizations face as they embark on their journey...
toward value-based health care. Improving outcomes and reducing costs requires adequate measures for each of these two performance dimensions. Historically, many hospitals have limited their systematic collection and reporting of outcome measures to relatively coarse and noisy metrics, such as mortality or readmissions. Fortunately, several initiatives — such as the International Consortium for Health Outcomes Measurement (ICHOM) and the Patient-Reported Outcomes Measurement Information System (PROMIS) — are making headway in the development of robust and widely accepted sets of measures capturing patient outcomes for many of the main conditions afflicting patients globally. By contrast, developing cost management systems should be a much faster endeavor, thanks to the availability of proven and widely accepted costing techniques that have operated for decades in most other industries.

Among the costing methods that one could learn by reading a management accounting textbook, time-driven activity-based costing (TDABC) has been shown to be particularly appropriate to the costing of service operations — in recent years, specifically in hospitals. Known benefits of measuring costs using TDABC include the discovery and elimination of costly non-value added activities or redundant steps in care delivery processes; the optimization and streamlining of workflows by eliminating unnecessary wait times; and the reduction in average treatment costs by downshifting certain tasks, where appropriate and safe for the patient, from high-cost providers (e.g., physicians) to qualified lower-cost ones (e.g., nurse practitioners). Step-by-step implementation processes are readily available, describing how to generate a process map, how to calculate the cost per minute for each resource involved in the care cycle, and how to combine process and unit cost information to calculate the total procedure cost. Most health-care management courses and programs in postgraduate and executive business education include costing in the curriculum. Nonetheless, hospitals remain slow in their adoption of TDABC. In several cases, the implementation does not proceed beyond a pilot program, thus failing to produce the promised benefits, which are likely to come to fruition only at or beyond a certain scale.

In the remainder of this article, we describe some of the common obstacles that challenge the success of TDABC implementation in health-care provider organizations and suggest potential remedies and preventive measures to reduce their negative impact. For brevity, we do not examine issues that are common to most other industries, such as potential biases introduced in the time equation due to cognitive limitations (for example, recency bias, desirability bias, outlier bias, etc.) or behavioral responses to change (e.g., inflating the time it takes to complete a task or “filling the shift” to hide potential sources of downtime or unused time). Instead, we focus on challenges that are either unique or particularly salient in health care.

**Charges, reimbursements, and costs**

Effective communication between clinicians and accounting professionals depends in part on a shared understanding of basic accounting concepts. For decades, conversations about health-care costs have centered around the concept of charges. Charges correspond to sticker prices, set at levels that are supposed to ensure the coverage of costs incurred in delivering the particular service and guarantee a margin. However, the process by which charges are set in hospitals is, in most cases, highly opaque and rarely involves clinicians’ direct input. Additionally, the margin target embedded in the calculation is rarely disclosed internally, and cost estimates rarely follow a rigorous and systematic calculation such as TDABC. Finally, charges convert into actual revenues or cash collected in a small minority of cases, as contractual agreements with health plans typically result in lower prices paid for members’ treatments. Therefore, in a way, charges are akin to MSRPs in the automotive industry. Nonetheless, the use of charges as a surrogate estimate of utilization costs has become common. This practice has been exacerbated by electronic medical records information systems, which are in many cases designed with billing in mind and not collection of cost information.
To facilitate communication and collaboration between clinicians and accounting professionals, it is crucial to clarify the terminology and make clear distinctions between charges (i.e., sticker prices), reimbursements (i.e., revenues), and costs. The earlier in the process these clarifications are introduced, the better.

**Why are we (clinicians) doing this?**

Advocates for the adoption of TDABC have presented convincing arguments about the importance of clinicians’ buy-in and active participation in the process mapping, data collection, and review of results. A key rationale underlying this requirement is that clinicians have the most direct and updated information about the steps involved in the care cycle, the resources needed to complete each step, and the time the steps might take. However, the benefits of directly involving physicians and clinicians in these activities go far beyond the accuracy of the data. Active participation engenders ownership and appreciation of the bigger picture. More and more health-care services rely on effective collaborations and teamwork. It is critical for better management to understand how decisions made along the cycle of care by each of the actors affect the choice made available to others and, ultimately, the outcomes and costs of the entire process.

A common obstacle to clinicians’ buy-in is the misconception that costing is an accounting exercise geared toward financial reporting and, therefore, a responsibility of the accounting staff. We prefer the following interpretation: Costing is an exercise in expressing resources consumed in the care delivery process using a common unit of measure — money. This exercise allows us to compare quantities of resources of different natures and units of measure, thus supporting decisions that involve trade-offs or allocations of scarce resources. These decisions can (and should) only be made by physicians and clinicians while delineating the cycle of care that delivers the best possible outcomes for their patients. Project leaders must position the costing calculation within the value-based health-care framework to avoid perceptions among practitioners that cost reductions are prioritized over patient outcomes.

**Variation in services offered and production processes**

Most management accounting textbooks point out how investing in sophisticated costing systems, like TDABC, is appropriate if the organization exhibits variety in the products or services offered and in the associated production processes. In addition to those common to most other industries, two additional sources of variation influence the provision of health-care services. First, physicians’ practices are influenced by their training and preferences, which often convert into different procedure lengths, staff and equipment requirements, and post-acute care treatments. Second, the patient is a source of variation. Not only is variation in patient characteristics generally met with adaptations of the care plan, but patients are also often expected to be active participants in their care (for example, adhering to medication, nutrition, exercise regimens, etc.). The complexity of health-care services, compounded by multiple sources of variation, may project the mapping of all the possible paths a particular treatment may follow as a formidable task and discourage its undertaking. Segmentation, averaging, and iteration are three approaches that may reduce the size of the challenge and the associated anxiety.

Health-care processes are often interrelated, and it may appear challenging to map the steps of all possible paths a care plan may take. Practitioners should break down the process into its phases and/or branches and focus on one segment at a time, ignoring the rest of the process until ready to tackle the next branch or segment. Over time, the puzzle will fill itself in. For example, patients undergoing a knee replacement may follow different paths in their postsurgical experiences. Some patients may remain in the hospital for post-acute care. Others may be discharged to skilled nursing facilities. Others may be discharged to their homes and periodically return to the hospital for physical therapy. These three possible branches of postsurgical care for knee replacement patients need not be costed simultaneously. Instead, providers should begin by focusing on the most common alternative and address the other branches in the process map later.
Another health-care-specific complication resides in the frequent separation between the entity that employs the clinicians and the one that operates the facilities. Physicians are often employees of an organization or a specialty group, which contracts with the entity that owns and/or operates the facility. This separation influences the physicians' controllability over structural costs that participate in the cost of the care they provide. For example, contractual arrangements that are common in practice see the facility managing organization bill the physicians' organization for the utilization of the physical structure. In other cases, physicians' organizations forego a portion of their reimbursement revenues (i.e., technical fees) that are routed to the facility managing organization upon billing of care services provided to patients. These relations may prove complicated to capture in the costing process. As a result, providers must rely upon the expertise of accounting staff to disentangle cases of revenue sharing from instances of cost allocations.

Different providers carry different costs per minute. While the cost per minute can range as much as tenfold between the highest and lowest cost personnel, differences in available capacity among practitioners in similar roles and earning similar levels of pay may lead to material differences in cost per minute (e.g., surgeons involved in research and teaching activities may have a smaller available capacity compared with colleagues who dedicate most of their time to clinical work). The temptation to create a different process map for each provider may, again, unnecessarily complicate the task. Nevertheless, calculating average costs per minute for each role is a sufficient starting point to begin familiarizing oneself with resource consumption and identifying opportunities for health-care value improvements.

Incomplete processes and approximations often run contrary to the tenets of medical training and can cause significant intolerance and anxiety among providers. Iteration is, therefore, the keystone that allows process maps and cost estimations to be informative for decision-making. After a first approximation, providers must validate, repeat, and refine their mappings and associated cost calculations. TDABC can only succeed if approached not as a temporary intervention but as an ongoing program. Iterations are essential to improve accuracy and keep up with changes in care protocols, techniques, and continuous improvement initiatives. Outdated process maps lose credibility and fail to support decision-making.

**Availability of dedicated resources**

If costing is a program, it must have a dedicated staff. In many cases, providers are discouraged by the considerable time they devote to the first iteration of process mapping and costing and will resist repeating the experience. The prospect of hiring dedicated administrative resources to coordinate costing efforts may be met with resistance, especially because of the downward pressure on revenues and the prioritization of cost reductions where possible. However, managers must keep in mind that spending time working on iterations of process mapping and costing calculation may be a suboptimal use of expensive resources (e.g., surgeons), who could use their available capacity to perform clinical activities that cannot be delegated to others (i.e., working at the top of one's license). Our recommendation is to minimize the involvement of clinicians in the process — notwithstanding our earlier suggestion to ensure their buy-in and active participation in the initiative — and delegate iterative and administrative tasks to dedicated, lower-cost resources.

An important task to delegate to the costing program staff is the documentation of the process — what we call “mapping the process mapping process.” Creating a playbook and documenting best practices used in the specific organization to collect and organize the information about processes, unit costs of resources, and calculation algorithms ensures repeatability, consistency, comparability of resulting estimates, and continuity of the program beyond changes in the staff composition.

**Getting to scale**

Concerns about distracting clinicians from patient care to invest time in costing exercises are often worsened by underwhelming results...
of pilot projects. The role of a pilot run is primarily to develop, learn, and test the process. Pilots involve especially simple cost objects (i.e., care procedures) to prevent their complexity from overwhelming the learning aspects of the experience. Consequently, even the most successful pilot runs rarely provide sensational process improvements and cost savings. Skeptics in the organization may argue that the disruptions incurred to obtain such small benefits may not be worth the cost. For this and other reasons, many costing projects fail to move past the pilot stage.

Getting past the pilot stage may be even more difficult than starting the pilot might have been. War stories about mistakes made, time wasted going down the wrong path, and not knowing what one was supposed to do can be very discouraging. Leaders must highlight the learning that was gained during the pilot phase, which will simplify the adoption in subsequent phases. It will also stress the importance of getting to scale so that the initial investment in learning — a down payment — may be capitalized and generate the expected benefits for the organization. The sooner one develops the confidence to take on a process that can offer material savings and improvements, the better.

TDABC is a powerful and versatile costing system that adapts well to production processes along a wide range of complexity and therefore fits well in health-care provider organizations. Accurate and timely costing information supports providers in making important managerial and strategic decisions that can increase value for patients by improving outcomes and optimizing resource utilization. However, as in any organization, implementing a sophisticated costing system requires significant investments of time and effort by those directly involved in the production process. In addition, as in any change management initiative, the disruption associated with the implementation must be actively managed to minimize the distraction of critical resources from their primary responsibilities and manage potential bias, fear, and resistance that may stem from low trust in management and/or poor communication. In addition to these common issues, implementing TDABC in health-care provider organizations presents additional challenges rooted in the history and structure of the health-care industry. Actively and proactively managing these challenges is likely to set the organization up for success in implementing TDABC and reaping the many benefits associated with it.

NOTES
5. Reimbursements based on relative-value units (RVUs) comprise a professional fee and a technical fee. The former is intended as payment for the physician’s time, effort, expertise, and training. The latter is designed to reimburse the consumption of resources, such as facilities and equipment.
In the 1980s and 1990s, the interest for implementing activity-based costing (ABC) was exploding, but rumors and bad experiences were rampant, and companies perceived the models as large and complex — so, instead, activity-based management (ABM) became popular. In recent years, ABM has been subjected to the same rumors as ABC, so now companies have turned their interest to technology business management (TBM). Still, the foundation of ABC, ABM, and TBM is the same. The problems are in the companies themselves — there is nothing wrong with the ABC way of thinking, possibly because it is a well-proven way of thinking.

About 2,300 years ago in what is now known as North China, a lineage of military personnel put their wisdom into written form for the first time in a book known as Sun Tzu, which the West calls The Art of War. Their text was designed to shape the strategy thinking of East Asia. It offered a radically new perspective on conflicts, whereby one might attain victory without going to battle. With ABC in mind, it is interesting to read chapter 3 in The Art of War where it recommends that our response to conflict start from knowledge of ourselves and of the other. If we translate and interpret some of this, companies would understand why ABC is relevant:

Because all things are interconnected,
You must know each one,
And how each one affects and effects every other.
Only then can you plan effectively...

Knowing the first part and knowing the last part,
In one hundred battles no losses.
Not knowing the first part but knowing the last part,
One win for one loss.
Not knowing the first part and not knowing the last part,
In every battle certain loss.

In the business world, to be able to plan effectively and to reduce losses, we need ABC, as it shows how each step of a process affects every other one and reveals both the first and last parts. ABC is not large

MORTEN ZEIHLUND has a bachelor's degree in auditing, management, and IT and a background as auditing assistant at KPMG, followed by several years in different group controller positions. He started Isae AB in 2005, which is a consultancy firm specializing in activity-based costing, activity-based management, and technology business management. Since then, he has been active in more than 200 projects in more than 20 different countries across all branches for some of the main companies within each branch. Morten is specialized in model design and deep software knowledge and is licensed in almost all main ABM and TBM tools available in the market. As such, he serves as a consultant and subject matter expert worldwide for software vendors, including many of the main consultancies, and large companies.

This article briefly describes how a company’s first ABC management project can lead to more benefits than just an ABC insight.
and complex — only companies make themselves large and complex. It is amazing the amount of data and detailed information companies have about their production, products, customers, employees, and so forth. That gives them a huge challenge in terms of storage and knowing the truth. It seems the exploding data volume sometimes confuses people more than it provides insight. It is also amazing to see fully booked calendars with many meetings, and it still so often seems like employees are not actually talking to each other or are miscommunicating (see Exhibit 1).

ABC digs so deep that the output is much more than an understanding of the financial cause and effect — it gives many derived benefits, which many people tend to quickly forget. Some of the most common benefits are:

• clarifying financial definitions;
• identifying weaknesses in one’s enterprise resource planning (ERP) systems;
• forcing one to see across financial, sales, customer, and production systems;
• showing that nobody really knows what is done; and
• reducing cheating.

**Clarifying financial definitions**

IT expenses are often on the agenda for month-end, budget, and cost improvement meetings, and it is for a reason: IT expenses are the most quickly growing expense type in organizations. When we design ABC models, we also have IT expenses on the agenda, and it becomes clear that many organizations do not know what their IT expenses are because they do not have a clear definition. Is it the costs within the IT department; is it the expenses on all IT-related accounts; does it include depreciations, investments, or projects? Going deeper in wanting to reduce expenses, you need to know what the running costs and development expenses are, but what constitutes running costs? These are basic questions, but try to ask them in your organization, and you will see my point.

IT expenses have, for many years, been defined as overhead expenses, but I do not fully agree with this. Overhead expenses are expenses that you cannot link to specific purposes as customers or products, and your business could run for a time without them. You can serve customers and produce products without the top management, without the HR department, and without the finance department, but it would not be wise. You certainly have IT expenses that can be related to customers and products/services in some way — customer relationship management, production, and logistical systems, for instance — and these are needed to run the daily business. You do also have IT expenses that are not related to customers or products/services, such as ERP systems...
and reporting tools, as they “support” overhead functions. So, when companies bulk overhead expenses and distribute them evenly based on revenue or cover them by adding 4 percent to their margins on each product, it could be very wrong. During your model design, you will have these discussions, and you will change your impression about overhead expenses.

Aside from overhead and IT expenses, basic definitions such as product costs, profit, and direct expenses are not always as clear to everyone in the organization as they should be. Therefore, several ABC models are not successful, as definitions have not been agreed upon, and stakeholders have different expectations.

Identifying weaknesses in one’s ERP system
The ERP system is the basis of all financial data, and many companies implement fancy and expensive ERP solutions. However, the output is very often only the monthly and annual report, and they are not useful for any other purpose, so they invest in expensive EPM solutions and reporting tools in the search of better and easier understanding of the ERP data. This is because companies often limit themselves in the way they set up the ERP system. Many of the structures needed for an ABC model come, or should come, from the ERP system. These include, for instance, organization structure, account structure, product structure, and customer structure.

Far too often, companies have separate invoicing systems where products and customer specifications are, and the invoice is just transferred to the ERP system as a total sale, leaving sales in the ERP as a black box. Of course, you can see the sales detailed in the invoice solution, but your costs of goods sold are in the ERP. Where do you see something simple, such as the contribution margin per product or customer? IT expenses are often a black box, but they could easily be more visible if you use the dimensions in the ERP system. Most ERP systems have 10 dimensions or more, such as account, project, activity, entity, and so forth. These are seldom all used, so why not be creative and use them in alternative ways? You might create IT systems, areas, or purposes as “activities,” and when posting, for instance, software licenses, instead of just using the account labeled “software licenses,” combine this with “activity.” Now, instead of having an account with software licenses, you will be able to see expenses per solution or system area. As a project, you could create “running cost” and “development,” and instead of just having external IT consultant expenses on an account, you would be able to see them at the system level (activity), along with whether they were running, or development expenses (project). But you cannot do this with salaries and several other expenses, and that is where you need ABC. Also, ABC will not only show, for instance, the IT expenses per solution, but it will also assign these to relevant cost centers, work tasks, and, in the end, products and customers.

A third aspect often seen with ERP implementation is companies are not thinking globally. Companies implement ERP systems to be used at all factories or in all countries and have a global chart of accounts and guidelines about what to use the dimensions for. Instructions might say that the dimension “material” should be used for raw material codes, and “organizations” should be used for cost centers. But these dimensions are maintained locally and not centrally. Do you see the problem? Some make four-digit codes, others make three-digit codes, and if someone is instructed to use three-digit codes, they might not use the same code for similar raw materials. How would you easily analyze the total usage of a specific raw material? And how would you analyze total IT expenses for the group? It is doable, but it is not simple and requires deep knowledge about each factory or involvement from a person in each factory, and this is not the purpose of implementing modern ERP systems. Oftentimes, companies first see these challenges when an ABC project requires data across factories or countries.

Forcing one to see across financial, sales, customer, and production systems
An ABC model is not just financial information, but it often also includes data from sales, customer, logistical, and production systems. Using data from multiple sources often highlights further problems when it
comes to definitions — for example, what are the products of the business? Production and sales do not always see this in the same way. When the purpose of your ABC model is product profitability, and you need data from both sales and production systems, this is the first time production and sales employees talk to each other. This is where you see that product structures are not identical. Of course, there will be differences, as you produce single products but might sell them as packages, and packages only exist in sales systems. Still, maintaining two structures is not optimal, and you should have a master structure — but far too few companies have this.

In some cases in Scandinavian nursing homes and home services, they have a system to evaluate the physical and mental condition of new patients. This is used to define which services patients are given. Also, they have time registration systems, where the staff members register usage of time on the different services. Nobody ever cross-checks these systems and notices the problem before ABC processes start to request data. There are big differences, for instance, in amounts of time spent giving a patient a bath — is it a bath lying down, sitting up, or standing up? Does it require full or partial staff support? Does it require one or two staff members? It is therefore important to the ABC model to know how often the different types are executed. Each nursing home is financed based on the planned services in the “evaluation system.” The problem is that the evaluation system shows original assigned services and is not updated — even though patients’ health changes, and it requires more time-consuming services over time. The time registration system, on the other hand, shows exactly which services are given, but only in total time for all patients. None of the systems give useful data, and nobody questions these data, but planned resources and finances were still based on evaluation data. So, it is no wonder the staff was under time pressure and the economy was bad.

Showing that nobody really knows what is done
Many companies spend a great deal of time creating nice job descriptions so each employee has a well-defined role with a responsibility. The longer amount of time an employee has been at a company, the more the person does, although it is not necessarily within the person’s original responsibilities. If a person has moved between departments, there will often be time spent on tasks outside the current responsibilities. It can therefore be misleading to jump to conclusions and design a model from job descriptions. There are many companies that do not have job descriptions, and when designing their ABC models, they involve the managers in explaining what the departments does. Still, far too often managers do not know the facts or the complexities about employees working day to day. Instead, what they describe is how they believe and hope things will work.

Years ago, it became popular to outsource IT departments because companies believed it was an easy and fast way to reduce expenses. The fact is that several companies faced increased expenses and internal problems. They were unaware of how much time IT was spending on small support tasks for the organization that only took a few minutes and therefore were not registered; IT probably even helped in report creation or data extraction. When IT was outsourced, each task was charged, and small tasks that only took a few minutes were charged, with the minimum fee equaling 15 or 30 minutes. All of this accumulated in large amounts.

This is an advantage of an ABC model: It gives the organization the full picture. Of course, we could never make a model so detailed that it would show IT spending five minutes to help a department. Still, when interviewing staff members, an ABC model would find that IT spends 5 percent of their working time on miscellaneous tasks, and that would be discussed. An ABC model exposes more truth than many believe or even hope.

Reducing cheating
As the ABC model often has both financial accounts and departments as the starting points — and it has workflows or work tasks as connection points for expenses with customers or products — it gives more insight than the traditional accounting model. Also, different departments use the model and analyze data. More of them look at the data in the ERP system, so suddenly you
will have many different eyes on the financial data. A person who is responsible for a product or customer will examine the costs impacting the results, trace them back to their origins, and question them, whereas with only the ERP system, that person would have looked solely at direct expenses.

Some years ago, I was asked to design an ABM model for a major European manufacturer that wanted to get a better understanding of their overhead expenses, and especially IT expenses. It was clear they needed this because the way their ERP system worked, it created a mess and a black box. The first model produced some strange results, as it was difficult to get useful data to make a solid model, so we had to bring in data from the past four years to get some stability and understanding. Management was shocked when they started to analyze and dig into the results because it became clear that the IT expenses on average included 500,000 euros each year that had been taken privately by the chief information officer (CIO). For one person, this is a large amount of money per year, and it was almost the same as his salary. Unfortunately for him, it was discovered through the way we assigned IT expenses, and it happened to hit products in a way that impacted results remarkably. But looking at the big picture and in the ERP system, it was not noted. The total yearly IT expenses were about 47 million euros, so the 0.5 million euros the CIO had taken was only about 1 percent.

This article briefly described how your first ABC management project can give you derived benefits in terms of data insight and ensure a common view and understanding of the business — where the essential message is to be careful with all of your data gathering. Too much data and insight can lead to blindness and wrong decisions.
My experience with profitability growth goes back to the start of my career with a lesson in increasing profitability through revenue enhancement strategies.

After a job termination, I found myself back in the food service industry. As a waiter, I learned to increase the average guest’s order value by upselling a dessert. There was a contest among the servers to see who could gain the highest ticket price for a table. My strategy of presenting customers a tray of tantalizing desserts paid off, and my average ticket price increased. In the end, I excelled at selling desserts. The dessert I sold represented a 10 to 15 percent increase on a individual ticket, but the profitability of dessert items was much higher, so it also increased the overall gross margin percentage on that sale. I also benefited from increased gratuities in proportion to the increased ticket sizes.

For this national restaurant chain, the benefit was clear: Higher sales with higher-margin products increased profitability.

There are more opportunities to increase profitability by growing revenues than by decreasing costs. Wall Street rewards companies for revenue growth because they understand this very point.

Today, I work with business owners in an advisory role. My focus is preparing the business for transition in ownership, including preserving and growing business value, which should start long before the ownership team is planning to exit. Part of the work of growing business value is profit improvement. It is my observation that the focus on revenue growth takes a back seat to managing the expense side of the ledger. Many businesses miss opportunities when they decide not to focus time and resources on revenue enhancement or management. It is easy to focus on line items that are significant expenses, such as labor and benefit costs, but this overshadows the opportunity to take a deep dive into increasing revenue through several simple strategies, capturing more revenue and profits.

A deep dive into increasing revenues by customer or product or other unit measure looks much like an activity-based costing (ABC) analysis. With this exercise, we segment customers by common attributes. There may be several iterations of this analysis using different variables.

It is likely we will see inflation in many of our expenses in the future; some industries are already feeling the impact. To preserve our gross profit margins and bottom-line...
profits, business owners must be mindful of the impact of inflation and adjust the pricing of their product or service accordingly.

In 2000, I met Edi Osborne from Mentor Plus, and he was truly a mentor to me in my professional development. One of the very simple but powerful tools Edi taught me was that our opportunities to improve the profitability of our business lie primarily in that top-line revenue number. However, predicting revenue can be elusive, whereas predicting expenses can be much more tangible for those managing the finance function. To help, there are, in simple terms, five ways to increase profitability:
1. increase the average selling price for our product or service;
2. reduce customer defections;
3. improve customer acquisition rate;
4. increase wallet share; and
5. decrease costs.

### Increase average selling price
One of the biggest triggers of profitability is simply increasing the prices of our products or services. Many times, competitive pressures cause us to avoid or minimize price increases. This can cause long-term profit erosion when costs increase at a pace that exceeds revenue growth.

Consider this example: A $60 million consumer goods manufacturer experienced a significant decline in their gross profit margin over a 10-year period. During that period, this company had neither acquisitions nor exits from any lines of business. Their price increase averaged 2 percent per year over that period. At the same, their direct manufacturing costs (e.g., materials, labor) increased at an average rate of 4 percent per year. At the end of 10 years, the margin had eroded significantly (see Exhibit 1).

During this period, a larger competitor was targeting many of their customers, and this created pricing pressures. Had they maintained a 40 percent gross margin each year, they would have generated $47.4 million of additional gross margin over that 10-year period. This includes making pricing decisions based on both new and existing customers and knowing how to price the product or service to fit all those customers.

### Reduce customer defections
A Forrester study determined that it costs five times more to acquire new customers than it does to keep an existing one. Thus, from a profitability standpoint, more overhead should be invested in customer retention strategies rather than new customer acquisition.

If we simply focus on our existing customers and the revenue from that customer base, we can not only protect but grow profitability. We must build a strong relationship with our customer base to understand their needs and provide superior service to meet those needs. Then we leverage that relationship to educate the customer on the value of our service and better understand their other business challenges.

Additionally, when we understand our customers’ needs across our customer base, we compile that information, and it becomes critical data to identify where we can grow the wallet share with customers by offering new products or services.
Other studies from KPMG and the Harvard Business School reveal that customer retention is the key driver in customer profitability. Thus, investment should be made in developing strategies around improving retention and reducing defections.

There is a certain amount of customer attrition that will occur every year. Each business needs to assess their base level of defection that is acceptable, based on a self-analysis of customer data. Customers go out of business, close their business, sell their business, or pass away — when could losing those customers, or whoever replaces them, be avoided? The customers lost to competition — those losses should be avoidable. The customers that consolidate or sell their business to another — those, too, could be avoided. If we analyze the data for historical customer losses, we can then develop strategies to reduce these losses. A strong relationship with our customers may lead us to better retention strategies even when there is an event such as the sale of the business.

Remember, too, that there may be customers a business should not be serving for profitability reasons, and our ABC models should lead us to identify those customers. It is possible that there are viable strategies to retain customers while increasing profitability to acceptable levels.

**Improve customer acquisition rate**

Many sales professionals are hunters. They get great satisfaction from increasing market share. However, how do they acquire new customers? What activities are key to that acquisition? Could it be that one customer or one key industry contact is a primary driver for newly acquired customers? Could it be that a new product is attracting interest from new customers? Are these customers simply leaving a weaker competitor that is providing inferior service?

The point is, we have to look at historical data to understand the reasons we acquire new customers. This analysis will help us determine where to invest resources to increase the acquisition rate. There must be a process in place to collect data from the field, but we must also have a sales force that has a strong relationship with the customers to allow for the information to be collected. We also must understand what our customers’ future demand for our product or service will be as their business model evolves.

**Increase wallet share**

Harvard Business Review (HBR) coined the term “Wallet Allocation Rule score” in 2011. After doing an intensive study to determine what metrics link to share of wallet, HBR determined that the rank a customer assigns to a brand correlates with the share of wallet. In other words, the brand reputation is key to increasing wallet share.

In simpler terms, can we upsell or cross-sell our products or services? A deeper understanding of each customer’s business may reveal additional products or services that could be offered to that customer. These may be products we currently offer or others that we could offer by expanding our lineup. There may be enhancements to our current offerings that could enhance our revenues from each customer.

**Decrease costs**

There are many ways to decrease costs. The question is whether those tactics will ultimately cause revenue erosion. While change is inevitable, and customers will be asked to accept new processes that will purportedly benefit them, these changes create customer retention risks. How these changes are communicated as well as implemented will impact the customer experience. A negative experience reflects poorly on the company and could lead to customer base erosion.

A real concern is that a focus on decreasing costs will cause a corresponding decrease in customer benefits. Admittedly, this is difficult to measure. Intangibles that many customers highly value may disappear in an expense-reduction initiative. Many times, the loss of customer benefit is only discovered after a customer defects to another vendor.

Let’s explore a few examples. Increasing health-care costs have forced some businesses to make difficult decisions. In some cases, there is a decrease in health benefits covered under the plan. In other cases, the employer requires a higher deductible or higher employee share of health benefits. Either
way, the effort to reduce costs by cutting benefits can have an unintended impact on employee turnover. Increasing employee turnover invariably impacts the customer experience because the replacement employee will, at a minimum, not be as knowledgeable about the customers, products, and services.

Another example is the automation of customer processes that reduces the need for labor. It could be that an automated answering system is implemented or a call center engaged to field inbound calls from customers. Inevitably, this will create some communication breakdown because information could be misinterpreted as it is shared, causing errors and customer frustration.

Any responsible business owner will manage costs to protect all stakeholders — customers, shareholders, employees, and the community at large — who are dependent on the sustainability of that business. But the effort to increase profitability on a long-term basis lies in understanding how to increase revenue in a profitable way.

The strategy forward: Allocating resources to maximize revenue
We have good customers that are defined by the relationship we have with them, the growth in their business, and the profitability of that customer to our business. We also have internal resources that best serve these customers due to factors that add value to the customer relationship. Part of the answer to the question of how to retain and grow revenues from our existing customers is to first and foremost take care of our best customers.

Team members who can best serve the top customers must be allocated to those customers. While this seems simple and obvious, it doesn’t happen in many businesses for a variety of reasons. The biggest reason is leadership. Leaders know and understand that they need the “A” team to focus on “A” clients. However, due to internal politics, this doesn’t happen. Thus, the “A” team is left to manage a diverse customer base that consists of customers that are not “A” listers. This is a missed opportunity.

It is important to note that the customers who are not deemed “A” listers are still very important to the business. However, we must recognize they require less service and less attention. Thus, we should allocate appropriate resources and build appropriate processes around those customers to meet their needs. We have seen this play out many times in the insurance brokerage industry where individual insurance customers requiring home and auto insurance, and some requiring term life insurance, do not have significant needs for service and attention. A well-designed service center can meet their needs in a cost-efficient manner.

Lastly, our best employees will have the best chance to improve customer retention. Armed with the right tools, they will also be able to recognize and execute opportunities to grow the relationship with the top customers by increasing the wallet share. And because of the superior customer experience, they will be able to get referrals and acquire new customers.

Higher revenue solves many business woes. While we have to know our cost to serve each customer, we also need to know what the revenue potential is for each customer and focus more strategic and managerial attention on achieving that potential.

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Old normal, new normal, remote working, hybrid working — the longer-term impact of COVID-19 on the ways in which businesses operate is still unclear. Many employees are embracing the idea of a hybrid model of work with a flexible combination of remote and office-based working hours. HSBC Bank embraces the new way of working; Goldman Sachs rejects it entirely. Studies comparing productivity levels for remote and office-based workers were initially favorable for those working from home but seem to be less so over the long term.1

The circumstances of the past few months have provided a catalyst for likely enduring change in some organizations. While most workforces have suddenly been forced to operate remotely, initiatives such as digitization, adoption of cloud-based technologies, and robotic process automation (RPA) have accelerated. “The Future of Work,” an article published by the World Economic Forum in October 2020, identified the twin threats to many traditional jobs: the pandemic and an increasing drive to automation.2 Eighty-four percent of companies surveyed reported an increasing drive toward digitalization of work processes with 50 percent committed to accelerating the automation of tasks within the business. It is predicted that by 2025, 85 million traditional jobs will have been displaced by automation, although 97 million new jobs will have been created as part of that transformation. Of the top 20 jobs decreasing in demand, “accounting, bookkeeping and payroll clerks” are in third place, and “accountants and auditors” are in fourth.3

The future reality is that many routine, repetitive tasks using structured data will be automated with implications for reskilling individuals in the workforce who find themselves displaced. Gary Cokins, in an article for Intelligent Automation Network,
identified five accounting functions that will be most impacted by automation: traditional accounting processes, month-end closures, auditing, business process outsourcing, and regulatory reporting.4

Where does this leave cost management?
Many organizations have traditionally maintained very basic reporting of costs with little emphasis on analysis or connection to decision-making. Simple cost center reporting, labor and material variance, and high-level overhead allocations are all tasks that can be automated in the future. The drive toward the automation and migration of financial accounting and operational systems to the cloud will improve the timeliness, availability, and quality of data available, making automation of basic cost management reporting much easier. The benefits of RPA also include reduced wage costs, greater consistency, and faster processing.

The writing is on the wall. Accountants must either create more value for organizations or face long-term redundancy.

Creating value
In 2019, the Institute of Management Accountants (IMA) published a statement on management accounting titled “Costing System Attributes that Support Good Decision-Making.”5 The authors, IMA’s Managerial Costing Taskforce, correlate the necessary level of sophistication of cost models with the information required to inform management decision-making. For organizations making decisions based on the most basic cost reporting with highly aggregated costs and no analysis, it is not difficult to imagine how that process can be completely automated.

It is important to recognize that the rise of RPA and its relationship with human labor does not present a zero-sum game. The win-win solution is one where the strengths of automation (handling relatively straight-forward, repetitive tasks using structured data) can be combined with those of human ingenuity, creativity, and higher-order thinking.

Demand
The starting point for increasing the value of cost management in an organization is to establish the connection between strategy and management decisions and to accelerate the provision and utilization of the cost information needed to support those strategies and decisions. The circumstances over the past year have led many organizations to revise their business processes, restructure products and product groups, revise routes-to-market, and reprioritize customers. For example, where local COVID-19 restrictions have discouraged consumers from visiting physical outlets, companies have developed online offerings and digital channels to provide access to their products or services. A recent Forrester Consulting report found that 70 percent of decision makers have had to rethink or reprioritize channel strategies because of the pandemic.6

A competitive organization must be positioned to differentiate between the cost and profitability of channels, customers, and products. Recent research from Linnworks, an e-commerce platform provider, showed that 76 percent of consumers now value convenience over price, with 95 percent citing delivery options as a major determinant of purchasing decisions.7 Many local and regional companies in the past year have shifted their emphasis from physical distribution channels to an online offering. U.S. online grocery sales surged 54 percent to reach $95.8 billion in 2020, up from $62.2 billion in 2019.8 An unintended consequence is that these companies are finding they are now serving a national (and even international) customer base. This shift in channel sales comes at a cost. The logistics costs of online retail are anything up to three times higher than traditional channels, and customer returns in many categories often exceed 30 percent.

With people confined to their homes for extended periods during the past year, consumer spending patterns have changed. Sales of products such as casual clothing, personal hygiene, home gym equipment, and digital streaming services have shown strong growth. Personal service industries, travel and tourism, and many other sectors have been devastated by lockdown restrictions. Consumers facing financial uncertainty are seeking to limit spending on large capital items.
COVID-19 has fostered a period of unprecedented change, testing the resilience of many organizations and requiring complex, far-reaching responses. How are managerial accountants and cost management specialists providing information to support executives in navigating these extraordinary times?

Build a model

Cost management needs a model if it is genuinely going to add value for senior decision makers and provide multi-dimensional analysis across channels, customers, and product lines that cost business processes; model capacity constraints; disaggregate resource data into meaningful levels of detail; identify causal relationships between inputs and outputs; and describe cost contribution by resource and processes to outputs. In a recent study by Gartner, 65 percent of organizations either used inconsistent cost management frameworks or no framework at all.¹

The simplest models can be built in spreadsheets or use the functionality of an enterprise resource planning (ERP) system. More complex models will benefit from dedicated software tools that can handle multiple periods, dimensions, business rules, and cost drivers. Such costing models are criticized because maintaining them becomes time-consuming and unwieldy, requires data from a variety of sources, and is more akin to an IT exercise than the work of a financial analyst. However, it makes the models perfect for RPA.

So where is the value? Model design, business logic, cost driver selection, level of detail, and reporting attributes are all a reflection of the objectives of the model. Product management, customer lifetime value analysis, product pricing, strategic channel management, capital investment decisions, discounting strategies, outsourcing decisions, regulatory submissions, and scenario planning are all examples of the kinds of decisions businesses need supported by reliable, reasonably accurate cost and profitability analysis. Therefore, the first step in the journey of adding value is to design a costing model that is fit for this purpose.

Improve the model

The capability of technology to improve the costing model has already arrived. Artificial intelligence (AI) can be used to sift through huge amounts of data and identify relationships that human beings are extremely unlikely to uncover. For example, understanding the correlation between cost driver quantities and costs may reveal that assumptions on which model is logic-based are not as robust as first thought. The algorithm could then search all other drivers in the model and evaluate, over a time series, which correlates more closely with cost behavior.

This use of AI is win-win. Human beings respond to change by adding value through creative design and connecting the cost modeling effort with the decisions needed. Technology is automating the mundane, repetitive data-processing tasks associated with maintaining the costing model. Technology is then further guided to review the causal relationships between costs and cost drivers in the model and identify possibilities for improvement.

Looking forward

Human beings are firmly in the driver’s seat now. A flexible, reasonably accurate, and up-to-date costing model describes the links between an organization’s resources, business processes, and outputs (channels, customers, products, and services) as a series of mathematical relationships. Now, the question is no longer about evaluating the impact of alternative decisions based on historical analysis; it becomes a forward-looking model.

Activity-based budgeting takes the modeling one stage further and combines forecast output volumes with the knowledge of cost relationships and behavior to predict cost and profitability outcomes. The model now enables the cost and profitability of alternative strategies to be evaluated through running different scenarios. Much of the
heavy lifting in terms of data processes can be handled through RPA and modeling tools, and the refinement of cost relationships can be handled through AI tools. The skill to design and manage this environment must lie within cost accounting.

**Good, better, best**

Let us look at an example of where the costing is currently being taken to the next level. With global labor productivity growth in long-term decline, innovative approaches are required to eliminate inefficiency and create value. One such area is within supply chains where manufacturers, distributors, and retailers have traditionally sought to reduce costs in individual silos. Such decisions may benefit one party but are often at the expense of another participant in the chain as, consequentially, overall end-to-end (E2E) costs may rise.

In addition, logistics activity is highly complex and varies constantly due to promotions, seasonal demand, and changes in product range and suppliers. This constant change can often result in significant variances between supply chain costs and budgets. Retrospectively analyzing the costs in one period is a poor predictor of how to control or reduce them in another.

There is a need to move from passive post-analysis of costs that have occurred to active predictive management of costs in response to real time changes.

Historically, labor productivity gains in process improvements have yielded less than 5 percent of cost savings. The opportunity now lies in optimizing the flow of goods throughout the supply chain at the individual SKU level where cost reductions of 10 percent to 30 percent are achievable. While E2E cost modeling has been around for a while, it has historically been constrained by the effort required to update models, process the data, and analyze results. It is typically conducted as a quarterly exercise.

A new initiative in the United Kingdom led by Incept Consulting has attracted the attention of U.K. Research and Innovation, leading fast-moving consumer goods manufacturers, logistics companies, and major retailers to work together. The consortium is developing and testing the operational integration of predictive AI modeling with enterprise value network cost modeling (see Exhibit 1).

There are four stages in this exercise:

1. AI generates a predictive optimum order configuration for all SKUs about to be ordered, based on their order history. It generates the data to model all the possible alternative flows of individual SKUs and load combinations through the supply chain within defined operational rules and constraints.

2. The E2E cost model then calculates accurate costs of each SKU using the AI-generated scenario for the various flows including outbound handling, transport routes and vehicle utilization, inbound handling, storage and inventory from manufacturer through
national and regional distribution centers, and on to store level.

3. AI uses these results to select the optimal SKU, order and truck load configurations, and route-to-market for individual SKUs, and then supplies this to the order management systems, aiming to minimize overall costs, packaging waste, and CO2 emissions.

4. The final step is for the AI optimization model to evaluate the cost impacts in all the scenarios across the entire supply chain and the changes in cost for each participant. It will discard scenarios where the total system cost rises, and in the remaining scenarios where the E2E costs are reduced, it identifies if the costs have increased for some sectors to enable the savings for others. The model then calculates compensation between sectors according to agreed commercial rules.

Here we have a combined cost modeling and AI-derived optimal solution that directly impacts operational purchasing decisions. Total supply chain costs are minimized, and the model calculates the fair share of benefits across supply chain partners.

The value added by cost management practitioners comes from their ability to work with operational supply chain management across companies to develop new business and compensation models. Human ingenuity combines these new, interconnected commercial and operational rules with related cost methodologies while harnessing the power of RPA and AI technologies.

**Conclusion**

The COVID-19 pandemic has far-reaching implications for the working patterns and business operations of many organizations. It has accelerated initiatives to introduce technology-driven change such as RPA and cloud-based computing. RPA is set to replace human effort for rules-based, repetitive tasks including those in the finance function. Financial professionals must ultimately re-skill to create value for the organizations for whom they work. COVID-19 has also led to changes in consumer behavior, forcing...
many businesses to adapt their products and services, channels, and customer relationships. This period of significant change and uncertainty provides cost accountants with a real opportunity to demonstrate value through quantifying, evaluating, predicting, and optimizing (through modeling) the commercial impact of decisions.

NOTES


3 Ibid., p. 30.


6 “Connect with consumers, deliver value, and grow revenue with SMS,” Forrester (Mar 2021). Available at: https://f.hubspotusercontent40.net/hubfs/6110895/Attentive-OSnap_FINAL.pdf.


8 “In 2021, online grocery sales will surpass $100 billion,” eMarketer (Feb 24, 2021). Available at: https://www.emarketer.com/content/2021-online-grocery-sales-will-surpass-100-billion?cid=NL1014.


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