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The Association of Accountants and Financial Professionals in Business

Developing an Effective Managerial Costing Model

Statement on Management Accounting

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About the Authors

IMA's Managerial Costing Task Force is committed to (1) increase awareness that the costing practices of many organizations are deficient and (2) close the gap between the demand for, and the supply of, quality managerial costing models and solutions. To this end, the Task Force founded the Center for Managerial Costing Quality (www.thecmcq.org) to:

- Establish managerial costing as a specific function and discipline within the accounting profession with distinctly different principles and requirements from those used for external financial reporting;
- Develop tools to help organizations evaluate and improve their managerial costing systems;
- Serve as a resource for guidance on how to improve decision making in organizations using better costing systems; and
- Engage the broader business community to raise awareness of the need to design and implement better costing solutions.

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Introduction

Managerial costing is done solely for an organization's internal use to ensure that information for decision making reflects the characteristics of the organization's resources and operations. It differs from *managerial accounting,* which is a profession involving partnering in management decision making. It also differs from *cost accounting,* which is about measuring and reporting costs for external financial reporting or regulatory purposes.

Despite vast changes in the business environment during the past 50 years and the significantly advanced technologies used to gather and analyze cost data, the managerial costing practices used by many companies today are not much different than they were 10 or even 50 years ago. The cost information used to support critical management decisions continues to be based on minimalist cost models deemed acceptable for financial accounting—cost models that fail to consider the complexities of operating in today's environment.

Organizations that hope to thrive and grow can no longer afford to rely on externally oriented financial accounting systems to provide the internal accounting information required to support quality business decisions. Financial accounting's oversimplified methods of costing products and services misstate and distort critical cost measures for internal decision making (for example, the costs required to serve customers or distribution channels with radically different behavior patterns).

With so many business tools and fads out there, how do managers decide which costing practices are *right* for their organization? Best practices across an industry aren't necessarily the right practices for a particular organization working to compete with a specific strategy and structure. What's missing for most organizations is a clear set of principles, concepts, and steps to develop an appropriate costing model consistent with the organization's strategy, competitive environment, and management objectives.

The focus of this Statement on Management Accounting (SMA) is on cost modeling, which is foundational to having an effective managerial costing system that meets organizational needs such as operational cost control, financial planning and analysis (FP&A), pricing decisions, variance analysis, capacity management, cost simulations, and so on. All of these actions rely on a solid cost model.

This SMA is not about choosing the right technologies or information systems, although it does discuss ways to identify and implement the right technologies and practices after an appropriate costing model is developed. Technology and software currently employed by an organization should not dictate its managerial costing model. Rather, the model should reflect the organization's strategic objectives and a deep understanding of its operations.

Building on the IMA® (Institute of Management Accountants) Conceptual Framework for Managerial Costing (CFMC),[1] this SMA describes a six-step methodology that organizations

[1] Larry R. White and B. Douglas Clinton, *Conceptual Framework for Managerial Costing,* IMA, 2014, www.imanet.org/insights-and-trends/strategic-cost-management/conceptual-framework-for-managerial-costing?ssopc=1.

can use to develop an appropriate costing model for economic decision making by managers and employees in the company. We use the term *model* to reflect the causality of operations in the business. It includes principles and concepts that best represent the behavior of resources and operations, and how those resources are consumed by outputs. We use the term *system* to describe how the costing model is implemented and used. The costing system should be based on the cost model, which is the focus of this SMA.

Overview of the Six-Step Process

To improve its managerial costing model, an organization should do an initial assessment of its managerial costing system, develop a costing model that's appropriate for its needs, and then implement a system tailored to its strategic and operational goals and decision-making needs. This can be accomplished in six steps:

Step 1: Do a quick assessment of the current costing system's effectiveness.

Step 2: Analyze the organization's strategy and business environment.

Step 3: Consider managerial cost modeling concepts.

Step 4: Evaluate current managerial costing practices in the organization.

Step 5: Design the appropriate level of costing model sophistication for the organization.

Step 6: Implement the new cost model across the organization.

The steps are described, and recommended tactics and tools are provided, for each step in the following sections.

Step 1: Do a Quick Assessment of the Current Costing System's Effectiveness

The purpose of the quick assessment is to evaluate the adequacy of an organization's costing system and the need to further develop the system, and then get early buy-in from top management and other decision makers on the need to develop a more effective costing system. This buy-in is critical for generating support for the design and implementation of a better managerial costing system.

An initial quick assessment can be made by answering the eight questions in Table 1, which relate to the effectiveness of an organization's costing system. Answer "yes" or "no" to these questions, then add up the number of questions with an answer of "yes." While situations vary, a rule of thumb is that organizations answering "yes" to four or more questions may be relying on a cost model that is dangerously inadequate for its management needs. Regardless of the score, most companies can benefit by improving their cost model and costing system using this SMA.

Table 1: Quick Assessment Of Costing System Effectiveness	
Question 1:	Do managers in the organization spend an inordinate amount of time debating the accuracy of cost information being provided to support their decisions?
Question 2:	Is the primary purpose of costing in the organization to support the reporting of financial results to owners or outside parties such as lenders and investors?
Question 3:	Can some customers, or customer groups, be labeled as "high-maintenance" while the support level necessary for other customers is much lower?
Question 4:	Is the company much more price-competitive on some service or product lines than it is on others?
Question 5:	Do customers demand that more "add-on" services or customizations be incorporated into the organization's basic services or products today than they did in the past?
Question 6:	Have labor-intensive services or operations been replaced with technology-intensive activities since the organization's cost model was last updated?
Question 7:	Since the organization's cost model was last updated, have indirect costs become a much larger percentage of total costs or have overhead ("burden") rates increased significantly?
Question 8:	Are only one or a few generic bases used to apply indirect costs to the organization's services or products? (Note: Generic bases could include production labor hours to allocate factory overhead costs, billable service hours to allocate support overhead costs, or sales dollars to allocate selling and administrative costs.)

Step 2: Analyze the Organization's Strategy and Business Environment

The goal of managerial costing is to support the achievement of an organization's strategic objectives and the optimization of its operations. Designing a managerial costing model starts with understanding an organization's strategic priorities in the context of its competitive environment. To design an effective cost model, it is essential to evaluate, understand, and incorporate the organization's strategy into the model's design and implementation.

a. The connection to strategy and strategy execution

While a complete discussion of determining strategic priorities and execution is beyond the scope of this document, a summary is provided here.[2] Strategic planning should be anchored on the organization's mission, vision, and core values. It typically begins with a scan of the external environment using a framework such as Porter's Five Forces, followed by a SWOT (strengths, weaknesses, opportunities, threats) analysis. A gap analysis is performed with respect to where an organization wants to go compared to its current position. Based on these analyses, organizational goals are set and initiatives are put in place. An effective performance measurement system (including the costing system) provides feedback on progress toward achieving the organization's goals and the effectiveness of its strategy. Next are the basic steps to analyze an organization's strategy and business environment.

[2] For more about strategy and competitive analysis, see IMA's CSCA® (Certified in Strategy and Competitive Analysis) Learning Series and certification, www.imanet.org/csca-credential.

b. Identify the strategic priorities

A competitive strategy defines how the business will compete with others—in other words, its value proposition to customers. To be successful, companies must target their strategy along one of three fundamental priorities; otherwise, they lose focus and waste resources. These three fundamental strategic approaches are cost leadership, differentiation, and focus.[3] A cost leadership strategy involves establishing a position across the industry as a lower-cost producer or service provider by developing certain cost advantages. In a differentiation strategy, the organization identifies what customers in the industry value with respect to unique product or service characteristics, and then establishes a position to provide those unique needs. A focus strategy is based on identifying a certain segment or niche within the industry and then forming either a lower cost advantage or a differentiation advantage in serving that particular industry segment.

The organization's profit model is built with a clear strategic focus that creates and delivers value in a way that others cannot. For example, Walmart delivers value as a low-cost provider, while Apple delivers value with differentiated technology products. JetBlue Airlines focuses its low-cost value along certain routes, while Whole Foods Market caters a differentiated offering to a select consumer type. In all cases, cost is part of the profit model. Granular information is needed most in those areas that are critical to the company's strategic focus. Consider the costing needs for the following strategic decisions:

- Are the products or services being delivered the ones that customers want?
- Which products or services are the most distinctive, and which are the most profitable?
- Is the emphasis on customer service cost-effective?
- Which customers, channels, or purchase occasions are making or losing money?
- Which activities in the value chain are the most unique, least imitable, and cost-effective?

This is also a good time to analyze the value chains in which an organization participates and consider how it fits in that value chain compared to its competitors.[4] This analysis will be followed by identification of an organization's strategic objectives by taking into consideration its core competencies. For each strategic objective, key performance measures used to monitor progress toward achieving the strategic objectives need to be identified, along with the necessary cost information. Each strategic measure should be quantifiable and have a target. There should also be a mix of both leading and lagging measures of success. The organizations highlighted in the appendices provide examples of identifying strategic priorities.

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[3] Michael E. Porter, *Competitive Strategy,* Free Press, New York, 1980.

[4] For more guidance, see IMA, *Value Chain Analysis for Assessing Competitive Advantage,* 1996, www.imanet.org.cn/uploads/resource/2015-11/1447061044-16209.pdf.

c. Other contextual factors to consider

The following factors can also influence the appropriate level of sophistication for a managerial costing model:

- **Revenue and complexity.** Larger revenue or budget normally means more products or services, more complex operations and support functions, and greater diversity of customers and distribution channels.
- **Industry type.** The type of industry provides a very general view of the business model, competitive landscape, and economic factors that an organization faces. In particular, the industry type can indicate the extent of capital investment necessary to fund the organization's operations. Industries that require substantial capital investment may need more sophisticated costing models, insights into their use, and consideration of organizational capacity.
- **Number of employees.** A large number of employees often means that a more sophisticated cost model is needed to track the use and performance of human capital in creating value or profitability. A significant diversity of work done by employees certainly means a more sophisticated cost model is needed.
- **Length of product or service life cycle.** Short product or service life cycles need accurate cost estimating and forecasting. Longer product or service life cycles, particularly when they include annual cost reductions, often require even more complex costing systems focused on an evolving strategic plan.
- **Product and service portfolio mix and dependencies.** Large product portfolios often involve sophisticated costing needs for evaluating customer and distribution channel profitability and performance. Complementary products or services with price or purchase interdependencies add more complexity.
- **Level of competition.** Firms in hyper-competitive markets generally need much faster and more detailed cost data for decision-making support than companies in monopolistic markets where greater inefficiency can be tolerated.
- **Culture.** Organizational, regional, and national culture can impact the required sophistication of cost measurement models. For example, firms in Germany tend to employ more sophisticated costing models compared to U.S. firms, which are inclined to use simpler costing models that prioritize cost-effectiveness.

d. Identify the most important decision-making needs

An organization's industry, competitive situation, resources, culture, and financial situation are all important to the design of a costing model that supports optimal managerial decision making. These aspects comprise the company's "optimization context" and help determine the nature and frequency of decisions that managers make. Optimization context provides managerial costing efforts with a frame of reference that guides design and implementation of the cost model for effectively supporting managers. For example, in a distribution business, operational insights regarding processes such as receiving, picking, packing, and shipping are critical to maximizing profitability.

When change is considered, managers use current operations as the baseline in their optimized decision making. When evaluating alternatives, managers' best guidance for future outcomes is provided by understanding the cause-and-effect relationships in the process they are attempting to influence and improve.

Based on strategic analysis and an understanding of current operations, organizations need to identify the types of strategic and operational decisions that need to be made in the future. Ultimately, the organization's costing model should help answer key questions that are essential to these decisions. Examples include:

- Which customers are profitable and how can they be retained?
- Which customers are not profitable and how can they be converted to be profitable (or passed on to a competitor)?
- Which products or services should be pushed? Which ones should be priced differently?
- Which market territories and business segments are the most profitable? Which ones are most worthy of more investment?
- Is the promotional campaign having an impact on the target customers? Are promotional costs being tracked accurately?
- Should a particular activity or process be outsourced, and will outsourcing actually reduce costs?
- What impact will alternative capital expenditures have on long-term profitability?
- Should an unprofitable product, service, or customer be immediately dropped or held until there is a profitable replacement?
- How might a marginally profitable business restrict resources needed to add a more profitable business later?

Step 3: Consider Managerial Cost Modeling Concepts

Costing models should be based on basic managerial cost modeling concepts. This section provides a summary of those concepts. For a more detailed explanation of these concepts, see IMA's Conceptual Framework for Managerial Costing (CFMC).

As mentioned earlier, the goal of managerial costing is to support the achievement of an organization's strategic objectives and the optimization of its operations. The means by which managerial costing accomplishes this goal are:

a. Providing a monetary representation of how business resources are used; and
b. Establishing cause-and-effect insights on past, present, and future economic activities.

a. The consumption of resources

The CFMC defines resources to include people, machines, information technology, raw materials, depreciable capital assets, and intellectual property. Managers employ resources in the organization to produce output (i.e., goods and services) that align with the strategy.

Essentially, resources are consumed as they contribute to processes that achieve strategic objectives. An accurate representation of consumption relationships between resources and processes is critical to support decisions based on strategic objectives.

A successful managerial costing model begins with establishing a sound quantitative representation of all of an organization's resources. A cost modeling view of resources provides measurements and calculations (including rates) that reflect the consumption of the organization's resources in support of product- or service-producing operations. Monetary information about the consumption of resources and the outputs produced is key to effective management of the organization.

b. The critical role of causality

Causality is a fundamental concept of managerial costing. The design, implementation, and use of a managerial costing model should be based on the *causality* principle. Causality deals with capturing, understanding, and quantifying operational cause-and-effect relationships and their monetary impact across the enterprise. It is important to distinguish between causality and correlation. For example, two variables may behave similarly (i.e., they are correlated), but they may not have a causal relationship.

Optimizing decision making requires managerial costing that supports planning, simulation, measurement, and analysis through cause-and-effect insights. For example, a costing model built around cause-and-effect relationships should be used to support decisions involving an organization's existing strategic plan. A model with appropriate structure and detail better facilitates managers in their forward-looking decisions involving the strategic plan.

In developing a costing model, it is critical to start with the resources used for performing operations. Most managers in an organization make decisions about resources and processes (such as whether to outsource a product) that subsequently affect costs. Hence, costs for internal decision making must be collected and framed in a manner that describes accurately the effect of resources and processes on costs. Noncausal and weak causal relationships to costs must be handled in a way that reflects economic reality.

The CFMC identifies 10 key concepts that should be considered in creating a causal managerial costing model. This SMA uses the concepts in the CFMC to structure an assessment of the causal decision support information provided by an organization's current cost model and then identifies areas for improvement. The 10 concepts that support causality are listed in Table 2 along with their definitions. For a more detailed discussion of the concepts, see the CFMC.

Table 2: Modeling Concepts Supporting Causality

Concept	Description
1. Resources	Costing systems should include the sources of all costs for an organization, that is, the resources it has acquired and uses (or could use) to create value. These could include people, machines, robots, information technology, raw materials, and intellectual property developed internally.
2. Managerial Objectives	These are specific results or outcomes that management hopes to achieve with the resources at its disposal. The goal is to establish a managerial costing system that provides all the information needed to achieve management's strategic and operating objectives.
3. Cost	This is a monetary measure representing the consumption of a resource or its output to achieve a specific managerial objective or the expenditure needed to make a resource or its output available, whether or not it is used.
4. Homogeneity	This is when the behavior of one or more resources or inputs of similar technology or skill allows for their costs to be represented by the same causality or drivers in a nearly identical manner.
5. Traceability	This is the characteristic of a resource or cost input unit that permits it to be identified with a specific managerial objective based on verifiable transaction records.
6. Capacity	This is the potential for a resource to do work. Capacity describes the limits of a resource's capability to contribute to achieving managerial objectives.
7. Work	This measure represents the specific output of resources that engage in specific work activities or business processes to accomplish managerial objectives. The ability to model work provides managers with needed decision-making support (for example, for process improvement).
8. Responsiveness	This captures the nature of cause-and-effect relationships, which can be fixed, proportional, or a combination of both in relation to output. Ideally, the cost model should reflect the responsiveness of cost to outputs that enable accurate marginal cost information.
9. Attributability	This defines how weak and noncausal relationships are identified and modeled. Weak causal relationships and their costs can distort cost information and impair managerial decisions if costs are allocated in a manner that suggests strong causal assignments.
10. Integrated Data Orientation	Both operational and financial data should be readily accessible to be aggregated together into a variety of different views. A major aspect of this concept is the timeliness and availability of integrated information.

Step 4: Evaluate Current Managerial Costing Practices in the Organization

Step 1 involved performing a quick assessment of costing system effectiveness by examining the outcomes of the costing system. Step 4 goes much deeper by examining the costing system itself, its level of sophistication, and how it specifically supports a range of decision-making needs. The end result of this costing system examination is the identification of specific areas in need of improvement.

a. Identify the current cost model practices and level of sophistication

Step 4 begins by identifying relevant details of the current managerial costing model. This requires collecting information regarding costing practices in the organization and their level of sophistication. Table 3 provides a list of common costing practices distinguished by nine characteristics and by level of sophistication. This list is not intended to be complete; other practices can be added as needed. The goal is to identify the current level of sophistication for each characteristic. Later, in Step 5, management decision-making needs are used to determine the desired level of sophistication.

Table 3: Common Costing Practices Distinguished by Characteristics and by Level of Sophistication

Characteristics	Costing System Sophistication: *Lower* → *Higher*				
1. What's included in product costs	Direct materials and full absorption of all other costs	Direct costs	Variable costs	Upstream development costs	Life-cycle costs
2. Level of direct cost tracking	Value stream	Department (process costing)	Hybrid job and department (operation costing)	Job level	Resource-based cost center level
3. Level of indirect cost tracking	Enterprise-wide level with generic allocation bases	Department level	Resource (time-driven ABC)	Activity (ABC)	Resource-based cost center level
4. Types of metrics used to allocate or assign indirect costs	Volume-based	Transaction-based	Duration-based		Intensity-based (considers different skill levels, technologies, and so on)
5. Level of standard cost usage	Actual costing	Normal costing	Firm level	Department level	Resource-based cost center level
6. Separation of fixed and variable costs	No separation	Related to final output	Department level	Detailed cost center level	Resource-based cost center level
7. Measurement of unused capacity costs	Not computed	Firm level	Value-stream or department level	Activity (use ABC)	Resource-based cost center level
8. Level of variance analysis	Not used	Firm level	Value-stream or department level	Activity level	Resource-based cost center level
9. Extent of replacement cost depreciation methods	Not used	Firm level	Value-stream level	Department level	Resource level

A good place to start when implementing Step 4 is asking members of the finance department familiar with the cost system to independently rate the current costing model on each of the concepts listed in Table 3 and then work to come to a consensus. After achieving consensus in the finance department, survey members of various operational areas in the organization form their opinions on how well the cost model is aligned with activities in their area of the organization. The goal is an effective analysis of the current cost model as a reasonable monetary representation of the organization's resources, processes, products, service lines, sales and distribution channels, and customers' consumption of resources. This step alone has the potential to discover significant ways to improve the relevance and impact of the cost model.

Additional action items that can be taken to complete Step 4 include:

- Flowcharting the various operations (i.e., resources and processes) of the company.
- Facilitating a workshop for executives to identify "what drives success" and then determine what cost metrics are needed to support key success drivers.
- Identifying which of the cost metrics are available in the current information system.

b. Evaluate how well the costing model supports decision-making needs

This is a good time to consider whether the current costing model makes sense for the organization. For each aspect of the costing model, ask the following questions:

- Does it reflect the complexity of the organization's operations?
- Is it actively used for decision making throughout the organization by nonfinance managers?
- Does it support forwarding-looking activities such as scenario analysis, planning, and simulation?
- What specific decision-making support benefits does it provide, particularly with respect to the organization's strategy?
- Is it creating dysfunctional behaviors among operating managers?

For examples of how to evaluate managerial costing practices, be sure to review the organizations described in the appendices.

c. Identify and prioritize areas in need of improvement

After evaluating how well the costing system supports decision-making needs, consider the various cost model characteristics in the organization and rank the issues or concerns identified based on their impact on the business. At this point, don't worry about the ability of existing systems or staff to correct the weaknesses. The goal is to identify the critical weaknesses of the current cost model that are most important to fix.

Step 5: Design the Appropriate Level of Costing Model Sophistication for the Organization

Step 5 involves identifying the appropriate level of costing sophistication in the organization. We use the term sophistication to describe the level of detail in the costing model and the term

complexity to describe the nature of the operations. We stress that managerial costing should be as sophisticated as needed to reflect the complexity of operations and the operational decisions to be made.

As noted earlier, not every organization should achieve the highest levels of sophistication defined for each of the 10 modeling concepts defined in Table 2. Cost management is straightforward in organizations with relatively simple business models. Organizations with large profit margins may strategically focus more on revenue growth than on cost measurement and management. On the other hand, organizations with complex multilevel business models involving lots of internal transactions often need more sophisticated costing models. The variety of competitive and economic situations that most organizations face is growing, but the characteristics below (Table 4) provide a guide to determining the sophistication of the costing solution needed by the organization.

The goal in Step 5 is to identify the appropriate level of sophistication for each of the 10 modeling concepts for a given organization. Then a framework can be formed within which the selection and implementation of the practices described in Step 4 can be made. Table 4 serves as a useful template for identifying the appropriate level of sophistication for each of the 10 modeling concepts introduced in Table 2.

Table 4: Rubric for Identifying the Level of Sophistication for Each of the 10 Modeling Concepts

		Level of Cost System Sophistication					
CFMC Concept	**Characteristic**	**0. Nonexistent**	**1. External Reporting Only**	**2. Simple**	**3. Low Sophistication**	**4. Sophisticated**	**5. Highly Sophisticated**
1. Resources	Level to which resource detail is measured and modeled.	Resources are not measured.	Resources are grouped by GL accounts. Very broadly defined cost pools are not all useful for decision making.	Resources are grouped into functional cost pools (for example, departments or processes).	Detailed levels of resource costs are available in critical process areas of the organization (for example, high-cost areas).	Detailed levels of resource groups are available for most areas of the organization with relatively homogeneous groupings that have a quantitative output measure.	Resources are grouped in homogeneous pools for all areas of the organization. These pools each have a quantitative output measure and record all input quantities to generate an organization-wide network of planned outputs and their costs.
2. Managerial Objectives	Level of managerial objectives defined.	Virtually no managerial objectives are served.	Objectives are defined only in broad financial terms (for example, product, SG&A, and business unit).	Objectives are disaggregated into responsibility areas or cost centers for higher cost areas only– no integration with planning or budgeting.	Objectives are disaggregated into responsibility areas or cost centers, with only general integration with planning or budgeting.	Primary strategic objectives are tied to causal supporting resources in quantitative and monetary terms. Lower-level objectives are not fully developed.	Objectives are defined consistent with all strategic objectives. Managerial objectives are clearly tied to traceable and causal supporting resources in quantitative and monetary terms.

Table 4: Rubric for Identifying the Level of Sophistication for Each of the 10 Modeling Concepts (continued)

		Level of Cost System Sophistication					
CFMC Concept	**Characteristic**	**0. Nonexistent**	**1. External Reporting Only**	**2. Simple**	**3. Low Sophistication**	**4. Sophisticated**	**5. Highly Sophisticated**
3. Cost	Correlation of quantitative cause-and-effect relationships of resources, processes, and products or services to monetary measures.	Costs are highly aggregated in GL accounts and are not related to specific resource capacity and outputs.	Costs are allocated only to the extent required for financial reporting compliance with little to no separation of direct and indirect costs..	Costs are separated into direct and indirect categories, with indirect costs allocated using single overhead rate and volume-based drivers.	There is better causality modeling in high-cost areas. Volume-based department allocation rates are used. Costs of idle capacity are not reported as a separate line item.	Volume and non-volume drivers are used with simple assignment rates that aggregate the reported cost measures of the cost of idle capacity.	Quantitative causal relationships underlie all cost assignments. Activity-based or resource-based output measures are used. Idle capacity is tracked and reported.
4. Homogeneity	Level of homogeneity of resource cost pools.	Resources are not categorized or grouped except as expenses or capitalized assets.	Large cost pools are based on very general categories primarily for external reporting.	Costs are disaggregated into department or responsibility areas for higher cost areas only.	There is detailed categorization of resource pools in critical process areas for specific areas of responsibility.	There is detailed categorization of resource pools for most areas of responsibility with relatively homogeneous groupings that are driven generally by the same driver.	There is detailed categorization of resource pools for most areas of responsibility with relatively homogeneous groupings that are driven generally by the same driver.
5. Traceability	Ability to track the flow of resource quantities as they move through processes as outputs and inputs.	Costs are not at all traced to products or services.	Most direct production or service costs are traced to products or services. Indirect costs are pooled by firm or value stream and allocated to products or services.	Some indirect production or service costs are traced to products or services while other costs are traced to processes or departments.	Indirect production or service costs are traced to products or services for higher cost areas; the rest are pooled by process or department. Some selling and administrative costs are traced to products or services.	Most indirect expenses are traced using transaction data and then assigned to key managerial objectives. Resource use that is not traceable is either allocated or assigned to general business-sustaining objectives.	Resource use is traced using transaction data. Costs are assigned according to managerial objectives. Resource use that is not traceable due to weaker causal relationships is assigned to relevant business sustaining objectives.
6. Capacity	Extent to which capacity use and nonuse are identified, measured, and costed.	Resource utilization is not tracked at all and is not considered in costing.	Resource use is minimally tracked but not considered in costing products or services, leading to full absorption costing based on a single capacity measure.	Some capacity metrics are used, but finance still pushes full capacity costs to products and services through full absorption costing.	Operational measures provide some insight on resource utilization. Excess or idle capacity may be reported with respect to normal capacity.	Two denominators are used to calculate resource cost rates (theoretical capacity and planned output). Unused capacity costs may be segmented on internal reports.	Two volume denominators are used to calculate cost rates (theoretical capacity and planned output). Unused capacity is clearly identified in operational and monetary terms and is highlighted internally.

Table 4: Rubric for Identifying the Level of Sophistication for Each of the 10 Modeling Concepts (continued)

		Level of Cost System Sophistication					
CFMC Concept	**Characteristic**	**0. Nonexistent**	**1. External Reporting Only**	**2. Simple**	**3. Low Sophistication**	**4. Sophisticated**	**5. Highly Sophisticated**
7. Work	Measure the type of work or activity being done by a resource.	Work is not measured at all.	Type of work or activities is not measured by a resource. Minimal standard costing is used for financial reporting requirements.	There is some measurement of specific work performed by resources by operational personnel, but not used by finance.	Work is measured in terms of basic activities but not by resource. All activity costs are assigned as variable or proportional costs from the GL using activity drivers.	Work is measured at more detailed activity levels (both fixed and proportional) and costs are pulled through to cost objects for both line and support activities.	It is possible to measure work at the detailed resource level. The work concept is employed in a manner that maintains operational quantities, cause-and-effect relationships, responsiveness, and resource capacity insights.
8. Responsiveness	Track the nature of resource consumption relationships as proportional or fixed.	The nature of resource consumption is not tracked.	Aggregated cost pools are assigned to final products or services as a variable cost, but the nature of consumption is not considered.	Some tracking of fixed and variable costs, but only for limited types of consumption.	Fixed and variable costs are tracked by their relationship to final output. Indirect costs are grouped into fixed and variable cost pools.	The fixed or proportional nature of resource consumption is tracked more accurately for intermediate outputs in the value chain. Consumption may be measured at the activity level.	The fixed or proportional nature of resource consumption is measured accurately throughout the value chain for each resource's inputs and outputs, resulting in an ability to provide multilevel contribution margins for decisions at any point in the value chain.
9. Attributability	How weak causal relationships are modeled.	Costs are highly aggregated in GL accounts. Causality is not addressed.	Highly generalized cost pools are allocated only to the extent required for financial reporting. Causality is not assessed.	Indirect operating costs are assigned to departments or process cost pools and allocated using departmental rates. Causality is not assessed.	Weak causal relationships are assigned in a way to reduce distortions, though distortions still remain due to depreciation methodology and excess capacity costs.	Causality is considered for most costs, including non-operating costs such as customer service and marketing. Unused capacity and replacement cost depreciation are not allocated to products.	Strong causal relationships underlie all cost assignments, leading to very few distortions with no arbitrary cost allocations. Operating improvements are clearly reflected in the cost system. Replacement cost depreciation or capital replacement allowance is used.
10. Integrated Data Orientation	Level of integration of operational and financial data.	Very limited, uncoordinated systems are used for finance, operations, sales, customer service, purchasing, and so on.	The GL is the source of all cost and financial data. Operational data is not used for costing beyond financial reporting requirements.	Simple financial and operational systems are not integrated. Operational data are collected by finance only for special studies.	Effective operational data systems are used primarily by operations management. There is little or no integration with GL data on a systems level.	The managerial cost system is largely integrated with operational systems. Decision-support data is readily available.	Managerial costing data are fully integrated with operational data and are not limited by financial reporting needs. Operational data used in the cost model are the same as that used for management decision making.

Performing a "gap analysis" by comparing current and desired levels of sophistication will help provide guidance and indicate specific opportunities for improvement. Note that the overall focus of Step 5 is on identifying the cost model design most appropriate for the organization. Designing the cost model involves five phases, listed below.

a. Identify the resources that the organization retains for its use

An understanding of each resource's inherent characteristics is needed, starting with an understanding of the physical entities that managers oversee and about which they make decisions. Specifically, the cost model needs to be based on a clear understanding of each resource's quantitative output (for example, machine hours, oven cycles, square footage, and so on), capacity, and consumption behavior characteristics. The consumption behavior of a resource (that is, how it is used) can be proportionate to output in the organization, fixed in its use, or a combination of both (this is the concept of responsiveness).

In digital (internet) industries, the platform-based business model for many companies like Uber and Airbnb doesn't have significant operating assets—at least not in the traditional sense. Many of the resources in digital companies are intangible—for example, data, systems, market relationships, and brand. In this context, it is especially important to consider where the intellectual property (IP) resides and how costs are incurred to preserve the IP as a fixed-use resource. To that end, it is important to remember that managerial costing information is guided by causality and economic reality, not by external financial reporting rules. The operational model and cost information should be structured to meet an organization's specific business and cost modeling needs.

b. Identify the managerial objectives supported by the retained resources

Ideally, the cost model supports managerial objectives and desired outcomes across the organization. Useful causal insights and related cost information enable managers' planning and control, and the performance of corrective and adaptive actions.

Managerial objectives can be grouped into three tiers:

Tier 1: The output of resources, which comprise resource pools with activities and processes.

Tier 2: Products and services, including production orders, client services, and projects.

Tier 3: Segment results, including entity-level (e.g., plant, business unit, and legal), market-segment, and target-market objectives.

The particular managerial objectives employed in the modeling process are determined by managers' planning, data analytics, decision-making, and optimization needs within the strategic objectives of the organization's strategy.

c. Develop a quantitative understanding of cause-and-effect relationships between inputs and outputs

Resources, as mentioned in Tier 1 managerial objectives, often exist in a chain of cause-and-effect relationships. Resources are inputs used to provide outputs in achieving intermediate

managerial objectives, or they may provide ultimate business outputs that directly drive revenue. To achieve effective managerial costing, accountants must understand and clearly model this chain of inputs, intermediate outputs, and ultimate outputs. The model captures the organization's cause-and-effect relationships and serves as the basis for assigning resource uses and costs through the costing system.

To successfully model what can be a complex chain of inputs, intermediate outputs, and ultimate outputs, it is imperative that the accounting and finance staff understand the business and speak the same language as the rest of the organization. Some ways to achieve this understanding include:

- Instituting a rotation program to bring management accounting personnel into operations (and vice versa);
- Training staff in the process of representing operations in the cost model so they can recognize those relationships across the organization; and
- Providing "soft skills" training for finance staff to be able to communicate effectively with colleagues in other operational areas.

d. Design a cost model that reflects the organization's resources, managerial objectives, and their causal relationships

Equipped with an understanding of the organization—including its objectives, managers' needs, resources, activities, and outputs—the next stage is the task of designing an adequate representation of the relationships between resources and their consumption, expressed in quantitative input-output relationships. It is critical to first understand the types of decisions that managers need to make, bearing in mind that there may be different costs for different objectives. To design a cost model that captures the resources, managerial objectives, and causal relationships, ask the following questions:

- What are the organization's managerial costing needs to support the range of decisions (both strategic and tactical) that managers will be making?
- Will important information be readily available for routine analyses or will special studies often be required?
- Will the proposed managerial costing model inform decision making with respect to the most significant operational and strategic needs in the organization?

The 10 modeling concepts (see Table 2) can be used to pursue questions more specific to the design work on the organization's costing model.

1. *Resources:* Is there a need to understand resources specifically, or are broad groupings and representations adequate?
2. *Managerial objectives:* Do managerial objectives tie to the specific strategic measures and targets identified earlier?
3. *Cost:* How deep in the organizational structure is the need to understand the relationship between its resources, their capacity, and their actual output in monetary value?

4. *Homogeneity:* Are there one or more resources or inputs of similar technology or skill that are consumed by the same causal factor (or driver) in a nearly identical manner?
5. *Traceability:* Are verifiable transaction records available to support the data that managers need to make tactical and strategic decisions?
6. *Capacity:* How important is it for managers to understand when capacity limits are being challenged and what options are available to address capacity constraints? Is it important to understand the resource costs of productive, nonproductive, and idle capacity?
7. *Work:* Do managers need the ability to model organization processes in order to connect work activities directly to resources being used?
8. *Responsiveness:* Do managers need to understand fixed and proportional costs across all levels of processes in order to make decisions to invest in improvements, set special order pricing, make or buy a particular product or service capability, and others?
9. *Attributability:* To what degree are decisions impaired due to the allocation of costs without clear causal relationships?
10. *Integrated data orientation:* How well can the organization's operational and financial data be combined to represent resources, processes, products or services, and related management decisions?

Maintenance of the model should be a consideration throughout the design phase. This includes weighing the constraints and the effort required to get the information for a particular resource pool, which may depend upon where the data resides and the frequency with which it is available. Keeping the model current is an important part of consistently providing managers with relevant information. A lack of ongoing maintenance is a major stumbling block for advanced costing systems. Cost models that require significant additional investment to update and maintain will struggle to remain current and effective. Hence, it is important to develop a model that can be maintained efficiently.

e. Provide a description of the model, including its scope, intended uses, required inputs, outputs, and underlying assumptions and limitations

It is crucial that users of cost information understand not only the underlying assumptions used in constructing the organization's cost model, but also the model's limitations. For example, if financial depreciation is used, then users should recognize that these depreciation schedules can create inconsistent signals with respect to product life-cycle profitability due to differences between financial depreciation compared to the actual economic lives of the assets. Typically, as an asset is being depreciated, products or services will be over-costed. Once the asset is fully depreciated, products or services will be under-costed.

Step 6: Implement the New Costing Model Across the Organization

With a cost model designed with an appropriate level of sophistication necessary to capture operational cause-and-effect linkages, the final step is a successful implementation across the organization. Like any significant change, this process must be managed well. Issues to be addressed include the rollout approach, technology investments, organizational resistance, and data usability.

a. Managing the introduction of a principle-based costing approach

Implementation of a managerial costing approach can be complex and will impact most components of the organization. Applying project management techniques, including cross-functional implementation teams, is critical to a managerial costing project. Otherwise, the project runs the risk of being swamped by requirements for growth, scope creep, or stonewalling.

As with most projects, managerial costing initiatives should be segmented and rolled out using phased deliverables that senior management can assess and approve on a regular basis. The early availability of improved information from a more accurate managerial costing model will lead to more sophisticated questions and demands for more in-depth modeling efforts. The project team and organizational leadership need to be prepared for increasing demands and should work to ensure that the entire organization benefits from the improved information. It is best to start small. Work on just one to three significant areas in the organization where improvements to the cost model can significantly improve decision making. Use success in these areas to build up experience and confidence in linking operations to the cost model. Track and report progress on the evolving model with regular evaluations to determine if decision-making support in the organization is being improved.

b. Technology and software issues

It is important to understand that the initial step in a managerial costing project should not be the selection of software. The conceptual design of the organization's managerial costing system should precede an evaluation of software alternatives, even if the organization already has sophisticated information systems in place. From a practical standpoint, system architects and administrators often need to be resourceful with the tools and technologies they have available, and this may ultimately drive the sophistication of the cost model that is finally implemented. Nevertheless, it is important to first determine an "optimal" cost model before adjusting implementation based on existing software options.

Smaller organizations may not be able to invest in sophisticated information systems, but the costing models needed in small companies are often not very complicated. Hence, smaller organizations may find that an appropriate costing model can work with systems already available.

There are three major types of software that midsize to large companies use to support managerial costing:

1. *Enterprise resource planning (ERP) software*: For managerial costing, an ERP system used in operations, logistics, and finance—large-scale software with integrated

modules—may serve as an effective foundation for cost information. An ERP system used only for financial accounting and reporting may not have the resources or operational and logistical information necessary for adequate managerial costing. On the other hand, operational systems such as manufacturing enterprise solutions are a rich source of core operational data.

The drawback of ERP systems is that they are transaction execution systems with significant master data links and validations. This means ERP systems are critical data repositories but may not be appropriate for simulations that consider new or potential products, services, or market segments.

2. *Specialized managerial costing software*: A number of specialized software solutions exist for specific managerial costing approaches. Most of these integrate with ERP, financial, logistics, and operational systems. Over the years, many of the large ERP software vendors have purchased one or more of these solution providers and incorporated their systems as independent modules.

The drawback of these stand-alone systems is that they have traditionally been method-centric and not conceptually based. Today, there are few concept-based systems available in the market.

3. *Business analytics (BA) software*: These software systems focus on integrating data across the enterprise and typically require creating calculation engines to support managerial costing. This class of software works well for organizations that are small with simple needs or large with unique needs and have the expertise to develop their own solutions. It should allow nontechnical users to be able to join large data sets from multiple sources (including ERP systems), do detailed analyses, and facilitate data visualization.

For organizations to change legacy information systems, the most important factor is top leadership having the right vision. Executives need to recognize the reasons for change. New systems and significant change to existing systems require significant investment, not only in the initial technology cost but also in planning and design, infrastructure, deployment, training, and data security. Without committed leadership, the overall cost of significant technology decisions, as well as the time required to realize a return on investment, can significantly stall the work necessary to put in place the information system needed to support an effective cost model for the organization.[5]

c. An organization's acceptance of a new managerial costing system

The successful design and implementation of a strategic cost model in the organization's information system must include an investment in helping managers to understand and embrace the new decision-making support. Costing as a decision-making support tool may be low on

[5] For more guidance, see IMA's C-suite report, "Barriers to Change in Information Technology Decisions," by Kip Krumwiede, 2015, www.imanet.org/insights-and-trends/technology-enablement/barriers-to-change-in-information-technology-decisions?ssopc=1.

managers' priority lists or may be perceived as a threat by changing the "rules" used to evaluate management performance. Response to new managerial costing change initiatives can be summarized as (1) pre-initiative, (2) denial, (3) anger or pessimism, (4) testing, (5) acceptance, and (6) post-initiative.

Three types of communication activities that can move the organizational change management process forward include assessment (relating to project planning), analysis (relating to the analysis and design), and adoption (development, testing, implementation, and support).

For additional information on implementing organizational change, see IMA's SMA on *Managing Organizational Change in Operational Change Initiatives*.[6]

d. Usable cost information

The key elements of usable cost information include the transparency, defensibility, and timeliness of the information. Transparency means that users understand how cost figures are calculated and whether the information reflects cause-and-effect relationships within operations. A lack of transparency will cause most managers to ignore, to the extent possible, such cost information.

Defensibility means that the cost information can be used by both financial and nonfinancial personnel to build and evaluate business cases, explain results, support and explain decisions, and advocate ideas. Cost information should be defensible against challenges, whether by finance or operating personnel, regarding its accuracy for a given purpose. Timeliness refers to cost information that is current and readily available. The definition of what is current or "real-time" data depends on the speed of the competition in the market. Real-time data may be defined in the organization in terms of minutes, hours, or days to reflect immediate and ongoing operations. Cost information must also be readily available. Usability requires an effective managerial costing system to be in place and ready to generate the information as needed for managers and employees. A cost study—no matter how effectively done and well-guided by policy and procedures—is never truly useful unless it is able to support constant measurement and evaluation.

Refer to the appendices for demonstrations of implementations in two different organizations.

[6] Katie Terrell, *Managing Organizational Change in Operational Change Initiatives*, IMA, 2015, www.imanet.org/insights-and-trends/business-leadership-and-ethics/managing-organizational-change-in-operational-change-initiatives?ssopc=1.

Conclusion

Despite huge advances in technology and rapid changes in the global marketplace, managerial costing for most companies is either not done at all or is of too low quality to adequately support internal decision making. Despite accounting and finance professionals increasingly being asked to provide more strategic analysis, financial reporting still dominates their time. Most organizations' costing systems are not viable in today's rapidly changing world. Guided by the cost modeling concepts and the six-step process discussed in this SMA, any organization can determine and implement the right managerial costing system for its decision-making needs. The goal is to develop the right level of cost model sophistication given an organization's strategy, environment, and management objectives.

Without a good causal cost model, analyses involving cost will not be useful for decision making and may actually do harm to the success of the company. Analysis recommendations, pricing decisions, capacity management findings, operational cost control, cost simulations, and so on may all be wrong if the cost model is faulty and reflects a distorted reality. Improved technologies or information systems cannot overcome a bad cost model. Instead, the right technologies and costing system practices should follow and enable an appropriate costing model.

A key first step is understanding that there is a problem with the organization's current costing model. Doing the quick assessment in Table 1 is a good start to show what the legacy costing model is failing to do. Second, once a costing problem has been identified, analyze the organization's decision-making needs to identify what the cost model needs to provide. Third, at the core of managerial costing is the principle of causality that supports important cost modeling concepts such as responsiveness and traceability. Using the 10 modeling concepts in Table 2, organizations can both evaluate their current managerial costing practices and design an appropriate costing system. Once designed, the costing system must be implemented the right way, addressing resistance to change, overcoming technology and data management issues, and following sound change management protocols. By following the steps described here, any organization can successfully design and implement an effective managerial costing system.

Appendix A

Case Example 1—A Large Health Maintenance Organization

Community Health Plan (CHP) is a large multistate health maintenance organization (HMO) located in upstate New York, Vermont, and Massachusetts. When CHP calculated the cost of several of its new managed care option (MCO) contracts, the prices derived from the analysis were not in line with market rates. The CFO wondered, "Is something wrong with our costing system?"

CHP is organized into six operating regions, each with a separate community rate structure and varied product lines. The regions are supported by a central services support staff. Like other HMOs, CHP's primary business was providing comprehensive healthcare services to its members for a fixed monthly premium.

CHP began offering a new product, MCO contracts. Under these contracts, CHP agreed to provide administrative and medical management services in support of an employer's healthcare plan. The services varied depending upon the employer's needs and included such services as utilization review, claims processing, and coordination of benefits. Employers using these plans are self-insured for the cost of the medical services rendered to their employees.

Step 1: Do a quick assessment of the current costing system's effectiveness

- Under its conventional costing system, CHP allocated the cost of central services largely based on regional membership.
- When CHP computed the costs of several contracts, the prices derived were not in line with market rates.
- CHP's existing costing system was designed to provide reporting required for regulatory use. It did not provide information useful to managers.
- The cost system was unable to model the varied services provided depending upon each employer's (i.e., customer's) needs.
- CHP's CFO concluded that the information provided by the conventional costing system was unreliable and that an improved accounting system was needed.

Step 2: Analyze the organization's strategy and business environment

- CHP's vision is to provide outstanding comprehensive healthcare services to meet individual employers' needs.
- CHP's strategic priorities were to provide outstanding customer service, develop new products for a continuously changing market environment, win new MCO contracts, and execute continuous quality improvement (CQI) programs.
- Other factors affecting CHP are a highly regulated industry, increasingly tighter margins as demand for lower healthcare costs increases, and competition from several other large HMOs.

- CHP's most important decision needs are to:
    a. Identify which products and customer segments are profitable vs. unprofitable;
    b. Evaluate which customer acquisition methods are most successful; and
    c. Determine what types of administrative and medical management services CHP should offer to support employers' healthcare plan needs.

CHP developed a balanced scorecard to identify its strategic priorities and decision-making needs. The scorecard with strategic objectives, measures (including several important cost-related measures), and targets is provided below.

Perspective	Objective	Measure	Target
Financial	• Grow revenues • Increase market share • Improve margins	• % growth in revenues • % revenues new clients • % market share • % margin per month	• 12% for quarter • 10% for quarter • 20% (current 12%) • 7% (current 5%)
Customer	• Improve employer (customer) satisfaction ratings • Gain new employer clients	• Employer satisfaction rates (quarterly survey) • Employer retention rate • Conference calls with employers (potential clients)	• 90% average for quarter • 90% average for year • 20 (40) calls per month
Internal Process	• Improve accuracy of product costing information • Promote CQI by promoting process thinking • Keep costs low • Optimize customer acquisition costs	• Subjective assessment of cost system accuracy • Administrative errors • Administrative cost per member • ROI of customer acquisition costs	• 90% accurate • < 10 documented errors per month • $125 per member per month • 15% ROI
Learning and Growth	• Develop new viable products and services • Increase customer rep and product manager skills • Reduce caseload-to-staff ratios	• New products created (offered) • Average training hours per rep • Average caseload-to-staff ratio	• 5 (2) per year • 30 CPE hours per staff member • 6:1 (currently 10:1)

Step 3: Consider managerial cost modeling concepts

- Causality was rated as poor. The current costing system allocates the cost of central services largely based on regional membership, which is a poor driver of central services used.
- Modeling causality based on the 10 concepts:
    1. Resource was rated as fair. The source of all costs is more or less included in the financial system.
    2. Managerial objective was rated as poor. The information provided by the conventional costing system is unreliable for supporting its strategic priorities.
    3. Cost was rated as poor. Costs are highly aggregated in general ledger accounts and do not relate to specific resource capacity and outputs.

4. Homogeneity was rated as poor. Large cost pools are based on very general categories such as direct or indirect costs primarily for external reporting.
5. Traceability was rated as poor. Costs are not traced to products, services, or activities provided to employers.
6. Capacity was rated as poor. Resource utilization is not tracked at all and is not considered in costing.
7. Work was rated as poor. The types of activities done by different administrators (such as utilization review, claims processing, and coordination of benefits) are not measured.
8. Responsiveness was rated as poor. Aggregated cost pools are allocated to regions. There is no separate tracking of fixed or proportional costs.
9. Attributability was rated as poor. Causality is not assessed. Highly generalized cost pools are allocated only to the extent required for financial reporting.
10. Integrated data orientation was rated as poor. The general ledger is the source of all cost and financial data. Operational data is not used for costing beyond financial reporting requirements.

Step 4: Evaluate current managerial costing practices in the organization

- *How product costs are defined.* CHP loosely defines product costs as direct costs plus allocated support department costs.
- *Level of direct cost tracking.* Costs are tracked only at the regional level.
- *Level of indirect cost tracking.* Costs are tracked only at plant-wide and central service levels.
- *Types of cost drivers used to allocate indirect costs.* Regional membership is used to trace central services, which may be considered a volume-based driver at best.
- *Level of standard cost usage.* There is no use of cost standards. Customer, product, and regional costs are estimated.
- *Separation of fixed and variable costs.* There is no separation of fixed and variable costs.
- *Measurement of unused capacity costs.* Capacity costs are not tracked or computed.
- *Level of variance analysis.* Analysis takes place at the regional level only and is based on budget vs. actual costs. Allocated central services costs are included with no way to measure actual usage.
- *Extent of replacement cost depreciation usage.* Replacement cost depreciation is not used.

Based on this evaluation, CHP identified two primary objectives for designing a new costing system:

a. Obtain more accurate product costing information, including a framework for costing administrative services for MCO products; and

b. Promote CQI by promoting process thinking and changing the view of financial leadership in the organization.

Step 5: Design the appropriate level of costing model sophistication for the organization

- To meet these objectives, CHP implemented a multistage activity-based costing (ABC) system.
- Major activities were traced to the resources providing those activities and measured based on consumption by different HMO contracts, employers, and regions.
- Direct costs were tracked at the contract, employer, and regional level. Indirect costs were tracked at the regional and product level, then linked to operational activity using causal transaction-based drivers.
- CHP still does not separate fixed vs. variable costs, but it does estimate unused capacity and performs variance analysis at the activity level.

Step 6: Implement the new costing model across the organization

- The CFO assumed the role of ABC champion and made the case for the new costing system at the executive level to get the cross-functional support needed to identify and track key activities and drivers. Some product managers were resistant to the change because their product margins were at risk of going down. With the executive-level support, however, the importance of accurate costing and pricing to maximize profitability and gaining new customers was communicated and eventually accepted.
- A new cloud-based integrated information system was identified as necessary to track the operational activity and related costs.

The Results

The differences in product costs between the two systems were substantial. Under the conventional costing system, the administrative cost per employer did not vary by more than 5% across all regions. Under the ABC system, a vastly different picture emerged. For the HMO product, administrative cost per employer by region ranged from 85% to 121% of the organization's average. For the MCO contract product line, the range was from 53% to 2,592% of the average.

The information from the new costing system provides CHP with a definitive tool for rationalizing the pricing of the MCO contract services that it provides to its clients. The new costing system also better supports CHP's CQI efforts and provides better information on which to evaluate performance at the various levels of the organization.

Appendix B

Case Example 2—A Midsize Manufacturer

XYZ Industries is a midsize closed-die forging company located in southeastern Michigan. Its annual sales of $25 million generated earnings before income taxes of about $500,000. The company's management had been successful in improving both product quality and delivery reliability over the past few years due, in part, to an extremely detailed and effective ERP system that had been developed in-house. Improvements in sales and profitability, however, did not follow the other improvements. Sales stagnated at the $25 million level and profits remained disappointing.

The chief financial officer's background was in financial accounting and taxes. He had recently been introduced by a mutual friend to an accounting professional who specialized in managerial costing—cost information produced for internal use by managers and employees in making decisions. Their conversations about costing and its role in supporting decision-making processes led the CFO to suspect that XYZ's costing practices might have something to do with the company's inability to emerge from its state of lethargy. As a consequence, he decided to take a critical look at the company's costing practices.

Step 1: Do a quick assessment of the current costing system's effectiveness

XYZ Industries' costing was based on the traditional manufacturing cost model. After assigning direct material and labor costs to products, all indirect manufacturing costs were assigned as a percentage of the direct labor cost. For XYZ, that percentage was 495%. For pricing decisions, XYZ also assigned general and administrative costs to products as a percentage of the total direct material, direct labor, and overhead assigned to a product. That percentage was 20%. In assessing these practices, the company noted that:

- The design of the existing cost model was dictated by the rules of financial reporting. The model was designed to value inventory and measure cost of goods sold in compliance with Generally Accepted Accounting Practices (GAAP).
- The model used a single, generic base for assigning indirect costs to products.
- Managers spent a great deal of time arguing about the accuracy of the cost information they were given to support their business decisions.
- The company's products with short production runs and low material content appeared to be much more competitive than other products.
- Manufacturing overhead as a percentage of direct labor costs had risen significantly (from 350% to 495%) during the past four years.

This assessment led XYZ management to the conclusion that it needed to carefully examine the appropriateness of the company's cost model as well as its effectiveness in supporting decision making.

Step 2: Analyze the organization's strategy and business environment

- XYZ Industries was a relatively small auto industry supplier during a period when customers—both original equipment manufacturers and higher-tier suppliers—were trying to reduce the number of vendors in their supply chains. This was a period when a company like XYZ was either going to grow by winning business away from other like-size suppliers or go out of business.
- Despite buyers' claims to the contrary, price was the primary basis for awarding contracts to suppliers. To win business, XYZ had to be price-competitive.
- To become price-competitive, the company needed to do the following:
    - Understand the costs of its major processes in order to facilitate the identification and execution of cost-reduction opportunities.
    - Accurately measure the cost of individual products, both those currently being produced and those that could be produced over the next five to seven years.
    - Project the cost structure of the organization, including product cost rates, using a wide range of volume, mix, and other economic assumptions.
    - Understand how to exploit the new, more accurate, and relevant cost information to build a larger and more profitable portfolio of business.

Steps 3 and 4: Consider managerial cost modeling concepts and evaluate current managerial costing practices in the organization

Causality was not incorporated into the company's cost model. The existing model put all manufacturing costs in a single pool and allocated these costs to products using direct labor dollars, which is not a major driver of manufacturing costs. Selling, general, and administrative (SG&A) costs were pooled together and allocated to products as a percentage of all other product costs.

Eight of the 10 key concepts that define a causality-based cost model were missing in XYZ Industries' cost model:

- Managerial objective: The information provided by the current costing system was adequate for financial reporting but incapable of effectively supporting management decisions.
- Cost: Costs were highly aggregated into two categories, manufacturing overhead and SG&A expenses. Neither of these categories were related to specific resource capacity and outputs.
- Homogeneity: One large cost pool existed for all manufacturing activities regardless of the technology, skill, or resource costs required. High-cost processes were mingled with low-cost processes.
- Traceability: Costs were traced to products using verifiable transaction records, but the transactions being reported had little or nothing to do with the consumption of those costs by the products.

- Capacity: Resource utilization was not traced at all and was not considered in costing.
- Work: Neither work performed in support of manufacturing nor SG&A work were measured and assigned to the types of activities being performed.
- Responsiveness: Costs were not segregated into fixed and variable costs, nor were they linked to their causes.
- Attributability: Causality was not assessed. One highly generalized cost pool was allocated only to the extent required for financial reporting.

Two of the 10 concepts were present but weak:

- Resource: The sources of all costs were more or less included in the model.
- Integrated data orientation: The company's ERP system provided a wealth of financial and operating data, but the existing costing system was used only for financial reporting purposes.

Based on the evaluation, it was apparent to management that a radical change in the company's cost model was needed. Yet the company was small and its resources were limited, so it needed to establish the right level of sophistication and find a method of implementation that was within its staffing and financial capabilities.

Step 5: Design the appropriate level of costing system sophistication for the organization

The company involved key executives from manufacturing, sales, materials management, information technology, and human resources, as well as general and financial management, in designing the cost model. As a group, they identified the resources that the company employs in its operations and the cause-and-effect relationships between and workflows among those resources. They also identified the key objectives of the cost model as: (1) facilitating process improvements, and (2) providing accurate information to support quoting and pricing decisions. Each model design suggestion was assessed in light of these objectives. Suggestions that were deemed important to meeting the objectives were included and those that were not were excluded.

The result of this process was a managerial costing model that more closely reflected the operation of the business. Manufacturing activities, both value-adding and nonvalue-adding, were segregated into groups with similar cost structures: Expenses and activities supporting production labor (for example, payroll taxes, health insurance, human resources support, and so on) were segregated from those supporting nonlabor production resources (for example, depreciation, utilities, maintenance, and so on). These production labor-support costs were the only costs included in the hour-based labor rate used to assign direct labor costs to products.

1) Expenses and activities involved in the pre-production setup of forging presses, including the cost of lost capacity due to equipment downtime during setup, were segregated and incorporated into a "cost per setup" that was used to assign set-up costs to products based on their production batch size.

2) Forging presses were divided into three groups based on their tonnage, and machining operations were separated from forging activities. Nonlabor-related production expenses and activities (for example, occupancy, depreciation, utilities, maintenance, and so on) were assigned to these four activity centers based on consumption metrics or estimates of knowledgeable individuals. These costs were subsequently included in equipment hour-based rates used to assign indirect manufacturing costs to products.
3) Expenses and activities involved in sorting and packing parts were segregated and included in an hour-based direct labor rate used to assign sorting and packing costs to products.
4) Expenses and activities involved in the in-process movement and storage of parts were segregated and included in a "cost per move" that was used to assign these direct (though nonvalue-added) costs to products.
5) Expenses and activities that supported materials were also addressed. Resources related to purchasing, receiving, quality testing, handling, and storing steel bar stock were isolated and included in a "cost per pound" that was used to assign these costs to products.
6) Nonmaterial or manufacturing-related indirect expenses and activities were included in a "G&A" cost pool and, when necessary, assigned to products as a percentage of "activity cost." Direct material costs were not included in the base for assigning these costs.

Using this new costing structure, an Excel-based predictive cost model was developed that accumulated the total cost of operating the business under varying volume and mix scenarios, and then translated those costs into "fully-absorbed" rates for costing individual products and customers. Both the financial and operational data required to populate XYZ's model was provided by the company's ERP system.

Step 6: Implement the new costing model across the organization

XYZ Industries decided that it would not change its day-to-day cost accounting practices. No changes would be made for bookkeeping or financial accounting purposes. Management would, however, use the managerial costing information derived from its new model as input for decision making. It selected and trained two "model masters"—individuals with in-depth understanding of both the theoretical basis of the cost model as well as its incarnation as an Excel-based computational tool—to maintain and "drive" the model when used for decision-making support. The company also created an Excel-based product costing template, based on a combination bill of materials and process routing, that enabled managers to use the model's costing rates to measure the cost of individual products. This template was employed both for products currently being produced and for product proposals that required the development of price quotations.

Using the company's new product costing template and the cost model's new "fully-absorbed" cost data (which were not determined at the company's current production volume but rather at its practical capacity), XYZ managers identified several products that were losing a significant amount of money. For example, one high-volume driver pinion product selling for $9.18 that the company believed generated a $1.38 profit actually turned out to be losing $0.70 per unit sold. On the other hand, the new model and template also highlighted several recent quotes that the company was not awarded because its former costing model caused it to quote prices far above those needed to earn its targeted return. During the next few years, the company was able to use its new cost information to stock its portfolio of core business with much more profitable products.

The company capitalized on its new ability to perform accurate incremental cost analyses. It was able to take on several noncore products that contributed to its profitability in the short term without damaging its ability to sell core products profitably. Management was also able to accurately model the addition of equipment and floor space before committing to a project. Surprisingly, managers were able to determine the overall savings that XYZ would realize when the cost of performing setups was increased and the time required to perform setups was reduced. By reducing set-up time, managers were able to open up enough capacity to avoid the purchase of two new presses during the first few years after adopting the new cost model. Finally, the new understanding of activity and process costs radically changed the way managers operated the XYZ business. The most powerful revelation was the cost of in-process movement and storage. Once this cost was isolated, managers found ways to eliminate movement (and its cost) through increased use of progress dies, moving secondary operations next to primary operations, and adjusting the scheduling so that former "move-store-move" activities were changed to "move-only" activities.

The Results

Four years after the new costing model and methodology were adopted, the $25 million forging business had not only survived the industry's purge of supply-chain partners but had grown into a $60 million operation. More importantly, the $500,000 pretax profit grew to more than $6 million. Admittedly, more than just improved cost information was involved in this success. Yet all of the company's actions were based on accurate and relevant cost information—information that would not have been available had XYZ continued using the old, traditional approach to costing.

As a postscript to this case, XYZ Industries was purchased by a $3 billion automobile industry supplier. The new owner's management was so impressed with the smaller company's performance and the economic literacy of its management that the XYZ costing methodology was adopted by the larger $600 million forging division—and later by the entire organization.