Chapter 9
Performance Measurement and Evaluation

The system for evaluating purchasing and SC (supply chain) performance represents a sophisticated, systematic technique to evaluate and monitor performance of purchasing. This looks easy, but usually it is very complex to develop measures that direct activity or behaviour exactly as planned. Some companies still depend on measures that could be causing harm, subject on performance goals, rather than supporting long-standing performance. For example, the capability to get discounts on price from a vendor is still a key objective for certain/cost/price performance measures. On the other hand, if short-term price bargains is continually squeezed from a vendor, will this vendor have the commitment or financial resources to invest in long-term performance enhancement?

Modern measurement and evaluation systems of purchasing and SC cover a range of measures. Many of these measures are divided into two main categories: efficiency measures and effectiveness measures.

The measures of effectiveness refer to the extent to which, by selecting a certain course of action, management can fulfil standard or goal. The efficiency measures refer to the correlation between actual and planned sacrifices made to realize an earlier agreed-upon goal. Usually the measures of efficiency relate some contribution to a performance productivity.

More or less all measures cover a target or standard against which to evaluate performance outcomes. It is not suitable and preferable to say, for instance, that a measure will track enhancement in quality of supplier. We will need to evaluate desire target against actual improvement. Fulfilling this target, which is probably on the basis of world-class performance benchmark, will contribute great value to a firm. Every performance measure needs to cover targeted performance levels and actual performance level.

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9.1 Why Measure Performance?

There is no doubt that there are many reasons for measuring and evaluating activity and performance of purchasing and SC.

9.1.1 Support Healthier Decision-Making

Measurement may lead to good decisions by making performance and results more clear and visible. It is very complex to develop plans of performance improvement without in-depth understanding of the areas in which performance is not good. Measurement offers a track record of procurement and contracts performance over time and directly supports activity of policymaking through management.

9.1.2 Support Improved and Effective Communication

Performance measurement may lead to good communication from upstream to downstream of the SC, covering within supply departments, with senior management, and with suppliers. For instance, a buyer must transmit performance expectations to suppliers. Undeniably, performance of the supplier reflects a buyer's expectations.

9.1.3 Provide Performance Feedback

Measurement offers a chance for feedback and perfection of performance, which helps in the correction or prevention of glitches and difficulties identified during the process of performance measurement. Feedback also gives awareness into how well a purchaser, supplier or department is fulfilling its objectives of performance over time.

9.1.4 Motivate Behaviour

Measurement encourages behaviour towards desirable output. A system of measurement may perform this in many different methods techniques. First of all, the selection of objectives and performance categories shows purchasing staff those activities that a company consider significantly important. Second, management can influence behaviour through attaching achievement of performance goals to rewards, like promotion and cash rewards.

9.2 Problems of Measurement and Evaluation in Supply Chain

The measurement and evaluation of performance, covering procurement, logistics and overall firm performance, generally have had certain limitations, difficulties and problems. According to Mark Brown, many professionals and executives today are similar to a driver trying to drive a car with only half the tools needed and a number of additional tools and gadgets that measure unrelated data. Mark Brown suggests that, in practice, each and every firm has some sort of issues, difficulties and problems with its system of measurement.

9.2.1 Too Much Data

There are too much data for a company's measurement system to handle, which is a common problem for companies. And the data that supervisors, personnel or managers pay attention to are usually wrong, which is a significantly important problem. In reality, measures that supervisors, executives or personnel use may be encounter with the measures used in other functional areas. In general, workers should monitor simply a dozen measures, with half of those being significantly critical.

9.2.2 Measures That Are Not Long-Term Focused

Some medium and small companies are facing a problem of depending on data and measures that are not long-term focused. Normally the only data they gather are operating and financial data, including inventory and production related data. In purchasing, this would mean a not long-term focus on workload and SC activities (not long-term), while ignoring strategic or long-term measures.

9.2.3 Lack of Detail

Sometimes data are summarized and reported, resulting in making the information meaningless. A statistic that reports on a single measure of weekly supplier quality possibly lacks detail that a supervisor of supply will be interested to understand: which types of faults are experienced by supplier, what the faults cost the purchaser's firm, and the quality performance of supplier over time.

With the information the supervisor may be able to take necessary action to cope with the essential causes of the quality issues at his facility.

9.2.4 Wrong Performance

Unluckily, a number of measures drive behaviour that is not what was really needed or intended. If purchasers are measured on the basis of quantity of POs (purchase orders) printed, then they will ensure the distribution of orders between suppliers to produce as many POs as possible. Part of this is because of the fact that it is not an easy job to measure intellectual work. On the other hand, companies still want to look for factors or elements that can be reported and measured. But not always are these factors the right factors.

9.2.5 Behaviour vs. Accomplishments

The main problem with measuring behaviour is that the behaviour will lead to anticipated objectives has no guarantee. A behaviour measure that tracks the dollars of purchase volume enclosed by corporate wide agreements, for instance, is becoming increasingly common. However, a good measure is one that tracks the aggregate savings due to the use of corporate wide agreements.

9.3 Procurement and SCs Performance Measurement Classifications

As part of a firm-focused procurement and SC-measurement approach, companies should follow a systematic process to take full advantage of results and achieve horizontal and vertical alignment of purpose. As indicated in Fig. 9.1, firm aim drives specific firm strategies for example become the low-cost manufacturer. These firm strategies should then drive suitable and prioritized procurement and SC aims and specific strategies.

Alignment of measures, strategies and actions will bring together bottom-up targeting and top-down direction to produce positive contributions. In a single company, this could provide competitive benefit. Integrated procurement and SC may also produce competitive edge for the entire SC level, enhancing efficiency and minimizing overhead.

Undeniably, there are many procurement and SC measures. Perhaps the best approach to summarize the large number of separate measures is by developing performance measurement classification or grouping as identified in Fig. 9.1. Within each group, several separate measures relate to each common category. Many procuring and SC measures are covered in one of the given classifications:

- Cost-effectiveness
- Price performance
- Quality

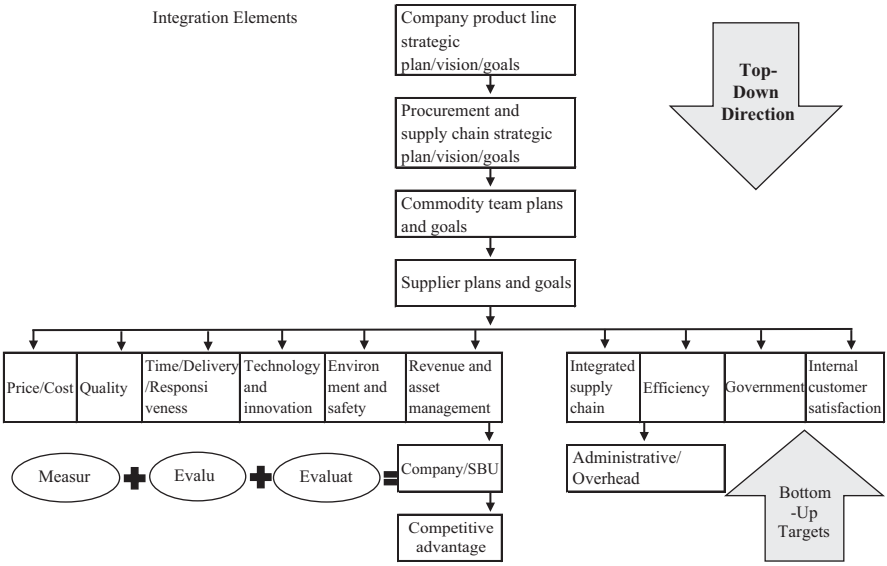

Fig. 9.1 Integrated firm/purchasing measurement process

- Revenue
- Innovation and technology
- Time/responsiveness/delivery
- Asset and integrated SCM (supply chain management)
- Physical environment and safety
- Administration and efficiency
- Internal customer satisfaction
- Government and social expectations
- Strategic performance
- Supplier performance

9.4 Price Performance Measures

Many indicators are used in purchasing to check price performance measures—in simple words, how effectively it spends purchase dollars. Planned purchase price versus actual purchase price comparisons, actual purchase price(s) compared to a market index, comparisons of actual to actual purchase prices for aggregated and individual products or divisions or factories within a company, and target prices achieved—these are all included in the very common price performance measures. Two measures of price performance which are important:

1. Price to market index comparison
2. Target prices achieved.

9.4.1 Actual Price Compared to Standard/Plan Price

Generally, the difference between planned purchase prices and actual purchase prices is reflected in measure of price performance. Measurement of planned purchase price difference can arise at different stages in organization.

For instance, procurement can calculate planned price versus actual price variances for every individual purchased product identified in Fig. 9.1. There are many approaches and techniques for computing purchase price variance.

9.5 Actual Price vs. Market Index

The price of purchase vs. market index measures give information about the relationship between published market prices and actual prices. These measures are the most suitable for market-based items where pricing is mainly a function of demand and supply. This also applies to readily and standard available items. The difference between a published index number over a designated period of time (such as month or quarter) and the change in the actual price paid is taken into account in index measures.

9.5.1 Price Comparison Between Operations

Actual prices for similar products are also compared between division, business units or factory. These comparisons give an opportunity to recognize purchase price differences within a company. This gives greater clarity as to which unit is securing the best purchase price. The activity of comparison may also help recognize commonly purchased products between units for purchase consolidation. Many companies also attempt actual-to-actual price comparisons between firms to determine true price advantage.

Companies are more and more emphasizing cost vs. price, but price performance measures are still used widely, mainly with companies that lack detailed data of cost. Price performance measures are also generally used when purchasing components, standard-type products, or other commodities, and raw materials.

9.5.2 Target Prices Achieved

Target pricing is the process of defining what the customer is eager to pay for service/item and then allocating specific cost targets to the assemblies, systems and components that make up the service or product. Target costing apply the given formula to define allowable costs:

Target Price – Project Target = Allowable Cost

Allowable cost is then assigned to several factors that constitute the finished goods.

9.6 Measures of Cost-Effectiveness

Cost-effectiveness measures fall into two broad categories:

1. Cost avoidance
2. Cost changes.

The use of measures of cost-effectiveness calls for a word of caution. The technique for attaining cost elimination is crucial. A cost minimization on the basis of mutual collaboration and cooperation is the same, on paper, as a cost minimization resulting from heavy-handed pressure on a vendor. Undeniably, cooperation and collaboration may reduce the cost but heavy-headed pressure lead vendor towards poor quality.

9.6.1 Cost Changes

A cost measure compares the actual cost of a product over a period. A cost change is the decrease of increase in cost resulting from a change in practice or purchasing strategy brought about by an individual or group.

The main measure of concern to firms is cost minimization accomplished, which is estimated by taking (Current Price – Previous Price) × Estimated Volume. For instance, if the current price was $10/unit and the previous price was $11/unit with an estimated volume of 20,000 units for the next budget, there would be forecasted cost minimization of $20,000. The final cost minimization achieved would depend on actual usage.

9.6.2 Cost Avoidance

The cost avoidance signifies the difference between a price paid and a potentially higher price (if purchasing had not achieved the lower price through a specific action or effort, this might have happened). For instance, given that purchasing paid $6.00 per unit for a product in the past, but the supplier has now quoted a price of $7 per unit. If the purchaser negotiates a price of $7 per unit, then she or he has obtained a cost avoidance of $1 per unit, even though the price was still $1 higher than the previous price. However, often finance believes that cost-avoidance savings hardly display on a company's income line.

9.6.3 Revenue Measures

The effects of purchasing and supply actions and strategies on revenues of the company are shown in revenue measures. For instance, supply and purchasing may uncover new technologies of supplier before others in the industry do and gain exclusive access, leading to new item applications with volume growth and favourable pricing.

Revenue growth is also connected with meeting new-product launching dates with perfect supplier performance, and allowing a first-to-market position with premium pricing. Perfect-launch revenue is crucial at several companies and is affected by performance of supplier.

Revenue measures for supply and purchasing are significantly important since they connect supply and purchasing strategies to the revenue factors of economic value-added. However, relatively few measures of revenue are being used. Obviously, companies have not entirely identified the contribution to revenue generation that supply and purchasing can make. This is the situation for direct products, where the connection of supply and purchasing strategy to revenues is less recognizable.

9.6.4 Revenue Measure Examples

- Contribution of supplier as a reason for new business, e.g. new business development, flexibility in shifting output service or product mix to meet higher revenue or profit, creating customer demand
- Revenues of royalty generated from supplier- or buyer-developed technology and patents originated by sourcing or purchasing
- Return on licensing technology driven by sourcing or purchasing
- Number of invention disclosure forms filed
- Value of free samples from suppliers
- Number of patents granted

9.7 Quality Measures

9.7.1 Parts per Million

This measure shows a supreme level of defects allowable for any specific assembly, service or product. It can be expressed by using one of the given specific definitions or could be the mean time between failures for an equipment or factory item. When applied to components, systems, assemblies or products the traditional metric has been parts per million not to meet the specification. As quality control has been enhanced and the capability to produce to tighter tolerances has been increased, this metric can also be tightened. In determining the “Parts per Million” result, it is

necessary to measure (by factual testing, statistically reliable sampling or inspection) the incidence of nonconforming or defective parts. The measure requires a reference point, like receipt, production, shipment or incoming inspection. Additionally, measures of quality are also being created and used for services.

9.7.2 Field Failure Rates by Purchase Product and by Supplier

In many industries, this measure use to calculate satisfaction of customers. As a measure, it shows failures rate after sale and companies will have a tendency to aim for a zero incidence of such failures.

9.8 Delivery/Time/Responsiveness Measures

9.8.1 New Services/Products, Time-to-Market Targets

This measure is the amount of time (in months or weeks) from idea to first provision or shipment of a service or product to the external customer. This aims at continuous reduction of the amount of time it takes to accomplish break-even of investment and also at being first to market with the service or product.

9.8.2 On-Time Delivery

These measures show the extent to which suppliers are capable of fulfilling the requirements of customers. Main factors for such measures cover the following:

- Delivery windows
- Scheduled due dates or promised
- Acceptable late or early arrivals to due dates

Typically the metrics are calculated as the percentage of services, shipments or indivisible products late or on time. These measures may be applied in manufacturing or service businesses. Procurement and supplier performance can be measured through indices on the basis of the above measures.

9.8.3 Achieving New Product Launching

These measures show whether SCM, procurement, supplier and strategic processes are achieving necessary available volume objectives at milestones and at market launching dates for the service or product.

9.8.4 Cycle Time Minimization: Order Entry, Operations/ Manufacturing, Logistics and Distribution

Total cycle time and its main components should be recognized by these measures. Measures emphasize minimization through elimination of delays and also delivering continuous enhancement to target times. Examples include supplier production cycle times, internal operations, order entry, and transportation.

9.8.5 Responsiveness to Schedule Changes, and Service or Design Changes, Mix Changes

These measures show how speedily suppliers may respond to changes or demand, for instance, the ability to adjust schedule by 50% within 2 weeks of scheduled delivery. Another measure could be time to accomplish changes of design to allowable targets. These measures identify the need for flexibility.

9.9 Innovation Measures

9.9.1 Manufacturing Outputs of Latest Supplier Technology

This measure would be typically in connection with a contractual agreement whereby for latest technologies, a company may get insight some period of time before latest technology developments are shared with other companies. This can be a significantly important focus in dealings with selected main technology suppliers to the company. A particular metric can be the number of such agreements with main suppliers for innovative and new technologies.

9.9.2 Standardization

These measures emphasize achieving standardization of systems, services, components and application of presently used purchased products or the use of industry standard vs. unique products. Particular measures cover reduction of different products used, percentage of new services or products made up of presently purchased products, and number of industry-unique products utilized in a new service or product. These measures then would be established in a company for service-specific goals or product-specific goals.

9.10 Safety and Physical Environment Measures

Firms are tracking the accomplishment of safety, environmental goals and cost connected with compliance, both voluntary compliance and where legislation enforces compliance. This aims at driving performance enhancement to achieve regulatory goals or self-imposed goals.

9.10.1 Integrated SCM Measures

As an asset for a single company, the measurement of inventory may contain a number of aggregate or unit inventory measures such as those mentioned below:

- Dollar value of inventory investment
- Inventory turnover
- Months/weeks/days of inventory supply

This aims at minimizing cost of inventory through increasing the speed of throughput or minimizing carrying cost of inventory. A unique set of this measure is its application across inventory throughout many steps within a company's SC and, more essentially, across companies in the aggregate SC (external to one's company) with specified future targets.

Generally, it is also common to have measures that track the velocity or speed of inventory as it moves through different factors of the SC. This covers work in process and raw material, final products and inventory turns. The amount of inventory maintained as safety stock is also a common measure. The accuracy of computer records that are part of the inventory location system is also closely tracked.

9.11 Transportation Cost Minimization

The measures of transportation cover tracking actual costs of transportation against some pre-established objective, premium transportation, detention and demurrage.

Cost minimization measures emphasize the total costs of transportation incurred per planning period to conduct business and those premium transportation costs incurred where a nonstandard method of transportation to fulfil external and internal requirements are required in expediting, for instance, using air consignments when trucking is the preferred mode of shipping.

9.11.1 Customer Orders

How well a company is satisfying its commitment to customers (downstream) can be evaluated by these measures. Many measures consist of the percentage of non-time delivery, returned orders, warranty claims and total time from customer order to delivery. We have focused basically on purchasing and activities of upstream SC, but materials and purchasing planners are increasingly accountable for managing inventory from a total SC perspective. This can also consist of activities of downstream.

9.11.2 E-Transactions (Percentage and Number of Dollars/ Orders and Suppliers)

These measures indicate some extent of cross-company linkage. The magnitude of use of web-based systems or EDI (electronic data interchange) that connect suppliers and purchasers can, for instance, be measured by the:

- Percentage of suppliers
- Percentage of ASN (advance shipping notices)
- Absolute number of suppliers
- EFT (electronic fund transfers)
- Percentage and dollar value of orders
- Inventory throughout the SC (supply chain)
- Meeting customer requirements
- Others

9.11.3 Shared Schedules/Pull Systems/SMI (Supplier Managed Inventory)

These measures establish the percentage or the number of suppliers that are sharing schedules and operating in pull systems. They can also measure percentages of suppliers that are sharing schedules against those that would be. Supplier Managed Inventory measures establish the magnitude of inventory and the number of suppliers being managed by suppliers for which they have financial responsibility.

9.11.4 Efficiency and Administration Measures

Efficiency and administration measures are used in management to plan the procurement annual administrative budget and to help control expenses of administration during a period of budget. Budgeted expense products usually cover travel, meetings, training expenses and other expenses. Conventionally, salaries take the largest portion of budget. The two common methods to establish the budget are following:

9.11.5 Present Budget Plus Adjustment

The very common method of establishing a budget uses the present administrative budget as a beginning point. Depending on expected conditions of business or other departmental requirements, management then adjusts the budget for the next year downward or upward.

9.11.6 Control Ratio Budget

With the approach of a control ratio, the purchasing administrative budget is a percentage of another measure that reflects workload of purchasing. Planned dollar expenditure for DM (Direct Material) is often the selected workload measure.

The old control ratio as well as negotiation between top management and purchasing often determines the control ratio percentage used during calculation of the administrative budget. The administrative budget then is influenced by a projection of DM requirements of purchase for the next period. Workload of purchasing is assumed to be proportional to planned dollar expenditures for DM. The budget of purchasing administration becomes the following:

Purchasing Budget = Estimated Expenditures for DMs × Control Ratio

Managers of purchasing use the total budget figure to assign resources among different departmental uses. Management must define how many purchasers are needed, the size of the clerical support personnel, and other budget-related problems and issues.

9.11.7 Other Approaches of Budgets

Existing budget plus adjustment and control ratios are not the only techniques used to arrive at a purchasing administration efficiency or budget. The efficiency can also be measured by using workload of purchasing such as POs processed, line products processed and headcount. Once more, we must warn against highlighting efficiency of purchasing over effectiveness of purchasing as a strict KPI (key performance indicator).

9.12 Social and Governmental Measures

9.12.1 Internal Customer Satisfaction Measures

Firms are also using measures that show the extent of satisfaction with buying's value-add contribution. Typically internal customers do this and they are asked to show their satisfaction with buying by responding to a series of open-ended questions. Satisfaction of suppliers' measures and surveys are also used.

9.12.2 Measures of Suppliers' Performance

Supplier performance measurement is an area where several companies have made great improvements. Supplier scorecards regularly cover several of the measures discussed before. Generally buyers track supplier cost, delivery and quality along with other performance areas. Moreover, companies are starting to quantify the cost connected with supplier non-performance. The resulting cost figure denotes the total cost of doing business with a supplier. Total cost measures of supplier allow direct comparison between suppliers.

9.12.3 Strategic Performance Measures

Procurement needs measures that show its capability to support overall functional and corporate goals, which means a minimized emphasis on pure efficiency measures and a larger emphasis on measures of effectiveness. Examples of the latter contain tracking early involvement of supplier in the design of product, performance gains because of valuable suggestions of suppliers.

9.13 Developing a System of Performance Measurement and Evaluation

The development of a system of measurement and evaluation requires the leadership, commitment and support of top management, who must commit the financial resources necessary for system development. Management must also require all purchasing locations to use the same structure of system, which can minimize duplication of effort and save training and development costs. This does not mean that every location must use the same performance criteria or objectives, but that the system's primary design should be similar. Top management support would also send a message about the monitoring, tracking and seriousness in improvement of performance.

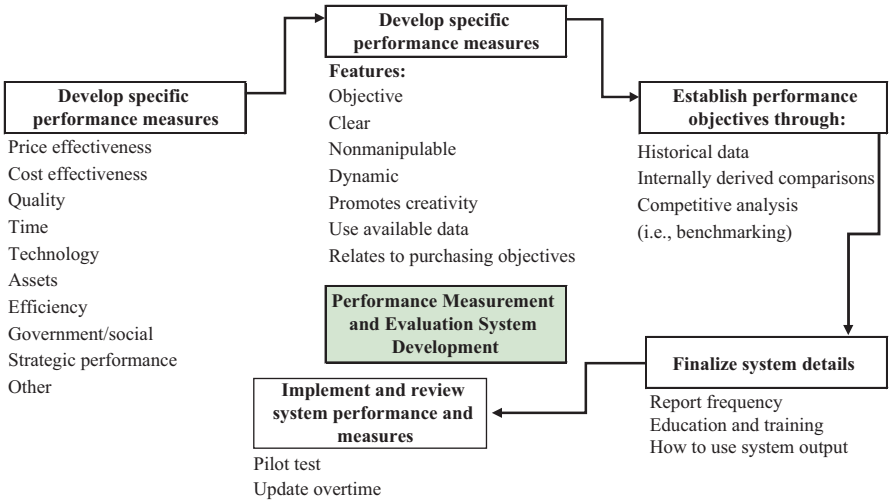

Fig. 9.2 Developing a purchasing and SC performance measurement and evaluation system

Development of an effective measurement and evaluation system follows a common sequence of activities. These cover defining which performance categories to measure, establishing performance standards for every measure, developing particular performance measures, finalizing details of the system, and reviewing and executing the system and every performance measure (see Fig. 9.2).

9.13.1 Determine which Performance Groups to Measure

The preceding section discussed many classes of performance measurement. The first stage of the development process requires recognizing measurement categories on which to focus. Also, a company can weigh its performance measures and classes differently.

During this period of system development, management does not concern itself with particular performance measures. The chosen performance classes must relate widely to organizational and SC and purchasing objectives and goals.

Choosing the performance measure classes is an important stage prior to developing particular performance measures.

9.13.2 Develop Particular Performance Measures

Developing particular performance measures starts once management recognizes the measurement classes it will emphasize. Certain features characterize successful SC and purchasing performance measures.

9.13.3 Objectivity

Every measure should be as objective as possible. Instead of qualitative assessments and feelings, the system of measurement should depend on quantitative data.

9.13.4 Clarity

Staff must understand a requirement of performance measure so as to direct performance towards the desirable outcome and remove misunderstanding and misconception. All members must be clear as to what every performance measure means, agree on the objectives of performance associated with the measure, and understand what it takes to achieve the measure. Well-understood measures are unambiguous and straightforward.

9.13.5 Use of Accurate Data

Well-defined measures use data that are accurate. If a measure requires data that are unreliable or difficult to generate, the probability of using the measure on a consistent basis declines. The cost of collecting and generating the required data should not outweigh the potential advantage of using the performance measure.

9.13.6 Creativity

A general misconception is that a system of performance evaluation should measure each possible activity. When this occurs, the measures can stifle individual creativity. The measures control behaviour so tightly that the system removes room for personal initiative. In a successful system, only what is significantly important will be measured while this system still promoting individual creativity and initiative, which can mean emphasizing five or six important, clearly explained measures instead of 25 vague measures.

9.13.7 Directly Associated to Organizational Goals

Figure 9.3 shows how corporate objectives/goals influence purchasing objectives/goals. Other functional objectives also may impact and influence purchasing. For example, goals of manufacturing can have a direct impact on purchasing because purchasing supports the process of manufacturing. To fulfil its objectives and goals, purchasing managers develop strategies and action plans. Finally, senior management develops measures that evaluate the performance or output from the activities needed to achieve purchasing's plans and strategies. The measures serve as indicators of purchasing's improvement.

9.13.8 Joint Participation

Joint participation means that the staffs responsible for every measure participate in establishing the measure's performance objective. Joint participation may go a long way towards getting the support of the staff responsible for achieving the measure.

9.13.9 Dynamic Over Time

A dynamic system is one that management reviews periodically to define whether existing measures still support objectives of purchasing and to determine whether performance objectives or standards require updating or whether there is a need for new measures.

9.13.10 Nonmanipulable

This measure is one of the results of which staff cannot inappropriately influence (i.e. the measure is cheat-proof). To be ideal, the individual(s) responsible for the measure should not be responsible for supplying the data to the reporting system, because it will be counted as an integrity and accountability problem. In fact, it should be a computerized system from receiving data till displaying performance.

9.13.11 Establish Performance Objectives

Establishing an objective for every performance measure is important. Objectives quantify the desired performance goal or target.

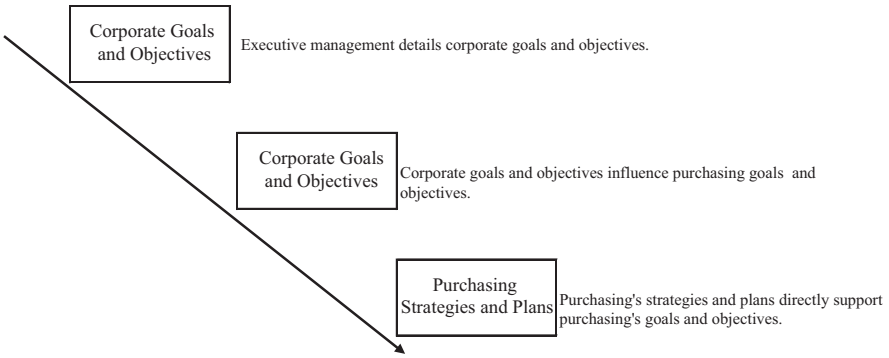

Fig. 9.3 Connecting purchasing measures and corporate objectives

Performance objectives or standards must be practical, which means the measure should be challenging yet achievable through a solid effort. Achieving a target should not be so easy that it needs small effort. While it should not be so difficult that it discourages staff from even attempting to achieve the goal. The actualities of a company's competitive environment must be reflected in the objective.

Usually companies use three methods when creating objectives:

1. Historical data
2. Internal comparison
3. External analysis

9.13.12 Historical Data

Past data about an activity are used as the basis in this technique for creating a performance objective. Usually historical performance is modified with a performance improvement element to arrive at a current objective. SC and purchasing management often use the historical approach with efficiency-related measures.

Some problems will occur due to relying on historical data. It is possible that past performance was less than optimal. By the establishment of an objective on the basis of suboptimal performance, even having an enhancement element, a company risks continuing suboptimal performance. Besides, historical data give no insight into the performance capabilities of rivals companies. Additionally, the company's

strategies, and financial objectives will drive supply and purchasing goals. Without contributing to company success through objective accomplishment, purchasing cannot be a value contributor.

9.13.13 Internal Comparisons

A company can perform internal comparisons between business units. The best internal performance level can become the basis for a companywide performance objective. Companies with multiple business units often rank and compare performance internally across different performance classes.

This method, which provides some benefits over the historical approach, also has drawbacks. A company that emphasizes comparisons between internal units can lose sight of its external competition. Unhealthy competition can also develop between internal departments and business units. Moreover, it cannot be ensured that the best-performing internal unit matches the best-performing unit of a direct competitor.

9.13.14 External Analysis

This method involves examination of the performance objectives and practices of competitors or other leading companies. The benefit of this method is that it calls for an external evaluation at very specific levels of detail. The next part of this chapter discusses benchmarking as a competitive-analysis method for creating objectives of performance.

9.13.15 Finalize System Details

The management is required to consider issues in the next aspect of execution, such as the frequency of performance reporting, the training and education of system users, and the final determination of flow to use system outcome.

9.13.16 Performance-Reporting Frequency

A good system of measurement and evaluation gives regular reporting of performance outcomes. The actual reporting regularity may differ from measure to measure. What frequency supports the most effective use of every measure must be defined by management.

9.13.17 Training and Education

An organization must provide trainings to their suppliers and staff, how to use the system of measurement and evaluation. Every participant must know his or her responsibility and accountability.

9.13.18 Using System Output

Management uses the outcome of a performance measurement and evaluation system in many ways. Some supervisors comment on the output to directly evaluate the performance of purchasing suppliers and staff. Managers can use the system to trace the effectiveness of individual purchasers. System outcome can also recognize better-performing suppliers that deserve future contracts of purchase.

9.13.19 Execute and Review System Measures and System Performance

Every system has an execution stage, which may contain trial or pilot runs to ensure the system performs as planned. The system of measurement and evaluation, along with each performance measure, must be subject to periodic review. Having a system that includes inappropriate or obsolete measures can be more damaging than having no formal system at all.

9.14 Benchmarking of Performance: Comparing Against the Best

An ongoing method for establishing performance standards, measures, processes and objectives is benchmarking, a process that is not exclusively a SC or purchasing approach or practice *per se*. Rather, it is a method used by functional and corporate level managers and executives. Benchmarking has definite applications, however, when establishing SCM and purchasing performance objectives and action plans. Before discussing specific benchmarking applications, first an in-depth understanding of the process of benchmarking must be gained.

9.14.1 Benchmarking Overview

Benchmarking is the continuous measuring of services, activities, products, processes and practises against a company's best competitors. Formally, the process of activity or process of benchmarking requires measuring performance against that of

best-in-class firms, determining how the best-in-class achieve their levels of performance, and using that information as the basis for establishing a firm's performance strategies, action plans and targets.

In benchmarking, comparisons against competitors are not always involved. Companies usually depend on comparisons with non-competitors as a source of information, especially when a process of benchmarking is common to companies across different industries such as SCM (supply chain management). Usually it is easier to obtain benchmarking information and data from a cooperative non-competitor.

9.14.2 Benchmarking Advantages

A firm hopes to gain advantage from actively pursuing performance benchmarking in many ways. The process of benchmarking helps recognize the best functional or business practices to include in a company's business plan, which can lead to performance enhancement. Benchmarking also can break down a reluctance to change. Senior managers start to see what it takes to maintain functional or corporate leadership by viewing the outside world. Benchmarking also can assist as a source of market intelligence. For instance, competitive benchmarking may find out a previously unidentified technological breakthrough. Eventually, valuable professional contacts between companies can result from the process of benchmarking.

9.15 The Benchmarking Process

Robert Camp noted that there are five different phases before a company fully receives advantages of the performance benchmarking process.

9.15.1 Planning

During this initial step of the benchmarking process, a company addresses issues such as which functions or products to benchmark, which firms to select as benchmarking targets (non-competitors, competitors), and how to recognize information. Benchmarking plans should emphasize methods and processes instead of simply quantitative performance results.

9.15.2 Analysis

Information and data collection and analysis occur during the second stage. A company must determine who and why the benchmarked company is better. A variety of questions should be asked:

- In what functional areas or product is the benchmarked firm better?
- Why is the benchmarked firm better?

- How large is the gap between the benchmarked firm's performance and our firm?
- Can we include the benchmarked firm's best practices directly in our plans of operating?
- Can we project future performance stages and rates of change?

This stage is important because it requires management to understand and interpret the benchmarked firm's methods, activities and processes.

9.15.3 Integration

Integration is the process of gaining and communicating acceptance of the benchmarking findings throughout a firm. During this stage, management starts to establish operational, functional and target goals based on the benchmark findings.

9.15.4 Action

The action stage requires translating the benchmark findings into detailed action plans. Clearly, actions during this stage include having staff directly responsible for carrying out the plans involved with formulation of the plans, developing a schedule for objectives over time and updating plans, and developing a reporting system to communicate progress towards benchmarking goals.

9.15.5 Maturity

A company reaches maturity when benchmarking becomes an accepted process for establishing performance objectives and plans. Another indicator of benchmarking maturity occurs when a company realizes continuous performance enhancement as a direct result of performance benchmarking.

9.15.6 Balanced Scorecard for Supply and Purchasing

The balanced scorecard was first presented by David P. Norton and Robert S. Kaplan in 1992. The original premise was that a total reliance on financial measures was leading companies to make poor decisions. Norton and Kaplan argued that companies must go beyond monetary (financial) measures, which are lagging indicators, and utilize measures that are leading indicators of performance.

They further recommended that the most suitable measures that would cause companies to do the right things would be those metrics that measure the strategy of the company, its processes, and functional activities.

According to Norton and Kaplan, the balanced scorecard covered four main connected performance measurement areas:

1. How do customers look at us? (customer satisfaction viewpoint)
2. What must we excel at? (operational excellence viewpoint)
3. Can we continue to enhance and create value? (innovation viewpoint)
4. How do we look to shareholders? (financial viewpoint)

Additionally, Norton and Kaplan stressed that measurement itself is not the objective. Measurement and particular metrics give clarity to general statements and strategy emphasis, around which to provide performance rewards and recognition.

The balanced scorecard and its related concepts have been adapted by numerous firms and applied to supply and purchasing.

Table 9.1 provides an example of balanced scorecard for supply and purchasing. Involved are measures related to the following questions:

1. How are we seen by shareholders?
2. How do our customers look at us?
3. What must we excel at?
4. What do we need to do to enhance business?

Table 9.1 Case example of strategic performance measures

Financial	Customer satisfaction
Revenue	*Internal*
Revenue from suppliers based on process improvements	Number of plant shutdowns
Royalty revenue from patents	Single-source risk mitigation
Cost	Internal stakeholder survey
Cost for direct material, direct spend and capital spend	Factory quality incidents
Bill of material cost versus target	Supplier business continuity
Savings on direct materials used by contract manufacturers	Tool performance
Administrative costs per headcount	On-time delivery
Maverick spend	Ramp-up readiness
	Percentage of spend with preferred suppliers
	External
	Customer quality incidents
Operational excellence	**Innovation**
Cost price enforcement	*New-product development*
Audit results and severity of errors	Performance versus data milestones in the new-product innovation (NPI) process
Payment terms in contracts	Current estimated cost against target in NPI process
Most favoured customer clauses in contracts	NPI process
Not to exceed pricing in contracts	Cost savings initiated by purchasing/supply in the NPI process
Keeping pricing current in ERP database	*People development*
Strategic sourcing plans in place	Training hours
	Leadership development pipeline
	Employee morale

Based on the firm's supply and purchasing strategies, the balanced scorecard would then be linked to a particular set of suitable performance measurements. The result would be a scorecard by people or department with specific KPI (key performance indicators).

9.16 Measurement and Evaluation Characteristics: A Summary

A review of supply chain and purchasing performance and systems of measurement supports many conclusions, which fall into two classes:

1. System characteristics
2. Human resource characteristics

9.16.1 System Characteristics

- Measurement is not free. A system of evaluation must compare the cost related with measurement against the advantages. Furthermore, increased measurement does not necessarily mean enhanced performance.
- Managers of supply chain and purchasing are better served by thoroughly understood and precisely defined measures.
- A system of effective management requires a database that gives reliable and consistent data. All staff must have access to the same data when reporting and calculating purchasing KPI (key performance indicators).
- Periodic review of the supply chain and purchasing measurement system should occur to remove unnecessary performance measures.
- It is very difficult to find a best way to measure performance. There is a difference between companies about performance measures and also between industries.
- Measurement-reporting requirements and content vary by level and position within the company. Careful planning helps to ensure effective use of the system at every organizational level.
- A single, overall productivity measure representing supply chain and purchasing performance is not feasible.
- Many industries are required to shift from operational measures to strategic measures evaluating a desirable end result (for instance, increase in participation by suppliers during new development of product).
- The plans and strategies used to create or produce a performance measure's results are possibly more important than the end performance result itself.
- An approach of balanced scorecard is an effective approach of evaluation and measurement of supply and purchasing.

9.16.2 HR Characteristics

- A system of measurement and evaluation is not an alternative for effective management. This system can be used to assist in the effective and efficient operation of the supply chain and purchasing function.
- An effective system is dependent on communication. Responsible staff must thoroughly understand its expectation of performance, the performance measure and the role of the measure during the process of performance assessment.
- Measures must strengthen positive behaviour and be positively connected to a company reward system. Dysfunctional, negative or beat-the-system behaviour may result if organization uses the measures exclusively as a means to recognize nonperforming individuals.

Discussion Questions

1. What are the types of benchmarking?
2. What are the safety and physical environment measures?
3. What is a purchasing performance measurement and evaluation system?
4. Why would a company want to measure performance of purchasing?
5. Which type of benchmarking is commonly used by the purchasing function?
6. Why would a company want to measure performance of suppliers?
7. What is the basic difference between efficiency and effectiveness measures?
8. When should a company focus on purchasing effectiveness and efficiency measures?
9. Discuss the basic difference between cost avoidance and cost-reduction measures.
10. What are the advantages of developing performance measures that focus on cost vs. purchase price?
11. Discuss the different use a manager has for supply chain and purchasing performance data.
12. What is required to establish a balanced scorecard to measure supply and purchasing performance?

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