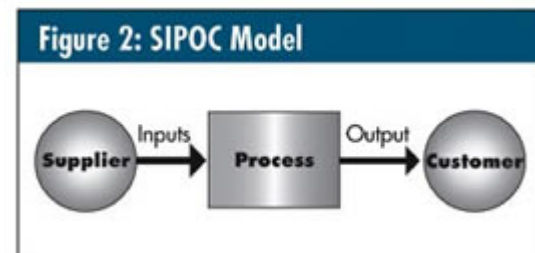
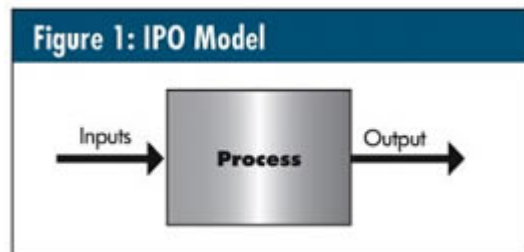


**Turtle Diagram & Octopus Diagram: Process Evaluation Tools**

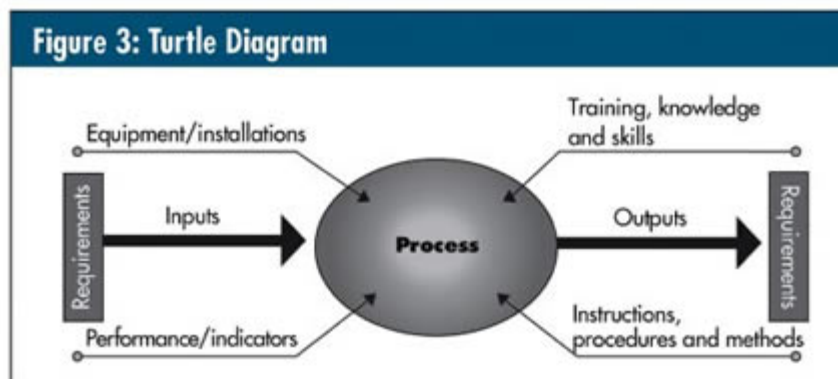
The starting point for effective internal auditing is to understand your organization's existing processes. Many people came to understand the basic process model. (See figure 1.) This model can be seen in any activity and represents a balance of energy going into a process and coming out. If you don't have a balance, waste is present in the process.

By understanding the basics of any activity through the process model, you can start looking deeper into what is happening in your organization. Six Sigma practitioners have expanded the process model to get the supplier-input-process-output-customer (SIPOC) model. (See figure 2.) This includes recognition that every process has customer(s) and supplier(s). Sometimes organizations change, and processes that were at one time important are no longer needed. The challenge is to determine if your current processes still add value to your organization and its customers.



To achieve this, we now must move to what is called the turtle diagram for individual processes. (See figure 3.) This takes the basics of the process model and adds aspects of the SIPOC to what is being done in the process to satisfy customers. Internal auditors must review these diagrams for every major process in your organization. If the internal auditors don't find such diagrams, they will have to create them as they go.

(Remember to leave a copy in the area for the next auditor.) Some say that the turtle diagram is a cross between the SIPOC and a cause-and-effect diagram. This is a good analogy because the turtle diagram looks at how the process satisfies the customer (typically an internal customer at this stage). By looking at what is really happening vs. what procedures say is supposed to be happening, an evaluation can be made as to whether the process is effective in meeting the customer's requirements.



## **Octopus Diagram**

The next step is for management to start connecting the turtle diagrams (i.e., individual processes) into larger flow maps showing how the company functions. This is called an octopus diagram, and it looks at the sequence of activities and how these elements actually work together. Top management may need several levels of maps to show high-level, medium-level and shop/office activities. It's important to show how activities are interconnected and what is being done to satisfy the ultimate customers of your products and services. Internal auditors should evaluate the organization using the octopus diagram(s) to look for opportunities to improve customer satisfaction.

An analogy here could be the advanced product quality planning (APQP) process. Note that every output of one phase becomes an input into the next phase of the planning model. Everything is used (a balanced system), thus making everything a value-adding process. Waste is eliminated, and planning for contingencies is part of the process. This ensures that customers receive what they expect and what will work with their systems.

The organization should coordinate the construction of the octopus diagram, and evidence of the use of these diagrams might well appear in minutes of management meetings. Points (sometimes called process characteristics) that the organization should recognize in the processes include:

- A process owner exists.
- The process is defined.
- The process is usually documented.
- The process linkages are established.
- The process is monitored.
- Records are maintained.

An organization can demonstrate full coverage of the QMS by using the octopus diagram as a guide/model for managing the organization. Reviews of what is actually occurring should be evident, and the use of the internal auditor reports become a key management tool in verifying that what is believed to be happening is in fact a reality. Some questions that can be asked during reviews are:

- If the process is eliminated, will the customer notice?
- Does the customer have a metric for the process?
- Do any of the inputs and/or outputs directly affect the customer?
- Have we identified the support processes as value-adding activities?
- If we were to design what we do from scratch, would it look that same as what we are doing today?

Internal auditors need to look for evidence that top management is asking these and other questions of the current systems. Such evidence is proof that continual improvement is being sought in every aspect of the business. (Note: In any given audit, internal auditors should be writing far more preventive action requests than corrective action requests.)

## **Customer-Oriented Processes (COPs)**

At any point in the octopus diagram, there can be some form of customer interface, either with an input and output, or both. These processes must be identified and given special attention to ensure that information is collected on customer satisfaction metrics.

These interaction points can include any number of activities. Some areas that the internal auditors can look for include:

- Market analysis
- Bid/tender
- Order/request
- Product and process design
- Product and process verification/validation

- Production part approval process (PPAP)
- Product production
- SQA/STA reviews
- Shipping/delivery
- Payment
- Warranty/service
- Post-sales/customer feedback

One key point is to gather some type of customer input in these highlighted processes so that data are collected on what the customer perceives as value-adding activities. A correlation should then be established with the rest of the processes to ensure that what the company is doing will satisfy its customers. The internal auditors should look for this information and make a judgment as to how effective the overall process is in satisfying the customer.

### **Process Auditing**

Establishing procedures and proving that they are being followed will no longer suffice. Although that practice theoretically helps reduce variation for the customer, in actual practice it has been shown that after the auditors leave, organizations frequently go back to doing what they did before. Such behavior doesn't help the organization improve. Auditors are now to start by looking at the process effectiveness in all areas they visit, and to ask questions relating to customer wants and needs, and how those are being met.

Under ISO/TS 16949 and ISO 9001, auditors (internal and external) view the organization horizontally, according to the process model, instead of as a group of vertical/functional departments. Customers see the results of the organization's work, so an audit will view the organization in the same manner. What is shown to auditors is merely what is done every day. This method requires top management to be much more involved in overseeing the quality management system and more aware of the audit process than ever before. What is the organization, as a whole, doing to satisfy customers, and are plans' successes being evaluated in terms of the measurement of customer satisfaction?

### **Summary**

The organization, including the management committee (instead of the management representative), has the responsibility to ensure that all aspects of the internal audit process are planned, implemented and maintained, and that the information generated from the internal audit reports is reviewed and acted upon during management meetings. If this is not the case, suboptimized results may be achieved, and top management may miss opportunities for improving customer satisfaction.

The internal audit program must be seen as a value-adding activity for the organization. Top management must understand the reasons for taking people away from their regular jobs to review the overall system. This is why internal auditor selection is important and must be considered carefully. If the organization seriously considers the internal audit results and takes action appropriately, it can become an honor for employees to be asked to become internal auditors.

*Note: This article was excerpted from chapter 16 of The ISO/TS 16949 Answer Book: A Step-By-Step Guide for Automotive Suppliers (Paton Press, 2004). For ISO/TS 16949 and customer-specific requirements, visit [www.iaob.org](http://www.iaob.org). The core tools and related documents can be found at [www.aiag.org](http://www.aiag.org).*

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## SURVEY SAYS...

In a Quality Insider survey readers were asked if their company ever asked its customers what their perception of quality is when soliciting feedback. Here's a sampling of the responses:

- "Yes, when you try to put your best foot forward as a routine, it shows in the responses that are received."
- "No, but it is an excellent idea to understand what our customers expect from us and of us."
- "Yes, and the information helped us to develop a much clearer and more precise document of product requirements, as well as an open communication process between the customer's and our employees."
- "Absolutely! Our focus is always on the customer."
- "The feedback we received from customer surveys directly affected how we set our quality goals for our organization."
- "No, I am going to suggest to management to add to our survey."
- "Unfortunately, from the quality department's perspective, this is unknown, indicating a traditional approach of sales and management that is reluctant to embrace the true essence of the quality phenomenon."

Last month we asked what you thought were the most pressing problems facing the quality industry. Here are the results:

Lack of management buy-in **48.6%**  
Outsourcing and layoffs **24.0%**  
Prohibitive expense associated with programs **10.4%**  
Budget cuts to quality departments **8.0%**  
Inefficient methodologies and products **7.5%**  
Other **1.5%**

- [Attend the 6th Annual Six Sigma Forum Roundtable-Sept. 14-16, Fort Lauderdale, FL](#)
- [2007 Six Sigma Conference Call For Papers](#)

Most of us have to call a customer support number at some time. Usually, that number connects to an automated attendant that steps you through a phone tree before connecting you to an actual humanoid. How often do you find yourself either lost in the phone tree or connected to the wrong customer support department?" Here are the results:

- 0 percent of the time (I never have problems with automated attendants.) **4.4%**
- 25 percent of the time **35.6%**
- 50 percent of the time **33.7%**
- 75 percent of the time **21.6%**
- 100 percent of the time (I always have problems with automated attendants.) **4.7%**

*Are you losing customers based upon your customer support system?*