

2260 Kempis on Information Technology IT Performance: How the Best Are Measured

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Executive Summary

Some corporate boardrooms regard their information technology (IT) department as just part of the “overhead,” or worse, as a “necessary evil.” If a CEO doesn’t understand enough about technology, or the IT manager cannot communicate in executive-speak, how can either of them align the company’s technological and business strategies? Unless all parties are given the tools to objectively measure performance against the corporate vision, no such alignment is likely. This document draws from studies of the best and the worst IT departments on the planet, and from the author’s 25-plus years of consulting experience, to formulate successful IT performance measurements (also called “metrics”). Armed with these tools, an IT manager can prove the department’s valuable contribution to the bottom line, while the CEO can evaluate the decision to purchase that new Web server or to find a new IT manager.

Table of Contents

<i>Executive Summary</i>	1
Table of Contents	2
<i>Introduction</i>	3
<i>Impact of IT on Corporate Success</i>	5
Indicators of Corporate Success	6
Indicators of Business Process Performance	7
Indicators of IT Performance	10
<i>The Evolution of a Metric</i>	12
Establish Management Goals	13
Define, Test and Refine All Measures	15
Cost	15
Speed	16
Quality	17
Internal Measures.....	19
Data Collection, Reporting, and Use	19
Implement the Process Improvement Program	19
<i>Conclusion</i>	21
<i>References</i>	22
<i>Appendix A – Examples of Common IT Metric Benchmarks</i>	23

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Introduction

Management-Speak: “Our leadership team has determined that we need to establish metrics for our key processes to verify that we continuously improve.”

Translation: “Let’s produce a blizzard of numbers large enough to make the leaderships’ eyes glaze over, although not actually measuring anything useful or informative.”¹

Nearly twenty-five years after the first personal computers (PCs) appeared, having been promised by the machine’s pundits that it would increase user productivity, we have yet to see much more employee productivity. Why? Because productivity isn’t the point of PCs - making people more capable and effective is. Unfortunately, typical corporate boardrooms and executive suites are still populated with those who are waiting for that old promise to be fulfilled, and they use performance measurements largely unrelated to the true contributions made by today’s information technology (IT) departments.

IT personnel, therefore, must become experts at defining, collecting, reporting, and acting on business measures that *do* relate to their services. The exercise of creating and tracking these measurements very often educates all concerned – the IT department and the boardroom – of the value technology brings to the overall business strategy. In order for this education to succeed, however, both sides must be clear on the goals being measured.

Scientist Donald Griffin once described a four-step process of scientific inquiry:²

1. List all variables that might affect a system.
2. Study the variables easiest to measure.
3. Declare these to be the most important variables.
4. Proclaim the other variables don’t really exist.

I am repeatedly amazed at how many process managers actually follow the above steps to develop their system measurements! In my experience, I have found that the most accurate perception of a successful implementation of a system (be it hardware or software) comes from the end-user of that system. Most users describe their system expectations in terms of a need for improved efficiency or effectiveness. If the end product does not satisfy one or both of these needs, the system is generally considered a failure.

¹ Bob Lewis, 1999. “IS Survival Guide” (SAMS [Macmillan] Publishing, Indianapolis, IN), p. 211.

² Donald Griffin, quoted by Bob Lewis in “IS Survival Guide” (Ibid.), p. 214.

In the larger, corporate picture, IT should likewise be measured by its contribution of efficiency or effectiveness, both to the bottom line and to employee utilization of its services. Therefore, for purposes of this document, we will generally define corporate measurement categories as follows:³

- *IT Efficiency*: IT cost as a percentage of revenues, plus project management performance against schedule and budget.
- *IT Effectiveness*: The availability, functionality, and utilization rates of IT applications for each core business process.

In order to reduce confusion, we must also distinguish the term “measurement” from the term “metric,” because they are often used synonymously. Actually, I believe that the term “metrics” was devised by consultants just to make them sound more precise and expensive than “measures.” However, for purposes of this work, we will define a “metric” to mean a ratio, whereas a measure is a simple quantity. In other words, miles or gallons are measures, but miles-per-gallon is a metric.

This paper is based upon the course text, *Do IT Smart*, (The Free Press, 1999) by Rolf-Dieter Kempis and Jurgen Ringbeck, with supplemental works from other authors, articles, statistical sources, Internet research, and my own experience as a professional IT consultant.

Finally, many of the metrics and measurements recommended herein were selected because of their successful use among the most effective and efficient IT departments surveyed by *McKinsey & Company, Inc.*, in 1996 and 1997.⁴ This survey tapped a cross-section of companies in the U.S., Europe, and the Far East, both large and small, from many business sectors including component manufacturing, mechanical engineering, electronics, automotive suppliers, and process industries. The details of this survey are examined thoroughly in the course text, and the results corroborated by other sources I encountered on the Web.

Among the IT departments surveyed, *McKinsey* documented that 27 percent excelled in both efficiency and effectiveness, while 49 percent performed poorly (diplomatically labeled “laggards”), with the remaining subjects indicating mediocre performance due to over-spending or under-spending. Our study will concentrate on the characteristics of the top 27 percent.

³ Rolf-Dieter Kempis and Jurgen Ringbeck, 1999. "Do IT Smart" (The Free Press, [Simon & Schuster], New York, NY)

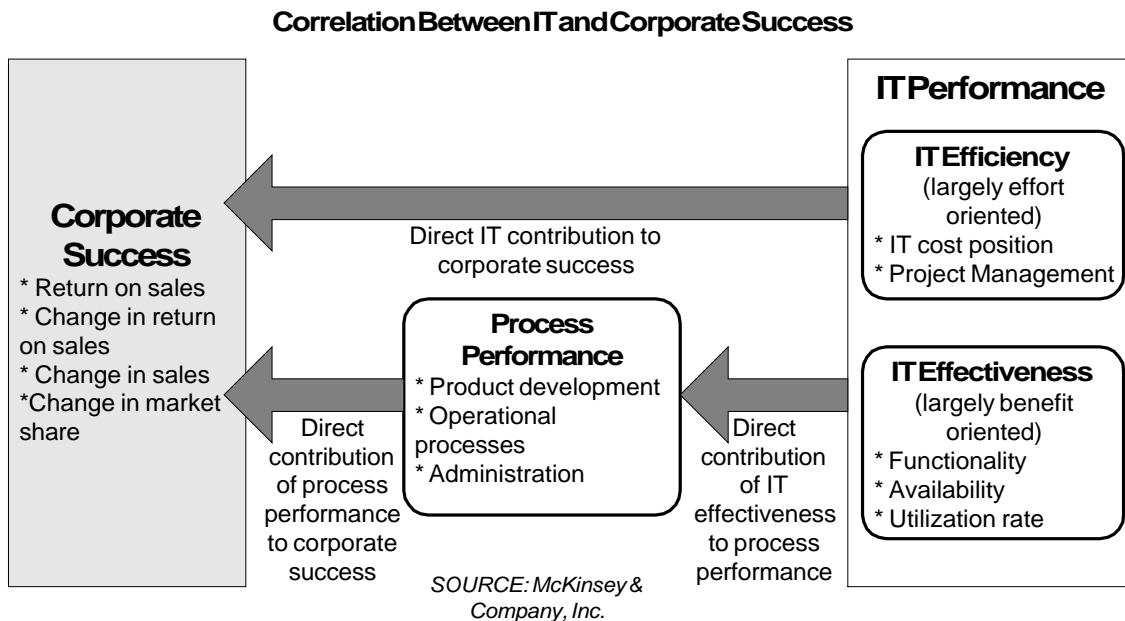
⁴ Ibid, Kempis, pp. 187-188.

Impact of IT on Corporate Success

To be “counted” among other corporate disciplines, IT departments must prove that they can contribute to standard corporate bottom-line performance indicators, including return on sales, change in return on sales, change in sales, and change in market share.

The measurements necessary to validate these contributions can be derived, directly and indirectly, from process performance activities. Figure 1 illustrates the relationship between IT efficiency and effectiveness efforts, and corporate success. Top IT departments tend to properly mix support of core business processes, measured by functionality, availability and utilization rates, with reasonable costs as a share of sales and project efficiency (budget and deadline control).

Figure 1. Success Factors of IT Management



In the *McKinsey* survey,⁵ the most successful companies reported that higher IT efficiency achieved a higher return on sales than companies with lower efficiency ratings. The actual difference averaged two percent (2%) between the two classes of IT departments. There was also a strong self-reinforcing effect: in companies with high IT efficiency, the rate of change in return on sales was clearly positive, while in companies with low IT efficiency, the change was negative or only marginally positive.

The survey also found that IT effectiveness stimulates revenue growth. The average sales growth of companies with high IT effectiveness was 7.4 percentage points per year. Companies with low IT effectiveness only achieved

⁵ Ibid, Kempis, p. 9.

4.6 percentage points per year. According to the survey analysts, this relationship can be seen even more clearly in the relative change in market share, defined as nominal change in sales minus change in market volume. Companies with high IT effectiveness increased their market share, whereas companies with low IT effectiveness actually lost market share. In almost every case, this was true regardless of whether the companies use IT with high or low efficiency.⁶

In order to quantify these IT performance measurements, it is necessary to standardize how other parts of the business are measured, specifically in three areas:

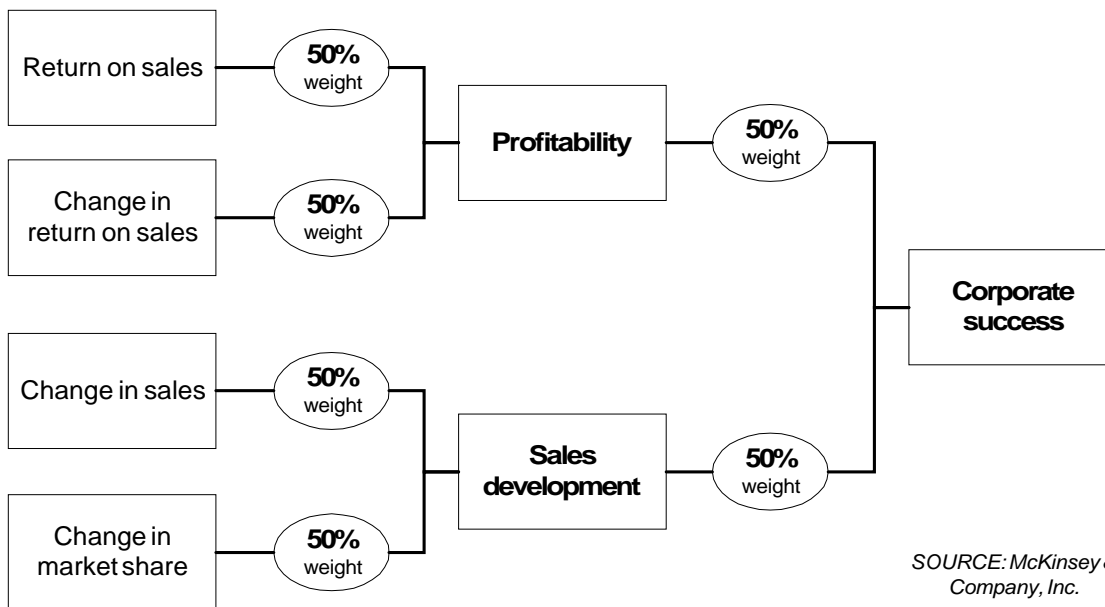
- Corporate success;
- Business process performance; and
- IT performance – efficiency and effectiveness.

The impact of IT management on corporate success can be measured directly. The indicators of business process performance assess IT performance in specific core processes such as product development, marketing/sales, order processing, and service. These, of course, are indirect contributions to corporate success, but they can be quantified.

Indicators of Corporate Success

Since we have theorized, and by survey, confirmed, that IT performance affects return on sales (ROS), change in ROS, change in sales, and change in market

Figure 2. Indicator of Corporate Success



SOURCE: McKinsey & Company, Inc.

⁶ Ibid, Kempis, p. 9.

share, we can build a model of these indicators which can then be subjected to IT performance inputs. While each company may have different weights for their success criteria, we have assumed for our model that all criteria are weighted equally. Figure 2 illustrates the model.

An interesting finding among the *McKinsey* survey numbers was that, even the top IT departments had plenty of room for improvement. In other words, some of the “stars” shined brighter than others. As a percentage of sales, for example, the top eight percent of IT departments spent less money than the other high-efficiency peers. That same eight percent also completed projects closer to budget (by 5 percent) and closer to deadline (by 12 percent) than the others. The brightest stars were also more effective in product development processes (by 13 percent), operational core processes (by 14 percent) and administrative services (by 23 percent).⁷

The research clearly showed that operational core processes (marketing, sales, order processing, materials, logistics management, manufacturing, and after-sales service) and product development performance are key drivers of financial success. Further, the top IT departments have superior process management and their companies rely on smart IT applications and have high internal utilization of IT solutions. The *McKinsey* group concluded that:

“High performance in operational core processes improves profitability, while effective development performance promotes growth.”⁸

The numbers bear out the conclusion. Companies with the best IT departments surveyed had 5.3 percent higher profits as a percent of sales, an 8.1 percent better rate of change in sales, and a 3 percent rate of change improvement in market share.

One area that differentiates the top IT departments from the competition is the liberal use of standard (off-the-shelf) software and a constant drive to integrate systems and business processes. These companies continuously find ways to introduce IT applications with superior functionality faster, more systematically, and more efficiently, thus safeguarding their competitive edge or even capturing a new advantage. In stating this, of course, one must add that the *utilization rate* of such software has to be high in order for success to be realized. To meet successful utilization levels, it was no surprise that the top IT departments spent considerable effort in training and involving users in systems selection and implementation.

Indicators of Business Process Performance

The first process performance indicator relates to product development. While this primarily serves the manufacturing environment, the principles can be applied to many engineering or service-oriented industries. In order to model this indicator, we must consider three variables: time, quality, and cost of product

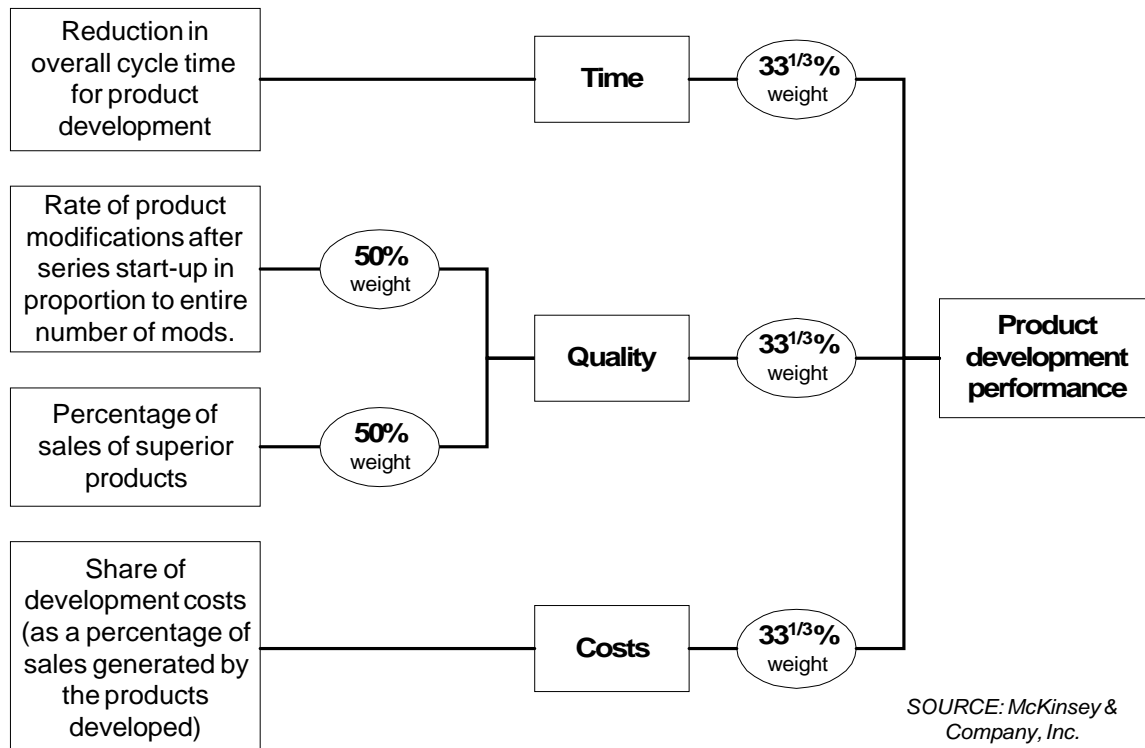
⁷ Ibid, Kempis, p. 10.

⁸ Ibid, Kempis, p. 23.

development. The quality variable can be further divided into two variables: the rate of product modifications and the percentage of sales of superior products. Figure 3 depicts the resulting model.

Note that, although time, quality, and costs variables are equally weighted in the model, the goal is not to keep them equal. The IT department's incentive should be to help the company reduce cycle time, increase quality, and reduce IT's share of development costs, as a percentage of sales.

Figure 3. Indicator of Product Development Performance



The differences between top IT departments and others, relating to product development utilization, was significant. It is important to note that:

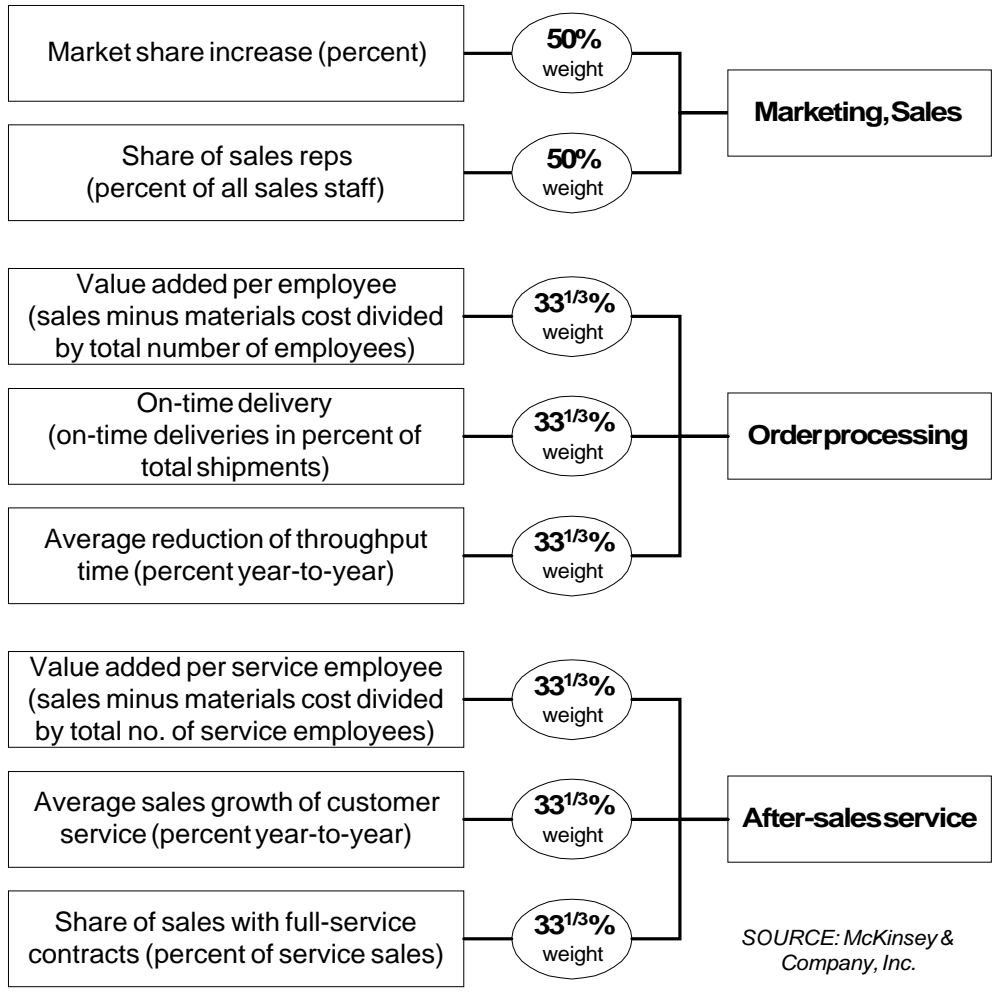
“...[Surveyed] companies with superior product development performance achieved on average a return on sales of 4.6 percent and annual sales growth of 7.7 percent. Less successful product developers merely broke even, achieving a disappointing profitability of 0.1 percent, with annual sales growth of 4.1 percent.”⁹

It may seem that the “less successful” companies (who only achieved 4.1 percent in annual sales growth) weren’t doing too badly, but the survey also found that the successful product developers – *who also happened to have the most effective IT departments* – increased their market share substantially, while less successful product developers were constantly *losing* market share.

⁹ Ibid, Kempis, p. 28.

The second indicator measures operational core process performance. Here, we distinguish between the core functions: marketing and sales, order processing, and after-sales service. Performance indicators in each of these functions are affected by multiple variables, all of which can be improved through IT efficiency and effectiveness patterns. Figure 4 illustrates the resulting model.

Figure 4. Indicators of Operational Core Process Performance



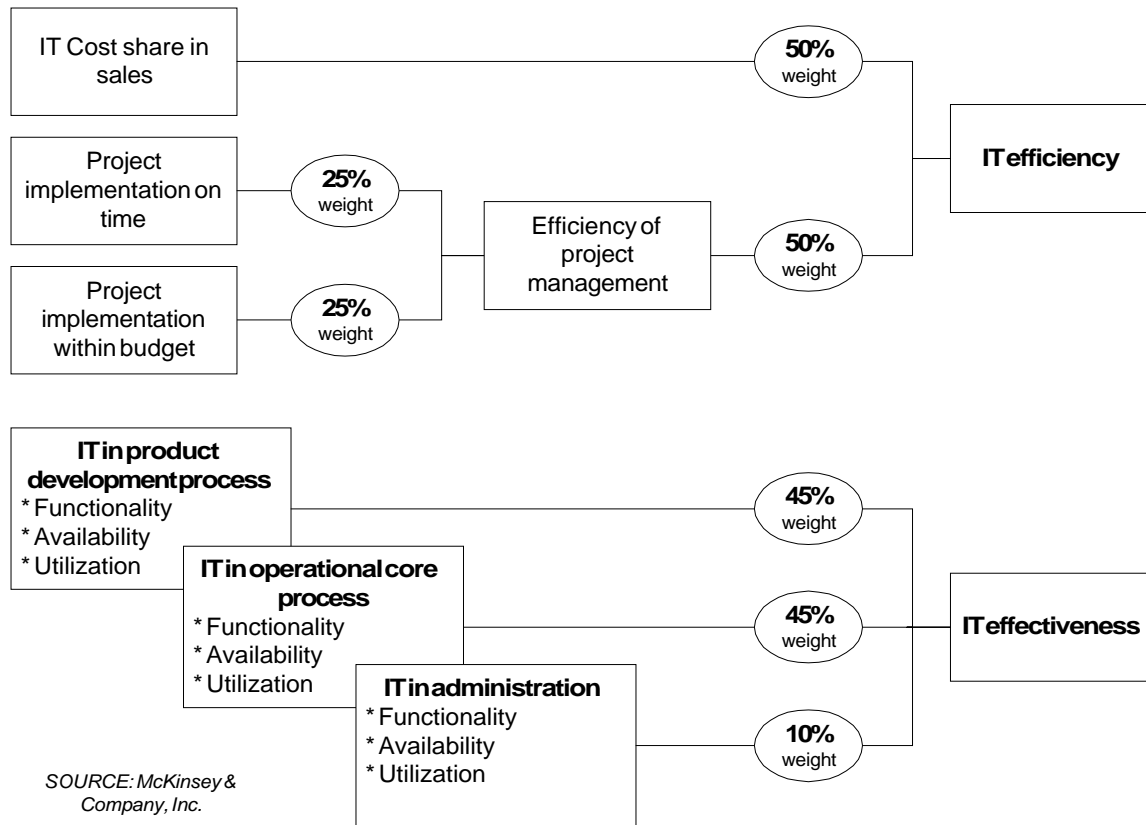
Many of my past clients have been amazed when confronted with performance measures that integrate IT services with seemingly unrelated business metrics. For example, most people would immediately recognize that a reduction in “throughput” time is an obvious IT contribution, but how many CEOs would give IT any credit for contributions to value-added sales, sales growth from customer service activities, or on-time deliveries? It is very clear from the *McKinsey* survey that the most efficient and effective companies also have the most efficient and effective IT departments.

Now that we have defined the corporate success and business process indicators, we can move on to specific IT performance measurements.

Indicators of IT Performance

Measuring IT performance, in context with the previously defined corporate success and process performance indicators, requires a two-dimensional system that considers both IT efficiency and IT effectiveness. Efficiency measurements include overall costs as well as project management performance in terms of time and budget. Effectiveness, as we have seen, is a less direct measurement, but considers the functionality, availability, and utilization of systems within the three primary process areas of the business: product development, core operations, and administrative services. Figure 5 illustrates the resulting model.

Figure 5. Indicators of IT Performance



Measuring IT effectiveness is often considered a subjective exercise, however, with the application of weighted results it is possible to systemize the calculation. For example, *functionality* can be measured by the number of IT-supported functions or operations in the process being examined, regardless of whether these functions are actually used.

Availability measurements track the availability of overall IT systems (i.e., low failure rate, quick response time, number of workstations per user, etc.); the quality of data provided (i.e., consistent, complete, error free); and the degree of integration. Degree of integration can be divided into *internal* IT systems (i.e., availability across business functions), and *external* IT systems (i.e., availability for business partners, suppliers, and customers – can you say “Internet?”).

The *utilization* rate measures the extent to which the functions provided are actually used, whether the utilization aims at improving total process performance, as well as the acceptance, satisfaction, and training level of the IT users.¹⁰ This is probably the most subjective of the variables, requiring the most input from users and project sponsors. It is important that IT departments routinely obtain sign-offs, user surveys, and perform rigorous training upon implementing each system. The data collected will furnish the needed statistics to calculate the IT system utilization rates.

With the trend toward customer-centric or user-centric online systems, the more *utilization* statistics that IT can measure, the more incentive the department will have to migrate systems toward user-friendly, intuitive, and easily trainable applications. This same incentive naturally applies to internal and external systems integration, in that IT performance will receive higher marks as integration levels increase. Essentially, the IT effectiveness measurements resulting from *McKinsey's* survey are self-promoting and self-fulfilling. It is human nature to respect what others inspect.

In the *McKinsey* survey, most administrative systems were found to have little impact on overall corporate success, whether the IT department was one of the best or one of the worst. That is, unless the administrative applications included planning quality and decision support solutions. For example, the survey revealed that financially successful companies spend an average of only 1.4 percent of revenues on controlling, accounting, and human resources, whereas less successful companies spend 2.7 percent – nearly double.

Further, less successful companies estimate their trend in return on sales with an average precision of ± 4.0 percentage points, whereas successful companies achieve an accuracy of ± 1.7 points. How? Through effective analysis and utilization of standard, but integrated, planning software systems. The key integration factor, the survey found, was the link between administrative reporting systems and order processing. It seems that, if marketing and administrative managers can timely analyze order flows in real-time, they can make equally timely decisions to improve their products and services. Go figure! *McKinsey* concluded that:

“Financially successful companies integrate their administrative systems with IT applications used in other functional areas almost twice as frequently as less successful companies, and achieve much higher availability and consistency of data. At the same time, they reduce nonproductive activities to a minimum. Financially less successful companies often spend more than half their total working hours on these activities.”¹¹

¹⁰ Ibid, Kempis, pp. 192-193.

¹¹ Ibid, Kempis, p. 83.

The Evolution of a Metric

Sometimes clients ask me why IT professionals use measures or metrics to judge performance. Still others ask why we bother to measure IT at all. Apparently, the latter group still believes that IT is where bespectacled guys with pocket protectors waste company money on computer toys. If that is the case, then that is also why we should bother to measure the process output of that group of nerds. Note that I said we should measure *process* output, not *people* output. I have found that measuring people just ticks them off, while measuring projects, processes, application performance, and system efficiency, motivates those same people into improving the output.

Eventually, the use of measures and metrics leads to benchmarking, which has come to mean two different things in the industry:

1. *Metric benchmarking* is the use of quantitative measures as reference points for comparison against prior experience, industry norms, or best-in-class organizations.
2. *Best practice benchmarking* is the identification, and potentially the adoption, of best practices or techniques for performing common tasks.

Either definition of benchmarking, however, has its drawbacks. For example, relying too heavily on simple metrics (ratios) for, say, help-desk performance can be misleading because employees will find ways of improving the measured results by short-cutting unmeasured tasks. In this section, we will experiment with ways of measuring a semi-fictional IT help-desk and illustrate ways of devising “bullet-proof” formulas. We will also discuss other commonly accepted IT metrics.

Bob Lewis, a consultant for Perot Systems, author, and regular columnist for *InfoWorld*, describes a practical approach to developing process measures:¹²

1. Establish what's important – that is, management's goals, arranged into a thought map that relates the various goals to each other.
2. Define a mathematical expression – a measure – that corresponds to each management goal.
3. Test each measure to determine whether it behaves properly – whether it always goes one way when things improve and always goes the other when things get worse. If a measure fails to behave properly, modify and refine it until it does.
4. Develop suitable data collection and reporting procedures.
5. Implement a process-improvement program and use the new process measure as an indicator of change.

¹² Ibid, Lewis, pp. 214-215.

Let us explore the IT help-desk at company “M” – a former client, who actually needed a help-desk to improve its own help-desk. All names have been changed to protect the guilty.

Establish Management Goals

The customer issue resolution rate at company “M” was abysmal, and the average telephone hold time was even worse. Not that there were any measurements showing these averages, but customers and internal users were calling other departments just to complain about hold times at the IT help-desk.

The first step was to connect the dots between IT operations and real people who consume the IT resources and services. The bottom line was this: real people do not want to hear an excuse that their problem cannot be immediately resolved. We had to establish both internal and external goals. External goals are what people outside the department care about. Internal goals are the buttons process managers can push to affect the external measures.

Getting management to buy-in on a simple philosophy was difficult at first, but we finally agreed to the following theory: Good measurement is part of good process management, and good process management starts by establishing clear external goals for each core process. This is difficult in an IT environment, because there are many internal processes (network management, change control, system backup, etc.) that are invisible to external users, but that affect the services external users receive.

To connect the dots, we agreed on a high-level vision of how the help-desk process should work: *The help-desk answers calls from end-users and either resolves the request during the phone call or escalates it to a suitable specialist based on the nature of the call. The help-desk process is not complete until the call is marked ‘closed’ and a resolution has been entered.*

Next, using *Xerox Corporation’s* best practices benchmarking criteria¹³ as a guide (at the time, they were a major player), I asked the following questions:

1. What is the most critical factor to my function's/organization's success (e.g., customer satisfaction, expense to revenue ratio, return on asset performance)?
2. What factors are causing the most trouble (e.g., not performing to expectations)?
3. What products or services are provided to customers?
4. What factors account for customer satisfaction?
5. What specific problems (operational) have been identified in the organization?

¹³ Michael J. Spendolini, “The Benchmarking Book” (American Management Association, 1992), p. 71.

6. Where are the competitive pressures being felt in the organization?
7. What are the major costs (or cost "drivers") in the organization?
8. Which functions represent the highest percentage of cost?
9. Which functions have the greatest room for improvement?
10. Which functions have the greatest effect (or potential) for differentiating the organization from competitors in the marketplace?

After a few days of discussion, with a splash of office politicking, the management team defined the following external goals:

- **Cost** – Unit cost, or the expense associated with production of a single unit of output (however it's defined). The question is, how much is management willing to compromise speed and quality in the process of cost cutting? For the IT help-desk, the cost goal was to keep the cost of handling each end-user issue as low as possible, allowing the department to support the largest number of end-users.
- **Speed** – Speed is how long it takes to deliver the goods or services after receiving a request. Unfortunately, setting speed goals is understanding that, anything slower than *instantaneous* is a compromise! Improving the speed of service is often traded for cost increases and/or a reduction in quality. Or, in context with the *McKinsey* survey findings, efficiency (speed) may have limits if the service must also be effective – if you have the fastest systems possible and the most customer service people, but those people are not competent (effective), your mission has failed. In our case, a reasonable balance, to start, with ongoing process improvements, was agreed to.
- **Quality** – While cost and speed are tangible variables, quality is in the eye (or ear) of the beholder. If you're making yardsticks, length is an important statistic while width is not. If you're an IT department, the length of your disk array is irrelevant, whereas reliability is extremely important. For our help-desk example, the perception of *value* was considered important. If an end-user has to wait too long for assistance, that reduces value; if it takes too long for the reported problem to be resolved, that reduces value. In other words, the issue is based on how the external customer perceives the value of the service: either the direct recipient of help-desk services, or a real paying customer, or both, must care about every attribute of the external goal we plan to define. The bottom line, then, was that customer/user perception was reality, and perceived value was value; thus, if the customer experience could be improved, it was *added value*. Three secondary goals were included under quality: every contact with a caller had to be an "enjoyable" one, every contact was to be used to increase the customer/user skills, and every contact was to obtain feedback on the service provided.

To summarize the external goals, then, we boiled down the game plan as follows:

- **Cost** – Minimize the cost per end-user issue resolved.

- *Speed* – Answer calls quickly; resolve issues quickly.
- *Quality* – Provide accurate diagnosis; offer the appropriate solutions; make the interaction enjoyable; enhance user skills; verify the favorable service-recipient's perception.

Finally, we shifted our focus to the necessary *internal* goals. The variables included staffing utilization versus telephone hold times, help-desk analyst turnover, training, morale, and other “invisible” factors. It was now time to define our preliminary measures.

Define, Test and Refine All Measures

Bob Lewis's *Fifth Law of Management* states: “What you can't measure, you can't manage, but when you mismeasure, you mismanage.”¹⁴ Of course, this means that you're far better off not measuring at all than measuring the wrong thing. Employees will tend to work towards making the measurement look good rather than doing their jobs.

For example, if a lawnmower factory wanted to measure the defect rates of their mowers and found that bad paint jobs and weak cutting blades were the predominant problems, but there were 1,000 more bad paint jobs than amputated customers' feet, how could a simple “defect metric” resolve the issues? Is resolving 1,000 bad paint jobs efficient? Yes. Is this more important than the blade problem? No. Thus, a weighted measurement is necessary to determine the *importance factor* of each defect.

Cost

In our help-desk case, company “M” decided to express their *cost* measurement with the following equation:

$$Cost = \frac{(HDA + EA + \sum \#EUs \times IF \times IssueDuration)}{\sum DF \times Issue}$$

The variables are defined as follows:

HDA is the number of full-time-equivalent help-desk analyst hours available in the reporting period (including vacation, sick time, and unproductive hours).

EA is the amount of time spent by “escalation analysts” – anyone to whom the help-desk escalates problems – handling issues elevated to them.

#EUs are the number of end-users affected by each reported issue.

IF is an “Impact Factor,” ranging from 1 (minor inconvenience) to 5 (nuclear meltdown).

¹⁴ Ibid, Lewis, p. 222.

IssueDuration is, for a single issue, the number of business hours elapsed from the time it was reported to the time it was resolved.

DF is a “Difficulty Factor,” designed to give the analyst more credit for fixing complicated issues than for simple ones. A *DF* of 1 might be given to explaining how to use the “Caps Lock” key, whereas a 5 might be assigned to someone with a network interface card with an obsolete driver that’s flooding the network with bad packets.

Issue is the counter of each separate issue.

“ ” is the mathematical symbol for summation – in this case, we are accumulating each occurrence (weighted and multiplied by affected end-users and the time-to-cure) and adding the total employee-hours, then dividing by the count of all issues in the period (each multiplied by its weight).

For simplicity, let us assume that, in a single day, the help-desk received ten calls, each affecting 2 users, half with an impact factor (*IF*) of 2 and the balance at 3. There were two help-desk analysts (*HDA*) on-duty and one specialist (*EA*) at 8 hours apiece. The issues with an *IF* of 2 took 20 minutes to resolve, and the issues with an *IF* of 3 needed one hour. The difficulty factors were all considered to be at “2.” (Did someone say this was simplicity?) The equation for this day yielded a *unit-cost* (per-issue cost) factor of 3.03, or approximately three weighted man-hours per issue. Had we simply added up all the hours and divided by 10 calls, we would have seen a *unit-cost* of just 2.4 hours, but we wouldn’t have known how *hard* our help-desk people worked to make the end-users happy, nor the *impact* of that service on the user community.

This new cost metric assisted company “M” in measuring both efficiency and effectiveness, to some extent, in a single equation. Even the subjective elements were quantified through the use of weighting multipliers. Of course, the process improvement program that was introduced suggested ways of reducing the unit-cost of help-desk services, as measured by the above equation, but the company left open the probability that the metric would evolve over time and include other cost factors.

Speed

Since we had identified two *speed* goals, answering calls quickly and resolving issues quickly, company “M” needed a couple measures. When a user experiences equipment failure, the time needed to resolve the problem (the external measure) must be shorter than the measure of time needed to actually repair the failed item (an important internal measure). Thus, we needed to use both averages and service levels – averages tell everyone what to expect, while service levels tell everyone what you consider acceptable.

The first metric averaged the answer speed of the help-desk, or, the average time users spent on hold. It was a straightforward formula measured in seconds:

$$AnswerSpeed = \frac{(\sum HoldTime)}{\#Calls}$$

Next, as a measure of how closely to service goals the help-desk was reaching, we instituted an “Answer Service Level” metric that we wished to increase over time, as a percentage of all calls received. The equation was simply:

$$\text{AnswerServiceLevel} = \frac{\# \text{CallsAnsweredWithin20Seconds}}{\# \text{Calls}}$$

Company “M” estimated the “threshold of pain” for a user on hold to 20 seconds, thus the *CallsAnsweredWithin20Seconds* variable. So far, we had devised easy measurements of raw speed, but now we needed to track how quickly issues were being resolved. The suggested formulas were as follows:

$$\text{ResolutionServiceLevel} = \frac{\# \text{IssuesResolvedWithin1Day}}{\# \text{Issues}}$$

Like the Answer Service Level, we needed an incentive to resolve every issue within one business day, hence the “Resolution Service Level.” The final *speed* metric was designed to give us weighted results, tempered by the complexity of the issues.

$$\text{ResolutionTime} = \frac{\sum \# \text{EUs} \times \text{IF} \times \text{IssueDuration}}{\sum \text{DF} \times \text{Issue}}$$

The “Resolution Time” equation was similar to our previous *cost* calculations, in that it considered the number of affected end-users (*EUs*), the “Impact Factor” (*IF*), and the Issue Duration (business days, or fractions thereof), summed together for the period and divided by the sum of all the issues multiplied by their respective “Difficulty Factors” (*DF*).

It was hoped that company “M’s” help-desk employees would be motivated to lower the raw speed averages and raise the service level measures. To that end, the managers agreed to chart and post daily the previous day’s results so that all personnel could see an improving trend over time.

Quality

As we have seen, it is possible to objectively measure processes, even when subjective variables exist. On the other hand, quality processes are almost completely subjective, or, in the eye of the end-user. At company “M” we had previously established five external quality goals for the help-desk: accurate diagnosis, appropriate solutions, enhanced end-user skills, enjoyable interactions, and favorable end-user perception.

Diagnosing a situation accurately is a matter of conformance to specifications. Distinguishing between a diagnosis and the application of a solution is also important. There may be many diagnoses before the first solution is tried, and multiple solutions may be tried before the issue is fully resolved. Employing a weighted average of diagnoses helps determine the skill levels of the help-desk collective employees by revealing how many diagnoses are thought up before

the “real” one is found. Thus, employees will want a rating as close to 1.00 as possible, because that means it requires, on average, one diagnosis per issue to find a solution. Then, a basic Diagnosis Service Level can simply offer a percentage of total issues correctly diagnosed the first time. Note that the weighting factors (*IF* and *DF*) are the same as in previous equations. The two metrics are shown below:

$$DiagnosisAccuracy = \frac{(\sum \#Diagnoses \times IF)}{\sum DF \times Issue}$$

$$DiagnosisServiceLevel = \frac{\#IssuesDiagnosedRightFirstTime}{\#Issues}$$

Devising metrics for Solution Accuracy was easy because it, essentially mimicked the diagnosis measurements, except that the formulas are limited to tracking *resolved* issues:

$$SolutionAccuracy = \frac{(\sum \#SolutionsTried \times IF)}{\sum DF \times ResolvedIssue}$$

$$SolutionServiceLevel = \frac{\#SolutionsResolvedFirstTry}{\#ResolvedIssues}$$

Enhancing user skills is a long, slow process, and measuring this process is equally challenging. Company “M” decided to collect the information indirectly. The more skills end-users develop, the more they can deal with minor issues themselves and the more they’ll encounter complex problems and try advanced techniques. Thus, we should be able to measure the process based on the kinds of issues users call in over time. Company “M” assigned a “Call Difficulty Rating” to each call, excluding all equipment-failure related issues. The resulting formula was intended to track the average user skill level over time as indicated by the difficulty of the issues reported.

$$UserSkillIndex = \frac{(\sum CallDifficultyRating_{NonEquipmentFailureCalls})}{\#NonEquipmentFailureCalls}$$

If you thought the User Skill Index was subjective, how do you measure a user’s happiness? The answer is simple: you don’t. There is only one way to determine users’ enjoyment, perception, or satisfaction, and that is to ask them. Assuming that we already know the “Impact Factor” (*IF*) and “Difficulty Factor” (*DF*) of each issue (see earlier equations), all that remained was to devise a “User Enjoyment Rating” (1 through 5, 1 meaning “not impressed” and 5 meaning “ecstatic”), and a

“User Feedback Rating” (1 through 5, 1 meaning “problematic resolution” and 5 meaning “perfect resolution”), and plug the caller’s responses into the data collection system. The formulas used to track these two weighted “subjectives” were as follows:

$$EnjoyableInteractionIndex = \frac{(\sum \#UserEnjoymentRating \times IF)}{\sum DF \times Re\ solvedIssue}$$

$$UserPerceptionIndex = \frac{(\sum \#UserFeedbackRating \times IF)}{\sum DF \times Re\ solvedIssue}$$

Internal Measures

The process of designing internal measurements is virtually the same as for external ones, except that they are between management and the members of the IT department. Every IT department will have different, measurable needs, so I will leave the equations to the reader’s imagination. Suffice it to say that the result is basically like translating English to Math.

Appendix A contains a list of commonly used IT metrics, some tracking internal and some, external, performance.

Data Collection, Reporting, and Use

It is very difficult to track and measure processes unless there is a system able to collect and massage the statistics being measured. Note that we are not just tracking simple counts of calls, but of issues, diagnoses, and ultimate solutions. This requires a many-to-many data relationship – a user can report more than one issue in a single call, and many users can report the same issue, and one end-user can make several calls to resolve a single issue. Get the picture?

Fortunately, there are software solutions on the market capable of assisting managers with their metrics and data collection schemes. The best help-desk applications, for example, have user feedback input capabilities integrated into their databases, allowing for on-the-fly surveys and follow-up interactions.

The caveat here is that, sometimes, data collection can become too time-consuming, resulting in a self-defeating rating system. The solution is to select (or build) software that includes data collection, computation, and reporting of your process metrics, thus preventing measurement activities from interfering with the underlying management goals.

Implement the Process Improvement Program

Let’s see, why are we using all these equations, data collection systems, and tracking methods? The point of this exercise is twofold: 1) to reinforce the process of devising accurate ways to measure performance, and 2) to improve our performance over time. It’s hard to know we’ve improved the IT department if we have no objective way to measure it. This brings us back to benchmarking.

The simple act of comparing your IT department's results to the results of other departments within your company and/or the competition, and publishing the clear differences in performance, has an uncanny way of motivating change. If your IT department is under-performing, human nature has a way of self-motivating when confronted with empirical data. That is the practical role of benchmarking, both for internal and external performance measures.

Once benchmarks are established, IT managers must consistently track performance over time, and publish the results regularly – daily or weekly is the preferred interval.

Next, managers should solicit ideas from the participants on ways to improve the results. Once metrics are graphed and prominently displayed in the department, managers will be amazed at how many opportunities to improve and streamline processes are suggested.

Conclusion

IT departments that excel above benchmarked ratings have been found to be the most efficient and effective, and the companies they serve are among the most successful in their respective industries. Engaging top management in the decision-making and performance measurement process is a key to elevating IT to its rightful place in the corporation. What management cannot see they will not understand, thus IT's contribution to overall corporate success must be exposed, tracked, and championed. Once IT is under boardroom scrutiny, however, managers must drive toward providing efficient and effective IT processes. And, *good process management must include good process measurement, which motivates constant process improvement.*

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Appendix A – Examples of Common IT Metric Benchmarks

Process	Metric or Benchmark
Communications	Percentage of cost for telecommunication LAN contention in peak periods WAN cost per packet, per byte, and per message
Customer Satisfaction	Overall user/manager satisfaction with IT department Overall user/manager satisfaction with IT services User satisfaction with response to problems Manager satisfaction with cost and speed of development Percent of application feature/function utilization
Financial	IT cost as a percent of revenue IT investment as a percent of assets Total system cost Average cost per job/project Average cost per module, or application object Average cost per report produced Average cost per employee workstation and software
Help-Desk	Percentage of problems solved by first contact Average time to problem resolution Percentage of accurately diagnosed problems Percentage of accurately resolved problems Average time spent on hold Employee cost per issue
Operations	System Availability (percent of time) Mean Time Between Failure CPU Usage (percent of capacity) Disk Usage (percent of capacity) Average MIPS [speed: million instructions per second] Jobs/Reports produced on time
Quality Assurance	Application defects found per module/object Defects per application or project Defects per screen or report Percentage of data errors requiring normalization/cleanup Data entry error rates
Staffing	Percentage of professional staff with college degree Percentage of professional staff with industry certification Percentage of staff with advanced degrees Payroll as a percent of overall IT budget
System Development	Percentage of projects completed by deadline Percentage of projects completed within budget Program modules/objects per employee per period Percent of specified features/functions delivered first version
Technology	Percent of IT budget spent in R&D Average workstation useful life Number of workstations per employee
Training	Courses taken per IT employee per year Average courses taken per IT employee Average courses taken per non-IT employee