

Thoughts on Goals and Metrics

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Aspects of Goals and Metrics

In business, I find that there is a lot of confusion about the meaning of the words *goals* and *metrics*. Metrics are the terms (units) in which we measure something. Goals are targets set in terms of the metrics.² For instance, we might use a *metric* based on dollars of profit. One million dollars might be the *goal* or *target* we aim for in terms of the dollars-of-profit metric.

There is often particular confusion between metrics and goals when the issue is motivation. Many is the time I have heard someone speak of developing a set of metrics with the intention of motivating improved performance. But, metrics are not intended to motivate; they measure. For example, the metric of error free lines of code in and of itself is unlikely to motivate. Goals, however, *may* motivate. For example, simply having a goal of writing twenty error-free lines of code per hour may motivate the programmer. More often, goals alone are also not able to motivate; they do better as part of a motivational system that provides rewards or penalties based on the nearness of actual performance to goals. It is also possible that goals may demotivate. For example, some people do not work well under the pressure of goals. Unreachable goals, trite goals, and goals for which no justification is given also may demotivate.

Metrics and goals may be qualitative and subjective, or quantitative and objective. As I will discuss below, qualitative and subjective goals may, in fact, be useful in a number of instances; however, we probably would do well to have more quantitative and objective metrics and goals than most of us use today.

Another confusion about goals and their metrics is the notion that goals always have to be high or low in terms of their metrics. I have heard people say that a “good metric” will implicitly make clear the direction of its goal. For instance, by this rubric these people might say that automobile gas mileage is a proper metric because it is implicit that higher gas mileage is better. I believe it is wiser to separate goals from metrics and not think of metrics as containing implicit goals. In fact, in many cases we should use metrics simply to tell what we are doing, rather than whether one is reaching a target. The speedometer on a car gives us a reading for this kind of metric—it tells us how fast we are going in miles per hour (mph); however, it has no implicit target. We choose our minute-by-minute or second-by-second miles per hour targets on the basis of what is going on inside and outside our automobile. The speedometer just provides the information necessary for

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² In this paper the words *goals* and *metrics* are used generically, the first to mean targets or objectives, the second to mean measurements; the words *goals* and *targets* are used interchangeably.

us to know whether, depending on other events, we should be speeding up, slowing down, or staying at the same speed.

Two other automobile-related metrics that in general don't have implicit targets are miles-driven (as indicated by the odometer) and gallons in the gas tank (as indicated by the fuel gauge). These two metrics let us calculate a third metric, miles per gallon; interestingly, our goal may be to maximize this latter metric.

The example of an automobile is also good for demonstrating that the goals with regard to a metric may change frequently. For example, suppose we are in an automobile rally, and the goal is to get from a location in one city to a location in another city in a specified amount of time, passing by certain milestones (checkpoints) along the way at prespecified times. Once again, the speedometer gives us readings in terms of the metric of miles per hour, but our goals for miles per hour change frequently as we go along in the rally. When we're in a 35 mph zone, we want to stay just at 35 mph, for instance. If we're coming into a checkpoint early, we want to slow down for a period of time, so we can arrive at the checkpoint on time. And so on.

Hierarchy of Goals (and Metrics)

The automobile rally also illustrates that there can be a hierarchy of goals. The ultimate goal is to travel between two cities in the prespecified amount of time. The metric for this ultimate goal is in terms of hours, minutes, and seconds between the two cities. The lower-level metric is miles per hour, as described in the previous paragraph, and the target value for this metric frequently changes as we try to achieve our top-level goal of getting from one city to another in the specified amount of time.

I find that it is useful to think in terms of a three-level hierarchy of goals, each with its own metric, to which I use the following names:

- Top-level positioning goals—the league in which we want to play
- Medium-level improvement goals—capabilities we want to improve
- Low-level practice (or rehearsal) goals—steps we need to take to make improvements.³

Top-level positioning goals

Top-level positioning goals⁴ specify the league in which we want to play and the level at which we want to play. For example, we may want to play in the local, regional, national, or international league whether in business, in sports, or in other fields of endeavor. The level we want to play at may be a casual performer, average performer, excellent performer, or superior performer. The league and the level do not necessarily go hand in hand. For example, regarding league: I may want to compete in sailboat races at my local club or in the whole East Coast region; in business, my company may want to be a supplier of communications equipment in the United States or may want to be an international communications equipment supplier. In terms of performance level: Even

³ There may be so-called "noble goals" above the top level goals in this three level hierarchy; see footnote 7.

⁴ An alternative name for positioning goals might be results goals, since this is how we tend to think of such goals.

though I may aspire to race sailboats at the East Coast or even national level instead of my local club level, I may be satisfied with being a casual or adequate performer at these levels; in business, I may want to compete in the regional league but may want to be a top-level performer in this league.

From top-level positioning goals we can derive the kind of investment we must make—the process we must follow to achieve our goals. That is, we can determine the facilities, the money, the capabilities, the effort, and the time we are going to spend to perform in the chosen league and at the desired level. For instance, if we want to compete in the international league at the top-level, we probably have to invest in the best equipment, spend long intense periods of time developing our understanding and skill, and have the best consultants and coaches.

With top-level positioning goals, the goal itself, qualitative and subjective as it might be, is typically more important than the metric. Often, metrics for top-level goals are obvious, and someone else judges or measures our results. For example, in racing sailboats, the results are clear—a complex metric is not required to say whether our team won or did not win a race or series. In the cases of a company's aspirations for growth or higher stock price, the results also are clear—people buy the company's product and buy the company's stock or they don't. Again, no fancy metric is needed. In each of these examples, performance is judged by someone other than the person or company that set the goal. It is important that we think carefully about our top-level positioning goals; others will provide the metrics.

I think that about one top-level goal is all most people can handle competently at one time.

Medium-level improvement goals

If our top-level positioning goals are beyond our current capabilities, then it is essential that we improve. Thus, we must have appropriate medium-level improvement goals. Depending on our top-level goals, we need to decide which few capabilities are important to develop or which few weaknesses are important to eliminate in the coming period of time. For example, in sailboat racing I may be prevented from achieving my top-level positioning goal of finishing high for the season in my local club fleet because I am unable to sail fast in light wind, and two of the five months of the sailing season have predominantly light winds. I may be prevented from achieving my business goal of being an excellent performer in the international market because of my poor understanding of how to sell products in Japan. To reiterate, medium-level improvement goals specify the areas of competence we want to develop. The competency I may need to develop to achieve my top-level sailboat-racing goals is the ability to go fast and think strategically at the same time. The competency I may need to develop to achieve my top-level business goal may be the ability to get products developed rapidly. Thus, these should be my medium-level improvement goals for the next period.

The metrics relating to medium-level improvement goals probably have to do with levels of competency in particular areas, and they are probably qualitative (or only grossly quantitative). In sports, for example, a person might set medium-level improvement goals of becoming a good light-wind sailor, a good putter in golf, an outstanding driver in golf, a golden-glove fielder in baseball, or a .300 batter in baseball. Medium-level improvement goals for business might be ability to sell in Japan, knowledge of our competition, ability

to predict sales volumes accurately, and ability to develop new products rapidly. All of these are qualitative goals. It does not pay to spend much time developing precise metrics for such qualitative medium-level improvement goals.

I think that for each top-level goal one would do best to have only a few (one to three) medium-level improvement goals at a time.

Low-level practice goals

Practice goals⁵ specify what we have to accomplish or change to meet our medium-level improvement goals. Practice goals have to do with both systems of instruction and patterns of behavior; for instance, the learning methods we will use and repetitions we will use to change our behavior or improve a skill.

There are a variety of reasons for practice goals.

Learning practice goals. One may set certain practice goals to learn new skills. For example, in sailboat racing, one may set a practice goal of having the second-string helmsman steer in at least one race a month to develop his or her helming capabilities; or, we may decide to try our new spinnaker takedown method in some Tuesday-night club races so that eventually we'll have the windward spinnaker takedown option in our arsenal. In business, I may write proposals to a potential new customer even though existing suppliers to the customer have a lock on short-term business, because I want to get feedback which will teach me to write successful proposals to this customer in the long term; or, to learn to sell products in Japan, I may decide that I must put three Japanese-speaking marketing people from Cambridge in Japan for two years.

Enabling practice goals. Sometimes the requirements for achieving higher-level goals have less to do with learning than with simply having done something. For example, I cannot participate in the Marion-to-Bermuda race unless I have already sailed several hundred miles offshore. There may be no new learning involved (although I am presumably demonstrating some kind of competence or at least ability to endure hardship). Similarly, sometimes potential new customers will not award an order to a company until the company has shown interest in them by bidding on several jobs.

Demonstration of performance practice goals. Sometimes we must demonstrate a certain level of competence before we are allowed to compete for our higher goals. In a golf tournament one must make the cut if one is to play in the final rounds. It may be important, therefore, is to set up low-level practice goals which enable one to make the cut; for example, to learn to play safe on drives by practicing driving for shorter distances with better control. In business, a customer may require that we show a minimum frequency of new product releases before placing a long-term order, and this requirement will compel us to practice doing frequent small product upgrades.

Retention practice goals. We all know that it is not sufficient to learn a new skill once; we must also work to maintain the skill, or we will eventually lose it. For instance, in sailboat racing, our racing crew may have practiced and developed its ability to do windward spinnaker takedowns a few seasons ago; however, if we do not practice windward spinnaker takedowns again at least a few times each season, it is unlikely that

⁵ An alternative name for practice goals might be "action goals," since actions are what are needed to bring about the desired results. In some domains "practice" might be synchronous with "rehearsal."

we will execute one flawlessly when the infrequent need for one arises in a race. In business, if our engineering leaders do not periodically do some circuit design, they will probably fall behind the state of their art and be unable to coach young engineers properly.

The metrics of low-level goals are typically quite detailed and often have to do with repetition. Examples might be number of night races, number of miles sailed offshore, or number of proposals written to Japanese companies.

It is quite possible that, in the short term, repetition goals will lead to decreased performance. For instance, we may have been finishing in the middle of the fleet using only leeward spinnaker takedowns. By deciding to practice using both windward and leeward takedowns in races, we may do worse in races for a while until we perfect windward takedowns (that is, until I learn how to avoid dropping the sail in the water). After perfecting windward takedowns, however, I would expect our results to be better than ever. It is through this investment in leaning that we eventually accomplish our medium-level improvement goals.

We may have one, two, half a dozen, or more low-level goals for each medium-level goal—it all depends on what type of practice helps us attain the medium-level goal. For instance, a company may have one practice goal for improving the way personnel respond to phone inquiries in Japan; a sailor may have ten practice goals for strengthening his or her back muscles so as to be able to hike out better when sailing.

Units of the metrics. In this three-level hierarchy of goals, the dimensions of the metrics should probably change at each level. That is, the top-level metrics should be in different units than the middle-level metrics, which should be in different units than low-level metrics. Furthermore, it is also common that some metrics will simply report actual performance rather than being used to achieve an absolute target. Two examples follow.

Example 1. Our higher-level goals are to reduce inventory in progress and to coordinate our manufacturing line better. To achieve these goals, we implement a Kanban system.⁶ The number of units in a Kanban between two stations is a metric. Suppose the Kanban holds ten units. When the number of units in the Kanban is nearly ten, I stop making units and go to another station. When the number of units in the Kanban falls below three or four, I return to my own station and start making my units again. There is no absolute target the metric of number of units in the Kanban tells me to meet. When the number of units in the Kanban is quite high, I go help another station; when it's quite low, I come back to my own station. By tracking this metric and acting appropriately, I improve performance in terms of the inventory level and manufacturing efficiency.

Example 2. The top-level goal is to have our stock price go steadily upward. To do this, perhaps we must increase our earnings from quarter to quarter, and therefore we track earnings per quarter. To increase earnings per quarter from one quarter to the next, we

⁶ A Kanban is a system for coordinating process steps and the inventory or work-in-process passing through a process. Kanbans are a typical part of just-in-time (JIT) manufacturing. The Kanban is some sort of physical representation of the parts from the prior process available to the next process; for instance, empty slots on a cart. Whenever the next process removes a part from the cart, an empty slot is created. The prior process is allowed to deliver a new part to any empty slots in the cart but is not allowed to build new parts if there are no empty slots in the cart; and it must build parts frequently enough to assure there is always a filled slot in the cart when the next process needs a part.

perhaps need a flow of new product options and an increasing amount of sales effort. Thus we might track new product options per quarter and salesperson hours available per quarter. Product options per quarter and salesperson hours per quarter in this example are low level metrics. Earning per quarter is the medium-level metric. We want this to increase smoothly. Stock price is the top-level metric. It tells us whether we have reached our goal or not (but it does not tell us how to get there).

Precision of Goals and Metrics

Top-level positioning goals typically are more results oriented, and low-level practice goals are typically activity or process oriented.

For top-level goals, the general area of the goal and metric is very important, but precision is not necessary for either the metric or the goal. It is unnecessary to focus on detailed top-level goals. For instance, Larry Bird probably concentrated on being about a 90 percent free-throw shooter, not on having a free-throw percentage of exactly .899. A major-league batter concentrates on being a .300 or .350 hitter, not on having a batting average of .342. Similarly, a goal of reaching \$1.298 million in profit or a stock price of \$9.25 is probably too detailed for a top-level positioning goal. What happens with one's top-level goals is what happens; the results will speak for themselves. Time spent developing detailed numeric goals for top-level positioning goals is for the most part time wasted. If a company spends much time on detailed numeric goals (as opposed to time spent choosing appropriate types of goals and metrics), it's an indication that the company is focused much more on the target than on how to get to the target—on the driven variable, not on the driver. The stock market chooses the stock price. Customers choose to buy our product. It's clear who won the boat race. Other skippers invite excellent sailors to join their crews. We need to concentrate on *how* to accomplish each goal after we have decided generally what we want to accomplish.

For low-level practice goals, on the other hand, many different goals and metrics are possible, and which ones are selected is not of profound importance; nevertheless, the ones selected should be precisely determined. For instance, it is probably less important to decide whether to shoot 300 or 500 free throws each day than to choose one of these and stick to it rigorously. In business the question whether we put three people or five people on site in the new market region is probably less important than that we decide to put some number of people there and then act on our decision and actually put the people there.

The area of medium-level improvement goals is important, as was the area of top-level positioning goals. However, which particular area is chosen for improvement is probably a tactical issue and is less important than that some (any) important weakness be chosen for elimination or that some important capability is chosen to be improved.

Succession of Goals

It is not useful in most cases to have goals too much above or beyond one's current level of capability. We can change goals as the circumstances change. For instance, when we win the local sailing club championship, it is time to think about winning the regionals.

However, to think about the Olympics when we have yet to be able to finish a race upright in our local club races is not a very useful goal.

It is my belief that many of the very ambitious goals that we regularly state in business, such as to be the best supplier or the best international company (the stuff of typical mission statements), are really counterproductive. By focusing on long-term goals instead of the next reasonable top-level positioning goal, we do not work out the middle-level improvement and low-level practice goals to achieve the *next feasible* top-level positioning goal. A dream or a distant metagoal can be useful. However, cheerleading is no substitute for improvement. If I daydream too much, I risk not putting in the appropriate practice time.⁷

Management by Results vs. Managing the Process

Our decades of experience with management by objectives (which is mostly practiced as management by results) makes it difficult for us to think in terms of hierarchies of goals with changes of units of the metrics at each level, using qualitative goals at higher levels and quantitative goals at lower levels, and to focus on low-level means rather than low-level results. However hard we try, we have a tendency to revert to the deep-seated belief that focusing on quantitative goals at every level is the key to accomplishment.

The hierarchy of goals and metrics suggested in this article is related to Hoshin Management, a system for achieving results by managing the process needed to achieve the results.⁸ Table 1⁹ shows some of the typical contrasts between management by objectives (results), with which many of us senior managers feel comfortable, and Hoshin Management, which does not feel natural to us.

⁷ “Noble goals” are different from the too-ambitious company goals I am describing here. Noble goals are aimed outside the company; for example, to serve society or to allow the staff to use their infinite capabilities. Overly aggressive company goals, such as to be the largest international company in our industry or to make the highest returns in the industry, are focused into the company, not externally, and thus are not noble goals by definition. Because they are not noble goals does not mean they are not laudable goals, but I am suggesting they are not very useful.

⁸ Shoji Shiba et al., *A New American TQM*, Productivity Press, Portland, OR, 1993, pp. 411-57.

⁹ *Ibid.*; this table is adapted from an earlier version of the chart that appears on page 449.

Table 1

Management by Objectives	Hoshin Management
Management deploys a portion of the top-level target to each segment at each level (no change of units).	Management deploys targets with different metrics at each level (change of units).
Higher-level management delegates the means to lower-level management.	Higher-level management works with lower-level management to discover plausible means for achieving key targets.
Targets are subject to some negotiation (considerable pressure for lower management levels to accept targets proposed by higher management levels).	Management levels engage in iteration to find a suitable set of targets and means.
Little monitoring of the means takes place (if it works, it's OK).	Some targets and metrics are aimed at controlling adherence to the means.
Missed targets result in recriminations and suggestions of where to look for a new job.	Analysis of causes of failure of the means of the last planning cycle is used to improve methods for the next planning cycle.
New manager blames predecessor's system for past problems and begins to plan a new system.	Old manager learns from past to do a better job next time.

Summary

My view is that goals and metrics will be more effective tools if people understand the following:

- That there is a difference between goals and metrics;
- That many useful metrics just say what is happening and have no implicit target direction; and
- That there is a three level hierarchy of goals and metrics; for example, see Table 2.

Table 2

One (or so) top-level positioning goal.	Think carefully about the proper qualitative top-level goal; a precise metric is probably not important.
One to three medium-level improvement goals for each top-level goal.	Choose qualitative or quantitative medium-level goals that address a needed improvement; a precise metric may not be important.
As many low-level practice goals as are appropriate for each medium-level improvement goal.	Choose useful quantitative goals; use precise metrics.

As we think about adopting various goals and metrics, it may help to ask if each significantly improves the efficiency of our business (or personal) learning system.

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