

HUMAN PRODUCTIVITY: THE NEW AMERICAN FRONTIER

Over the past several decades, the sources of competitive advantage have shifted dramatically, with financial and physical capital giving way in importance to intangibles contributed by human beings. However, the measures of human productivity have not kept up with the changes. Despite rhetoric to the contrary, human capital continues to be treated in most companies as a cost rather than a source of value, and managers are forced to make decisions about investments in human capital without reliable information on the returns that can be expected. As a result, many mission-critical actions—such as mass layoffs or outsourcing—are undertaken without a clear picture of the likely consequences. This article introduces the general theory of human capital asset management and explains how it can clarify the relationships between investment and value, generate useful measurements, and permit meaningful comparisons with other companies. The end result is a strategy for the intelligent, informed creation and management of human capital assets. © 2000 John Wiley & Sons, Inc.

by Jeanne M. DiFrancesco and Steven J. Berman

The United States is enjoying the longest economic expansion in its history. Yet, with unemployment at around 4.0 percent, there is a concern that human capital will become the constraint that stops the show. History tells us that when unemployment is this low and the economy is growing, inflation is sparked. The idea is that workers will start demanding higher wages because they can, and those wage increases will show up in higher prices for goods and services.

Whether you are the Federal Reserve chairman, a stock analyst, or a plant manager, human productivity matters. Yet, for decades, the measures of human productivity and what they tell us about what is really happening in business and what we should do about it have not seemed to ring true. Cost cutting has been the goal. Managers have been repeatedly instructed to sack a sizable number of employees, freeze

their hiring “this year,” reduce their training expenditures to hit next quarter’s earnings target, replace permanent positions with temporary workers, or outsource to get the revenue per employee up. While recognizing the short-term merits of these types of actions most managers also know they have serious negative consequences for both the company and its people in the long run. Thoughtful managers know that doing more with less cannot go on forever, that it is not possible to reduce people costs to zero and still make a profit.

Although some companies certainly have some fat they can trim, many efforts to reduce the cost of human capital actually hurt the performance of firms. What is human productivity, really? Is the economic expansion doomed? Will we all be working 60 hours a week and

* * *

Jeanne M. DiFrancesco, MBA, is the principal of ProOrbis, LLC, a consulting firm in Wilmington, Delaware, specializing in the development and application of advanced management concepts. She leads the development of comprehensive human capital strategies for global firms, and is the principal author of the Institute of Management Accounting course on Valuation and Accounting for Intangible Assets. Steven J. Berman is vice president at Organization Resource Councilors, Inc., in New York City, which provides consulting services in human capital management and measurement, strategic compensation and rewards, workforce strategy, deployment of key resources, performance management, and management development. Before joining ORC, he was managing director, compensation and rewards practice, in the Global Human Resource Solutions Group at Price Waterhouse LLP. Berman and DiFrancesco have authored HCPSM, a cross-company comparative profile to compare returns on investments in human capital.

never see our families again? Will interest rates top 10 percent?

All these questions have some aspect of human productivity at their core. The good news is that human productivity can be improved dramatically. The economy can keep expanding, working hours can actually fall, corporate profits can continue to grow, and people can enjoy real increases in both their wages and their real standard of living. But achieving that requires a serious shift in the way companies handle people as a business asset.

ASSETS AND PRODUCTIVITY

For the most part, the concept of productivity is in the context of an asset. The term itself implies the “ability to produce.” Raw materials are not productive, they cannot produce. They can be made into something of higher value, but they do not have productive capabilities. Machinery is generally considered an asset with productive capability, for it can turn raw materials into something of higher value; it can “add value.” The value of raw material in inventory is whatever you could sell it for—which is usually the same price as what you paid for it. Machinery could also be “valued” based on what it would “sell” for. But as any manager with a fully depreciated plant that is pumping out millions of dollars worth of goods understands, the plant is worth much more than the price the machinery can fetch in the current market. It is worth what the machinery helps create. The machinery is said to be productive, and the more it puts out (output) the more productive it is.

Output is a measure of value when the asset is viewed as a fixed cost, the market price of the output does not fluctuate, and you can sell everything you make. If the exact same machinery can produce more on one day than another, all things being equal, it is better to produce more. In this way, productivity is like return on investment, for there is some investment (machinery) that produces something that has value (output).

In their annual reports and employee communications, many firms proclaim “Our people are our greatest asset.” Yet few, if any, of these companies know what their greatest asset is worth. They know what their people cost—how much the companies have paid to hire, train, reward, and provide benefits for them—but would be hard pressed to assign a value to the “people asset.” While touting the value of human assets, most organizations do not have the slightest idea of what that value is.

People are not like raw materials; they cannot be sold. They are more like machinery; they turn raw materials into something of value. Yet, investments in this type of asset are not fixed, they tend to vary. How is people’s output valued? What do they produce, and what is it worth?

Properly accounting for human capital only matters if you want to manage people as effectively as you manage

your equipment, your building, or your inventory. Companies are continually making decisions about their human capital. Despite a slight decline in job cuts since 1998, the number of American workers losing their jobs to mass layoffs remained at close to a million and a quarter in 1999, according to the December 9, 1999 edition of *Daily Labor Report*. Other, less cataclysmic decisions face managers daily. Should we give more training to our first-line supervisors? Should we expand our incentive pay program? Should we outsource our maintenance function? Should we hire more customer service representatives to keep up with demand, or should we open a new call center? Somehow, managers have to analyze these issues and arrive at rational plans of action. Most people-related decisions are justified by one of three arguments: Other companies have achieved cost savings (or faster cycle times or higher quality) while doing the same thing; employees would like it (which we think would generate higher productivity); or we think, intuitively, from our years of experience, that it will work. Rarely, if ever, do companies seek to demonstrate that their investments in human capital will actually produce an identifiable return.

Properly accounting for human capital only matters if you want to manage people as effectively as you manage your equipment, your building, or your inventory.

But think what could be accomplished if organizations were able to accurately assign value to human capital. They would have a way of measuring the impact of managerial decisions, of knowing whether more training or more variable pay will produce greater productivity. They could rely on more than “gut feel” to assess whether a best practice taken from another company would work. They could even marshal some real evidence to test actions with serious consequences, such as layoffs, before carrying them out.

BARRIERS TO HANDLING PEOPLE AS ASSETS

If most firms say that human capital is their most important asset, why has so little progress been made? For one thing, old habits die hard. As Baruch Lev, the Philip Bardes Professor of Accounting and Finance at New York University’s Leonard N. Stern School of Business, has pointed out, the accounting system in use today has been around for 500 years, and for almost all of that time it has served remarkably well. Only recently has the nature of business, especially in the developed world, changed so dramatically that a new system, or at least a supplemental one, is

needed to account for what are termed the intangible (non-physical) assets of a company, such as human capital.

It may also be difficult for managers to recognize the legitimacy of human assets when the relationship between investment and return is not always apparent at first glance. When you buy a new piece of equipment, the return can be almost immediate: Plug it in and watch the widgets come out. But when you hire a new individual or install a new diversity program, the payoff may be months or even years away and, when it comes, it may be difficult to recognize as the result of that earlier investment.

There also remains a certain amount of resistance to the entire concept of human capital. To some, the term sounds worse than “human resources.” It implies that it is possible to put a price tag on people. There is a fear that assigning a monetary value to workers would further mechanize business, forcing all decisions to be based on a balance sheet, divorced from more humane considerations. Yet, how often do humane considerations come into play when a company is missing its earnings projections?

There is no system for valuing human capital because the know-how to create it simply has not existed, although a lot of smart people have been trying for a long time to figure out how to do just that. Today, most of the metrics put forth as measures of human resources effectiveness are, in fact, cost measures (for example, hiring cost, training cost) or measures of the relative efficiency of the human resources function (for example, the ratio of the number of human resources [HR] employees to the total workforce). Measurements that seek to go further have, until now, been incomplete or incorrect because they can’t really define the asset, how it creates value, and how investments affect return. Noting that higher training expenditures are correlated with higher market capitalization is interesting cocktail party chat, but would any manager boost a training budget based on that? Managers are not confused about how physical capital improves their productivity, and so they feel confident in justifying such investments. Is there a similar causal relationship that can be established for human capital investments and their effect on productivity?

DEFINING HUMAN CAPITAL AND ITS PRODUCTIVITY

To begin the understanding of human productivity, it is critical to understand that people are not the assets of any business or organization. The U.S. Financial Accounting Standards Board defines an asset as something tangible or intangible obtained by an entity and exhibiting three characteristics:

- The asset embodies probable future benefits that will have an impact on cash inflows.
- The owner can obtain the benefit from the asset and control the access of others to it.

- The event leading to the rights to control the benefit is in the past.

In other words, an asset is something the company owns the rights to and uses to produce future returns. How, then, can we talk about people as assets?

Yes, employees represent future economic benefits to the company, but the firm cannot entirely control access to the employee. Although the company may be able to put some restrictions on an employee’s ability to work for other firms, it cannot actually control a person’s employment relationships forever. So if people are not the asset, what is?

To begin the understanding of human productivity, it is critical to understand that people are not the assets of any business or organization.

In essence, people own themselves—that is, they hold their own asset which can be called human capital. They invest their human capital in many different aspects of their lives: family, community, recreation, school, and *work*. Therefore, a company does have human capital assets. These are the collective time, effort, energy, talent, and enthusiasm people *invest in their work*. In this way, human capital is like a leased asset. The firm needs this asset to create its offerings (products and services)—the things that have value. The employee trades a portion of his or her human capital in exchange for a mix of valuable things or *rewards*—compensation, benefits, and many other important work environment factors.

In general, productivity has been a measure of efficiency—the relationship between what goes in, like hours of work, raw materials, energy, and so on, and what comes out. In the industrial age, what came out was almost always a widgetlike product. In the information age, the “product” may actually be a service or a product bundled with a service. Until now, these services or product/service bundles have been fit into productivity formulas by converting them to units and treating them the same way as physical products were in the past. Inputs, too, have been accounted for the same way since Frederick Taylor’s day, as a simple collection of undifferentiated, easily countable units associated with costs (see sidebar). They are all lumped together in the traditional formula, as are outputs, which do not distinguish among products sold, waste, or goods sitting in inventory awaiting a customer. The result of the formula allows the company to calculate how much it costs to produce a certain number of goods or services.

In the information age, these measures do not truly reflect what goes into our business processes, what happens to them, and what returns the business achieves. Nor do they

Historical Approaches to Valuing Human Capital

Frederick Taylor, who published his seminal Principles of Scientific Management in 1911, sought to reduce the measurement of human productivity to a simple formula of units produced in a certain time period. For Taylor, efficiency was the chief objective of management, and cost, therefore, was an appropriate measure of performance. The way to achieve efficiency was to put the “right man in the right job,” expect him to follow a uniform operating procedure, and, if he didn’t work out, replace him with someone else.

Frederick Taylor initiated the era of modern management science. In the following decades, his theories led to compensation schemes linking pay to improvements in output. This approach recognized the fact that human beings control the investment they choose to make in an enterprise, but continued to define the value of that investment as a function of costs.

Taylor’s aggressively engineered approach began to lose currency in the middle of the century. During World War II, the government had turned to behavioral scientists for help in motivating the armed forces and the citizenry at home. During the 1950s and 1960s the psychologists who had helped win the war went to work for American businesses, looking for ways to increase human productivity and ushering in the humanistic trend in management of human resources. The humanists expanded the definition of the value of employees to include not only what can be measured as output/input—the number of widgets produced in a certain time at a certain cost—but also their creativity and commitment. Researchers such as David McClelland and Douglas MacGregor developed theories of how to motivate people to offer the organization those voluntary contributions.

By the 1970s, Thomas Gilbert could coin a phrase like “human capital,” defined as “the product of time and opportunity” and used to express the goal of converting human potential into competence. Through the 1980s and 1990s—the major period of growth in the information age—organizations worked at defining the specific competencies needed from individuals and from the organization as a whole. They developed new performance measuring devices, such as 360-degree feedback, to track their progress in achieving these competencies. However, these measures essentially have been devices for tracking the progress of individuals. Even where attempts have been made to aggregate measures of human performance organizationwide, for example, in Robert S. Kaplan and David P. Norton’s celebrated “balanced scorecard” approach to strategic management, the results have failed to show the relationship of performance to the investments that have been made in producing it or to the value of the company as a whole.

Look, they say, the economy has changed. Its focus has shifted from manufacturing hard goods to creating and trading information and tools for manipulating it. In the information age, the old sources of competitive advantage—physical assets and financing—don’t mean that much anymore. When the market value of the Standard & Poor’s 500 is more than six times the companies’ total net assets, something else, something intangible but real nonetheless, must be accounting for the extra value. Some of that extra value may be brand-name or proprietary processes or products, or institutionalized knowledge. But where did these things come from? Does it not take people to create this kind of value?

We are entering an era in which, for the first time, more than 40 percent of the U.S. workforce is composed of knowledge workers. The U.S. government’s own measures of human productivity indicate that manufacturing worker productivity has risen at an annual average rate of 2 percent over the past ten years, while service worker productivity has risen a scant few percent over the entire period. Does this mean investing in human assets will pay off less over time as more and more workers become knowledge workers?

These are big questions and have implications for the understanding that investors have in the value of their stocks, the working experience of people in their daily lives, and the overall standard of living in the country.

—J.M.D. and S.J.B.

allow us to isolate returns directly attributable to productive assets, never mind human assets. To be meaningful, the formula for productivity must account not only for direct inputs, but also for the different company assets used to transform the inputs into something of value. The result of

the formula should be a measure that tells organizations not just how much they made, but also its worth. It should also allow organizations to analyze the relationships between the cost of inputs and the investments made to turn those inputs into something of value.

THE VALUE OF HUMAN CAPITAL

The value of an asset is not the same as its cost. It is the value that someone is willing to pay for it. We need to keep in mind, however, that the firm did not buy (or lease) its human capital assets to sell them directly. It acquired the human capital to make something that it intends to sell. This is the nature of an organizational asset or core asset. Core assets produce something that has value—an *offering*.

Yet, rarely can human capital alone produce an offering. The offering is produced through myriad business processes (production, marketing, distribution, and so on) that create an output that has value. This valuable output (be it the offering or a subcomponent of the offering) is called *throughput* to distinguish it from output that does not have value, such as obsolete inventory or management reports that no one reads.

Closely examined, every business process comprises three core assets: human capital, physical capital, and technology capital. Physical capital is generally recognized as an asset by financial accounting and includes plant, equipment, desks, computer hardware, and so on. Technology capital includes both product and process technology. Human capital is the human talent, energy, enthusiasm, skill, etc., that is transformed into the work activities. Process technology is what takes the other assets (human capital, physical capital, and product technology) and configures them into a business process that creates a throughput (see **Exhibit 1**).

The business processes configured by the company's core assets require something to process—that is, inputs such as raw materials, energy, subassembly, or subcontracted services. Inputs are not a part of the productive capability of the organization (human, physical, or technology capital). Organizational leaders are not always clear in their minds about the difference between assets and inputs and the roles they play in creating value. They tend to confuse those items associated with inputs (costs) with assets (investments) that represent the productive capability of the organization. They

are often changing their corporate structure by deciding certain parts of their operation are no longer “core” and need to be outsourced (see **Exhibit 2**). This is a process of re-drawing the boundaries of the organization, which often leads to a reduction in the assets a company holds, but an increase in the cost of inputs.

If assets create the business process and the business process transforms inputs into throughputs, then it follows that the value of the assets is the difference between the cost of the inputs and the value of the throughputs. This is the value the assets created. Therefore:

Throughput – Input = Value of the Assets.

Core assets only have value in a going concern. This is different from the liquidation value of the firm. If you are planning to liquidate the company, the assets are only worth what you can sell them for, not what you can make with them. Core assets also only have value in *combination*. To see how this works, try thinking of any business process in your firm and imagine taking any one asset completely out of it. What is the value of the throughput? Generally, zero. It is especially problematic to think about the value of intangible assets outside the context of their working with other assets. Saying that assets are *optimized* means there is no way to trade a dollar of investment in one kind of asset for a dollar of investment in another asset and achieve a higher value.

RETURN ON INVESTMENTS IN HUMAN CAPITAL

Companies trade rewards to lease human capital—that is, to get people to show up and invest their human capital in the company. The costs of these rewards are clearly part of the investment the company makes in its business. Yet, most managers understand that there is a lot more than compensation and benefits involved in managing human capital. There are all the costs of recruiting, selection, and training, for example, in addition to the costs of attending offsite management meetings and writing performance appraisals.

EXHIBIT I.

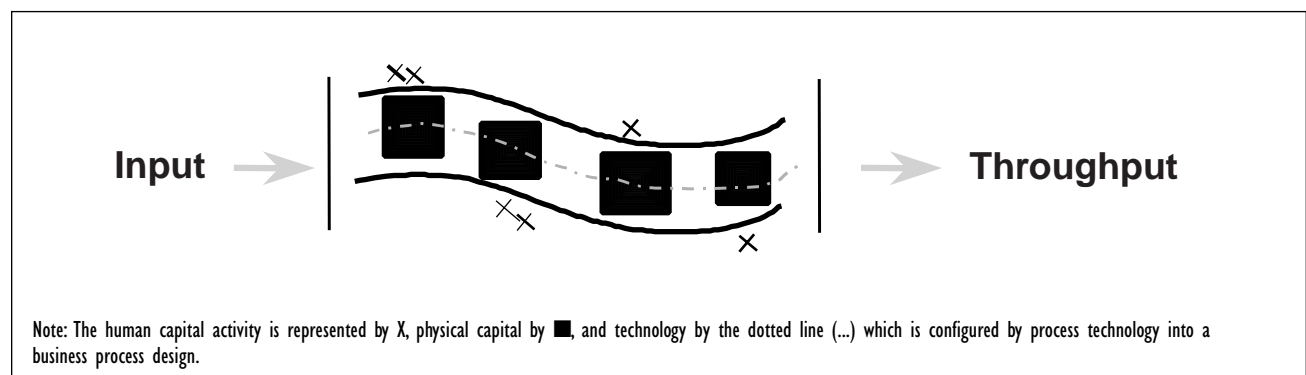
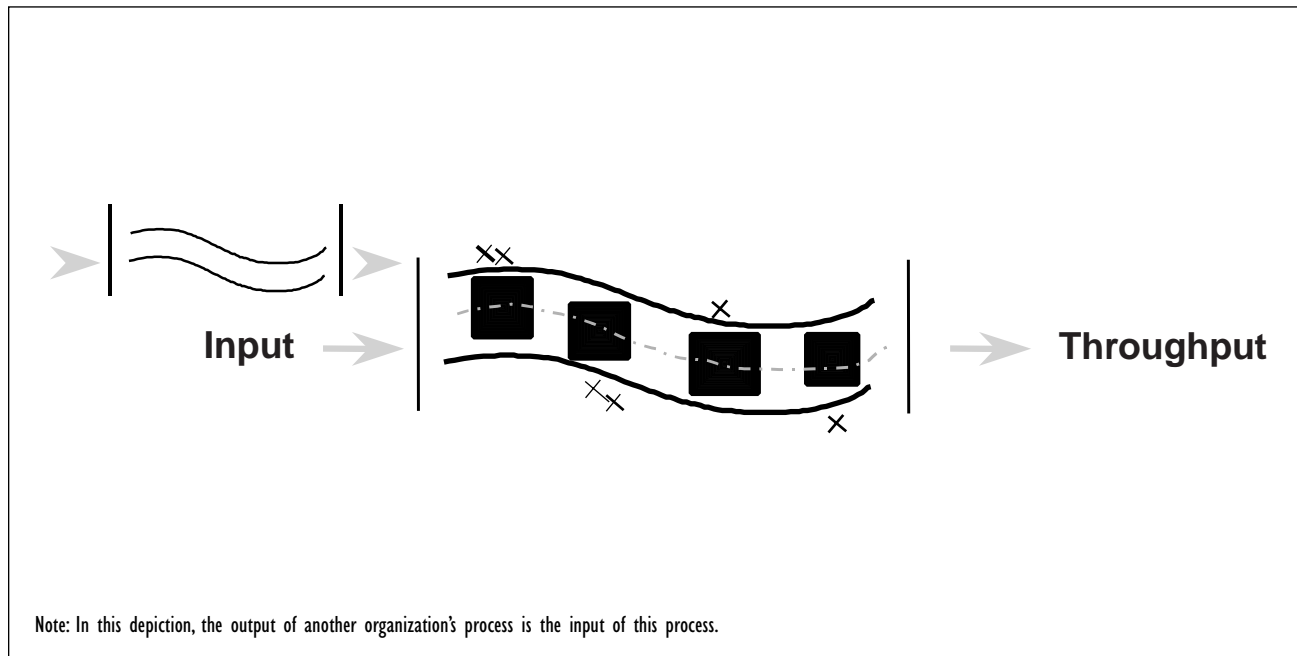


EXHIBIT 2.



Human capital does not magically materialize. It must be acquired, maintained, and divested from time to time. With physical capital, it's clear to everyone how much must be done to get a billion-dollar plant on the ground. The process that “manufactures” the plant and equipment asset is so well understood that often the engineering, construction staff, and other human capital expenditures can be *capitalized* with the plant. In other words, they are added up and, instead of being expensed in one year, they are depreciated—that is, expensed over the useful life of the asset.

Investments in human capital do not enjoy this type of treatment in traditional management accounting. All investments must be expensed immediately. This is generally advantageous if you are looking for a tax write-off. However, if you are trying to get a clear picture of the investment in the context of the value it will generate, that annual net income figure is going to have a lot more investment in it than it has value.

The first rule of calculating return on investment is that the investment and the value need to be temporally matched. In accounting this is called *periodicity*. Technically, if your investment had a useful life of ten years and you only considered the value it would generate over five years, you would have made a mistake. The problem with human capital is that if you believe people are the asset, the first question is, “What is their useful life?”

Since human capital is not people but, rather, what they invest in the organization, the useful life of human capital can be found by looking at how long people tend to invest their human capital in the company. Most companies

know the average length of service of their employees and can even make distinctions between demographic groups (for example, the average length of service for those who stay more than five years or the average length of service for programmers versus line operators).

Although much of the investment in human capital, like wages and benefits, is “used up,” there is some that is not. Training, development, teambuilding, performance appraisal systems, and recruiting programs often are not used up right away. These parts of the investment can be used for many years, either by building human capital “capabilities” in many people over many years, or by building a capability in one person who will be utilized for many years. Therefore, as you consider return on any investment in human capital, the question is, What value will it generate, and for how long?

How does the investment in human capital generate value again? Go back to the concept of throughput. Assuming inputs stay the same for a moment, the only way an additional dollar invested in human capital can generate a return is if throughput goes up more than one dollar. Therefore, to understand improving productivity, you must understand the relationship between the work people do and the value of the throughput. Can people make a difference? Every business process can “tolerate” (that is, use or accept) a certain range of performance for all the assets. If the performance falls below the range, it is said to be “unsatisfactory”; if it is better than what the system can use, it just goes to waste.

So if it takes all three core assets to create value, then what is the value of human capital? If you agree that human

capital did not create all the value, then only a portion of the value was created by the human capital investment. This calculation can be very complex in practice, but the simplest way to think about it is when assets are optimized. If you could not trade a dollar of investment from one asset to another and improve the value created, then (mathematically) the value associated with the asset would be in proportion to its investment. So if the return ratio (value divided by investment) for all assets were 3.2, the return ratio for each asset would be 3.2. But this assumes that all investments have been credited to the right asset and that inputs have been isolated. Accounting methods would not produce these aggregated numbers today, although most of the needed data is already captured in the transactions.

ASSET MANAGEMENT ISSUES AND CHALLENGES

Not all assets are in the business of directly making throughput. Some parts of operations are designed to build assets. In a manufacturing firm, there are engineering, construction, and maintenance functions that build the plant and maintain the equipment. A research and development group may build technology. Then there is human capital. This is usually built by a combination of the human resources function and supervisory management. Asset management creates the assets needed, which is to say that it makes the human capital assets materialize in the operation, doing what needs to be done.

The asset has value because throughput minus input is (should be) positive. Asset management has value because the asset has value. Asset management is creating something that has value—the asset. The value of the asset is the throughput of the asset management system. With this the organization is complete. Everyone (every asset) is either in the business of making the company’s main throughput

or in the business of managing assets. There should be nothing else left (see **Exhibit 3**).

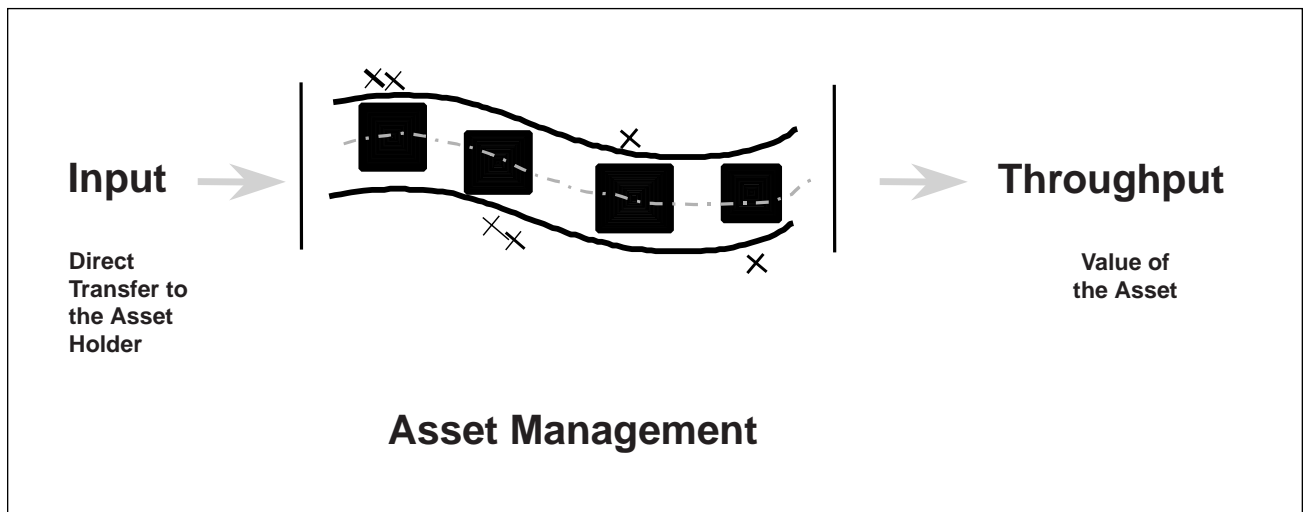
The inputs to the asset management system are the raw material of asset management. Although asset management is building the asset, some of the productive capability of the asset already exists in the asset. If you buy a plant that is ready to produce with the turn of a key, this is a very different asset management issue than when the plant comes in a thousand parts. The same is true of human capital or technology. If a person comes fully trained and prepared to be productive from day one, this is a very different asset management challenge than if the employee lacks a high school education and has never worked a day. Recall that rewards—the compensation, benefits, and work environment investments—are direct transfers to human capital. Articulating roles, recruiting, performance evaluation, training and development are aspects of asset management.

IMPROVING HUMAN CAPITAL PRODUCTIVITY

Does everyone in your organization see every work activity as a work process that creates value (a throughput or an asset)? Do they know how to make a difference to the value of the throughput? Does your human resources department know that it is in the business of managing human capital assets, that it is making investments on which there should be a return? For most organizations, such a perspective would represent an enormous paradigm shift.

The key to considering these concepts is to start at the beginning. Human productivity is critical to the lives of people. If you considered human potential (the asset people bring with them to the firm) as a kind of raw material in creating human capital, what is your company’s yield? Remember that yield is the percent of the raw material that turns into useful product. Even concepts as elusive as

EXHIBIT 3.



human health and culture have a place in these equations. Although most companies can understand the cost of workers' compensation or the lost production as a result of an on-the-job injury, how many can think of the reduction in an individual's human capital investment when working the sixty-fifth hour in the week? How has the loss of perspective affected the quality of a decision made in that sixty-fifth hour? What impact did that weak decision have on the *throughput*? It should be clear now how culture might affect productivity. Are people better able to perform in the context of the work process as a result of the culture, or does it get in the way of people doing the right thing? How many times have two leaders been given the exact same assets and produced very different results? Asset management alone is a complex topic; however, just putting those traditional human resource activities in the asset management context should offer insight in and of itself.

So what is the yield of your firm's human capital? If you say more than 50 percent, you are either kidding yourself or unusually well-managed. Imagine the "stores" of human capital that would be created if that yield were more like 75 percent. Certainly the economy could expand for another decade without concern. Real wages could increase without inflation and people might actually get home to see their kids.

Where should organizations begin? Here are some fundamental steps that they can take to improve the way they manage their human capital assets.

Find the Value. Start with a clear understanding of the throughput that is creating value. This is more challenging than it sounds because there are throughputs that are not just sold today, but create value today and hold value for tomorrow (like brands and customer relationships). These can be valued and routinely are. Other factors, like flexibility, also can be valued, but are generally not quantified. Yet, many assets can be tied up in offering the firm *options*. This is especially true when market opportunities in the future are uncertain. The price of an organization's publicly traded stock is a function of its current operations and future growth potential. What are you creating today that you will use in the future to create value?

Mix the Assets. Design the operation to create the throughput with the best mix of assets: human, physical, and technology capital. There are "asset biases" created in companies—capital budget, headcount, and R&D spending caps. If you want to maximize the return on investment, don't be biased.

Isolate the Inputs. Do what it takes to get your input costs separated from your asset investments. Remember these are raw materials, energy, subassembly and any part of the operation (not asset management) that is outsourced (like warehousing).

Construct the Return Ratio. Get a clear picture of the return on investment. Make sure the throughput and input

calculation is time-matched with the investment in all three assets. Only consider "cost reduction" in the context of the entire equation. Sometimes a cost reduction in one area will increase the cost in another. Sometimes a tactic to reduce asset investment will cause the throughput value to fall even faster. Although improving productivity is generally a good thing, be sure to watch it carefully from the context of the overall value the assets are adding (value of the assets minus investment in the assets). The percentage change in the value added of the assets is like a growth statistic. To ensure profitable growth, watch both measures simultaneously.

Consider the Competition. If you have an asset return ratio of 3.2, you cannot know if that is good unless you know what your competition is up to. Although moving to 3.4 is generally better, if your competition is at 4.8, you may be in trouble. This is also a way to wash out the effects of fluctuating input prices. For example, if oil prices rise, they do so for everyone. Comparative analysis is very useful for getting an idea of how productive your assets are, given the competitive environment.

Focus on Asset Management. Creating assets is just like creating throughput. Integrated systems will be far higher performing than a bunch of programs without a purpose. Improve your understanding of what people do that makes a difference and construct a system to build and manage your human capital as an asset.

Are all these steps possible? Absolutely, and perhaps more necessary than ever. Business managers play a pivotal role in improving human productivity. If they combine the right perspective on human capital as an asset with vastly improved measures, the dramatic improvements they seek may be easier to realize than they expect. ■

ADDITIONAL RESOURCES

Bureau of Labor Statistics.

Drucker, P.F. (1999, Winter). Knowledge worker productivity: The biggest challenge. *California Management Review*, 41(2).

Extended mass layoffs in 1999 decline in third quarter from last year, BLS says. (1999, December 9). *Daily Labor Report*.

Gilbert, T.F. (1978). *Human competence: Engineering worthy performance*. New York: McGraw-Hill Book Co.

Kaplan, R.S., & Norton, D.P. (1996, January-February). Using the balanced scorecard as a strategic management system. *Harvard Business Review*.

Kelly, J. (1999, March 11). Changing our values. *Financial Times of London*.

Webber, A.M. (2000, January-February). New math for a new economy. (Baruch Lev in an interview with Alan M. Webber.) *Fast Company*.