Understanding IT Worker Productivity & Finding Those Valuable "2x, 4x, 10x" Performers

> **In a productivity study of computer programmers, above-average performers were 320% more productive than average programmers.**
>
> **Top performers were 1,272% more productive, adding economic value over 11 times their salary. [1]**

P roductivity is generally defined in most businesses as revenue per employee - a gross measure derived from the income statement. However, this is too simplistic. All workers are not created equal and there can be wide disparities in productivity from one individual to another. Further, in a business utilizing part-time and/or contingent workers such as computer consultants, accurate productivity metrics require formulas beyond the basic "revenue divided by employees". This paper provides some insight and suggestions towards arriving at more comprehensive, accurate productivity metrics to account for the realities of today's flexible staffing strategies - as well as the varying degrees of individuals' productivity.

Jac Fitz-enz provides an excellent underpinning for the concept of individual productivity disparity in his book *The ROI of Human Capital: Measuring the Economic Value of Employee Performance*:

> "If you give me a gazillion-dollar supercomputer, I can solve large mathematical equations faster than I can using my laptop. But the question is, can I do it as fast as a mathematics professor using the same equipment? No way! This is the human leverage.[2]

> Computers and programs don't add value until knowledgeable human beings put their trained hands on the keyboard and draw out the potential within the software programs."[3]

In making this statement, Fitz-enz was challenging the notion that invested capital is the primary determinant of productivity. Rather, he believes that only human capital can add value in and by itself, and that differences in human knowledge, skill and effort affect productivity:

> "All other variables (cash, credit, materials, plant and equipment, and energy) offer nothing but inert potentials. By their nature, they add nothing and they cannot add anything until some human being leverages that potential by putting it into play."[4]

The difficulty lies in measuring the value-add of human capital - but it can be done. Key metrics and formulas are summarized in this paper's appendix.

Understanding and measuring productivity differences among workers is a more difficult task. However, there has been research in this area, some of which is summarized in this paper. The conclusions are thought-provoking and worthy of consideration by organizations seeking optimal staffing strategies.

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[1] Spencer, L.M. "The Economic Value of Emotional Intelligence Competencies and EIC-Based HR Programs." In *The Emotionally Intelligent Workplace: How to Select for, Measure, and Improve Emotional Intelligence in Individuals, Groups and Organizations*, eds. C. Cherniss and D. Goleman, Chapter 4.
San Francisco, CA: Jossey-Bass/Wiley, 2001.

[2] Fitz-enz, Jac. *The ROI of Human Capital: Measuring the Economic Value of Employee Performance*. New York: AMACON, 2000, 5-6.

[3] Ibid., 18.

[4] Ibid., xii.

## *Validating Productivity Differences in People*

In 1990, Hunter, Schmidt and Judiesch published a landmark study indicating dramatic productivity variance between top performers and other workers. They found that the top 1% of workers were anywhere from 50% to 127% more productive than the average workers, depending on the complexity of the job - the more complex, the higher the productivity.

Even more remarkable was the comparison of productivity between the top 1% and the bottom 1%. For jobs low in complexity such as unskilled and semiskilled blue-collar workers, the top 1% of workers were three times as productive as the bottom 1%. However, in medium complexity occupations such as technicians and supervisors, the top 1% of workers were *twelve* times more productive than the bottom 1%. Stated another way:

> "A single person in the top 1% is worth twelve people in the bottom 1%. Finding workers who have these abilities adds tremendous value to the bottom line."[5]

In high complexity jobs such as managers, professionals and some technical workers, the productivity differential was "infinite".[6] What does this mean in terms of value-add? Hunter, Schmidt and Judiesch illustrate it as follows:

Economic Value Add (EVA) By Superior Performance
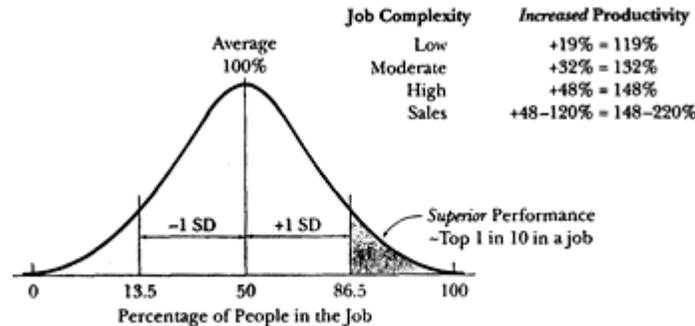
Source: Data from Hunter, Schmidt, & Judiesch (1990).

For high complexity jobs (e.g., software developers, systems analysts, project managers) performance one standard deviation above the mean represents a 48% increase in productivity. *A 48% productivity increase means the same amount of work can be done with 32% fewer staff.*[7]

A separate study by the Engineering & Construction Contracting Association (ECC) revealed very similar results. Top construction project managers were found to have 47.3% more productivity than the average project manager (Spencer, 1997). Specific economic value added by superior project managers was estimated between $27.0 and $29.6 million:

Economic Value Added by Superior Project Managers [8]

Productivity of Superior ECC Project Managers	+47.3%
Average Salary	$87K
Average Size of Project Managed	$57.0 mil
Economic Value Added by Superior P.M. (1 SD above mean by %)	$27.0 mil
Economic Value Added by Superior P.M. (1 SD above mean by $)	$29.6 mil

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[5] Goleman, Daniel. *Working with Emotional Intelligence*. New York: Bantam, 1998, 9.

[6] Hunter, J. E., F. L. Schmidt & M. K. Judiesch. "Individual Differences in Output Variability as a Function of Job Complexity." *Journal of Applied Psychology* 75, 1990, 28-42.

[7] Using 100% as baseline productivity for the average worker, a 48% productivity improvement equals 148% (100 + 48). If all workers produced at 148%, 68 workers would produce the same amount of work otherwise done by 100 workers (100 / 148 = .68), resulting in a workforce reduction of 32% (100 - 68 = 32).

[8] Spencer, L.M. "Competency Psychology." St. Augustine, Florida: Spencer Research & Technology, 1997.

Although one must be cautious about generalizations - that is, all computer programming is not the same - a study was done by Spencer that sought to establish economic value added (EVA) by computer programmers.

Spencer suggests that organizations use the full cost of employment (base salary plus benefits) as the economic value an employee or full-time equivalent must attain simply to break even.

Computer programmers' productivity was measured using Albrecht's Function Point technique, a recognized metric of economic software productivity which empirically measures and weights five factors:

- The inputs to the application
- The outputs from the application
- Inquiries by users
- The data files that would be updated by the application
- The interfaces to other applications

Spencer found that average programmers produce five Albrecht function points of debugged code per month, while above-average performers produced sixteen Albrecht function points per month, a 320% increase. *Top performers produced sixty-four Albrecht function points per month - an impressive 1,272% increase.*[9]

Performance Distribution for Computer Programmers
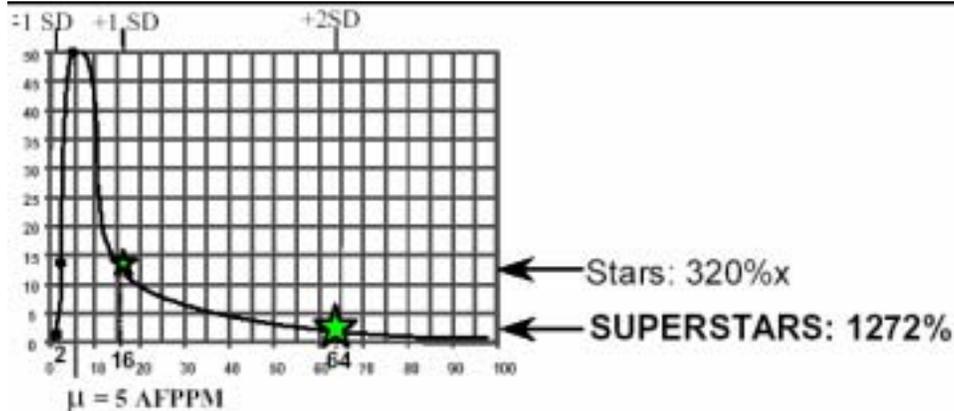
Increased Productivity @	+1SD	+2SD
% Value Added	320%	1272%
Economic Value added	$132K	$703K
Multiplier effect x Salary	2.2x	11.2x

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[9] Spencer, "The Economic Value of Emotional Intelligence Competencies and EIC-Based HR Programs," Chapter 4.

Computer Consultants and Productivity

Computer consultants are used as part of a flexible, "just-in-time" staffing strategy which augments an organization's internal IT staff with specialized talent on a temporary basis. Consulting services include:

- Systems needs assessment
- Design services
- Systems integration
- Customized software
- Programming

- Testing
- Project Management
- Training
- Specialized services such as help-desk support or network administration

With computer consultants comprising an estimated 21.7 percent of the information technology workforce (U.S. Census Bureau and Bureau of Labor Statistics, 2001), this is noteworthy in a discussion of workforce productivity. On a macro level, the computer business services industry was estimated to produce $188.5 billion in gross industry product in 2001. This is comparable to the $191 billion produced by the telephone industry and larger than the banking industry ($153.6 billion).[10]

Like direct full-time employees, consultants differ in individual performance, productivity and value-add. As a group, however, computer consultants were credited with impressive productivity gains for clients in a recent study by the Employment Policy Foundation. Discussions and interviews with companies in the industry and their clients revealed three broad dimensions along which computer business services companies add value:

1) Saving time - sometimes getting results that the client could never obtain with in-house resources. Survey respondents reported project time was reduced by 23.8 percent.

2) Increasing quality - providing the client with a better product or service than the client could have provided for similar cost with in-house resources. Respondents cited a quality increase averaging 20.9 percent.

3) Lower dollar cost - providing the product or service more efficiently and for less cost than if the client had provided the effort internally. Respondents said costs were reduced an average of 12.3 percent.[11]

Based on the average estimate of gross industry output value of $188.5 billion, the 12.3 percent cost savings to clients implies that the greater efficiency of the Computer Business Services industry saved clients $26.4 billion in the year ending March 2001, as illustrated below.[12]

Annual Cost Savings To Clients
Computer Business Services Industry, 1996 - 2001
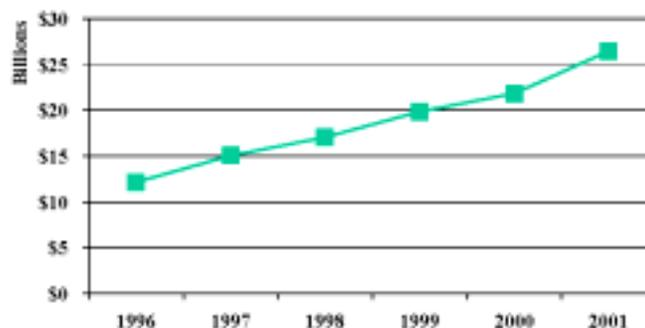
Source: Employment Policy Foundation analysis.

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[10] Employment Policy Foundation. *Economic Impact and Characteristics of the Computer Business Services Industry.* Washington, DC: National Association of Computer Consultant Businesses, 2002, i-ii.
[11] Ibid., 32.
[12] Ibid., 33.

What Makes One a Top Performer?

Top performers yield greater productivity and value-add, which in turn lead to reduced costs, increased revenue and/or increased market share. But what characteristics make a person a top performer? Interestingly, basic job knowledge or technical skills are not the primary factor. All skills being equal, what distinguishes top performers from the average is what behavioral researchers call "emotional intelligence competency".

Emotional intelligence is a term introduced by Salovey and Meyer[13] which describes a combination of traits, values and behaviors that is the most powerful and reliable predictor of success in the workplace. These traits, commonly called "people skills" include self-awareness, self-regulation, self-motivation, empathy and social skills.

Goleman's book "Working with Emotional Intelligence" (1997) was the seminal work which brought emotional intelligence (EI) to the fore. Goleman studied 286 organizations worldwide where job competencies of star performers at every level were analyzed. As detailed below, twenty common competencies were identified, classified within four broad categories - all but three are emotional competencies:

Self Awareness *Knowing what is felt in the moment and using that to guide decision making; having a realistic assessment of own abilities and a well grounded sense of self-confidence.*	▪ Emotional self-awareness ▪ Accurate self-assessment ▪ Self-consciousness
Self Management *Handling emotions so that they facilitate rather than interfere; delaying gratification to pursue goals; recovering well from emotional distress; deploying deepest preferences to take initiative, improve and persevere.*	▪ Self-control ▪ Trustworthiness ▪ Conscientiousness ▪ Adaptability ▪ Achievement orientation ▪ Initiative
Social Awareness *Sensing what people are feeling, being able to take their perspective and cultivate rapport with a broad diversity of people.*	▪ Empathy ▪ Organizational Awareness ▪ Service Orientation
Social skills *Handling emotions in relationships well and accurately reading social situations; interacting smoothly; using these skills to persuade, lead and negotiate.*	▪ Influence ▪ Leadership ▪ Developing Others ▪ Communication ▪ Change Catalyst ▪ Conflict Management ▪ Building Bonds ▪ Teamwork and Collaboration

This is not to say that cognitive abilities (IQ, technical skills, etc.) don't play a role in successful, productive work performance - they do. However, if two individuals have comparable technical skills, research indicates that the individual with strong emotional intelligence (people skills) will be more successful and productive on the job. This has been validated by numerous case studies, a few of which are summarized below:

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[13] Salovey, P. and Meyer, J.D. *Emotional Intelligence. Imagination, Cognition and Personality.* 9, 185-211.

- 300 senior executives from fifteen global companies were studied to identify the critical factors that contributed to their success. The analysis found that six emotional intelligence competencies distinguished star performers from the average: influence, team leadership, organizational awareness, self-confidence, achievement drive, and leadership.[14]

- Experienced partners in a multinational consulting firm were assessed on the twenty EI competencies. Those who scored above the median on nine or more of the competencies delivered $1.2 million more profit from their accounts than did other partners – a 139 percent incremental gain.[15]

- In a study of 515 senior executives, 74 percent of the highest performers were also very high in emotional intelligence. Moreover, those strongest in emotional intelligence were more successful than those who were strongest in either relevant previous experience or IQ.[16]

The bottom line is that emotional intelligence contributes to the bottom line of an organization.

How to Identify Job Candidates Most Likely to Succeed as Top Performers

With research establishing the significance of emotional intelligence in an individual's job performance and productivity, how can organizations assess emotional intelligence (EI) in a job candidate? There are four widely-recognized tools, summarized below. While the first two pioneered the concept of EI testing and are still in use today, they are viewed more as personality tests rather than true measures of EI. The last two are recognized as predictive measures of emotional intelligence *ability*:

- BarOn Emotional Quotient Inventory (EQ-I) - A screening test measuring many of Goleman's 20 competencies, plus areas such as problem-solving, stress tolerance, optimism and happiness.

- Emotional Competence Inventory (ECI) 360 - Developed by Goleman and Richard Boyatzis, this is designed to assess the 20 competencies in Goleman's model. The ECI 360 is designed primarily for use as an employee development instrument versus one for hiring decisions.

- Multifactor Emotional Intelligence Scale (MEIS) - The MEIS measures the four branches of the emotional intelligence ability model of Mayer and Salovey: Perceiving Emotions, Using Emotions to Facilitate Thought, Understanding Emotions, and Managing Emotions. Although highly-regarded, the MEIS is being superseded by the MSCEIT (below).

- Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) - Introduced in 2002, the MSCEIT improves upon the MEIS and is an ability-based scale that measures how well people perform tasks and solve emotional problems (as opposed to a scale that relies on an individual's subjective assessment of their perceived emotional skills). The MSCEIT is beginning to be used to predict important cognitive and behavioral outcomes in workplaces.

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[14] Spencer, L.M. J., McClelland, D.C. & Keiner, S. *Competency Assessment Methods: History and State of the Art*. Boston: Hay/McBer, 1977.

[15] Boyatzis, R. E. From a presentation to the Linkage Conference on Emotional Intelligence, Chicago, September 27, 1999.

[16] Cherniss, C. "The Business Case for Emotional Intelligence." Consortium for Research on Emotional Intelligence in Organizations. 2002.

In addition to emotional intelligence tests, various behavioral tests seek to identify candidates with traits known to contribute to high performance and success. While job experience and skills are obviously important, those also having success-oriented behavioral traits will generally out-perform others.

The diagram at the right illustrates the relative importance of traits and "chemistry" in comparison to experience.

A candidate is assessed in:
- Behavior traits required to get the job done
- Job-related experience, education and training
- Personality that fits into the company culture, manager and work group.

Strength in any area is illustrated by an upper-case letter abbreviation with a large circle. Weakness in any area is illustrated by a lower-case letter within a small circle.

Of particular note is how far down the "likelihood to succeed" scale is a candidate who is strong only in experience (line 7 of 8). Yet that is really all that is reflected on a resume.

MPR Competency Model

Rank Ordering of Combinations

1. (T) (E) (C)   IDEAL CANDIDATE
2. (T) (e) (C)
3. (T) (E) (c)
4. (T) (e) (c)
5. (t) (E) (C)
6. (t) (e) (C)
7. (t) (E) (c)
8. (t) (e) (c)   CANDIDATE UNLIKELY
                       TO SUCCEED

T = Traits   Behavior traits required to get the job done.

E = Experience   Job-related experience, education and training that contribute to greater productivity.

C = Chemistry   Personality that fits into company culture, the manager and the work group.

◯ = Strength   ◯ = Weakness

Source: MPR, Inc, Chicago, IL

Clearly, organizations must ensure that hiring processes and assessments are focused on much more than job experience. So-called "soft skills" should be given significant weight.
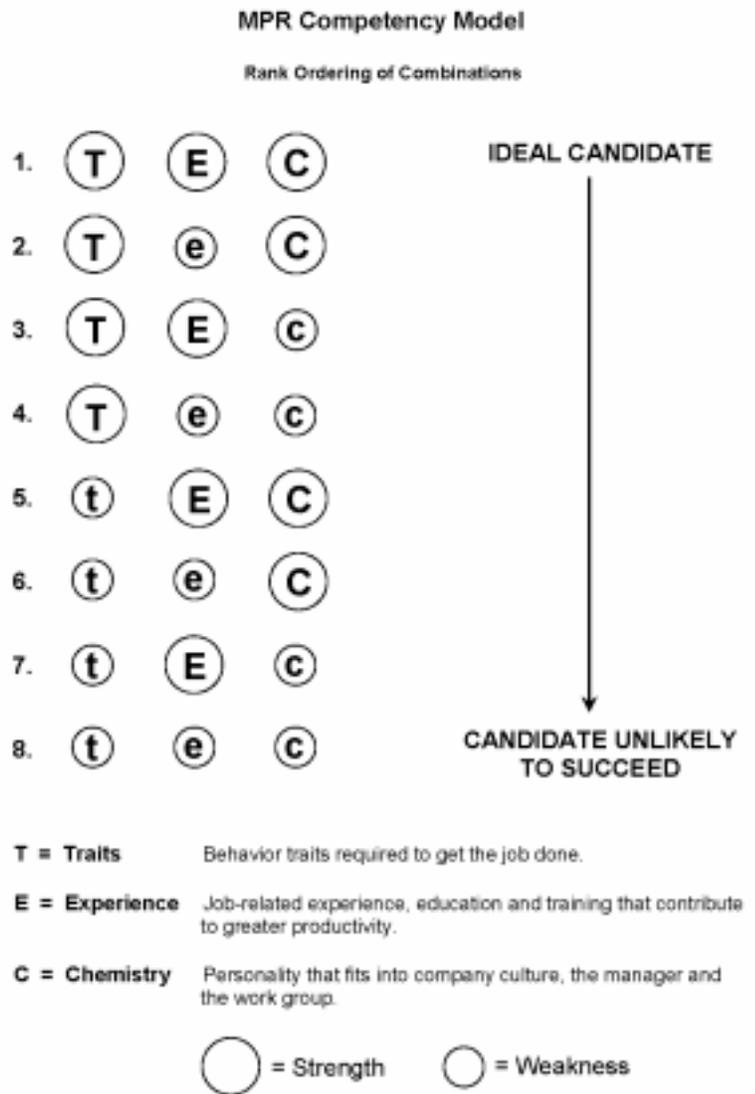
Strategic Implications for Staffing

Increased productivity and revenue are direct results of top performers. Top performers have been found to possess a high degree of emotional intelligence and people skills along with job skills. Chemistry, or a person's fit within the culture of the organization, also plays a role in a worker's performance and productivity.

Unquestionably, a primary staffing strategy is to hire greater numbers of those most likely to be top performers. How does an organization do this? Suggestions include:

Formal behavior assessment testing
Research indicates that most interviews and reference checks are poor predictors of actual on-the-job performance. Pre-employment screening tests such as those outlined above are widely available for purchase for in-house use. Third party evaluation firms can also be employed to conduct interviews and testing, especially for high-level managerial or executive positions.

Informal behavior profiling

Working with hiring/department managers, develop profiles of traits and skills that constitute high performers. Ask hiring managers to document traits exhibited by highly-valued workers who were "2x, 4x, 10x performers". Most likely, traits such as self-motivation, initiative, leadership, communication, collaboration, quick-learning and flexibility will be cited in addition to technical skills. Structure interview questions to uncover whether a candidate possesses those traits.

Specialized staffing firms

Many organizations employ contract labor as a means of organizational productivity and maximum human capital utilization, providing the correct level of resources for the correct duration. Staffing firms specializing in professional contingent labor such as computer consultants and project managers provide value not only in screening for the success factors discussed earlier, but also in having access to professionals they know to be *proven* performers. With so much of the "performance equation" residing in emotional intelligence - precisely that which cannot be determined from a resume - past performance becomes a most crucial factor.

Recruiting firms

Reputable recruiting firms have procedures designed to identify traits as well as verify job experience and skills. In fact, a key value of a recruiting firm lies in its ability to find candidates with all three critical components for success and high productivity: behavioral competence, technical/job skills, and cultural fit with the client.

Summary

Human capital is the only component in an organization that can add value in and of itself. Highly productive individuals who are 2x, 4x or 10x performers undoubtedly and positively impact an organization's bottom line, as validated by research. Furthermore, individual productivity and subsequent value can be quantified.

Businesses must find the best people - whether direct hires or contract labor - with those critical success factors that drive their performance and those around them. These success factors include numerous emotional intelligence/soft skills along with technical skills and chemistry specific to the organization. Staffing strategies must ensure that internal processes are in place to find and retain these best people. The use of outside resources with proven expertise in identifying and providing highly productive performers is a prudent strategy.

Appendix

Jac Fitz-enz, in his book *The ROI of Human Capital: Measuring the Economic Value of Employee Performance*, provides several human capital metrics. These metrics are directly related to an organization's income statement, providing measurable valuation of the effect of people on the financials of the organization.

Human Capital Revenue Factor (HCRF)

HCRF is the total labor hours invested for the revenue generated. However, in order to arrive at an accurate number, one cannot simply divide revenue by the total number of employees, as part-time and contingent workers must be accounted for. This is particularly important as contingent (contract) workers are now estimated by the U.S. Census Bureau at 35% of the American workforce and projected to grow to 50% by 2007. Full-time equivalent (FTE) labor must be calculated, a measurement equal to one person working a full-time work schedule for one year.

If 30 part-timers work half-time, the FTE is 15 people. Likewise, if 30 contract workers were each on projects for 6 full months, the FTE is 15. Adding these FTEs with the total number of full-time employees provides an accurate total of labor hours invested for the revenue generated.

Human Capital Cost Factor (HCCF)

Comparable to an income statement's expense line item, HCFF is the sum of:

    (1) Pay and benefits for employees

    (2) Pay costs for contingents (non-employees, e.g. temporary and contract staff)

    (3) The cost of absenteeism (one-half the value generated per hour by all jobs - for example, if revenue per FTE per hour is $100 and absenteeism is 2%, subtract 1% or $1 per FTE hour)

    (4) The cost of turnover (cost of termination, replacement, vacancy and learning curve - generally the equivalent of at least six months of a nonexempt person's pay and benefits and a minimum of one year's worth for a professional or a manager)

Human Capital Value Added (HCVA)

This is essentially the profitability per FTE and is calculated as follows:

$$\text{Human Capital Value Added (HCVA)} = \frac{\text{Revenue} - (\text{Expenses} - \text{Pay and Benefits})}{\text{FTEs}}$$

    Example:

$$\text{HCVA} = \frac{\$100{,}000{,}000 - (\$80{,}000{,}000 - \$24{,}000{,}000)}{500}$$

$$\text{HCVA} = \frac{\$44{,}000{,}000}{500}$$

$$\text{HCVA} = \$88{,}000$$

This can be set up to include the cost of contingents, absence and turnover:

    Example:

$$\text{HCVA} = \frac{\$100{,}000{,}000 - (\$80{,}000{,}000 - \$31{,}550{,}000)}{600}$$

$$\text{HCVA} = \frac{\$48{,}450{,}000}{600}$$

$$\text{HCVA} = \$85{,}917$$

Human Economic Value Added (HEVA)
EVA is the net operating profit after tax minus the cost of capital. HEVA is the portion of EVA that is attributed to the average amount of labor contracted for. It is calculated as follows:

$$\text{HEVA} = \frac{\text{Net operating profit after tax - Cost of Capital}}{\text{FTEs}}$$

Human Capital Return on Investment (HCROI)
HCROI is the relationship of human capital investments to the profitability of the organization. This looks at ROI in terms of profit for monies spent on employee pay and benefits and is calculated as follows:

$$\text{HCROI} = \frac{\text{Revenue - (Expenses - Pay and Benefits)}}{\text{Pay and Benefits}}$$

Example:
$$\text{HCROI} = \frac{\$100,000,000 - (\$80,000,000 - \$24,000,000)}{\$24,000,000}$$

$$\text{HCROI} = \frac{\$44,000,000}{\$24,000,000}$$

$$\text{HCROI} = \$1.83$$

To include the costs of contingents, absence and turnover:

Example:
$$\text{HCROI} = \frac{\$100,000,000 - (\$80,000,000 - \$31,550,000)}{\$31,550,000}$$

$$\text{HCROI} = \frac{\$48,450,000}{\$31,550,000}$$

$$\text{HCROI} = \$1.53$$