
The Art and Science of Human Capital Valuation

Smart Assessment. Smarter Performance

“This is far and away the best study I have seen concerning the most critical factor in the venture capital investment decision process.”

--Stanley E. Pratt, Managing Director, Abbott Capital Management LLC

“This is a gigantic first step. We are all indebted to Geoff Smart for his trailblazing study of a little-understood area. It is a ‘must read’ for everyone in the venture capital arena.”

--David Gladstone, author of Venture Capital Investing and past Chairman of American Capital Strategies and Allied Capital Corporation

EXECUTIVE SUMMARY

The purpose of this study was to identify the best and worst practices of management team evaluation. The goal was to design a process that yields the most accurate evaluation in the least amount of time.

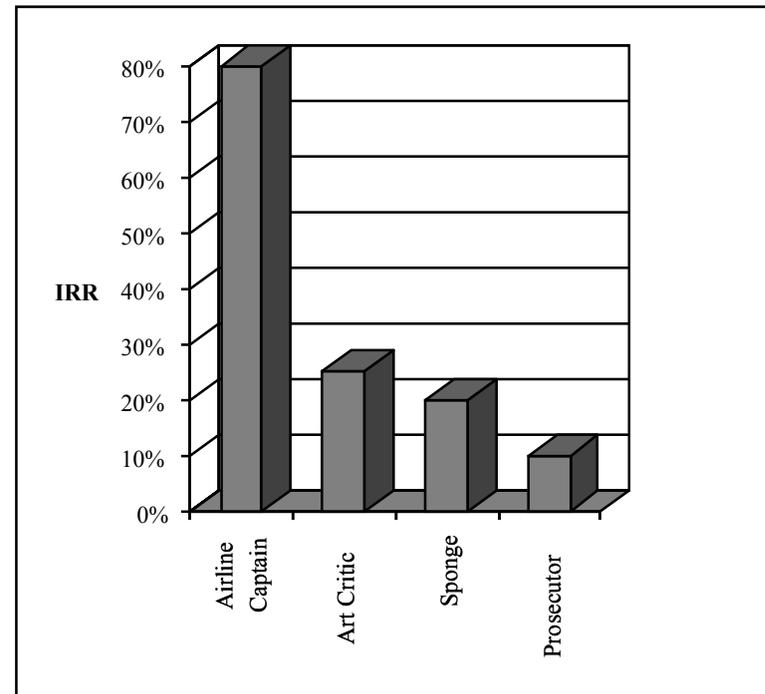
Failing to accurately evaluate the human capital can result in disappointing investment decisions. Venture capitalist Arthur Rock said, “Nearly every mistake I have made has been in picking the wrong people, not the wrong idea¹.”

Chart 1 describes the IRRs associated with the four primary approaches to human capital valuation. The approach to human capital valuation named the “airline captain” yielded an average IRR of 80%. This approach is characterized by a high level of systematic and disciplined data collection and analysis on the management team members. In contrast, the three primary alternative approaches achieved IRRs that were under 30%.

GPs from forty-eight private equity firms participated in 90-minute interviews about specific deals. The database contains a total of 86 deals. Human capital valuation refers to the process of appraising the human capital in a venture.

This report provides an explanation of the best and worst approaches to human capital valuation. Next, it identifies the qualities of human capital that venture capitalists fail to assess accurately. Finally, it reveals the most common regrets that private equity investors have when assessing human capital.

Chart 1
IRRs Associated with Different Approaches to Human Capital Valuation





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JK&B Capital
Kentco Capital Corp.
Kitty Hawk Capital
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BACKGROUND

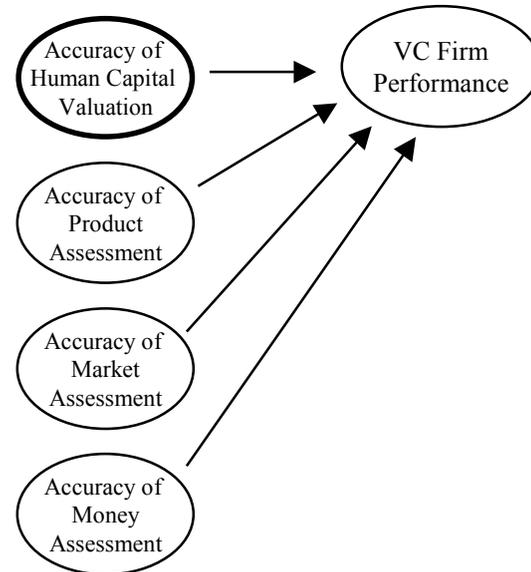
Prior to designing this study, an extensive review of past research was conducted. Several hundred studies were examined in the fields of venture capital and industrial psychology. Below is a summary of the state of relevant research in each field.

Venture Capital

The consensus from this body of literature is that four main factors contribute to the success or failure of new ventures.² These factors are commonly assessed during due diligence. The factors are: human capital, product, market, and money. We call this the HPMM Model of Venture Capital Firm Performance. Human capital refers to the people in a venture. Product refers to the product or service offering and any relevant technology. Market refers to any factors in the external marketplace such as competitors, regulatory issues, customer preferences, or broader market trends. Money refers to any financial aspects of the deal, such as financial reporting, deal structure, and ownership issues.

Human capital, arguably the most important factor, is often the most difficult factor to assess accurately during due diligence.³

Chart 2
The HPMM Model of VC Firm Performance



Industrial Psychology

The field of industrial psychology has studied personnel assessment for a half-century. No study has ever been conducted on management team assessment during venture capital due diligence. However, the conclusion from thousands of studies on personnel assessment is that informal interviewing formats do not work very well, whereas “past-oriented” structured formats work very well.⁴

RESEARCH METHODOLOGY

This study was conducted from the fall of 1996 until early 1998 as a part of a Ph.D. dissertation in the Program in Psychology, Claremont Graduate University in Claremont, CA.

Sample

The participants in this study were venture capitalists at United States-based venture capital firms. The unit of analysis is the “deal.” A deal is a transaction in which a venture capital firm invests in a new venture. $N = 115$ venture capitalists were contacted using a snowball sampling technique. Early respondents were asked to provide referrals to several other venture capitalists, who were contacted by telephone, and so on. Fifty-one venture capitalists participated, yielding a response rate of 44%. The respondents represented forty-eight different venture capital organizations across the United States. Since several respondents agreed to discuss more than one deal, the total number of cases in the study is $N = 86$ cases.

Procedure

A pilot study was conducted with $N = 13$ cases to validate the questionnaire instrument. In the main study, a 12-page questionnaire with mostly closed-ended, fact-based questions was administered verbally to all of the respondents. Twenty-five case interviews were conducted in person, and 61 were conducted by telephone. The duration of the case interviews averaged 90 minutes.

In order to test for biased responses from the venture capitalists, an additional 28 separate interviews took place with colleagues of the respondents to provide corroborating data on specific deals. Respondent bias was found to be small and not statistically significant.

Measures

The 12-page questionnaire contained primarily closed-ended questions. The questions were designed to record factual data about the amount of time that venture capitalists allocated to various methods of human capital valuation during specific deals. In addition, several qualitative questions recorded venture capitalist assumptions and beliefs about the process of human capital valuation. The “accuracy of human capital valuation” was an index comprised of 6 questions. It had a Cronbach’s $\alpha = .82$ and inter-rater reliability for this variable was $r = .64$, which clears conventional expectations for reliability.

Limitations

A non-random sample was collected which inevitably led to some biased sampling of deals. Some data were dependent on respondent memory. Some subjective variables were used--though most variables were objective measures of time and financial performance.

HUMAN CAPITAL VALUATION METHODS

Venture capitalists have seven primary tools or methods at their disposal to conduct human capital valuations.

Work Sample

The work sample was the most heavily-used method. On average, VCs spent 63.9 hours per deal in work samples with management. In these direct interactions, venture capitalists “quiz” the management team on various issues related to the business. They are called work samples because they allow the venture capitalist to view samples of how the managers think and work firsthand. The time that venture capitalists spent in work samples was positively related to the accuracy of the human capital valuation in early-stage deals but negatively related to accuracy in later-stage deals. Why the difference? In early-stage deals, these discussions are more probing and often personal. In later-stage deals, formal presentations by managers coached by investment bankers can be as misleading as they are informative. The evidence suggests that work samples are not sufficient for achieving accurate human capital valuations.

Reference Interviewing

Reference interviews are discussions with people who have observed the behavior of the target managers. There are several possible sources of reference interviews: personal references, supervisors, coworkers, industry players, current employees, suppliers, customers, lawyers, accountants, bankers, or other investors.

Chart 3

Methods Used by Venture Capitalists

Method	Mean (hrs.)	Low	High
1. Work sample	63.9	4.0	290.0
2. Reference interviewing	19.8	0.0	134.5
3. Past-oriented interviewing	16.8	0.0	100.0
4. Documentation analysis	3.7	0.0	22.0
5. Job analysis	3.6	0.0	100.0
6. Psychological testing	0.1	0.0	8.0
7. Formal assessment center	0.0	0.0	0.0
Total time allocated to human capital valuation methods	120.1	14.9	448.0

Past-oriented Interviewing

Whereas the work sample relies on present or “hypothetical” behavior, past-oriented interviews rely on *past* behavior. This method is based on the notion that past behavior is the best predictor of future behavior. Therefore, during past-oriented interviews, venture capitalists talk chronologically with individual managers about their entire career histories. This interviewing format has emerged as the most effective personnel assessment method in industrial psychology within the last 5 years. The results of this study also strongly support the past-oriented interview format. See Appendix B for a sample past-oriented interview guide.

HUMAN CAPITAL VALUATION METHODS (cont.)

Documentation Analysis

Documentation analysis refers to the collection and review of written documentation about the target managers. Such documentation can include resumes, legal records, tax information, and publications written by or about the managers.

Human Capital Needs Analysis

Human capital needs analyses are typically conducted prior to an interaction with the managers. The purpose of this method in the context of new venture creation is to answer the question, “What human capital is specifically needed for this venture to survive and grow?” Also called a job analysis. See Appendix A for a sample human capital needs analysis.

Psychological Testing

Psychological tests are occasionally administered to candidates for lower-level or middle-level positions in large organizations. These tests measure psychological traits that are considered relevant to the performance of job tasks. Only 3% of the VCs in this study used a psychological test during due diligence. They are not as effective as past-oriented interviews and senior managers do not like to take them.

Formal Assessment Center

Assessment centers are formal, multi-day sessions in which candidates are tested on their skills relative to the job for which they are applying. It is not clear if an assessment center has ever been conducted during venture capital due diligence. None was conducted in this study. This method does not appear to be appropriate for this context.

Other Variables

Three other variables that were hypothesized to affect the accuracy of a human capital valuation were: 1) the years of private equity investing experience of the venture capitalist, 2) the interviewing skill of the venture capitalist, and 3) the size of the VC fund. Experience and skill were related to the accuracy of the human capital valuation. However, neither factor on its own had as strong an association with accuracy as past-oriented interviews.

BEST PRACTICES

A practice is a combination or package of methods of human capital valuation. Several criteria determined whether a venture capitalist's practices were considered "best" or "worst" practices: the IRR for the deal, the accuracy of their human capital valuation, the degree to which their assumptions and practices corresponded to research in the field of assessment, and their track record for accuracy in the past 10 deals in which they participated. The two best practices are called the "airline captain" and the "infiltrator" approaches to human capital valuation.

Airline Captain

The airline captain approach to human capital valuation resembles the way an airline captain assesses his or her plane prior to takeoff to decide whether it is safe to fly. William Hunckler III, Madison Dearborn Partners, uses the airline captain approach. He has achieved a "very accurate" human capital valuation in 9 out of the last 10 deals in which he was involved. This ranked him near the top of the sample. He views human capital valuation as one of the most challenging and most important parts of his job. Here is how he conducted the human capital valuation for the deal we discussed.

Human capital needs analysis = 1 hour. At the beginning of every due diligence process, Mr. Hunckler makes a written human capital needs analysis. This document is based on the written business plan for the company. As he said, "I try to list and rank skills-sets that will be required to accomplish the plan." This increases the precision of his due diligence data collection process.

Documentation analysis = 22 hours. For the case we discussed (but not usually), his law firm did a background check on several target managers.

Past-oriented interviews, 100 hours. Mr. Hunckler had very lengthy in-depth discussions with individual members of the target management team about their actual past experiences, successes and failures. (See Appendix B for an example of a past-oriented interview guide.)

Reference interviews = 54 hours. He and his partner called 9 different categories of references: personal references (1 hour), past supervisors and coworkers (12 hours), industry players (12 hours), suppliers (10 hours), lawyers (1 hour), accountants (1 hour), bankers (2 hours), other investors (5 hours), and past employees (10 hours).

BEST PRACTICES (cont.)

Work samples = 145 hours. Mr. Hunckler and his partner allocated a total of 145 hours to discussions with the management about the following topics: financial issues (25 hours), product and market issues (100 hours), and government regulatory issues (20 hours).

The human capital needs analysis was used at the end of the six-month due diligence period to help guide the discussions he had with his partners about the managers. He said that they debated about where limitations were in the human capital and whether these were critical or not.

He said that his analysis was based on “mostly data” rather than gut feel. Total human capital valuation = 322 hours. He believes that a rigorous and thorough human capital valuation process is needed every time in order to ensure a high level of accuracy.

Another airline captain, David Gladstone of American Capital Strategies, Ltd., used a similar human capital valuation process. The proportion of time Mr. Gladstone allocated to each method was in proportion, but he spent about 100 hours less. He achieved a very high accuracy rating on the deal we discussed.

During due diligence, Mr. Gladstone constantly refers to his human capital needs analysis and adjusts his ratings of the management as new data become available.

Another airline captain, Eugene Hill of Accel Partners said, “Evaluating the management team properly and backing the right people is the difference between success and failure in this [venture capital] business.”

Mr. Hill achieved a very accurate valuation of the management on the deal we discussed, and has a track record of accuracy that ranks him at the 92nd percentile. In total, he spent 126 hours on human capital valuation, spread systematically across many methods. One noteworthy point about the case we discussed was that Mr. Hill spent 21 hours in reference discussions with people from 11 different categories of references. This was the highest number of different categories of all VCs in the study. He said his analysis was based on “mostly data” rather than gut intuition.

BEST PRACTICES (cont.)

Infiltrator

The next approach to human capital valuation is the infiltrator. This term comes from the practice of infiltrating a team to “become one of them” or taking a high-involvement role in incubating an early-stage venture prior to making a major investment. This appeared to be more common with early-stage deals than later-stage deals.

VC #50 was an infiltrator. He allocated an enormous 406 hours to human capital valuation over a year. His accuracy rating for the deal we discussed was a perfect 4.0 / 4.0. He did not conduct a human capital needs analysis, but he spent 11 hours on documentation analysis, 52 hours on past-oriented interviews, 68 hours on reference interviews, 175 hours on work sample discussions, and 100 hours on casual interactions.

This VC and the target managers traveled throughout Asia visiting potential customers together. They learned a lot about one another living out of a suitcase, during formal meetings, and over a beer after a hard day’s work talking with customers. This VC said that he does not always have the time to use the infiltrator model. But when he uses it, he is rarely surprised by the subsequent performance of the management, since he has spent so much time with them.

The downside to the infiltrator approach is that it takes the most time commitment of any of the seven approaches.

WORST PRACTICES

Art Critic

Picture an art critic glancing at a painting on a wall. In a very short amount of time, he or she may offer an accurate appraisal of the value of the work. Art critics in venture capital think that their years of business experience equip them to achieve an accurate assessment of people in a very short amount of time--that a person's human capital is as visible in its entirety as a painting on the wall. Art critics talk a lot about intuition, gut feel, and "shooting from the hip." Unfortunately, they also talk a lot about inaccurate human capital valuations and deals in which they lost 100% of their investment. Whereas airline captains tend to achieve 9/10 very accurate human capital valuations, art critics are lucky if they hit 5/10. Art critics do not do a human capital needs analysis. They do not collect much data or spend much time focusing on evaluating the management.

Sponge

Sponges are like art critics who need a little more data before making an assessment. Sponges do not perform a human capital needs analysis, but "soak up" data through multiple methods of human capital valuation--and then synthesize the information in their gut. As one sponge said, he does "due diligence by mucking around."

Prosecutor

Prosecutors act like prosecuting attorneys. They aggressively question managers and attempt to "pull the truth out of them." A prosecutor spends a high proportion of human capital valuation time on work sample discussions and does not conduct many past-oriented interviews or reference interviews. Prosecutors talk about "testing" management on what they know. The problem with this method is that prosecutors only collect data on present behaviors--how managers respond to questions in the present, live, right now. In comparison, *past* behaviors are more indicative of future behaviors.

Suitor

Suitors are more concerned with "wooing" management than assessing them. One suitor in this study lost over \$20 million because he failed to realize that the management team he bought was comprised of tired, ineffective senior managers.

Terminator

Terminators think that it is impossible to assess human capital accurately. Instead, they buy companies and then fire weak managers rather than spend time assessing them up front.

LINK BETWEEN HCV PRACTICES AND IRR

There was a very clear link between an investor's approach to human capital valuation and the overall deal success. The infiltrator approach yielded a median IRR of 100%; however there is only one deal for which financial performance was available. The airline captain approach boasted a median IRR of 80%. Ironically, the best practices were used less frequently than the worst practices.

The most commonly-used approach was the art critic (30%), followed by the sponge (26%). Only 13% use the airline captain approach. There is plenty of room for private equity investors to gain competitive advantage and earn higher IRRs through using more effective human capital valuation practices. Note: IRR data were not available for all 86 cases.

Chart 4
Approach to HCV and IRR

		IRR	# of Deals for Which IRR Was Available	Usage Rate in Total Population
1	Infiltrator	100%	1	6%
2	Airline Captain	80%	7	13%
3	Other	35%	7	13%
4	Art Critic	25%	13	30%
5	Sponge	20%	12	26%
6	Prosecutor	10%	4	9%
7	Suitor	0%	2	2%
8	Terminator	NA	0	1%
			46	100%

HUMAN CAPITAL IN EARLY-STAGE DEALS

Let us take a closer look at what human capital qualities or attributes are important in early-stage deals. The following chart describes the human capital attributes that early-stage venture capitalists most frequently seek to assess during due diligence.

Chart 5

Percentage of VCs Seeking to Assess Specific Human Capital Attributes

	<u>%</u>
1. Technical knowledge	40%
2. Industry knowledge	26
3. General management/operations	26
4. Sales/marketing skills	24
5. Leadership	17
6. Strategic thinking	14
7. Relevant past experience	14
8. Finance	12
9. Ability to build a team	12
10. Ability to grow a young company	10
11. Integrity/honesty	10
12. Openness	10
13. Strong work ethic	7
14. Can work well with others	5
15. Can recruit alliance partners	5

Perhaps what is even more interesting than the human capital attributes that venture capitalists seek to assess is to examine what attributes they most commonly fail to assess accurately. See Chart 6.

Chart 6

Blind Spots--

Percentage of VCs that Failed to Assess Accurately Specific Human Capital Deficiencies

	<u>%</u>
1. (Lacked) general mgt./operations	29%
2. Cannot work well with others	24
3. Sales/marketing skills	19
4. Technical knowledge	10
5. Ability to build a team	10
6. Leadership	7
7. Finance	7
8. Integrity/honesty	5
9. Lacked strong work ethic	5
10. Details	5
11. Emotionally unstable	5
12. Strategic thinking/vision	2
13. Ability to grow a young company	2
14. Openness	2
15. Charisma	2

HUMAN CAPITAL IN LATER-STAGE DEALS

Let us take a closer look at what human capital looks like in later-stage deals. The following chart describes the human capital attributes that later-stage venture capitalists most frequently seek to assess during due diligence.

Chart 7

Percentage of VCs Seeking to Assess Specific Human Capital Attributes

	<u>%</u>
1. Sales/marketing skills	37%
2. General management/operations	26
3. Technical knowledge	19
4. Leadership	19
5. Can work well with others	19
6. Industry knowledge	16
7. Strategic thinking/vision	16
8. Integrity/honesty	16
9. Ability to build an organization	14
10. Strong work ethic	14
11. Finance	12
12. Prior successes or achievements	12
13. Listening skills	9
14. Done it before	7
15. Ability to communicate	5

The following chart describes the most common blind spots in later-stage deals.

Chart 8

Blind Spots--

Percentage of VCs that Failed to Assess Accurately Specific Human Capital Deficiencies

	<u>%</u>
1. (Lacked) strong work ethic	28
2. General mgt./operations	23
3. Leadership	19
4. Finance	16
5. Integrity/honesty	14
6. Decision making skills	14
7. Inability to prioritize	12
8. Strategic thinking/vision	9
9. Sales/marketing skills	7
10. Cannot work well with others	7
11. Ability to build an organization	7
12. Listening skills	7
13. Adaptability	7
14. Ability to communicate	5
15. Details	5

COMMON REGRETS

There were several factors that led venture capitalists to be less rigorous in their human capital valuation than they felt they should have spent, in retrospect.

Rushing to close a deal

- for fear that another venture capitalist will swoop in and steal their venture.
- because they are pressured by co-investors to make an investment decision.
- for fear that the market opportunity window will close.

Halo effect: when one positive aspect of the deal causes investors to ignore or fail to assess other important aspects. Sources of halo effect were:

- great past financial performance. Venture capitalists sometimes assume that great financial performance is attributed to strong human capital, when it is not. “Don’t confuse brains with a bull market,” one venture capitalist warned. In psychology, this phenomenon is also called the fundamental attribution error--attributing an outcome to a person or group when other factors were the real cause.
- great technology. “Technology rarely sells itself,” one Silicon Valley venture capitalist in this study said. But many investors make the mistake of backing technical people who have developed great technologies but who cannot manage or build a team.
- trusting a single positive endorsement of a management team by a reference or co-investor.

Diffusion of responsibility: “too many cooks in the kitchen”

- Investing with too many co-investors can reduce the responsibility that any one person takes to rigorously assess the management team. Everyone assumes someone else must have done it.

CONCLUSIONS

The results of this study suggest that all human capital valuation practices are not created equal. Airline captains earn IRRs on average that are twice as large as the next best approach. The past-oriented interview emerged as a highly-effective interview format for conducting accurate human capital valuations.

Next, human capital may be challenging to assess. But it is more challenging when ineffective approaches are used. Perhaps human capital is an “intangible” only when superficial or undisciplined methods are used to appraise it. Using this scientific research to improve your practices related to human capital valuation may lead to fewer mistakes about the people part of the deal. Making fewer mistakes means making better investment decisions and earning higher returns for your firm and your limited partners.

The following columns summarize the key lessons from this study, as well as 50 years of research on venture capital and industrial psychology personnel assessment.

DO

- Realize that if you increase the accuracy of your human capital valuations, you can expect your investment performance to improve over time.
- Recognize that the best venture capitalists in the industry are not art critics, they are airline captains.
- Do a human capital needs analysis before you meet with the management so you know what attributes are key for driving performance in that deal.
- Learn how to use the past-oriented interview format.
- Watch out for common blind spots when you are assessing management--study Chart 6 and Chart 8.

DO NOT

- Do not be an art critic. Human capital is complex. Investors who go on “all gut feel” have worse track records than investors who collect data.
- Do not say that human capital is intangible and cannot be appraised accurately.
- Do not assume that your co-investors have rigorously assessed the management.
- Do not fall victim to halo bias and let one of the four main aspects of a deal give you a false sense of security and prevent you from assessing the other 3 drivers of performance (HPMM model).

APPENDIX A: HUMAN CAPITAL NEEDS ANALYSIS

VC Due Diligence Team

Member: _____

Portfolio Company Manager: _____

Date: _____

What will be this person's primary accountabilities and overall role be in creating and executing the business plan:

1) _____

2) _____

3) _____

Instructions

Choose which human capital attributes are important from the list at the right. Add a few of your own that are deal-specific. Then collect data on the managers and rate each manager on each relevant attribute on a 10-point scale. 10 = outstanding, 5 = mediocre, 1 = very poor. Use documentation analysis, past-oriented interviews, reference interviews, or work samples to collect targeted data.

Rating	Human Capital Attribute
_____	Technical knowledge
_____	Industry knowledge
_____	General management/operations/leadership
_____	Sales skills
_____	Marketing skills
_____	Works well with others
_____	Strategic thinking/vision
_____	Relevant past experiences
_____	Strong work ethic/energy
_____	Attends to detail
_____	Work style is compatible with mine
_____	Finance
_____	Ability to build a team/hires talented people
_____	Integrity/honesty
_____	Oral and written communication (and openness)
_____	Analytical ability
_____	Knowledge of distribution
_____	Can understand customer needs
_____	Frugal rather than extravagant
_____	Flexible/adaptable, not stubborn
_____	Listening skills
_____	Educational background
_____	Assertive
_____	Trustworthy
_____	Creative/innovative
_____	Professional network
_____	Emotionally stable
_____	Resourceful
	<u>OTHER</u>

APPENDIX B: PAST-ORIENTED INTERVIEW⁴

Purpose: Record behaviors that the person has performed in their career that are relevant to the deal.

Time: 3 hours for each manager.

- 1) Prior to the interview: Do the human capital needs analysis so you can focus on only the attributes that are relevant to the deal and waste less time.
- 2) Tell him or her that you are interested in walking through his or her career experiences in chronological order in order to get a sense of what they have done, how they operate, etc. Indicate that you will spend less time on things that happened in the distant past and spend more time on more recent events and accomplishments and failures.
- 3) For *each* of the following periods in their career, ask the same 6 core questions: High School, College, Job 1, Job 2, Job 3, Job 4, Job 5.
 - a) Tell me what your expectations were coming into that segment.
 - b) What were your responsibilities and accountabilities?
 - c) Let's talk about some accomplishments and other high points in that job.
 - d) How about some low points or things that did not work out so well.

- e) Who was your supervisor in that job? When I talk with Mr. X, what is he going to tell me were your strengths and weaker areas at that time?
- f) What comes next? Why did you leave that job?

4) Take a break after about an hour and a half. Glance at your human capital needs analysis and look for important dimensions on which you have not collected any data. Focus the subsequent discussions to cover these areas.

5) Let the person ask you similar questions.

6) Right after the interview, pull out the human capital needs analysis and give them ratings on all of the key attributes. Jot some notes.

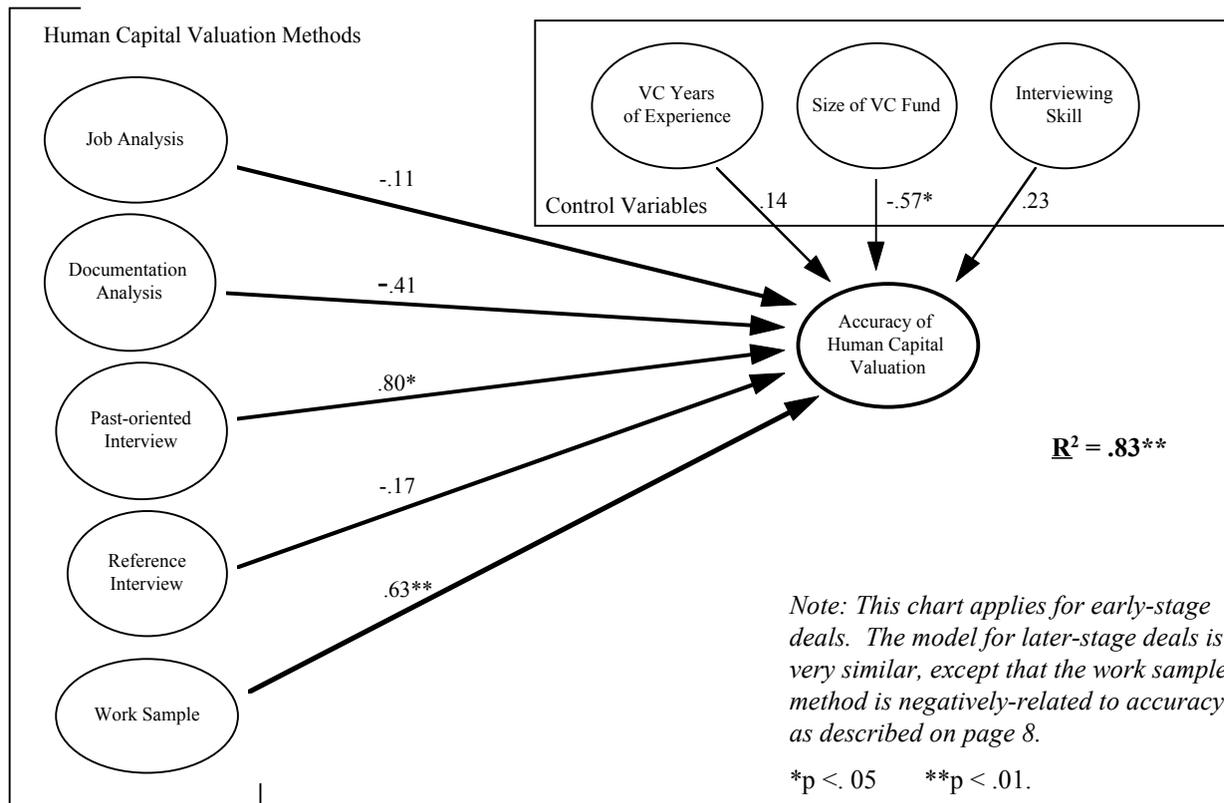
- DO NOT ask “hypothetical questions” (e.g., “How *would* you handle the challenge of managing multiple projects at once?”). Too easy to fake.
- DO NOT talk more than 20% of the time. Listen, take notes, probe, guide the discussion.
- DO ask “experience-based questions” that require concrete examples (e.g., “Tell me about a time in which you . . .”). Past performance is the best predictor of future performance.

APPENDIX C: FACTORS THAT PREDICT ACCURACY

What factors lead to an accurate human capital valuation? The past-oriented interview was the biggest predictor of a successful human capital valuation. Work samples, venture capitalist years of experience, and interviewing skill were also positively

related to the accuracy of the human capital valuation. The numbers in Chart 9 represent the beta coefficients from the hierarchical regression analysis. These tell us the size of the relationship between each factor and the accuracy of human capital valuation.

Chart 9
Predictors of Accuracy



Notes

¹Bygrave, W.D. & Timmons, J.A. (1992). Venture capital at the crossroads. Boston, MA: Harvard University School Press, p. 6.

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Geoff earned a B.A. in Economics with Honors from Northwestern University, an M.A. and a Ph.D. in Psychology from Claremont Graduate University, where he was a student of management guru Peter F. Drucker.

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