



A Key Measure You Need to Know to Grow (in the Knowledge Economy) **by Susan Allard**

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ABSTRACT

Our question was a simple one. Around the globe, we all know that innovation is how new value is created in the knowledge economy, and we all therefore desire continued investment. In fact, the top two priorities of corporate boards are to sustain and foster innovation in their companies, and to create a larger pool of innovation leaders – thereby increasing future valuation for their stakeholder communities (customers, employees, collaborators, shareholders, and country). Our question: was there a missing metric for internal knowledge efficiency that would allow us to predict corporate performance based on a new knowledge scale? ROIC (return on intellectual capital) was the answer. Like a prism refracting a different set of clarities, or a kaleidoscope revealing beautiful new patterns with a single turn, ROIC was the key that opened the door to the knowledge kingdom, wherein can be found the scientific formula for engineering innovation.

A group of business leaders, scientists and entrepreneurs, who together built our game-changing new economy innovator companies over the past twenty-five years, wanted to articulate what they had learned on-the-job about how to scale knowledge to increase investor returns (ROI). They asked themselves the following question: is there a missing element in the traditional array of corporate performance metrics that could specifically measure internal knowledge efficiency, thereby allowing peer-to-peer company comparisons on a knowledge scale, and predicting future earnings based on a knowledge efficiency ratio?

If the answer was yes (and it was), then knowledge-efficient companies can be identified, mapped into visually-distinct populations (peer comparisons), analyzed for traits in common (genomic mapping), and from this scientific learning a formula for innovation can be derived, then applied.

The new measure, Return on Intellectual Capital (ROIC), was elegant in its simplicity and its predictive power, and provided a direct strategic route for the board and executive management to follow to higher earnings multiples (P/E). The formula is simple: $ROIC = \text{annual revenues} / \text{number of employees}$ for any company or organization. For the US economy as a whole, ROIC is \$89,927 (GNP of \$13.843 trillion divided by 154mm in the labor force). The average ROIC for the companies in our study was \$385,285. The highest ROICs achieved were eBay at \$1,658,537 and Apple at \$1,664,431. The multiples in knowledge productivity that can be achieved by the disciplined application of know-how to opportunity are truly astounding, once revealed.

The analytical framework itself is also simple, ROIC is plotted on the y axis (internal knowledge efficiency), while P/E is plotted on the x axis (market expectations for future earnings).

As a case study, a recent new Institute client in the payments space had been acquired in 2007 by its now parent, and to-date the client is earning a 5% ROI on the parent's capital deployed. Their goal is to increase that return to 15%, and they intend to achieve this by increasing ROIC. We are helping them staff five new positions, from CFO to Marketing Traffic Manager, with superior candidates who know how to garner the gold in the data that surrounds them in their workplace every day (applied iterative learning). At the same time, the client is knowledge-partnering with the Allard Institute to access our banks of intellectual capital as another point of leverage.

How powerful is ROIC as a predictive tool? The more research we did, the more certain we became that we were on to something revolutionary.

Here is how our research logic unfolded. From our prior work on the American Innovation Workforce and its Expert Creator segment¹, and our years of experience recruiting talent² for leading knowledge-producing and knowledge-using companies since 1983, we knew for certain and first-hand that talent itself was the new coin of the realm (human capital). We also knew from our research that advanced degrees from America's (and the world's) top schools was the single most important trait in common shared by the knowledge industry worker population (which holds 1.7 degrees on average, of which 47% are technical or quantitative degrees and 53% are business degrees).

Top schools were even more concentrated at the board level. Board members held on average 1.9 degrees, with 60% holding a degree from one of EIGHT TOP SCHOOLS: Stanford, Harvard, the University of California, Dartmouth, Princeton, the University of Michigan, the University of Pennsylvania (especially Wharton), and Brown. When you think about it, this amount of innovation concentration in just eight schools is perhaps expected, yet also remarkable at the same time.

Finally, we knew from our years of recruiting experience, that the best talent was hired and trained at the best companies, and that these best companies were respected by all parties, including the markets, for their leadership. Now we wanted to prove empirically that there was a direct and causal link. We therefore identified ROIC as a simple one-step measure of human capital efficiency, which we could plot against P/E to predict performance.

ROIC and Growth

To test our theory, we accessed our database with the resumes of 32,883 knowledge economy expert practitioners who we have recruited and befriended since 1983, and studied the companies that they worked for during their careers. We called the top 100 companies (measured by number of innovation workers hired) “knowledge economy leaders”, and called their industries “the Knowledge Sector” www.allardinstitute.com. We could see definitively from our research that these companies in fact did hire, train, invent and scale the American Innovation Workforce.

The 100 top companies were found in the following industry sectors:

1. financial (banks, credit services, life insurance, and national investment brokerage)
2. health care (biotechnology, health care plans, major drug manufacturers, medical laboratories & research, and specialized health services)
3. services (business services, catalogue & mail order services, consumer services, diversified entertainment, education & training, major airlines, management services, marketing services, publishing, research services, retailers, staffing & outsourcing services, and technical services)
4. technology (application software, business software & services, computer-based systems, diversified computer systems, healthcare information services, information & delivery services, information technology services, internet information services, internet software & services, long distance carriers, personal computers, security software & services, and telecommunications services).

As recruiters in this new era where talent had become the coin of the realm, we had an expert understanding of every leading company's recruitment strategy and standards (think of Capital One, famous for applying iterative learning to the acquisition of human capital as the core of its investment strategy, or Google brilliantly advertising for the very best and brightest intellectual capacity in the world, and specifically stating that its growth could be constrained by its ability to hire enough human capital to drive its creative engines). By plotting the companies against ROIC, we found that those famous for their hiring prowess and their huge contribution towards building the American Innovation Workforce, also earned the highest ROICs. For example, the credit industry average is \$405,987, Capital One's average is \$569,679; internet information providers average \$399,875, Google \$1,208,477; business services average \$316,557, Visa \$1,373,684 etc.

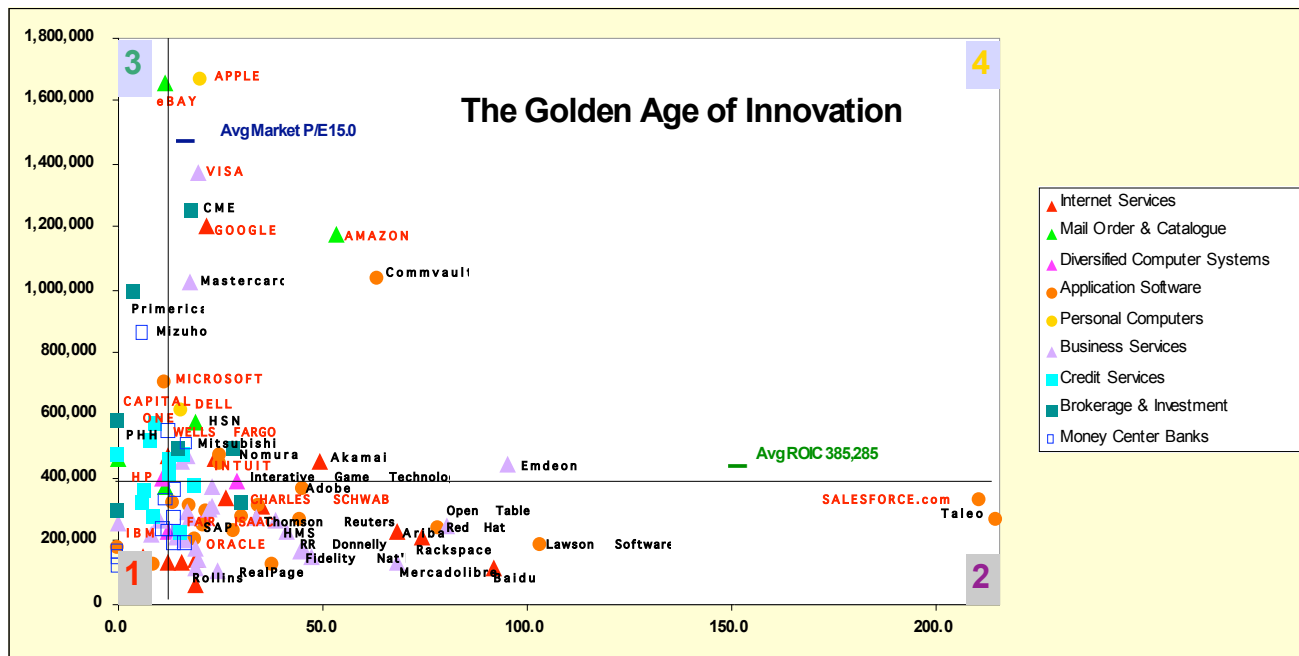
Because we believed that ROIC would also be a predictor of innovation (and investment in innovation is a very top priority on corporate and national agendas around the globe), we looked again at the top 100 companies, and identified a sub-population we called the 17 Innovator Giants -- companies (entrepreneurs, actually) who had the talent, vision, courage, connections, and unrelenting commitment to successfully scale new game-changing business models and entire new industries across the evolving economic landscape. Here's the list:

Summary of the 17 Breakthrough Innovator Companies

| Company Name | Year Founded | Entrepreneurs | Sector | Type Of Knowledge Company | Product |
|-------------------------|--------------|-------------------------------|---------------------------------|---------------------------|--|
| Wells Fargo | 1852 | Henry Wells & William Fargo | Money Center Banks | Knowledge User | Financial Services (Information as a Service) |
| IBM | 1924 | Thomas Watson | Diversified Computer Systems | Knowledge Producer | Information Processing |
| Hewlett Packard | 1939 | Bill Hewlett & David Packard | Diversified Computer Systems | Knowledge Producer | Intelligence Machines |
| Fair, Isaac | 1956 | Bill Fair & Earl Isaac | Business Services | Knowledge Producer | Intelligence Tools |
| VISA | 1970 | Dee Hock | Business Services | Networker | Coordination |
| Microsoft | 1975 | Bill Gates | Application Software | Knowledge Producer | Computer Communication Platforms |
| Apple | 1976 | Steve Jobs | Personal Computers | Knowledge Producer | Personal Creativity Platforms |
| Oracle | 1977 | Larry Ellison | Diversified Computer Systems | Knowledge Producer | Integrated Intelligence Tools |
| Intuit | 1983 | Scott Cook | Application Software | Knowledge Producer | Personal Utility Platforms |
| Dell | 1984 | Michael Dell | Personal Computers | Knowledge Producer | Mass-Customized Platforms |
| Capital One | 1988 | Rich Fairbanks & Nigel Morris | Credit Services | Knowledge User | Financial Services (Applied Creative Capital) |
| Amazon.com | 1994 | Jeffrey Bezos | Mail Order & Catalogue Services | Networker | On-Line Marketplaces |
| eBay | 1995 | Pierre Omidyar | Mail Order & Catalogue Services | Networker | Self-Seeking Communities |
| Charles Schwab | 1996 (1971) | Charles Schwab | Brokerage & Investment | Networker | Financial Services (Applied Disruptive Technologies) |
| Google | 1998 | Larry Page & Sergey Brin | Internet Information Providers | Networker | Knowledge Circuits |
| x.com/PayPal (now eBay) | 1998 | Elon Musk | Internet Products & Services | Networker | Payments Innovation Platforms |
| Salesforce.com | 1999 | Marc Benioff | Diversified Computer Systems | Knowledge Aggregator | SAAS Innovation Platforms (Applied Cloud) |

Following the same process as before, we mapped ROIC for the Innovation Giant companies and their industry peers (with market capitalization >\$1bb; >\$10bb for money center banks), this time against P/E, thereby creating a picture across two dimensions: internal knowledge efficiency (ROIC), and market expectations for future earnings (P/E). We wanted to see if the market rewarded high ROIC companies with high P/E's – in other words, if the market recognized and rewarded the Knowledge Sector and the Innovation Giants within. It did.

ROIC Plotted Against P/E



1 = the disappointers 2 = the workhorses 3 = the leverageables 4 = the superstars

Summary of the High Performing Industries and Companies as Measured by P/E

| Industry | Average P/E | Highest P/E | Company |
|---------------------------------|-------------|-------------|-----------------------------|
| Money Center Banks | 9.89 | 16.75 | Wells Fargo |
| Credit Services | 10.35 | 19.03 | Alliance Data Systems |
| Brokerage & Investments | 13.53 | 30.16 | Charles Schwab |
| Personal Computers | 17.54 | 19.83 | Apple |
| Diversified Computer Systems | 18.12 | 28.97 | Interactive Game Technology |
| Mail Order & Catalogue Services | 18.85 | 53.10 | Amazon |
| Internet Software & Services | 23.67 | 73.81 | Ariba |
| Internet Information Providers | 33.47 | 91.28 | Baidu |
| Internet Products & Services | 41.93 | 67.62 | Rackspace Hosting |
| Application Software | 49.90 | 335.97 | Taleo |

Note that Innovator companies lead their industries in P/E (until they are displaced by younger companies which the market appreciates even more).

Summary of the High Performing Industries and Companies as Measured by ROIC

| Sector | Average ROIC | Highest ROIC | Company |
|---------------------------------|--------------|--------------|-----------------|
| Internet Software & Services | 161,614 | 214,688 | Ariba |
| Business Services | 316,557 | 1,373,684 | Visa |
| Money Center Banks | 319,898 | 505,798 | Wells Fargo |
| Diversified Computer Systems | 329,294 | 406,349 | Hewlett Packard |
| Application Software | 332,093 | 1,038,062 | Commvault |
| Internet Information Providers | 399,875 | 1,208,477 | Google |
| Internet Products & Services | 475,831 | 1,000,000 | Facebook |
| Brokerage & Investment | 632,294 | 1,247,788 | CME |
| Mail Order & Catalogue Services | 851,597 | 1,658,537 | eBay |
| Personal Computers | 1,140,805 | 1,664,431 | Apple |

Note that Innovator companies lead their industries by significant amounts in ROIC, demonstrating that they are wise and consistent investors in internal knowledge efficiency.

Genomic Mapping of Innovation DNA

Once we had identified the knowledge economy's Innovator Giant companies, we wanted to understand the traits they had in common. We wondered if we could find a way to scientifically map the genomic bands of DNA that accounted for their evolutionary superstar success. If so, we would have a blueprint to seed any company with Innovator DNA as a means to genetically engineer higher ROIC and thereby increase ROI. This is the exact strategy being followed by our client desiring to triple ROI from 5% to 15% to better please its investor parent.

How to proceed with this novel notion? We had already drawn a knowledge chromosome map, which we used in previous research to measure the gene pool of the American Innovation Workforce. Since every Innovation Giant was founded by a great entrepreneur, along with an inner circle of classmates, friends, family, business partners, and investors who built the company and frequently sat on the board, we decided that today's board of directors (as evolved) would most closely resemble the original gene pool. And indeed, of the 17 Innovator Giants, 12 of them still have the original founding entrepreneurs on the board and usually in the corporate leadership role as well. For the others, the founders have since retired or died, but were intimately involved with the company and its board over their entire long careers (think of Bill Hewlett and David Packard at HP, or Dee Hock at Visa).

The "inner circle" concept also led us to define CCCs (Capital-Centric Centers), the three Cs that are a necessary prerequisite for innovation: Human Capital (entrepreneurs & great schools) + Investor Capital + Centers (the geographic education and business hubs that spark creativity and compound invention). Early in the evolution of the knowledge industry, these CCCs were in the great intellectual and business centers of the East, South, and Midwest. Today, California's Silicon Valley is in overdrive, proving the enormous compounding power of a CCC-driven growth engine.

Research Framework

Using Allard's Knowledge Chromosomes™, we measured and genomically mapped the Innovation DNA of the current Board of Directors (as of September 2010) of the 17 public Innovator Giant companies.

Innovator Board Members were found to be rich in 13 genes:

| Chromosome | Gene # | Description |
|------------------|------------------|---|
| Education | A-1, A-2, A-3 | BA/BS; MA/MS; MBA; JD; PhD Concentration of colleges and universities where earned |
| Experience | B-4, B-5 | Best-respected companies; start-ups |
| Applied science | C-7, C-9 | Scientific roles in business, research labs, government, and/or universities |
| Marketing | D-13, D-14, D-15 | New brands, new ways to touch customers, new markets |
| New technologies | F-19, F-20 | Productivity and logistics breakthroughs; breakthrough new products |
| New paradigms | G-21, G-22 | R&D and the internet |

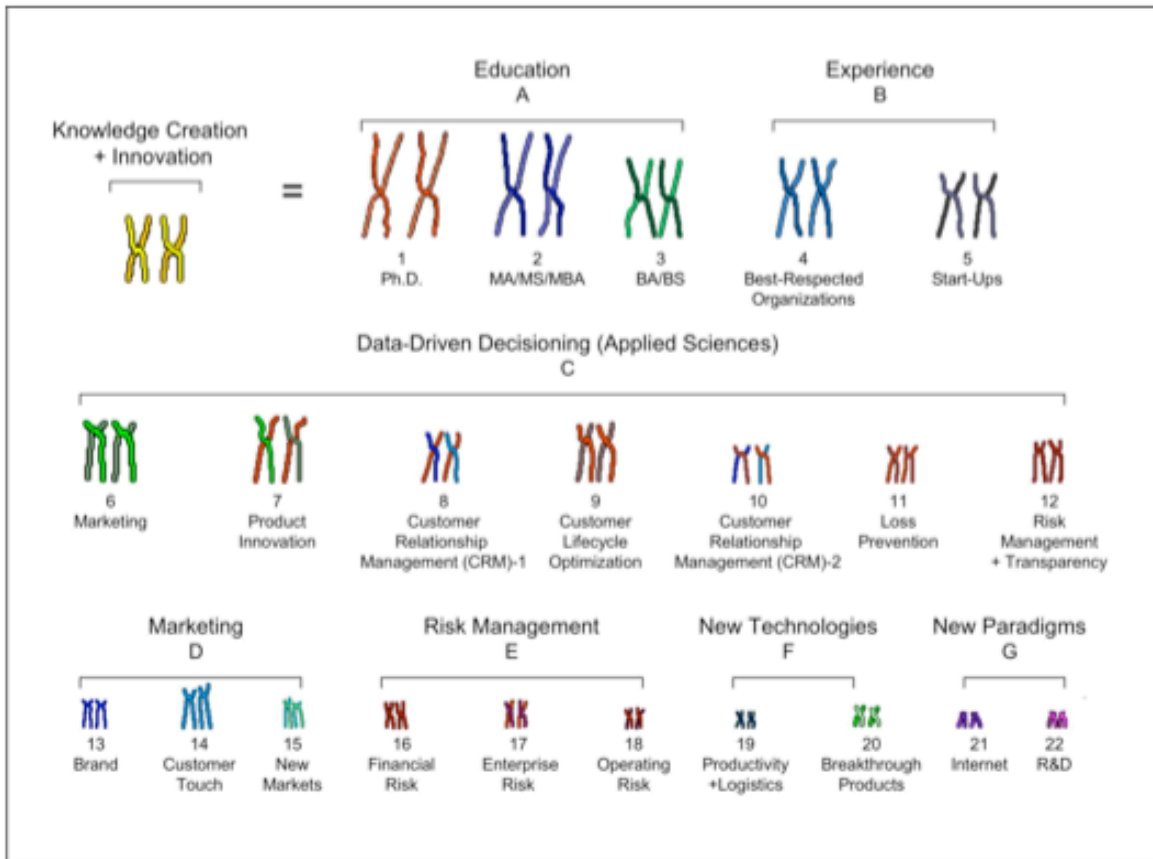
The Fourteen Traits and the Four Genomic Bands

We grouped the relevant genes into fourteen traits, and then displayed them in four color-coded bands:

| Traits | Colors | Description |
|--------------|--------|--|
| CCCs | hot | the entrepreneurial base, the concentration of Top Eight Schools, and the investment community |
| Strategists | blue | visionaries and professional strategists who create new business concepts and ideas |
| Scientists | green | innovators via research, scientific discovery, and the applied sciences |
| Multiplicity | violet | diverse and multi-disciplinary perspectives |

The cumulative percent of Board members with each of the fourteen traits are mapped on the y axis. The x axis names the company by founding date. Thus is created a visual blueprint and evolutionary map of Board Innovation DNA that is easy to read, suggests a formula for innovation, and provides a genomic blueprint to engineer the board (or any part of the company) to higher ROIC.

**Knowledge Chromosome Map© for the New Economy –
The DNA of the Knowledge Industry Skill Sets and Their Recombination**



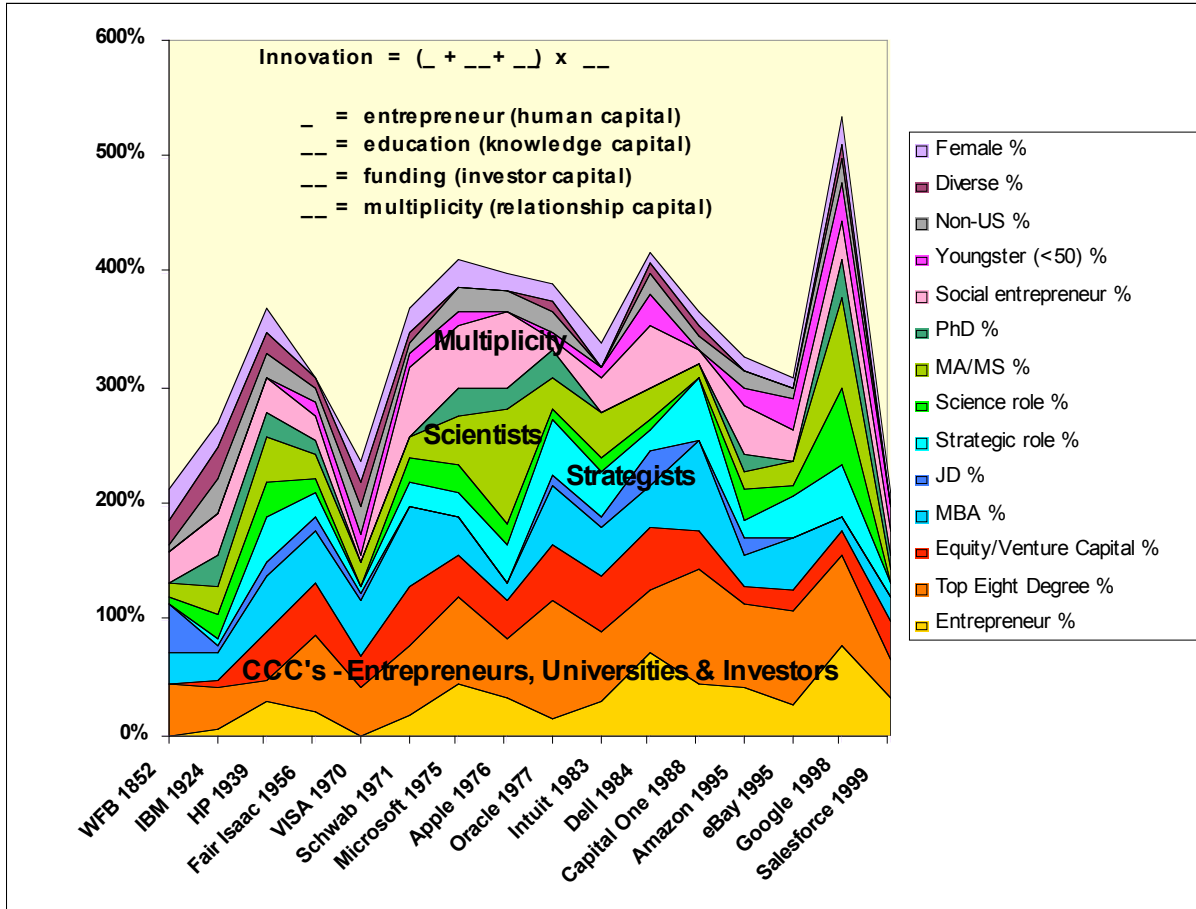
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Observations

The younger the Innovator Board in historical time, the closer it is to its entrepreneur-centric roots, therefore the broader the CCC band (colored “hot” as a visual metaphor for the heat of creativity and invention). All Innovator Boards have a wide blue band (colored blue for the brilliant new concepts upon which best-respected organizations and new brands are built), and depend on the strategic insights of Board members who have graduated from the world’s best business and law schools, and have worked in the world’s best strategic think tanks (“blue chip stock”). Capital One and Oracle have the highest strategic percents (the blue band, plus the orange band of the Top Eight Schools). Microsoft and Dell are most multiplicitous due to high levels of social entrepreneurs, while Dell and Google have the most entrepreneurs. The science band (green for living systems and sustainability) is widest at Microsoft and Google. With business models based on engineering and scientific invention, their competitive success depends on the creative caliber of their highly educated workforces (and so is it reflected in the composition of the Board).

Genomic Mapping of the Boards of the Innovation Giants



Innovation Formula

$$I = (\Sigma + \Sigma^2 + \Sigma^3) \times \Sigma^n$$

where

- I = innovation
- Σ = entrepreneur (human capital)
- Σ^2 = education (knowledge capital)
- Σ^3 = funding (investor capital)
- Σ^n = multiplicity (relationship capital).

The multiplicity band (Σ^n) multiplies the rest, because it seeds the company at the board level with the diversity of perspectives, expanded networks, and youthful energy that are needed to compound innovation.

Predictions

Innovator companies will continue to seed their boards with Innovation DNA. For example, in 2006 Wells Fargo named eight environmental experts from industry, academia and nonprofits to a new Environmental Advisory Board tasked to help bring a thoughtful and balanced approach to integrating environmental considerations into the bank's business practices. More boards will do the same.

All boards will start to add members with the Risk Management Chromosome (genes C-12 risk management and transparency, E-16 financial risk, E-17 enterprise risk, and E-18 operating risk). No such genes were found in the genomic mapping of the Innovator companies.

All boards will increase multiplicity, adding more youngsters (< 50 years old), women, diverse, and non-US candidates, as well as social entrepreneurs. This new pool of board members will come from the same clusters of schools (The Top Eight), as well as new emergents like MIT, USC, SUNY, Smith/Wellesley/Vassar and the Indian Institute of Technology to name a few.

New CCCs will also emerge, super-charging the innovation economy with more compounding investment on the very successful model of the Silicon Valley (keep an eye on Texas, and also China).

How to Increase ROIC

Assess your company or business unit against ROIC, and genomically map your talent pool. Map and understand your competitive position within the new economy, which is completely different and a revolutionary paradigm shift from that which came before³. Partner with a knowledge supplier to fill your internal gaps via lease, buy, or a combination (access banks of intellectual capital). Genetically engineer your company to higher performance standards by seeding the business unit, the company, and the board with Innovation DNA. Increase transparency, accelerate business efficiency, lower risk, and thereby deliver more predictable knowledge-based returns by investing in knowledge-liberating technologies, tools, and communities. Most importantly, through the practice of emotionally intelligent behaviors, today's leaders create an ecology of trust, where information-sharing, healthy risk-taking, continuous learning, and mental efficiency can flourish. Therefore, the very first place to invest to increase ROIC is to become a MASTER OF THE SELF, using such leadership tools and technologies as executive coaching, lifelong learning, and compassionate community.

DEDICATION

Susan Allard is Co-Founder and Chairwoman of Allard Institute Inc., a Bank of Intellectual Capital for the Knowledge Economy which was founded by its Members in 1983. She is expert on the American Innovation Workforce, especially its highly educated Expert Creator segment.

*This paper, based on 27 years of research data, is dedicated to the author's father, Robert W. Allard, who founded the field of population genetics at the University of California, Davis in the 1950s. In population genetics, massive amounts of data are analyzed to predict behaviors (traits) of populations over time. Among the many honors and awards earned over his distinguished career, Dr. Allard was elected to the National Academy of Sciences in 1973, where his contributions focused on agriculture and sustainability; population, evolutionary and ecological genetics; plant breeding; and genetic resource conservation.
(http://www.nasonline.org/site/PageServer?pagename=MEMOIRS_A)*

Footnotes

- ¹ See “Definition and Analysis of the American Innovation Workforce with Six Policy Recommendations” at www.allardinstitute.com.
- ² The word "talent" is derived from the Greek word *talanton*, which means "balance, sum, weight, value," and was a unit of weight, in gold and silver, which was used as a legal tender in early trading transactions (3,000 shekels = one talent). Talent entered into the Hebrew language and translated meant the word *kikar* (loaf or cake) suggests that the shape of the talent was circular like the bread of those times, even though some forms of the weight in later years were figurative in shape. According to Greek myth, *Atalanta* of Calydon, the virgin huntress, was famous for her swiftness, having the same value (as man). From the Online Etymology Dictionary it is understood that the word talent was originally an ancient unit of weight (Old English *talente*). The Medieval Latin and common Romanic sense developed from figurative use of the word in the sense of money. The meaning of special natural ability, or aptitude, developed in 1430, came from the parable of the talents in Matthew 25:14-30 "And unto one he gave five talents, to another two, and to another one..." Through the annals of history the word talent then denoted a special or innate skill, aptitude or ability, especially for the arts or music, etc., or a person or people with high general or mental ability. Therefore, talent literally started out as the coin of the realm, then as now.
- ³ See “A Brief History of the American Innovation Workforce and the Pioneering Companies of the Knowledge Economy”, “Paradigm Shift Defined – How the Knowledge Economy is Completely Different: Five Revolutionary Facts”, and “The Three Eras Analysis – the Pioneers, the Leveragers, the Liberators and the Three California Gold Rushes” at www.allardinstitute.com



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