Knowledge Capital Valuation
Lord Kelvin, *Popular Lectures and Addresses, 1891-94*

When you can measure what you are speaking about, and express it in numbers, you know something about it: but when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind: it may be the beginning of knowledge, but you have scarcely, in your thoughts, advanced to the stage of science.
We drown in information but crave for knowledge

• Human Capital: Competencies, Attitude …
• Structural Capital
  • Policies, Procedures and Processes
  • Corporate Databases
  • Content
  • Intellectual Property: Patents, Licenses …
• Customer Capital
  • Marketing, Sales and Delivery Channels
  • Customer Relationship
  • Partnerships and Alliances
Knowledge Capital in the US

Knowledge Capital - $7.4

Plant & Property $3.1

Software & Data?

Corporate Assets $10.9

Market Valuation $12.3

Fin. Assets $0.5

Basics: ROI, NPV & IRR

- **ROI = (Benefits-Costs)/Costs**
- **NPV = The equation for a three year NPV is:**
  \[
  \frac{\text{net benefit year 1}}{1+\text{discount rate}} + \frac{\text{net benefit year 2}}{(1+\text{discount rate})^2} + \frac{\text{net benefit year 3}}{(1+\text{discount rate})^3} - \text{initial costs} \quad \text{... Discounted Cash Flow Model}
  \]
- **IRR \rightarrow NPV = 0 e.g. 3-year model:**
  \[
  \text{initial costs} = \frac{\text{net benefit year 1}}{1+\text{IRR}} + \frac{\text{net benefit year 2}}{(1+\text{IRR})^2} + \frac{\text{net benefit year 3}}{(1+\text{IRR})^3}
  \]
Key Equations for EVA

Economic Value-Added (EVA) =

Accounting Profit − Cost of Shareholder Capital

Cost of Shareholder Capital =  

Cost of Capital * Shareholder Equity

Cost of Capital = Risk-Free Interest + Beta*Risk Premium
Information Productivity (EVA/Information Mgmt)

Information Productivity = \frac{Output}{Input}

Info. Productivity = \frac{Information\ Value}{Cost\ of\ Information}

EVA = Information\ Value
Calculate Information Productivity

<table>
<thead>
<tr>
<th>Company Name - All data in 1999 $Millions</th>
<th>Net Income</th>
<th>Cost of Capital - %</th>
<th>Net Financial Capital Employed</th>
<th>Costs of Information Management</th>
<th>Information Productivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>MERCK &amp; CO</td>
<td>$5,891</td>
<td>8.536</td>
<td>$13,242</td>
<td>$7,268</td>
<td>65.5%</td>
</tr>
<tr>
<td>ABBOTT LABORATORIES</td>
<td>$2,446</td>
<td>8.08</td>
<td>$7,428</td>
<td>$4,035</td>
<td>45.7%</td>
</tr>
<tr>
<td>BRISTOL MYERS SQUIBB</td>
<td>$4,167</td>
<td>8.044</td>
<td>$8,645</td>
<td>$8,830</td>
<td>39.3%</td>
</tr>
<tr>
<td>SCHERING-PLOUGH</td>
<td>$2,110</td>
<td>8.842</td>
<td>$5,165</td>
<td>$4,625</td>
<td>35.7%</td>
</tr>
<tr>
<td>PFIZER INC</td>
<td>$3,179</td>
<td>8.284</td>
<td>$8,887</td>
<td>$9,127</td>
<td>26.8%</td>
</tr>
<tr>
<td>JOHNSON &amp; JOHNSON</td>
<td>$4,167</td>
<td>8.338</td>
<td>$16,213</td>
<td>$13,103</td>
<td>21.5%</td>
</tr>
<tr>
<td>AMERICAN HOME PRODUCTS</td>
<td>$-1,227</td>
<td>7.492</td>
<td>$6,215</td>
<td>$6,780</td>
<td>-25.0%</td>
</tr>
</tbody>
</table>
How to Calculate Public Sector Information Productivity

Information Productivity = \( \frac{\text{Service Delivery Costs}}{\text{Management Costs}} \)

Information Productivity of the New York City Board of Education:*

\[
\text{Information Productivity} = \frac{\$1,972}{\$4,135} = 48\%
\]

Alinean – Strassmann ROI Model

Alinean ROI Dashboard™ Model

- NET TANGIBLE BENEFITS
- INTANGIBLE BENEFITS
- RISK

Costs vs. Benefits
Compare using:
- ROI
- NPV
- IRR
- Payback Period

Resources
Schedule
Staffing
Legal and Governance

Brand Advantage
Strategic Advantage
Organizational Advantage
Competitive Advantage
Intellectual Capital
Crisis in Company Valuation

• Book Value Accounting still based on Luca Pacioli’s 1494 Summa de Arithmetica, Geometrica, Proportioni et Proportionalita treatise on double-entry bookkeeping also known as the *Italian Method*.

• Inability to account for Intangibles later known as Knowledge Capital recognized since 1970s as a major problem.

• Goodwill introduced as an accounting fudge to explain why you paid too much. Goodwill is amortized whilst Knowledge Capital appreciates!
Knowledge Valuation Methods

Knowledge Capital® Assessment
Market Value to Book Value
Tobin's Q Replacement Cost versus MV
Calculated Intangible Value
Baruch Lev's Knowledge Capital Valuation
Scoreboard Valuation Techniques
Livson's Valuation of Startups
Knowledge Capital Views

- $People  Brand Advantage
- $Process Strategic Advantage
- $Content Organizational Advantage
- $Brand Mapping of Intangibles
- $Alliances Competitive Advantage
- $Customers Risk Reduction
- $IP Intellectual Property
Bell-Mason Dimensions and Stages
Figure 10-3. Flowchart of the Stages of Growth for a Start-up, Including the Criteria for Moving Among the Stages.
Baruch Lev’s KC Valuation

- **Knowledge Capital** = (Normalized earnings - earnings from tangible and financial assets)/(Knowledge capital discount rate)

- **Strengths**: Valuation is forward looking. It has some predictive capability.

- **Weaknesses**: Requires more effort to apply.
MV, Strassmann & Tobin

- Intellectual Capital = Market Value (Price/Share x # of shares) - Book Value (Equity - Debt)

- Strassmann’s Knowledge Capital = (Profits - Financial Capital "Rental")/(interest rate cost of long term debt)

- Tobin’s Q = Market Value/Replacement Cost
Calculated Intangible Value

- Calculate average pre-tax earnings for three years
- Calculate average year-end tangible assets for 3 years
- Divide earnings by assets --> company average ROA for 3 years
- Find industry average ROA
- Multiply industry ROA by company's tangible assets.
- Subtract product from company's pre-tax earnings. --> Excess return.
- Calculate 3 year average tax rate. Multiply by excess return
- Subtract from excess return --> premium attributable to intangible assets.
- Calculate Net Present Value of Premium. Divide premium by discount rate. (i.e., cost of capital)
Ben Livson’s KC Equation

- MC = Market Capital, KC = Knowledge Capital, BV = Book Value & CV = Comprehensive Value and PV = Perception Value in market perception
- CV = BV + KC
- MC = CV + PV = BV + KC + PV
- Nokia 2000: MC = $160b = $6b + $94b + $60b
- High PV => Overvalued; Low PV => Undervalued
- Best Stock: Low PV and High KC!