I just yet received the slides from Vishal’s presentation last week, and updated the wiki for Lecture 5.
Syllabus:
The order and coverage is flexible

1. Why should software be valued? Cost versus value.
4. Income from Sales and Service. Alternate Business models
5. Sales expectations and discounting of future income.
7. Software growth.
8. Legal & forensics
9. The role of patents, copyrights, and trade secrets.
10. IP in a service company, protectable IP, fencing of customers’ IP, know-how
11. Life and lag of software innovation.
12. How to grow a software company: organic or by acquisitions
14. Separation of use rights from the property itself.
15. Setting licensing rates.
16. Role of Government
17. Risks when outsourcing and offshoring development.
18. Effects of using tax havens to house IP. Abolish Corporate taxation?
Other methods of valuation

• Value is based on future income
  ➢ Looking into the future is risky
• Having multiple methods match gives confidence
  ➢ There is no best method
Leverage of R&D investment

Cost of IP generation

Earnings due to IP

$E$

Available non-ronitue earnings derived from sales

$E = \frac{E}{C}$

R&D capitalization permitted by GAAP

Product feasibility

Relevant R&D

Total discounted earnings after R&D

Earnings discounted to DTS

Earnings

Total capitalized expenses

Investment to be capitalized at R&D

Expenses $e$

R&D capitalization permitted by GAAP

Delay (ignored)

R&D to production

Time

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Expense Rollover
Valuation based on investment

1. Collect R&D expenses $R$ over several periods
   - Capitalize their retained R&D to the completion date $C$

2. Collect corresponding earnings from that data over IP life
   - Discount the earnings to the completion date $E$

3. Compute the effective benefit $b = \frac{E}{C}$ for each R&D period
   - The average of the values $b = \bar{m}$ is the expected leverage
     Published values of $m$ range from 0.8 to 20

1. Expected value of IP $V = m \times R$, assuming stability

This estimation of $m$ is verrrrrrrrrrrrry iffy
   - Is used for a) advertising -- short term, but much untrustworthy data
     b) stable maintenance component of R&D only
     c) venture capitalist’s result assessments
Comparables

1. Comparable businesses
   - Differences in businesses: size, market, product
   - Great if there is a match, as a recent acquisition
     - Then carefully adjust

2. Comparable parameters
   - Many choices, all are abstractions
   - Often reported and discussed in the business press
   - Many are related to financial assets
     We’d like to include intellectual capital
Comparative methods

- **Similar businesses** try to find more than 10
  - scale by **revenues** – within a modest range or
  - by **common business parameters**

- many ignore IP
Interquartile ranges and means

Original set of 16 comparable transactions

STATISTICAL MEAN = 1000
INTER-QUARTILE RANGE = 1380

Interquartile range per IRS formula = 1450 to 325

Comparable A
Comparable B
Comparable C
Comparable D
Comparable E
Comparable F
Comparable G
Comparable H
Comparable I
Comparable J
Comparable K
Comparable M
Comparable N
Comparable O
Comparable P

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Trusted set of 9 comparable transactions

INTER-QUARTILE MEAN = 1016
INTER-QUARTILE RANGE = 760

Interquartile range per IRS formula = 1305 to 685

High, not typical
Still high

Low

Still low
Model summary
7 methods  8 results

$ value of IP tranche

Applied to tranche of IP being offshored

- Income
- Profit split
- Market cap
- Identified IP life
- Comparing companies
- Comparing metrics
- R&D rollover
- Adjusted income
  [tax advisor]
Results differ

There are reasons for the differences
1. The shareholders are not as optimistic as the CEO
2. The company keeps information from the public
3. Not all the IP in the company can be identified
4. Comparable companies never match precisely
5. Use of corporate metrics introduces indirection
6. Profit split depends on allocation of income
7. Past R&D investments take a long time to pay off
8. The taxadvisor wants to achieve low taxation
Clustered results

1. The total range is less than 50% of the average
2. The standard deviation is 15% of that mean
3. The two outliers are 7% above and 27% under
4. The interquartile range is less than 8% of its mean

The differences can be explained and the range could be narrowed

No method is `best`

Combining multiple methods increases the confidence

Only the tax advisor’s result is out of bounds
Not every method is applicable in all cases

1. Lack of data
2. Lack of trust in data
3. Lack of comparables
4. Complex allocation of IP generating efforts to products
5. Convoluted IP generation
6. Integration of organic IP and acquired IP

And yet, very useful understanding emerges and provides a basis for ongoing management decisions
Summary

Valuation is important for business decisions. Always based on expected future income: uncertain

Using multiple methods reduces uncertainty:

1. Fundamental: Income prediction (sales – costs) based on SW growth, maintenance, IP diminution
2. Market estimates *Wisdom of the crowd*
3. Leverage of R&D: *investment expectation*
4. Comparison with other businesses or acquisitions
5. Comparison with parameters of similar businesses
Open Source software?

Should software should be a free good?

Implicit in that view is that government, universities, and foundations should pay for software development, rather than the users.

1. *Programmers are creative artists, creating beauty and benefits for all of Mankind!* 😊

vs.

2. Software is an industry. 😼

SW revenue is $121B per year in the U.S. alone, well over 1% of the US GDP. Non-software companies spend yet more for business-specific software. Over 4.8 million people are employed in IT, earning nearly $333B annually.

- It is unlikely that universal free software is an achievable and even a desirable goal.
• Appropriately, open source initiatives actually focus on software that deserves wide public use and should be freely available to students and innovators, as *editors, compilers, and operating systems*.

• Much open source software is incorporated into Commercial software, that is not made freely available,

  ➢ *even if it should be.*
Certain of our software (as well as that of our customers) may be derived from “open source” software that is generally made available to the public by its authors and/or other third parties.

Such open source software is often made available to us under licenses, such as the GNU General Public License (GPL), which impose certain obligations on us in the event we were to distribute derivative works of the open source software.

These obligations may require us to make source code for the derivative works available to the public, or license such derivative works under a particular type of license, rather than the forms of licenses customarily used to protect our intellectual property.

In the event the copyright holder(s) of any open source software were to successfully establish in court that we had not complied with the terms of a license for a particular work, we could be required to release the source code of that work to the public and/or stop distribution of that work.
What’s left to value?

• Common software that is sold or licensed
• Software that enables Internet Services
• Software that is written inside companies to improve their business
• Software purchased from vendors by companies to improve their business
• Software purchased from vendors by government to improve its operations
  ➢ Military, Social Security, IRS, Healthcare, . . .
Freemium

Software is free
1. Charge for fancy version
2. Charge for upgrades (maintenance)
3. Charge for multi-user version
4. Charge for Internet sharing
The Freemium Model

• Larry Tesler, MINE Inc.

• CS 207
• 31-Oct-2014
## Benefits to the User

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<tr>
<th>Free (ads)</th>
<th>$5-$10/mo</th>
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<tbody>
<tr>
<td><strong>Dropbox</strong></td>
<td><strong>1,000 GB Storage</strong>&lt;br&gt;<strong>Additional sharing controls</strong>&lt;br&gt;<strong>Remote wipe</strong></td>
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<tr>
<td><strong>2 GB Storage</strong></td>
<td><strong>60 MB/mo Upload</strong>&lt;br&gt;<strong>25 MB per Note</strong></td>
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<tr>
<td><strong>60 MB/mo Upload</strong>&lt;br&gt;<strong>25 MB per Note</strong></td>
<td><strong>1,000 MB/mo Upload</strong>&lt;br&gt;<strong>100 MB per Note</strong>&lt;br&gt;<strong>6 Added Features</strong></td>
</tr>
<tr>
<td><strong>PC/Mac Access Only</strong>&lt;br&gt;<strong>Last 5 episodes</strong>&lt;br&gt;<strong>SD Resolution</strong></td>
<td><strong>plus Mobile, TV, Console</strong>&lt;br&gt;<strong>Whole season, many films</strong>&lt;br&gt;<strong>HD Resolution</strong></td>
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Benefits to the Company

• Reduced marketing costs
• More predictable revenue
• Works best when:
  ➢ Free features cost very little and/or
  ➢ Subscriptions and ads subsidize free use
  ➢ Easy upgrade from the app itself
Works best when

- The quality of the product is very high
- The product offers unique features
- Free users become invested in content
- Free features cost the company little
- Paying users & ads subsidize free use
- Easy upgrade from inside the app
- Several % of users upgrade in 0 to 2 yrs
Conversion rates are key

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<th>1</th>
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<td>Annual Expenses</td>
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<td>Downloads (Triers)</td>
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<td>150</td>
<td>2,400</td>
<td>12,150</td>
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<td>20% to Free (Users)</td>
<td>-00</td>
<td>30</td>
<td>480</td>
<td>2,430</td>
<td>7,680</td>
<td>18,750</td>
<td>38,880</td>
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<td>1% to Premium (Buyers)</td>
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<td>24</td>
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<td>188</td>
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<td>720</td>
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<td>$5/mo annual revenue</td>
<td>$-00</td>
<td>$18</td>
<td>$288</td>
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<td>EBITDA if 1% go Premium</td>
<td>$(6,000)</td>
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<td>$(13,212)</td>
<td>$(18,792)</td>
<td>$(25,767)</td>
<td>$(34,313)</td>
<td>$(45,016)</td>
<td>$(59,298)</td>
<td>$(80,045)</td>
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<tr>
<td>3% to Premium (Buyers)</td>
<td>-00</td>
<td>1</td>
<td>14</td>
<td>73</td>
<td>230</td>
<td>563</td>
<td>1,166</td>
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<tr>
<td>$5/mo annual revenue</td>
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<td>$54</td>
<td>$864</td>
<td>$4,374</td>
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<td>EBITDA if 3% go Premium</td>
<td>$(6,000)</td>
<td>$(8,946)</td>
<td>$(12,636)</td>
<td>$(15,876)</td>
<td>$(16,551)</td>
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<td>$1,640</td>
<td>$27,138</td>
<td>$67,411</td>
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**EBITDA if 1% go Premium**

**EBITDA if 3% go Premium**

earnings from product, before interest, tax, depreciation, & amortization
Conflicts

• “At a very well-known vendor, the CMO reported to the EVP of sales. When the CMO tried to insist the software be made more safe and responsive, he was fired. As Jon stated -- and anyone who studies organizations know -- there can be good people participating in terrible decisions about creation of healthcare software products.”
Example of Free

• Adobe produced software to generate and read markup text (pdf) for sale to companies.
  ➢ minor business for internal publishing

• Arrangement with the IRS that if Adobe would separate the reader and provide for free, it would publish tax forms using pdf
  ➢ huge business – now everyone needed a reader and companies bought pdf generators to publish in pdf

• When patents ran out, others companies made pdf generators available
  ➢ Adobe still provides many pdf related services
How to react to software failures

• Freemium none
• I-phone Apps little, at most price refund
• games
• Shrink-wrap
• Enterprise software
• embedded software
  ➢ in chips
  ➢ in cars
  ➢ in planes
  ➢ in nuclear plants