

VALUING SOFTWARE AND SOFTWARE COMPANIES

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SOFTWARE IS EVERYWHERE

To begin with the crassest possible announcement: I make a good living from valuing software, but somewhere, deep in me, there is a little Luddite - or perhaps my one-eighth Irish ancestry, which is hesitant to admit the obvious: software is like the air we breathe; we can't live without it.

Like another long established practice, we are hitched to software "for better or worse". It enables airlines to crowd us together like sardines and call it "maximizing passenger loads". It determines the much cursed traffic light sequences, but without them, half of us would probably be employed as cops, regulating traffic on every intersection, and many of us remember the good old days when checks took about a week to clear - software now does it within 24 hours. To our chagrin, credit card charges are entered immediately; long gone is the time when American Express charges from Europe took six weeks to arrive on this continent.

It also:

- runs clock radios
- times the microwave
- turns off the coffee maker when the brew is just right
- triggers a car's anti-lock brakes
- operates elevators
- runs assembly lines
- keeps toilet paper on supermarket shelves
- creates video games that help pigs put on weight faster

And how much software do you think is carried on the Cassini probe? Maybe not quite as much as they've got at Cape Canaveral...

What is Computer Software?

The question is neither irrational nor stupid; remember when Spreadsheets and Financial Projections were done by hand? Using a slide rule was considered progressive. Now, the Pentium on my desk has more power than the whole mainframe at the Wall Street investment bank where I worked over 30 years ago.

Valuing Software and Software Companies

Things are going faster and faster, but without software a computer is ignorant. Comments by Lady Ada Lovelace, Lord Byron's daughter, who financed Charles Babbage's mechanical predecessor of the computer, still apply:

The Analytical Engine has no pretensions whatever to originate anything. It can only do whatever we know how to order it to perform.

That was in 1843, one hundred and two years before ENIAC, the first successful electronic computer, which took up the whole gymnasium at the University of Pennsylvania.

To put it simply, software instructs a computer what to do, how to do it, and how fast. Computers are expected to become even faster in the near future, and cheaper, due to two recent developments in chip technology: IBM's replacement of aluminum by copper, and Intel's doubling of the amount of data a chip can store; this means that computers will continue to follow the "Moore Law", based on the 1965 pronouncement by Gordon Moore, Co-founder of Intel, that microprocessors double in power and speed every eighteen months. About 2004, this law will come up against the Laws of Physics, but I'm backing Moore.

My own definition of software, based on Webster, is:

"Both the precise sequence of instructions that enable a computer to undertake a particular activity and the writ-ten code, flow charts, sub-routines, objects, languages, procedures, documentation, data, etc. that are used to prepare it".

Types of Software

There are two types of software: Systems Software and Application Software.

Systems Software is special; there are only about 70 types in general use, but every computer needs it to function. It includes not only the operating system, but also service and utility functions, such as data management, sorting, merging & conversion, system accounting, diagnostics, performance measurement, report generation, and security control. As it is highly unlikely that you will ever have to value Systems Software, we will not discuss it.

Application Software is that required by any computer to carry out specific functions related to the management, storage and processing of data. We all use it in our offices, for accounting, spread sheets and word processing.

This presentation deals with Application Software and covers some of the problems of valuing it and the organizations that create it. There are various types of Application Software based on different technologies and serving distinct markets.

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- Enterprise: Software products on various platforms that control business processes and functions. They may serve one vertical market (such as Financial Services), or provide a function (such as Document Retrieval Management or an Accounting System) in many vertical markets.
- PC Packaged: Software that runs on a personal computer and is normally used to improve individual productivity, such as word processors, spread sheets and personal information managers.
- Engineering: Software on various platforms that assists in the design and production of items ranging from food to mechanical devices, computer chips and, yes, even other software.
- Edutainment: Software usually running on PCs that offers entertainment or education, mainly oriented to the under twenty crowd. The above mentioned video games for pigs also falls into that category, but I refuse to draw any parallels to couch potatoes.

What Makes Software Different From Everything Else?

As discussed, today's society is dependent on computers which can't function without software; it is therefore needed by nearly every business and millions of consumers.

- The market life of any particular piece of software is limited, generally assumed to be about two years by investors and tax departments; this is very important when valuing it. However, established programs can often be enhanced to prolong their lifespan over several versions.
- Software is the ultimate intellectual property. Once it has been created, making as many copies as are wanted is easy and cheap; it has therefore a cost structure completely different from that of most goods and services.
- The barriers to entry are normally at the marketing, not the development level. This means that one first must find out if anyone really wants the product, and what advantage it has for any group or sector.
- In most industries there are standards. The world agrees on the layout of car pedals; North America accepts one electric plug and line voltage. Standards also exist for software, but as change happens so rapidly, most are determined by the market, before the official bodies can complete their work.
- Past losses and the amount of shareholders' equity have little importance on software companies' values; in general, these depend on future prospects.
- The major capital expenditure is on R&D, which is written off as incurred. For valuations, such amounts are capitalized to the extent that software assets have been created.
- Factors such as "distribution channels" and "installed base of users" are important intangible assets that do not normally appear in the financial records of a software company.

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- Downloading from the Internet is having a profound effect on deployment rates and pricing policies of the whole industry.
- Some types of software, such as "search & retrieval engines", are becoming commodities available on the Internet, sometimes free.

Typical Software Economics

Most industries show declining economies of scale: the bigger an organization or plant gets, the more layers of management and infrastructure are needed. With software, the opposite is true. As manufacturing and distribution costs tend to be fixed and rather low once development is completed, it has increasing economies of scale. This is demonstrated by the following example based on a PC packaged product:

	Company M	Company C
Product R & D	\$250 million	\$200 million
Software Selling Price/Unit	\$350.00	\$350.00
Variable Costs/Unit	\$50.00	\$50.00
Share of Market	80%	10%
Units Sold	8 million	1 million
Revenue	\$2.8 billion	\$350 million
Gross Profit	\$2.4 billion	\$300 million
S G & A (40%)	\$1.1 billion	\$140 million
Operating Contribution	\$1.3 billion	\$160 million
Return on R&D	520%	64%

The result is that whoever is ahead tends to get further ahead, and temporary monopolies are quite normal.

There are No Rules of Thumb

- In most industries, there are broad trends that are relatively easy for the valuation analyst to understand, as well as the long term effects that have a bearing on that sector of the economy. With numerous transactions, "Rules of Thumb" have become established.
- There are very few broad trends or long term effects in the software industry and certainly no such universally applicable rules. Nearly every situation is an exception in some way or other.
- There are lots of Software companies, but they usually don't have a high value, as shown by the statistics on Software Acquisitions for the last three and a half years:

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	Transactions	Median Size
\$ million		
1994	137	10.5
1995	253	8.6
1996	290	10.5
1997 (to June 30)	171	7.3

Those statistics may not seem out of the ordinary until it comes to specifics, such as the position taken by the IRS; very often, looking to public comparables, they IRS assumes that a software company's value is too high, a fixation that can have rather disagreeable effects:

- The tax position of an employee granted an option;
- Discouraging investors and curtailing the ability to raise financing;
- In some States, adverse impact on divorce proceedings.

Products and Companies

The majority of software companies are small; therefore, in many cases, THE PRODUCT IS THE COMPANY.

This has advantages as well as disadvantages. Products can be very lucrative while they flourish, but they are generally short lived. That means that, unless the company constantly updates, enhances, even replaces the software, your client should not count on gains on the shares sufficient to put his children through college, or use them to set up trust funds for the grandchildren.

One hundred and fifty years ago, this great state of California was built on mining. When I am talking to politicians who don't understand technology - by no means a rare breed - I sometimes use mining companies as an analogy to software firms. Both start with an idea: mining with a prospect, the other with a software concept. Substantial amounts have to be spent on developing the potential ore body - the computer program - before any cash flow is generated. In many instances, there will be insufficient ore - or lack of interest in the software - to become commercially viable.

Once cash flow has started, much of it must be pumped back into further development; find more ore - enhance the software. Eventually, a mine runs out of ore, and a software concept, like DOS, has been passed by and ceases to generate cash flow.

For established entities, whether in mining or in software, the value of the company consists of the value of the products, plus its skilled staff, products (prospects) under development, the opportunity and intention to innovate, and its relationships with customers, distributors, suppliers etc.

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For larger entities, the Value of the Company consists of the Value of the Products, plus:

- The Franchise Value of the organization
- Skilled staff
- Products under Development
- Relationships with Customers, Distributors, Suppliers, etc.
- Opportunities for Innovation

Our Case Study deals with these items.

Factors Affecting a Valuation

- Technology
- Markets
- Delivery of the Product
- Management
- The special edge that enables the firm to charge a premium for a product in high demand. In most businesses, selling prices are dictated by the market, and high margins are obtained by low costs. With software, price is set by what it can do for the customer; therefore, price, not cost, is the determinant of profit and key to value.

Technology

The product life cycle is fundamental:

- It may be driven by hardware capabilities or customer needs
- Economic lives have been decreasing
- Yet the "tail" is becoming longer
- Intranets within organizations and the Internet linking them are having a fundamental impact
- There is a shift from in-house creation (BUILD) to customization of packaged products (BUY)
- The Year 2000 will be here in 26 months

The degree of elegance of the solution is important:

- The choice of Operating System and language
- The suitability of the architecture

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- The quality of the Source Code and completeness of its documentation and comments
- Ease of modification

The programming team:

- Number of people
- Their experience
- Purpose-oriented internal communications

The Platform/Operating System:

- A trend to move from mainframe to Client/Server
- The importance of networking
- Growth of NT v UNIX

The Market

- Size: Value increases with size due to increasing returns
- Growth: Value is enhanced by a rapidly growing market
- Usage: The more people use or might use a product, the more valuable it is
- Market Cycle, based on "Crossing the Chasm" by Geoffrey Moore:
 - Innovators
 - Visionaries (early adopters)
 - The CHASM
 - Pragmatists
 - The Second Gap
 - Conservatives
 - Laggards

The Chasm can be enormous; some companies/technologies are never able to cross it.

Visionaries

Intuitive
Support revolution
Contrarian
Break away from the pack
Follow their own dictates
Take risks
Motivated by future opportunities
Seek what is possible

Pragmatists

Analytic
Support evolution
Conformist
Stay with the herd
Consult with their colleagues
Manage risks
Motivated by present problems
Pursue what is probable

Once a product is starting to be bought by the Pragmatists, its value jumps.

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Size and Growth of Market

- Every piece of Software uses a selected set of technologies; in this industry, technologies change very rapidly. When a new technology is introduced, it may allow a competitive product to offer better features. Depending on circumstances, the original product may not be able to take advantage of the new technology, because certain elements may be mutually exclusive. In this case, the potential market will be reduced and the value decreases
- The demonstrated size of the market for the competitive product and the penetration by a specific technology are a guide to the probable market share of the product being valued
- Rates of growth vary widely, depending on the maturity of the technology and the market. A new solution in a stagnant market can totally change growth rates

Competition

If there is no competition, there may be no market. On the other hand, enormous mass markets have been created for products nobody knew they wanted, such as hi-fi's, condos, cruises or health food stores. In 1950, Thomas J. Watson Jr., Executive Vice President of IBM, approved creation of their first general purpose scientific computer, as they thought they "could find customers for as many as 30 machines". At the time, there were probably only a dozen computers in existence.

Almost every piece of software is:

- Replacing an existing solution
- Competing head to head with alternatives
- Threatened by a novel approach

All three threats may occur simultaneously.

Positioning

Determines the place the software occupies within two interrelated systems:

- The customer's choices for purchase
- Companies interacting to make a market
- For valuation analysts, the second system is more important, as it determines the first

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Market-Maker's View of the Marketplace

New Market	Imperialists v Natives	Explorers & Forty-niners
Established Market	Old Guard: <ul style="list-style-type: none">• Gorillas• Chimpanzees• Monkey	Barbarians v Citizens
	Established Product	New Product

Understanding this situation is important to the valuation analyst, as a firm's future and the prospects for the product are influenced by Management's perception of itself. Each role implies different power relationships, alliances, and competitors.

A firm that does not recognize itself as one of the archetypes is likely to be considered just another 'no name' company, easily ignored by the market and not expected to be around for long. This can become a self-fulfilling prophecy, since survival requires a certain amount of industry support.

This and the next sections are based on "Crossing the Chasm" and "Inside the Tornado" by Geoffrey Moore, the best works I know on "Hi-Tech" marketing.

Software: The 'B' Movie

- The Old Guard - the Gorilla: The only question is whether it is a benevolent or cruel dictator; altruism rarely enters the picture
- The Old Guard - Chimpanzees: A threat to the Gorilla and a target for Monkeys, Chimpanzees must secure their power bases by retrenching into niche markets, building up sufficient product advantage to ward off attacks, and telling everyone they are not interested in expansion but prepared to defend their turf to the death
- The Old Guard - Monkeys: Their goal is to be the low-cost supplier who is easiest to do business with
- Imperialists: Members of the Old Guard who have extended established products into new markets, either geographically by deeper penetration, or through adoption of a new platform
- Natives: The mirror image of the Imperialist; instead of new technology, they have access to the customer through superb distribution and communications channels
- The Explorers: Oriented to new products and new markets, they are disquieting because they do not seek immediate profit and are in for the long haul

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- Forty-Niners: The most different from other companies, they claim to have found gold and are recruiting partners to cross the CHASM and mine it
- Barbarians: They attack a contested piece of the market with pincer movements, the way UNIX gradually wrapped itself around mainframes
- Citizens: Related to the Old Guard, they fight a war of attrition and counter-attack with new technology to preserve their position

Delivery of the Product

Marketing

- Nothing sells itself
- Does management understand the market and how to reach it?
- Marketing is rarely taught in Engineering, Science or Math Faculties

Distribution

- Is the distribution method geared to the needs of the sector
- Direct selling is effective, with good margins, but very expensive
- Channel marketing through Systems Integrators or VARs (Value Added Resellers) requires a totally different structure
- The Internet offers low-cost distribution, usually at reduced prices; it can be regarded as the software five-and-dime of the nineties

Sales Cycle

- Its length determines the appropriate selling method
- PC packaged products can be sold in a few minutes
- A sale of Enterprise software to a government agency can take as long as two years

Capital

- How much capital is needed to see the company through its product and sales cycles?

Management

Range of Talents

- A wide range of skills is of greater importance in a software company than in most businesses
- One-man shows don't fly

Track Records

- It is very difficult to analyze how much was due to the individual and how much to the team and circumstances

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- A failure, or even two, do not necessarily mean bad management, but may become part of the learning curve

Enthusiasm and Tenacity

- Is everyone willing to put in the hours and accept the risks necessary to make a software company grow?

Realism

- Do the projections look like a hockey stick
- A \$5 million company can grow by more than 100% for a couple of years, but not a \$100 million business; very few firms go from nothing to \$50 million in two years

Ownership

- How much of the company does management own
- Outside ownership and directors are essential to avoid complacency and ensure responsiveness to the market

Avoid

- In this industry, beware of sharp dressers, and don't let bankers or lawyers make the decisions; "grunge is good"

Approaches to Valuation

Cost Based

- Original cost to create the product; this is usually very high as it may involve many blind alleys
- Reproduction Cost of Software; this is generally very low
- Replacement Cost of Software and Documentation, reflecting not only the expenditures to recreate, but also "time to market" and the cost of re-establishing the user/dealer base
- Net Worth/Goodwill Value

Income Based

- Capitalization of Net Income (Net Income Value)
- Capitalization of EBITDA (Earnings Before Interest, Taxes, Depreciation & Amortization)
- Discounted Cash Flow (Adjusted Present Value):
 - Use managerially relevant segments for the existing operations and value each of them separately
 - Segregate the tax shield
 - Identify potential opportunities

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Transaction Based

- Multiple of Revenues
 - Trends
 - Substantial variations

Median Revenue Multiples

According to Broadview Associates, a specialised investment banking firm located in Fort Lee, New Jersey, the Median Adjusted Price/ Revenue multiples for software company acquisitions in the last four years were:

	Q1	Q2	Q3	Q4
1995	1.57	2.00	2.91	2.77
1996	2.31	3.25	2.74	1.97
1997	3.36	2.65	n/a	n/a

For the Period

1st Quarter Median	8.00 X
2nd Quarter Median	3.09 X
3rd Quarter Median	1.85 X
4th Quarter Median	0.79 X

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1996 Median Benchmarks from US Public Companies

	Enterprise	Packaged	Engineering	Entertainment
Operating				
Gross Margin (%)	57.2	68.5	78.1	56.9
S G & A (%)	58.1	68.1	62.3	64.2
R & D (%)	17.6	21.1	21.4	26.1
Net Margin (%)	3.8	(4.1)	5.2	(18.9)
Financial				
Current Ratio	2.6	2.4	2.4	2.1
Receivables (days)	99.6	66.6	74.0	82.7
Payables (days)	59.8	76.6	46.1	70.5
Working Capital (days)	156.4	189.4	166.4	153.3
Activity				
Asset Turnover (times)	1.0	0.9	0.9	0.8
Sales/Employee (\$'000)	160.2	146.7	174.3	152.0
Return on Assets (%)	6.0	(0.7)	11.1	(6.8)
Return on Equity (%)	7.4	(2.9)	8.0	(10.1)
Valuation Multiples				
Sales	2.0	1.7	2.2	2.0
Cash Flow	12.8	(6.7)	17.1	(0.8)
Net Income	15.1	(0.1)	17.9	(0.8)
Book Value	3.0	2.6	2.7	2.5

Source: Deloitte + Touche

Sources of Information

- Periodicals: PC Week, Computerworld, Information Week, PC magazine, PC World, Windows magazine, etc.
- The Internet
- Industry consulting groups: Gartner, IDC, DataQuest
- Trade shows: Comdex, Supercomm, Network+Interop, CEBIT (Hamburg)

Welcoming Change

Most people resist change; this can manifest itself in many forms, ranging from complete denial to open hostility. Sometimes the resistance proves effective and the status quo lives on; more often, the resisters become road kill.

The power to recognize change early and understand the forces behind the trend is one of life's greatest gifts. Taking advantage of upcoming change before it permeates common knowledge has laid the foundation for many fortunes.

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A Caution

If you are in the software industry, do not have a dominant market share, and Microsoft is entering your category, call a board meeting and consider drastic changes to your Business Plan.

APPENDIX – Build V Buy I

For Software Users

Advantages of Building

- You get exactly what you want

Disadvantages of Building

- Cost over-runs
- Timing uncertainties
- Diversion of management and other resources

Advantages of Buying

- Cost is known and can be tied to performance
- Debugging will be substantially completed
- Speed

Disadvantages of Buying

- Procedures may have to be changed to suit the system
- May be more expensive
- Likely not exclusive

Appendix – Build V Buy II

From the Toronto Globe and Mail, a Toronto newspaper, September 16, 1997:

"A software glitch led to the shutdown of a discount airline, Vistajet Inc., at midnight Friday, leaving a trail of angry passengers, unpaid bills and laid-off employees, according to Dave LeClair, president of Alliance Call Centre (London) Inc. [Ontario].

"His firm operated Vistajet's reservations centre and he blamed Vistajet's self-written software for losing up to half of the airline's customer calls.

"There was definitely demand [for their flights] out there, he said. They were getting 3,000 calls a day. But they made a decision to use their own company-owned reservations system. They developed it and did their own software. But it caused a lot of problems.

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"Ironically, he said, the London, Ontario company, which began service May 26, was getting ready to install a proven airline reservations system when it ceased operations."

Appendix – Build V Buy III

For Software Companies

Advantages of Building

- A company with proprietary products has a much greater value than one with similar revenues and profits, but without proprietary products, which only supplies services

Disadvantages of Building

- Requires sophisticated management skills
- Timing uncertainties
- Programmers have their own culture

Advantages of Buying

- Cost is known, as are margins
- Debugging is mainly somebody else's responsibility
- Speed

Disadvantages of Buying

- Can be locked into yesterday's technology

Appendix – Accounting For (Software) Twinkies

By Peter Huber, Forbes February 24, 1997

"A dollar spent on a toaster doesn't reduce your wealth in the same way as one spent on a Twinkie. One lasts, the other doesn't. But where do toasters end and Twinkies begin in the information economy?"

"Tax collectors and securities' regulators tell American corporations how to make that call. Washington's accounting rules insist that land values last forever, brick and metal for 10 to 30 years, and your typical silicon chip for 5 or 10. Windows 95, and the cost of training human wetware to use it, are all pure Twinkie. Officially, that is.

"But suppose Washington has it backwards. Say that only half the value of buying Windows 95 for your office is to make your workers more productive this year. The other half is to keep your office moving with the rising tide of software - to prepare for Windows 97. Which you'll buy for the same, divided purposes. The useful life of the software may depend largely on how long you retain your Windows-trained employees, whose

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productivity may grow year after year, commensurately with the power of the software they have mastered.

"Maybe learning how to use E-mail prepares you for even more productive use of the Web two years later. Maybe the painful cost of connecting up your first, slow office network not only pays for itself in a year or two, but slashes the cost of up-grading for the next fifty. Maybe productivity just keeps rising as one layer of software wisdom is spread over the next.

"If your accounts told that story, your P&L statement might look very different. When Disney pours millions into the next digital 'Hunchback', it's a good bet that this kind of software will generate income for decades to come. The rest of America has made massive software investments of its own. Now playing on a desktop near you.

"Meanwhile, the once durable desks, computers and buildings are getting Twinkied. When you run out of disk space or processing power, which do you throw out, your software and files, or your old computer? When networking software lets a credit card company abandon expensive real estate in Manhattan for cheap quarters in Nebraska, the Twinkie is eating the toaster.

"Accountants understand the general problem, but they don't know what to do about it. Capitalizing anything that you can't drop on your foot - software, worker training, America Online's marketing expenses - can be hugely speculative. You never find out whether such things have real future value until the future arrives. So securities regulators insist on expensing them to prevent inflated valuations. Tax collectors go the other direction in order to maximize their revenue. If the Internal Revenue Service had its way, you would have to capitalize everything from airline engine maintenance to advertising.

"Should we trust the accounting directives that issue from either government agency? For years, Washington quietly and earnestly miscalculated the inflation rate. Suddenly we learn that decades of numbers on productivity, wages, tax rates and Social Security are all wrong. The deficit figures may be wrong too, because they don't track capital investment. The fact is, Washington is losing its grip on economic reality."