Extract from **Commercialise 2001 Conference Proceedings**	
Workshop	**3D**
Title	**Valuation of Technology Businesses Commercialise 2001 Conference**
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Introduction

Valuation of Technology Businesses brought together both international and Australian expertise to discuss best practice valuation methodologies for technology businesses. Discussion was extended to explore new ways to improve Australia's ability to manage and value existing and potential businesses. Papers and articles on valuation techniques and the shareholder value concept were issued to stimulate discussion. Issues considered during the seminar were:

- Strategic logic and firm development
- Value theory and value paradigms
- Financial valuation methods and their strengths and weaknesses
- Axiological valuation methods and their strengths and weaknesses
- Managing firm development to maximise value

Background

The Commercialise 2000 conference highlighted the issue of valuation from two main aspects. Firstly, it was clear that the range and application of methodologies used in valuation were not broadly understood and secondly that there was a distinct lack of understanding of the different perspectives of value as perceived from the technologist and the financier viewpoints. These differences in opinion were often responsible for failures in the meeting of minds between the two parties.

Issues

These can be characterised by two quotes taken from the proceedings of last year's conference:

- (Lack of) "Processes for effectively valuing technology product or services. What is the value inherent in the company"[1]?
- "In general we confuse technology with business - we focus on the novelty of technology rather than value in business"[2].

The workshop was specifically designed to address these two issues by drawing together two experts in the field to provide both an international and local perspective. The workshop was facilitated jointly by Mr. Göran Roos, Chairman of Intellectual Capital Services, London, England, and Mr. Simon Bailey, Managing Director of Fulton Peak Pty Ltd. Their combination delivered both practical experience through consulting and business roles and academic rigour to deal with the diversity of opinion around the often deal breaking issue of valuation.

Identification of Issues

The fundamental crux to remember for valuations is that valuation outcome differs depending upon the approach adopted. The three commonly accepted approaches as described by Damadoran (2001) are:

- "Discounted Cash Flow, which relates the value of an asset to the present value of expected future cashflows on that asset.
- Relative Value, that estimates the value of an asset by looking at the pricing of 'comparable' assets relative to a common variable like earnings, cashflows, book value or sales.
- Contingent Claim Valuation, which uses option pricing models to measure the value of assets that share option characteristics"[3].

The object of the valuation, in this case a private technology firm, further complicates the use of varying approaches. These firms offer specific problems especially with relation to uncertainty in cash flows, growth and discount rates[4]. The conference paper 'Valuation of Private Technology Firms, A Discussion Paper on Dealing with the Associated Problems', G. Roos and O. Gupta, (2001), offers a description of each methodology and a comprehensive outline of difficulties associated with each valuation approach.

In addition to the inherent problems of methodology is the added variation of perspective, i.e. from whose viewpoint is the valuation being conducted? This variance in viewpoint exposes the issue of 'fair' value; that which appears fair to one party may not be perceived as fair by another.

A second paper included in the conference materials discusses an Intellectual Capital (IC) approach to valuation that is rapidly gaining broad acceptance (M'Pherson and Pike, 2001; Pike and Roos, 2001). This valuation approach is leading edge as it extends traditional accounting valuation approaches by combining the intangible assets perspective (Barney, 1996) with a branch of philosophy known as 'axiology'. Axiology deals with the study of value[5] and adopts a rational framework to deal with the emotive issues behind the perception of value (Rescher, 1969).

From this context, the major issues for the conference session participants may be grouped into two categories; firstly, dealing with valuation methodologies and approaches and secondly, dealing with the issues of value growth and maximisation . These are summarised as follows:

Methodologies and Approaches to Valuation

- Technology and intellectual property valuations
- Range of methods of valuation
- Intellectual capital valuation
- Rules of thinking / reality

Maximisation of Value

- Different perspectives of value
- Managing intellectual assets
- Managing expectations
- Learning from experiences
- The different roles of valuation and evaluation
- Growth and value accumulation

The maximisation of value introduces the need for good evaluation procedures to underpin the creation, growth and management of value and therefore maximise the return for both the investors and investee business.

"Value lies in the Eye of the Beholder"

Discounted cash flow, (DCF), lies at the heart of all the business valuation methodologies[6]. Although discounted cash flow valuation approaches are well established in finance theory, issues of uncertainty and variations in whose perspective value is perceived both complicate the task of deriving a 'fair' market value.

Value, in fact, may be described in three ways: intrinsic, instrumental and extrinsic. An intrinsic value is derived from the object of the valuation. That is, a value is applied that is linked purely to the objects existence despite its ability be used or put to use. Instrumental value is calculated on the basis that the asset being traded may be put to work to generate some form of revenue or other useful output. Extrinsic value is linked to the perception of others. That is, an object is valuable to one because it is considered valuable by others. Brands typically fall into this category as they are only valuable if others attribute a value to them, which in turn makes it valuable for another to own or display.

Typically Intellectual Property (IP) valuations are subjected to instrumental valuation and therefore unless the IP can be transformed in some manner to produce a revenue stream, the valuation on an instrumental basis is largely zero.

Another important issue with discounted cash flow valuations is the *type* of cash flows considered in the net present value calculation.

Typically, such calculations take into account a combination of past and future cash flow performance. The future cash flow components has however often failed to take into account how much of a company's value results from the following two very difficult factors to quantify; the first being *ignorance* and the second being the most intangible of intangibles, *expectations*.

Taking a more complete picture, DCF valuations must hence consider that the future state cash flows will be perceived to come from a range of sources:

- The actual operating activities, those that are known and have a proven history, (CF_{ao}).
- Other capital investments, income-producing investments unrelated to the main operating activities, (CF_{oci}).
- The identified opportunities, those that are clearly defined and provide a ready source of future cash, (CF_{io}).
- The unidentified opportunities, those that as yet remain unknown and provide a potential and latent source of future cash, (CF_{uo}).
- Information asymmetry, those perceived that may or may not occur based upon a deficiency in accurate information, (CF_{ia}).

This may be represented by a simple formula:

$$\textbf{Market Value} = \textbf{NPV}[CF_{ao} + CF_{io} + CF_{uo} + CF_{oci} + CF_{ia}]$$

Where NPV is Net Present Value

Two types of cash flow are largely responsible for the range of variations that occur in valuation methodologies. The first is cash flow from unidentified opportunities and the second from the information asymmetry cash flows.

Basing valuations on a high component of projected cash flows from unidentified opportunities essentially represents a potential investment based on *faith* that the cash flows will occur in accordance with future predictions. This dimension is performance sensitive, in that the belief in the future performance is either reinforced or eroded as the promised commitments are satisfied or missed as the case may be.

Basing a valuation with a heavy bias on the cash flows from information asymmetry represents a potential investment in *ignorance*, i.e. insufficient information is held to fully assess the true cash flow projections. This component is time sensitive in that as time progresses more information is gathered that fills the void in knowledge therefore reducing the emphasis on this portion of projected cash flows.

Providing a valuation that reduces the reliance on the faith and ignorance factors in the equation raises the issue of screening the business and its opportunity successfully and understanding the areas of insufficient information. For this a variety of tools are required ranging from rules of thumb to sophisticated analysis.

Good business prospects do not merely reside in the realm of good technical proof of concept. Technical justification must then be accompanied by proof of market concept. Which may include consistency with legislation and regulatory requirements. This then must be transferred into a workable business model. A package of good technology, market prospects and business models are the ingredients upon which future cash flows may be projected. Arriving at a cash flow forecast provides the basis for valuation. Good opportunity screening improves the reliability of the projected cash flows and therefore the valuation.

From an investor's viewpoint, screening is a process of de-selection. It amounts to the rejection of businesses to eliminate those that do not fulfil the necessary criteria for success. Of the businesses that remain after the de-selection process, prioritisation and further investigation narrows the field to a few possible investment contenders.

Screening a business opportunity focuses the attention of the business owner as well as the valuer onto the areas of interest and requires critical analysis in the following:

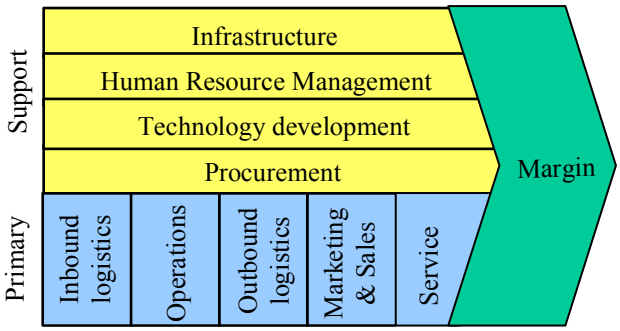
- The financial aspects.
- The market.
- The management.
- Products and services.
- Customer profiles.
- Production and delivery.
- Strategy and board membership.
- Marketing and distribution.
- Factors affecting the investors.
- Industry and macro environment.

Each of the above areas requires a number of sub-questions to complete the analysis and weightings will be assigned to each to reflect the variation in importance of each criterion. This screen will also highlight the strength and durability of the asset base of the business in five categories, namely; monetary assets; physical assets; relationship assets, organisational assets; and, human assets. The ability and reliability with which these assets can be leveraged to deliver value are the foundation of the risk assessment and the betas used in the valuation methodologies.

Leveraging these assets into value deals with asset transformations and introduces the topic of value creation logics or value logic. Essentially there are three value logic's that are employed in the arrangement of and effect of, combining assets to transform value. Each are supported by the same type of infrastructure, human resource management, technology development and procurement activities, however they each have different primary activities. The value logic's and their primary activities are (Fjeldstad and Stabell, 1998):

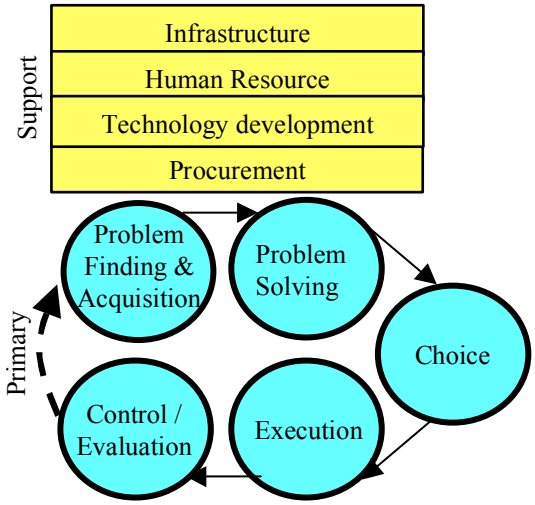
- The *value chain*, as shown in **Figure 1**, first brought to prominence by Michael Porter, utilises a value transformation system with a sequential chain of primary activities that responds to economics of scale.

Figure 1 Value Chain



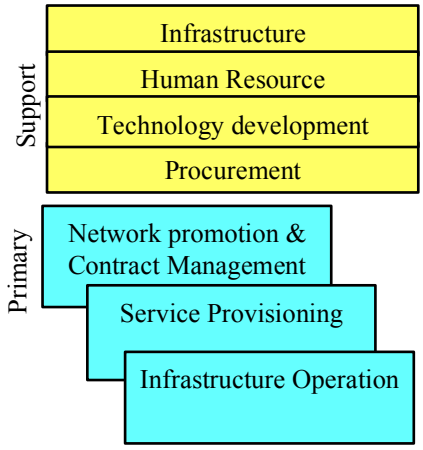
- The *value shop*, depicted in **Figure 2**, which uses a repeating cycle of primary activities that are employed to solve client problems and, is best managed by economies of scope.

Figure 2 Value Shop



- The *value network*, refer **Figure 3**, which connects independent enterprises into an interdependent system to provide mutual benefit to the network members. Being a parallel system of value creation it behaves according to network economics.

Figure 3 Value Network



In order to manage expectations during the growth stages of a business it is important to understand the economic behaviour of each of the value creation logics. **Figure 4** below plots

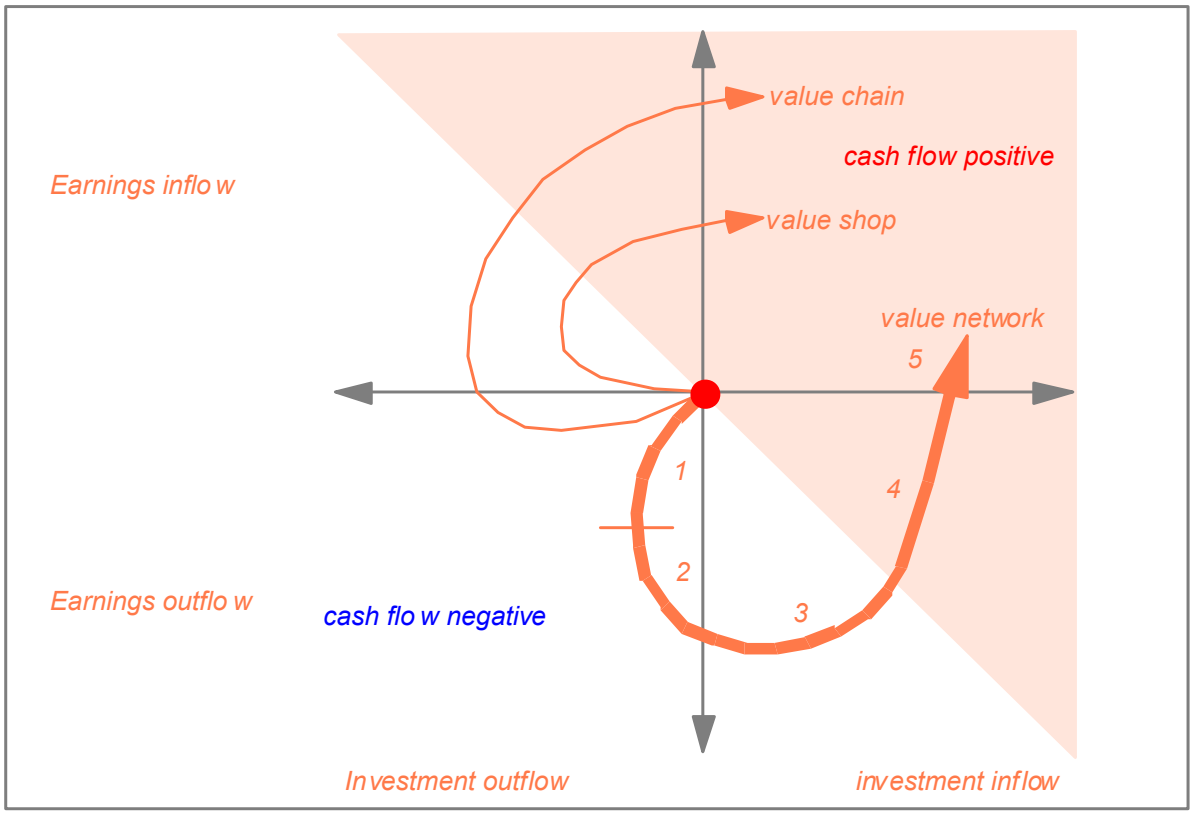
the projected earnings and investment inflows and outflows, which may guide a new business. Being unclear about which value logic is appropriate may cause the new venture to stray from its task by confusing activities which represent an alternate logic and therefore delaying its progress toward significant milestones causing frustration for both the investor and the investee.

Until such time as the new venture reaches a position of positive cash flow the predominant issue should be one of screening, or evaluation, to ensure the pathway to profitability is secure upon which to develop a valuation. After reaching a cash flow positive position then valuation becomes the prominent focus of negotiations as the cash flows of faith and ignorance both receive a more positive value through the proof of performance and progress of time.

Communication also becomes a key point in the negotiation of value in technology. If the investor can not be absolutely clear about the technology, what it does and how it can be applied within a market, then the negotiation will cease. In effect the cash flow of ignorance for the investor becomes far too negative and out weighs any positives from the other factors.

The final point on screening must rest on the management team. Despite a good package of technology, market and business model, the conversion of value will ultimately be the responsibility of the people charged with the delivery. Proven performance improves the cash flow of faith and whilst ever promises made are honoured this element of the valuation will remain substantially positive. Missing key milestones or assembling an unproven team risks a severe penalty with negative assessments from the cash flow of faith. If these salient points are misunderstood by the technologists then the financiers will be the targets of harsh negative criticism and deals will regrettably remain undone.

Figure 4 Revenue and Investment Flows for Different Value Logic's



Understanding that there are different viewpoints introduces an added complexity to valuation. If either the financier or technologist believe that there is only one truth, and that is theirs, then undoubtedly the majority of negotiations would stall. This is the view of the logical positive approach that says there is only one truth. An alternate argument does exist and that is the one based in the field of metaphysics and a branch of philosophy known as

axiology. This presents a case that truth is dependent upon perspective and is the foundation work for the axiological approach to valuation.

The axiological approach requires six steps (M'Pherson, 1996):

1. Identify the observer.
2. Identify the object to be valued.
3. Identify the reference objectives, which will be largely subjective and unmeasurable.
4. Identify the necessary and adequate attributes of the reference objectives.
5. Define the measurement space or operations
6. Assign relative importance to each attribute.

These parameters are gathered from the observer and hence reflect the conditions that define and ascribe value for the observer. The measurement attributes are most likely to behave differently to the standard additive accounting procedures and some will exhibit dependencies upon others, which in cases will not be mutually dependent. For example the attributes of happiness for a person may be good health, disposable income and free time. One may be inclined to decrease income to gain an increase in health; however, it is less likely that good health would be traded for an increase in income. Similarly, free time may well be useless without good health and therefore good health would not be traded for free time, but free time may be a necessary component of good health and hence, freely traded.

Applying the sophistication of such a methodology requires a substantial commitment from the person requiring the valuation and, the valuation would only be true for the one observer of the object subjected to valuation. The tailored and rigorous characteristics of this methodology, whilst undoubtedly superior in reducing the subjectivity of valuations, would largely be prohibitive for all but large valuation projects requiring an accurate outcome with clearly articulated dependency and interdependency relationships. The revealing insights of the approach however, are significant to the issues facing the valuation of technology businesses in Australia.

Conclusion / Recommendations

It is likely that the range of methodologies currently in use for the valuation of young technology businesses will continue to be the dominant means by which values will be determined. With this in mind the way forward to improve the valuations and the management of the valuation process in Australia is to increase the awareness and knowledge of the issues embedded in the valuation process for the technologists and entrepreneurs. So too the financiers need to be constantly in touch and informed about developments and applications of technology in their chosen fields of investment.

The summary conclusions and recommendations are

- Entrepreneurs and technologists need to be better educated about the inputs and process of business valuation.
- Communication should be improved between investors and technologists to increase the chance and rates of deal success.
- Regular networking events involving technologists, entrepreneurs, investors and intermediaries would assist in bringing about a common understanding of the valuation processes and issues.

Valuation is one of the key communication vehicles between the entrepreneur/technologist and investors. The quotes given in the introduction reflect a hurdle that is currently acting as a barrier to many early stage ventures obtaining finance. Whilst the hurdle will never be removed, (closing a deal will still be a matter of agreement), by increasing the awareness of the perspectives of both the parties and facilitating a better understanding of the valuation methodologies, a smoother path from seed to maturity may be laid for many promising young enterprises.

[1] Commercialise - technology commercialisation forum 2000 proceedings, (2000), Victorian Government Department of State & Regional Development, p26.

[2] Commercialise - technology commercialisation forum 2000 proceedings, (2000), Victorian Government Department of State & Regional Development, p7.

[3] Damadaran, A., (2001) Available Online: http://www.stern.nyu.edu/~adamodar/ (LINKS: Valuation, Overheads, Individual Presentations - Approaches to Valuation), 'An Introduction to Valuation', Accessed 14/11/01, p5.

[4] Roos, G. and Gupta, O., (2001), Valuation of Private Technology Firms - A Discussion Paper Dealing with the Associated Problems, Commercialise 2001 Conference Papers, Stream 3, Session D, p2

[5] Roos, G., (2001), The Axiological Valuation Approach For Valuation of Private Technology Firms, Commercialise 2001 Conference Papers, Stream 3, Session D, p5.

[6] Roos, G. and Gupta, O., (2001), Valuation of Private Technology Firms - A Discussion Paper Dealing with the Associated Problems, Commercialise 2001 Conference Papers, Stream 3, Session D, p6.

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