Technology Market Research & Technology Valuation

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EXCO Member, LES Singapore

18 April 2012
About the Speaker

DR. TIAM-Lin SZE is the Director at IPI, a company setup under the national Research, Innovation & Enterprise 2015 (RIE 2015) Plan, to be the nexus for enterprise to access, acquire and capitalize on IP to innovate and succeed in the global economy.

Prior to IPI, Dr Sze held several Senior Vice Presidents appointments at Exploit Technologies Pte Ltd, the commercialisation arm of A*STAR and involved in numerous roles including IP management and strategy, technology intelligence and competitive intelligence, commercialization and licensing. He has successfully commercialized new technologies ranging from IT, communications, manufacturing, semiconductors, materials, chemicals, nanotechnologies to medical devices. Dr Sze is a Certified Licensing Professional (CLP) and a member of the Executive Committee of the Licensing Executive Society (LES), Singapore. He has two granted patents. He is a panel member in the National Research Foundation (NRF) POC Committee and a review member of the A*STAR Biomedical Engineering Programme (BEP) POC grant.

Dr. Sze holds a Ph.D and B.Eng in Automatic Control & Systems Engineering from the University of Sheffield, UK and received an executive education in Strategic R&D Management at INSEAD, Fontainebleau.
OUTLINE OF PRESENTATION

1. Introduction to Technology Valuation
2. Market Approach
3. Cost Approach
4. Income Approach
5. Rules of Thumb (The 25% Rule)
6. Additional Methods
7. Technology & Market Research
NDP Fun Pack Song

Source: The Straits Times
INTRODUCTION

- The Value of IP and Technology in Business

- Create Competitive Advantage
  - Block competitors
  - Exploit new market opportunities
  - Reduce risks
  - Create loyalty

- Improve Financial Performance
  - Tap IP for new revenues
  - Reduce cost
  - Attract additional capital

- Establish Proprietary (Special) Knowledge
  - Protect technologies & business methods
  - Boost R&D and branding effectiveness
  - Anticipate market & technology shifts
INTRODUCTION

- How to extract value from IP?

Strategic Alliances & Collaborations

Divestments & Spin-Offs

Merger & Acquisition

Licensing & Franchising

Financing Strategies
1. Introduction to Technology Valuation
2. Market Approach
3. Cost Approach
4. Income Approach
5. Rules of Thumb (The 25% Rule)
6. Additional Methods
7. Technology & Market Research
1. MARKET APPROACH#

Concept of Value:

“Prices from previous transactions provide empirical evidence for the indicated value of an asset”

# Comparables or Industry Standards
1. MARKET APPROACH

- Comparables (survey or industry experts)

**Figure 3:** Use of Industry Standards to Determine Royalties
(Data set obtained from review of all Agreements filed in Japan)

<table>
<thead>
<tr>
<th>Terms of Payment</th>
<th>Classification of Technology</th>
<th>Chemical</th>
<th>Metal</th>
<th>Machinery</th>
<th>Electrical</th>
<th>Others</th>
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<tr>
<td></td>
<td>2% &gt; x &lt; 5%</td>
<td>42</td>
<td>24</td>
<td>119</td>
<td>55</td>
<td>126</td>
</tr>
<tr>
<td></td>
<td>5% &gt; x &lt; 8%</td>
<td>12</td>
<td>8</td>
<td>112</td>
<td>24</td>
<td>119</td>
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<tr>
<td></td>
<td>&gt; 8%</td>
<td>7</td>
<td>4</td>
<td>24</td>
<td>31</td>
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<td>Others</td>
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<td>80</td>
<td>54</td>
<td>69</td>
<td></td>
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<td>21</td>
<td>59</td>
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<td>92</td>
<td></td>
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<td>Minimum Payment</td>
<td>Required</td>
<td>38</td>
<td>19</td>
<td>116</td>
<td>35</td>
<td>186</td>
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<tr>
<td></td>
<td>Not Required</td>
<td>127</td>
<td>72</td>
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<td>Subtotal</td>
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<td>165</td>
<td>91</td>
<td>410</td>
<td>238</td>
<td>451</td>
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<tr>
<td>No Fee, Royalty</td>
<td></td>
<td>16</td>
<td>4</td>
<td>11</td>
<td>2</td>
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<td></td>
<td>181</td>
<td>95</td>
<td>421</td>
<td>240</td>
<td>466</td>
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</table>

Source: Science & Technology Agency, Japan
Class A Technological Assistance Agreements (1975)
1. MARKET APPROACH

- Other Sources

- Association of University Technology Transfer (AUTM) Professionals – [www.autm.net](http://www.autm.net)
- Licensing Executive Societies (LES) Professionals - [www.les.org](http://www.les.org)
2. COST APPROACH

Concept of Value:

“An investor will pay no more for an IP asset than the cost to purchase or construct an asset of equal use”
2. COST APPROACH

1. Cost method can be based on:
   a) Replacement cost
   b) Development cost

2. There are some concerns expressed in using the Cost Method, citing royalty rates are a representation of value and costs have very little to do with value, e.g., lottery ticket?

3. Attempt to calculate an investment rate of return on the R&D costs associated with developing an invention, again cost does not reflect well the value of an invention, e.g., 3M?

4. Why not? – High R&D cost can be result of poor project or investment management on the seller & cost depends on start date, poor start date will affect cost. What about inefficient way of creating technology?

5. Buyer is looking for forward opportunity, not to undo the misfortunes of the seller, if any.

6. Exception, using cost analysis to argue ROI for seller, what about outsource R&D effort/cost to others, i.e., buyer’s alternatives. Can be useful for buyer to determine the starting point for estimating associate cost to recreate the technology.
3. INCOME APPROACH

Concept of Value:

“An IP asset is what it can earn in the future!”
3. INCOME APPROACH#

- Basic Concept

The Process

- Step 1: Forecast of cash flow
- Step 2: Calculation of terminal value
- Step 3: Estimation of cost of capital
- Step 4: Estimation of Value

Value

Free Cash Flow

2006 2007 2008 2009 2010 .... Terminal Value

Weighted Average Cost of Capital (WACC)

# Discounted Cash Flow (DCF)
3. INCOME APPROACH

- Also known as Discounted Cash Flow (DCF). Basic concept:

\[ B = A (1 + k)^n \]

A = present value (e.g., $1,000)
B = future value (e.g., n=3 yrs @ k = 5%) leads to $1,050
k = Risk-Adjusted Hurdle Rate (RAHR), e.g.,

Seed stage (k>80%);
Startup (50% <k<70%);
1st Stage – limited customer (40%<k<60%);
2nd Stage – growth (30%<k<40%)
“Bridge” financing – to IPO (20%<k<35%)
e.g., payback? Microsoft (400), 10 – 40, etc.

A or DCF = B / (1 + k)^n
B/A = (1+k)^n ~ “payback”
### 3. INCOME APPROACH

<table>
<thead>
<tr>
<th>YEAR</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<tbody>
<tr>
<td>Number of Units Sold</td>
<td>100</td>
<td>200</td>
<td>300</td>
<td>350</td>
<td>400</td>
<td>400</td>
</tr>
<tr>
<td>Average Selling Price</td>
<td>$10,000</td>
<td>$10,000</td>
<td>$9,500</td>
<td>$9,000</td>
<td>$8,000</td>
<td>$8,000</td>
</tr>
<tr>
<td>Revenues (Sales)</td>
<td>$1,000,000</td>
<td>$2,000,000</td>
<td>$2,850,000</td>
<td>$3,150,000</td>
<td>$3,200,000</td>
<td>$3,200,000</td>
</tr>
<tr>
<td>Cost of Good Solds (COGS)</td>
<td>$600,000</td>
<td>$1,200,000</td>
<td>$1,710,000</td>
<td>$1,890,000</td>
<td>$1,920,000</td>
<td>$1,920,000</td>
</tr>
<tr>
<td>Gross Profit</td>
<td>$400,000</td>
<td>$800,000</td>
<td>$1,140,000</td>
<td>$1,260,000</td>
<td>$1,280,000</td>
<td>$1,280,000</td>
</tr>
<tr>
<td>Gross Margin</td>
<td>40%</td>
<td>40%</td>
<td>40%</td>
<td>40%</td>
<td>40%</td>
<td>40%</td>
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</table>

**Operating Expenses:**

<table>
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<tr>
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<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Overhead &amp; Admin</td>
<td>$50,000</td>
<td>$100,000</td>
<td>$142,500</td>
<td>$157,500</td>
<td>$160,000</td>
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<td>R&amp;D</td>
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<td>$199,500</td>
<td>$220,500</td>
<td>$224,000</td>
<td>$224,000</td>
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<tr>
<td>Marketing</td>
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<td>$228,000</td>
<td>$252,000</td>
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<td>$256,000</td>
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<tr>
<td>Selling</td>
<td>$30,000</td>
<td>$60,000</td>
<td>$85,500</td>
<td>$94,500</td>
<td>$96,000</td>
<td>$96,000</td>
</tr>
<tr>
<td>Operating Profit</td>
<td>$170,000</td>
<td>$340,000</td>
<td>$484,500</td>
<td>$535,500</td>
<td>$544,000</td>
<td>$544,000</td>
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<tr>
<td>Operating Margin</td>
<td>17%</td>
<td>17%</td>
<td>17%</td>
<td>17%</td>
<td>17%</td>
<td>17%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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</thead>
<tbody>
<tr>
<td>Income Taxes</td>
<td>$34,000</td>
<td>$68,000</td>
<td>$96,900</td>
<td>$107,100</td>
<td>$108,800</td>
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<tr>
<td>Net Income</td>
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<td>$272,000</td>
<td>$387,600</td>
<td>$428,400</td>
<td>$435,200</td>
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<tr>
<td>Net Profit Margin</td>
<td>14%</td>
<td>14%</td>
<td>14%</td>
<td>14%</td>
<td>14%</td>
<td>14%</td>
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</table>

**Cash Flow:**

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<th>4</th>
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<th>6</th>
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<td>$94,500</td>
<td>$96,000</td>
<td>$96,000</td>
</tr>
<tr>
<td>Gross Cash Flow (GCF)</td>
<td>$166,000</td>
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<td>$473,100</td>
<td>$522,900</td>
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<td>$531,200</td>
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<td>Increase in Investment</td>
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<td>$85,000</td>
<td>$30,000</td>
<td>$5,000</td>
<td>$0</td>
<td>$0</td>
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<tr>
<td>Net Cash Flow</td>
<td>$66,000</td>
<td>$247,000</td>
<td>$443,100</td>
<td>$517,900</td>
<td>$531,200</td>
<td>$531,200</td>
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</table>

**RAHR (k) @ 25%**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
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<tr>
<td>DCF(k)</td>
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<td>NPV(k)</td>
<td>$1,076,883</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DCF(k) = DCF @ 25%

NPV(k) = NPV @ 25%
3. INCOME APPROACH

Incremental Revenue
The IP asset allows the owner to earn incremental cash flows, e.g., to charge a price-premium

Cost Savings
The IP asset allows the owner to reduce cost, thus saving gain
4. THE 25% RULE

Value-Chain of Activities and Contributions

Use Of The 25 Per Cent Rule In Valuing IP

BY ROBERT GOLDSCHEIDER, JOHN JAROSZ AND CARLA MULHERN

Introduction

As the importance of intellectual property (“IP”) protection has grown, so has the sophistication of tools used to value it. Discounted cash flow, capitalization in copyright, trademark, trade secret and know-how contexts as well. Since the Rule came into fairly common usage decades ago, times, of course, have changed. Questions have been raised on whether the owners, the Swiss subsidiary of a large American company, with 18 licensees around the world, each having an exclusive territory. The term of each of these licenses was for three years, with the expectation of re-
4. THE 25% RULE

- Application of the 25% Rule

e.g., Inspec Tech Pte Ltd (*an illustration*)

<table>
<thead>
<tr>
<th>YEAR</th>
<th>1</th>
<th>2</th>
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<td>$1,140,000</td>
<td>$1,260,000</td>
<td>$1,280,000</td>
<td>$1,280,000</td>
</tr>
<tr>
<td>Gross Margin (GM)</td>
<td>40%</td>
<td>40%</td>
<td>40%</td>
<td>40%</td>
<td>40%</td>
<td>40%</td>
</tr>
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Operating Expenses:

<table>
<thead>
<tr>
<th></th>
<th>1</th>
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<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Overhead &amp; Admin</td>
<td>$20,000</td>
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<td>$57,000</td>
<td>$63,000</td>
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<td>$114,000</td>
<td>$126,000</td>
<td>$128,000</td>
<td>$128,000</td>
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<tr>
<td>Marketing</td>
<td>$30,000</td>
<td>$60,000</td>
<td>$85,500</td>
<td>$94,500</td>
<td>$96,000</td>
<td>$96,000</td>
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<tr>
<td>Selling</td>
<td>$10,000</td>
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<td>$28,500</td>
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<td>$32,000</td>
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<td>Operating Profit</td>
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<td>$600,000</td>
<td>$855,000</td>
<td>$945,000</td>
<td>$960,000</td>
<td>$960,000</td>
</tr>
</tbody>
</table>

| Operating Margin     | 30%     | 30%     | 30%     | 30%     | 30%     | 30%     |

The 25% rule applies to PM & translate to royalty of sales (i.e., 7.5%)
5. ADDITIONAL METHODS

(a) Comparable Licenses (Rating/Ranking)
   - Scoring criteria (market size, patent protection, stage of development, etc.)
   - Scoring system (1 – 5 where 5 is best)
   - Scoring scale (subjective and objective – experts/metric)
   - Weighting factors
   - Decision Table

(b) Auction

(c) Monte Carlo Method – a probabilistic approach

Exhibit 8.7  Monte Carlo Results for the Example in Exhibit 8.6
INTRODUCTION (Deal Structuring)

1. Value derived from *saving* or *profit* generated
2. Value versus Pricing
3. Equipped oneself with good negotiating skills
4. Importance of understanding Licensee’s business model
5. Royalty is based on Sales (not profit)
6. Licensing terms (examples):
   a) Licensor/Licensee
   b) Technology/Patent/Software
   c) Non-exclusive versus exclusive
   d) Field of Use
   e) Territory
   f) Duration
   g) Considerations, etc.
7. Royalty or payment structure
   a) Running royalties (e.g., 10% of sales, $4 per piece, etc.)
   b) Upfront payment
   c) Annual minimum (annual fee, milestone payment)
   d) Lump-sum or Paid-Up licence
TECHNOLOGY & MARKET RESEARCH

KNOW YOURSELF
✓ Know your business model
✓ Know your strengths & weakness
✓ Develop a strong business concept and value propositions that could be licensed
✓ Have a well considered business expansion plan
✓ Identify sufficient resources to support plan

KNOW YOUR TARGET MARKETS
✓ Identify the countries for your business concept
✓ Gather market information such as market size and share, market readiness, etc.
✓ Develop appropriate tactics to penetrate the market

KNOW YOUR COMPETITORS
✓ Know their strengths & weakness
✓ Know their products, services, customers, cost structure, etc.
✓ Formulate your own strategies on how best to tackle the competition
NDP Fun Pack Song

Source: The Straits Times
IP Academy (IPA) Singapore

1. Patent Due Diligence Using Software Tools
2. Practical Tips in Finding, Reading & Understanding Patent Documents in the IDM Landscape
3. Basic Licensing Course
4. Strategies & Tools for IP Marketing
5. Evaluating New Technologies
6. Essentials in Technology Intelligence & Competitive Intelligence (TICI)
a channel for Singapore Enterprises to acquire and capitalize on **technologies** and **know-how** to grow their business
Our Approach

**Scope**
Translate innovation objectives into specific IP and technology requirements to optimize your business processes, products and services.

**Scan**
Scan and search for available expertise and technologies from reputable local and overseas sources to meet your technology requirements.

**Source**
Engage technology owners with strong value proposition to seek out licensing, acquisition or JV opportunities.
INDUSTRY
SME & SG-based Enterprise

TECH PARTNERS
Local, Overseas & IP Partners

Search Technologies

Post TechNeeds

Tech Alerts

Extend Reach of IPI Network
Thank You for Listening

For further information, contact:

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Director, IPI
Phone: 65-64196601
Email: tlsze@ipi-singapore.org
Office: 61, Biopolis Drive, #01-02, Singapore 138673