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*The Valuation of Intangible Assets*

Mark L. Zyla CPA/ABV, CFA, ASA  
Managing Director  
Acuitas, Inc.  
Atlanta, Georgia



# Overview

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- What are intangible assets?
- Which are the best methods to measure the fair market value of specific intangible assets?
- What are some advance methods of measuring the value of intangibles?

# *Valuation of Intangible Assets*

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- Acquisitions, mergers and sales of businesses or parts of businesses,
- Purchases and sales of intangible assets,
- Reporting to tax authorities,
- Litigation and insolvency proceedings, and
- Financial reporting

IVSC Technical Information Paper 3, *The Valuation of Intangible Assets*

# How Intangible Assets Create Value

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- History of Intangible Assets
- Increasing recognition that intangible assets create value for an entity
- Provide rights and privileges to the owner
- Represent an entity's intellectual capital

# History of Intangible Assets

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- Changes in technology impact mankind's development
  - 15<sup>th</sup> century – printing press
  - 19<sup>th</sup> century – telegraph
  - 20<sup>th</sup> century – telephone, television and Internet
- Global economies have experienced a tremendous shift from “bricks and mortar” business to information based businesses
- Increased recognition that intangibles add value
  - Globalization and international trade
  - Information based technologies
- A greater % of global market capitalization is derived from intangible assets

# Economic Basis of Intangible Assets

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- Intangible assets represent an intellectual advantage
- Exploit the intellectual property to achieve a competitive advantage in the market place
- Economic advantage is realized through enhanced margins
  - ▣ Those without possession of the intellectual property must pay for its use through licenses or royalty fees
  - ▣ Relationships with customers already exist, so marketing and selling costs are lower
  - ▣ An assembled workforce keeps hiring and training

# Other Value Drivers for Intangible Assets

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- The use of an intangible asset does not have physical limitations – nonrivalry scalability
  - ▣ Permits multiple users
  - ▣ Size of market is only limiting factor
  - ▣ eBay, FaceBook
- The value of the intangible asset increases as the number of users increases – networking effect
  - ▣ Adobe Flash Player

# Key Terms

- An asset is *identifiable* if it either:
  - Is separable, that is, capable of being separated or divided from the entity and sold, transferred, licensed, rented, or exchanged, either individually or together with a related contract, identifiable asset, or liability, regardless of whether the entity intends to do so; or
  - Arises from contractual or other legal rights, regardless of whether those rights are transferable or separable from the entity or from other rights and obligations.

Source: IFRS 3, IVSC IVS 210 Intangible Assets, FASB ASC 805

# Examples of Intangible Assets That Meet the Criteria for Recognition Apart from Goodwill

- Marketing-related intangible assets
  - Trademarks, trade names
  - Service marks, collective marks, certification marks
  - Trade dress ( unique color, shape, or package design)
  - Newspaper mastheads
  - Internet domain names
  - Noncompetition agreements
- Customer-related intangible assets
  - Customer lists
  - Order or production backlog
  - Customer contracts and related customer relationships
  - Noncontractual customer relationships

# Examples of Intangible Assets That Meet the Criteria for Recognition Apart from Goodwill

- Customer –or supplier related ( continued)
  - Franchise agreements
  - Operating and broadcast rights
  - Use rights such as drilling, water, air, mineral, timber cutting, a den route authorities
  - Servicing contract such as mortgage servicing contracts
  - Employment contracts
  
- Artistic related intangible assets
  - Plays, operas , ballets
  - Books, magazines, newspapers, other literary works
  - Musical works such as compositions song lyrics, advertising jingles
  - Pictures, photographs
  - Video and audiovisual material including motion pictures, music videos, television programs

# Examples of Intangible Assets That Meet the Criteria for Recognition Apart from Goodwill

- Technology-based intangible assets
  - ▣ Patented technology
  - ▣ Computer software
  - ▣ Unpatented technology
  - ▣ Databases, including title plants
  - ▣ Trade secrets, such as secret formulas, processes, recipes

Source: IVSC Technical Information Paper 3, FASB  
Topic 805,

# The Cost Approach

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- Understand the economic foundation underlying the cost approach
- Distinguish reproduction cost and replacement cost
- Examine types of obsolescence
- Become familiar with the cost approach and underlying methods for valuing intangible asset
  - Historical Cost Trending
  - Unit Cost Method
  - Unit of Production Method
- Understand the limitations of the cost approach

# Definition of the Cost Approach

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“The cost approach is based on the economic principle that a buyer will pay not more for an asset than the cost to obtain an asset of equal utility, whether by purchase or by construction.”

IVSC Technical Information Paper 3 The Valuation of Intangible Assets 7.1

# Reproduction vs. Replacement Cost

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- Reproduction cost – the cost to construct an exact replica of the subject asset, using the same materials, standards, design, and workmanship at today's prices. Any obsolescence in the original will be duplicated.
- Replacement cost – the cost to construct an asset with equivalent utility using current materials, standards, design and workmanship. The replacement will exclude all curable obsolescence present in the original.
- Both are measured using valuation date costs.
- Either can be a starting point for the applying the cost approach.

# Components of Cost

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- When determining reproduction cost or replacement cost, consider all five components of cost
  - Material
  - Labor
  - Overhead
  - Developer's profit
  - Entrepreneurial Incentive (Opportunity Cost)
- Treatment of developer's profit and entrepreneurial incentive are inconsistent in practice.

# Applying the Cost Approach

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- Preferable approach when the asset is readily replaceable and when the costs of replacement are reasonably determined.
- Most often used for contributory assets that are not direct sources of the entity's cash flows
  - Assembled workforce
  - Internally developed software
  - Mailing lists
  - Engineering drawings
  - Package designs

# Cost Approach Methods

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- Historical cost trending – using the entity's records from the original purchase or creation and applying price indexes
- Unit cost method – a direct estimate of all the costs to create a similar replacement asset
- Unit of production method – relying on rules of thumb for determining cost that are commonly accepted in certain industries

# Historical Cost Trending Example

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- Suppose you have been hired to measure the fair value of ABC Company's internally developed customer order processing software.
- What factors might influence your decision to use historical cost trending?
  - Whether the software can be easily replaced
  - Whether the entity has maintained records from the development of the asset.

# Historical Cost Trending Example

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- Once you have calculated the current cost of reproducing the original software (trended original cost plus opportunity cost plus entrepreneur's profit), then ask:
- If ABC were creating the customer order processing software in 20X8, would it be better than the original software created in 20X2? Would it require less effort to create?
- If less effort is required, what does this indicate?
- Obsolescence in the original.

# Obsolescence

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- How you estimate economic obsolescence?
  - Comparative analysis of expected economic performance to historical, budget and industry to determine economic shortfall.
  - Economic shortfall is projected over the asset's useful life and discounted to present value.
  - Or, compare business enterprise value to total fair value of assets less liabilities. If BEV is less, the difference is obsolescence.
  - Or based on an estimate of overcapacity in an industry

# Taxes Under the Cost Approach

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- The last step in the analysis is to consider whether to include the impact of taxes in your analysis. The cost approach can be applied on a pretax or after-tax basis and there is divergence in practice.
- What are the factors that must be considered?
  - ▣ Tax structure of the entity
  - ▣ Tax structure of the transaction
  - ▣ Reason for the valuation – business combination, litigation, estate tax purposes

# Taxes Under the Cost Approach

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- The after-tax cost basis has two factors, the
  - The tax provision
  - A tax benefit from amortization of the intangible

# Amortization Benefit Multiplier

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- $TAB = VBA \times n / (-((AF \times t \times (1+r)^{0.5}) - 1))$
- Where:
  - TAB = Tax amortization benefit
  - VBA = Value benefit amortization
  - n = Number of years
  - AF = Annuity factor
  - t = Tax rate
  - r = Discount rate

**ABC Corporation**  
**Customer Order Processing Software**  
**Replacement Cost based on Historical Cost Trending**  
**as of June 30, 20X8**

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<u>Year Cost Incurred</u>	<u>Price Index</u>	<u>Historic Cost</u>	<u>Index Adjustment Factor</u>	<u>Cost</u>
20X0	168.9	1,124,800	210.3 / 168.9	\$1,400,506
20X1	173.5	1,362,874	210.3 / 173.5	1,651,945
20X2	175.9	1,237,400	210.3 / 175.9	1,479,393
<b>Trended Original Cost</b>				<b>4,531,843</b>
<b>Opportunity Cost - 15%, 26 months recreate</b>				<b>1,472,849</b>
<b>Entrepreneur's Profit - 4%, 26 months to recreate</b>				<b>392,760</b>
<b>Reproduction Cost</b>				<b>6,397,452</b>
<b>Less: Obsolescence of 30%</b>				<b>(1,919,236)</b>
<b>Before Tax Replacement Cost</b>				<b>4,478,216</b>
<b>Less: Tax @ 38%</b>				<b>(1,701,722)</b>
<b>After Tax Replacement Cost</b>				<b>2,776,494</b>
<b>Amortization Benefit Multiplier</b>				<b>1.16</b>
<b>Fair Value of Customer Order Processing Software, rounded</b>				<b>\$3,221,000</b>



# Unit Cost Method

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- The unit cost method is simply a direct estimate of all the costs that would be incurred to create a similar replacement.
- What is a logical first step?
  - Have a discussion with the original project manager to determine
    - the amount of time and effort it would take to replace the original
    - whether the replacement would be similar to the original, or
    - whether it would have enhanced capabilities and / or be more efficient (obsolescence in the original)

**ABC Corporation**  
**Inventory Control Software**  
**Replacement Cost based on the Unit Cost Method**  
**as of June 30, 20X8**

	Estimate Hours to Replace	Hourly Rate	Materials	Direct Labor	Benefits, Overhead, Profit & Opportunity Costs <sup>(1)</sup>	Total Costs
Specification Development	500	\$80.50	-	40,250	28,980	\$69,230
Project Management	3,000	63.75	-	191,250	137,700	328,950
Analyst	12,200	48.50	-	591,700	426,024	1,017,724
Programmer	17,750	44.50	1,850	789,875	570,042	1,361,767
Documentation	2,300	38.75	725	89,125	64,692	154,542
Testing	1,500	34.50	-	51,750	37,260	89,010
<b>Before Tax Replacement Cost</b>						<b>3,021,223</b>
<b>Less Tax @ 38%</b>						<b>(1,148,065)</b>
<b>After Tax Replacement Cost</b>						<b>1,873,158</b>
						<b>1.16</b>
<b>Fair Value of Inventory Control Software, rounded</b>						<b>\$2,173,000</b>

(1) Benefits of 33%, overhead of 20%, opportunity costs of 15% and entrepreneur's profit of 4%.

# Unit of Production Method

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- Within certain industries, rules of thumb exist for determining costs
  - Within the construction industry, costs per square foot
  - Within the fast food industry, cost estimates are based on seating restaurant seating capacity
  - Within the beverage bottling industry, franchise rights for distribution within a geographic are based on the number of cases sold
  - Within the software industry, cost is estimated based on the number of lines of code

# ABC Corp – Unit of Production

## Example

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- ABC Corp is a automobile rental company that is part of an international franchise. Within the industry, the value of the franchise is commonly estimated to be worth \$1,000 per automobile. Therefore, the replacement cost is simply the # autos X \$1,000.
- What other factors must be considered / measured?
  - Economic obsolescence
  - Tax effects
  - Whether value is consistent with other methods and approaches

**ABC Corporation**  
**Auto Rental Franchise**  
**Replacement Cost based on Unit of Production Method**  
**as of June 30, 20X8**

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<b>Franchise Location</b>	<b>Number of Automobiles</b>	<b>Replacement Cost per Auto <sup>(1)</sup></b>	<b>Total Replacement</b>
Gainesville, Florida	98	1,000	\$98,000
Jacksonville, Florida	330	1,000	330,000
Tallahassee, Florida	168	1,000	168,000
Augusta, Georgia	74	1,000	74,000
Brunswick, Georgia	42	1,000	42,000
Savannah, Georgia	115	1,000	115,000
Charleston, South Carolina	248	1,000	248,000
Columbia, South Carolina	174	1,000	174,000
Hilton Head, South Carolina	229	1,000	229,000
<b>Replacement Cost Before Obsolescence Adjustment</b>			<b>1,478,000</b>
<b>Less: Obsolescence of 10% <sup>(2)</sup></b>			<b>(147,800)</b>
<b>Before Tax Replacement Cost</b>			<b>1,330,200</b>
<b>Less: Tax @ 38%</b>			<b>(505,476)</b>
<b>After Tax Replacement Cost</b>			<b>824,724</b>
<b>Amortization Benefit Multiplier</b>			<b>1.16</b>
<b>Fair Value of Auto Rental Franchise, rounded</b>			<b>\$957,000</b>

(1) Per Business Reference Guide, 17th Edition, automobile rental companies have a franchise value of \$1,000 per auto.

(2) Management estimate of overcapacity within local markets.

*Fair Value Measurement: Practical Guidance and Implementation*, John Wiley & Sons 2012. Used with permission.



# Limitations of the Cost Approach

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- No direct incorporation of economic benefits
  - Duration or timing of benefits
  - Trends in benefits
- Risk is not incorporated
- Estimates become more subjective as time elapses from the date of original creation
- Obsolescence is difficult to quantify
- There is divergence in practice in the treatment of taxes, entrepreneur's profit and opportunity costs

# – The Market Approach

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- Learn how to apply the market approach when valuing certain intangible assets
- Understand the differences between various methods under the market approach
- Understand the limitations of the market approach to value intangible assets

# Definition of the Market Approach

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“ The market approach provides an indication of value by comparing the subject asset with identical or similar assets for which price information is available.”

IVSC Technical Information Paper 3, paragraph 5.1

# The Market Approach

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- The market approach is most commonly applied to the measurement of a business entity or reporting unit
  - ▣ Relies on market multiples such as the P/E ratio
- Can be applied to the measurement of fair value of intangible assets, but market information is often limited

# Applying the Market Approach to Intangible Assets

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- Relief from Royalty Method
  - Contains both market approach and income approach methods
  - Based on the theory that owning an intangible asset relieves the owner from having to pay license fees to a third party for a similar asset
- Guideline Transaction Method
  - Based on multiples from similar intangible assets applied to an operating parameter
  - Difficult to apply in practice due to lack of information

# Relief from Royalty Method - WW Wireless Example

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- What attributes of a license agreement would be assessed when determining the degree of comparability between a hypothetical license for the domain name and potential comparable licenses?
- Royalty rates is similar
- The economic measure to which the rate is applied
- The geographic area covered by the license
- Whether the license is exclusive or not
- The term of the license
- Whether the subject industry would support a similar royalty rate
- Any other risk / return attributes of the license
- How is the appropriate royalty rate selected?
- Selection is based on statistical analysis and judgment.

**WW WIRELESS, INC  
INTERNET DOMAIN NAMES  
AS OF DECEMBER 31, 20X0**

36 Licensor	Licensee	Date	Terms	Royalty		
				Low	High	
Arlington Fulbright Inc.	Passion Technologies, Inc.	May-09	International	1.0%	2.0%	
DigiWigiTech	TopTechNology.com	Dec-08	Non-transferable	2.0%	4.0%	
ThatName.Com	Cottage Industry Inc.	Sep-08	North America	2.0%	4.0%	
ChaseHatMadden.com	Central Chemical Co	Jul-08	NA	4.0%	4.0%	
Technology Alliance Group	Titians Technology GMBH	Apr-08	International	0.1%	1.5%	
Silverstein Jacobs LLC	Heartkind.com	Nov-07	Exclusive	1.0%	1.0%	
FirstPass.com	Sky Blue Sailing, Inc.	Jun-07	Exclusive	1.0%	2.0%	
				<b>High</b>	<b>4.0%</b>	<b>4.0%</b>
				<b>3rd Q</b>	<b>2.0%</b>	<b>4.0%</b>
				<b>Mean</b>	<b>1.6%</b>	<b>2.6%</b>
				<b>Median</b>	<b>1.0%</b>	<b>2.0%</b>
				<b>1st Q</b>	<b>1.0%</b>	<b>1.8%</b>
				<b>Low</b>	<b>0.1%</b>	<b>1.0%</b>
				<b>Mode</b>	<b>1.0%</b>	<b>4.0%</b>
				<b>Selected Royalty Rate:</b>		<b>1.0%</b>

# Relief from Royalty Method - WW

## Wireless Example

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- The relief from royalty method also incorporates basic discounted cash flow assumptions. Other than the royalty rate, what other basic DCF assumptions would be incorporated into the fair value measurement of the domain name?
- Projections for the economic measure to which the royalty rate is applied (revenues)
- Normalized growth rate
- Remaining useful life
- Cost of Capital (covered under the income method)
- Tax rate (covered under the income method)

**WW WIRELESS, INC**  
**VALUATION OF DOMAIN NAME**  
**AS OF DECEMBER 31, 20X0**

<b>38</b>	<b>20X1</b>	<b>20X2</b>	<b>20X3</b>	<b>20X4</b>	<b>20X5</b>	<b>20X1 + 30 years</b>
<b>Revenue</b>	<b>\$125,000,000</b>	<b>\$131,250,000</b>	<b>\$140,437,500</b>	<b>\$150,268,125</b>	<b>\$159,284,213</b>	<b>\$343,510,942</b>
<i>Growth</i>		<i>5%</i>	<i>7%</i>	<i>7%</i>	<i>6%</i>	<i>3%</i>
<b>Pre-Tax Royalty Savings @ 1%</b>	<b>1,250,000</b>	<b>1,312,500</b>	<b>1,404,375</b>	<b>1,502,681</b>	<b>1,592,842</b>	<b>3,435,109</b>
<b>Less: Taxes</b>	<b>(475,000)</b>	<b>(498,750)</b>	<b>(533,663)</b>	<b>(571,019)</b>	<b>(605,280)</b>	<b>(1,305,342)</b>
<b>After-Tax Royalty Savings</b>	<b>775,000</b>	<b>813,750</b>	<b>870,713</b>	<b>931,662</b>	<b>987,562</b>	<b>2,129,768</b>
<b>Partial Period</b>	<b>0.06</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>	<b>1.00</b>
<b>Period</b>	<b>0.03</b>	<b>0.56</b>	<b>1.56</b>	<b>2.56</b>	<b>3.56</b>	<b>29.56</b>
<b>Present Value Factor</b>	<b>0.994</b>	<b>0.902</b>	<b>0.752</b>	<b>0.627</b>	<b>0.522</b>	<b>0.005</b>
<b>PV of After-Tax Royalty Savings</b>	<b>48,556</b>	<b>734,363</b>	<b>654,807</b>	<b>583,870</b>	<b>515,752</b>	<b>9,716</b>
<b>Sum of PV of Savings</b>	<b>5,603,327</b>					
<b>Amortization Benefit Multiplier</b>	<b>1.15</b>					
<b>Preliminary Value</b>	<b>6,438,222</b>					
<b>Concluded Value, Rounded</b>	<b>\$6,438,000</b>					

<b>Assumptions</b>	
<b>Discount Rate</b>	<b>20.0%</b>
<b>Long-Term Growth Rate</b>	<b>3.0%</b>
<b>Tax Rate</b>	<b>38.0%</b>
<b>Royalty Rate</b>	<b>1.0%</b>
<b>Remaining Useful Life</b>	<b>30 years</b>

# The Market Approach

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- The market approach to valuing intangible assets can be one of the best indications of value. Unfortunately, information about comparable transactions is sometimes difficult to find. Even with available information the analyst must consider a variety of factors, such as
  - The type of intangible asset
  - The geographic region or other restrictions under the agreement
  - The time frame of the agreement
  - The terms of any royalties paid
  - The exclusivity of the agreement
  - The underlying industry and marketing dynamics

# The Income Approach

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- Learn when the income approach is appropriate
- Be able to apply the various methods under the income approach
- Develop the appropriate rate to discount cash flows from intangible assets

# Definition of the Income Approach

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“Valuation methods under the income approach determine the value of an intangible asset by reference to the present value of future income, cash flows or cost saving that could be reasonably expected to be achieved by a market participant owning the asset.”

IVSC Technical Information Paper 3 *The Valuation of Intangible Assets*. Paragraph 6.1

# Income Approach Methods

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- Discounted cash flow (DCF)
- Multi-period Excess Earnings Method (MEEM)
- Income Increment / Cost Decrement Method (With / Without Method)
- Profit Split Method

# General Considerations for Prospective Financial Information (PFI)

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- When you use PFI as the basis for your analysis, what are the questions you must ask?
  - ▣ Does the forecast correspond to internal budgets or external forecasts by stock analysts?
  - ▣ Is the current forecast consistent with previous forecasts?
  - ▣ Do the assumptions in the forecast appear reasonable in relation to historical performance?
  - ▣ Do the assumptions in the forecast appear reasonable in relation to performance of guideline companies or assets?

# Multi-period excess earnings method (MPEEM)

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- Value is based on cash flows attributable to the subject intangible asset
  - Typically the primary generator of cash flows for the entity
    - Technology
    - Customer relationships
- Contributory asset are secondary assets
  - A contributory asset charge is deducted from cash flows for each secondary asset to cover a reasonable return “on” the asset
  - An investor expects to receive a return “on” his investment and a return “of” his investment, similar to interest and principal on

# Steps in Applying the Multi-period Excess Earnings Method (MPEEM)

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1. Develop a fundamental understanding of the entity's operations and its value drivers.
2. Determine the subject asset's contribution to company revenues. If the subject asset is a wasting asset and will decline over time, apply a decay factor.
3. Estimate the PFI attributable to the subject intangible asset
4. Deduct a charge for the use of the tradename based on market royalty rates.
5. Deduct taxes to get debt free net income attributable to the subject asset

# Steps in Applying the Multi-period Excess Earnings Method (MPEEM)

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6. Determine which contributory assets assist in generating debt free net income ( i.e. working capital, fixed assets, other intangible assets)
7. Estimate an appropriate rate of return for contributory assets
8. Subtract returns on contributory assets from debt free net income
9. Discount residual cash flows to the present at a risk adjusted rate of return
10. Sum of present value of cash flows adjusted for amortization benefit is the fair value of the subject intangible asset

# Contributory Asset Charges

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- Underlying theory for contributory asset charges (CACs)
  - The charge represents an attribution of earnings to the contributory asset owned by the entity, or
  - The charge is similar to the payment of a usage fee for an asset owned by a third party
  - Either way, the return on investment would include a pure investment return and a recoupment of the original investment
- CAC provide a required return “on” the contributory asset
- Include a return “of” the contributory asset in the CAC
  - When asset has to be replaced over time
  - CACs for fixed assets
- No return “of” the contributory asset in the CAC
  - When asset does not deteriorate and is continuously replenished over time
  - CACs for working capital and assembled workforce

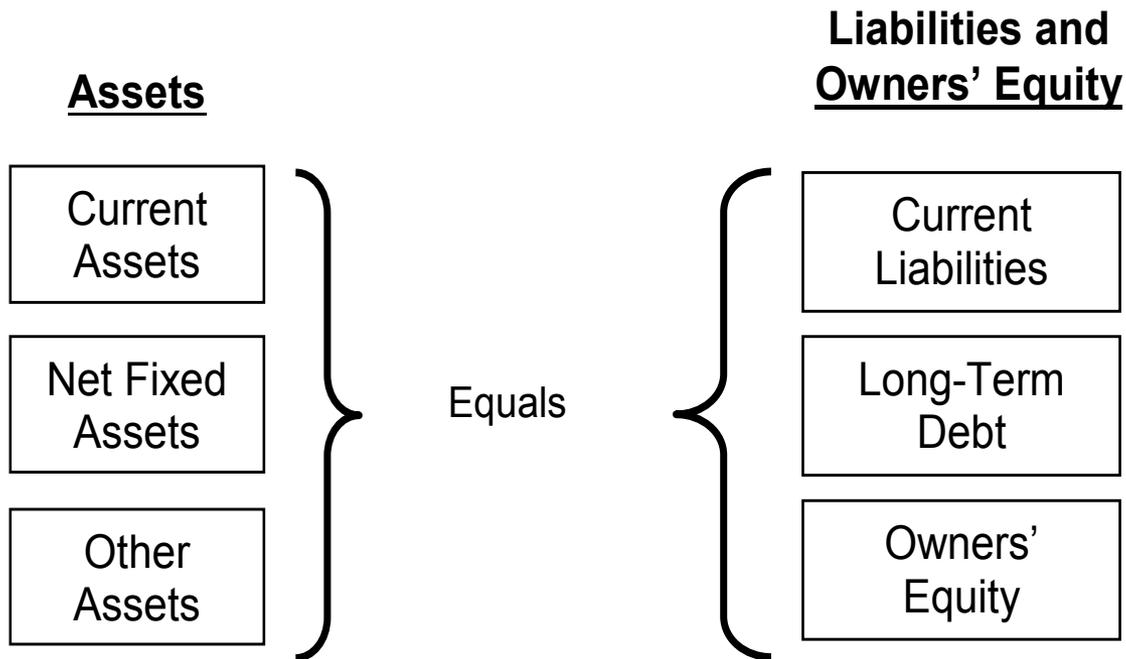
# Contributory Asset Charges by Asset Category

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- Required rate of return should be commensurate with the relative risk
  - Considers the level of debt financing that could be secured
  - Considers market participant costs of equity and debt
  - Considers degree of certainty in realizing future cash flows from the asset
- Hierarchy of required returns increases as you move down the balance sheet as the type of financing available shifts from debt to equity
  - CAC should be consistent with weighted average return of assets (WARA) and the weighted average cost of capital

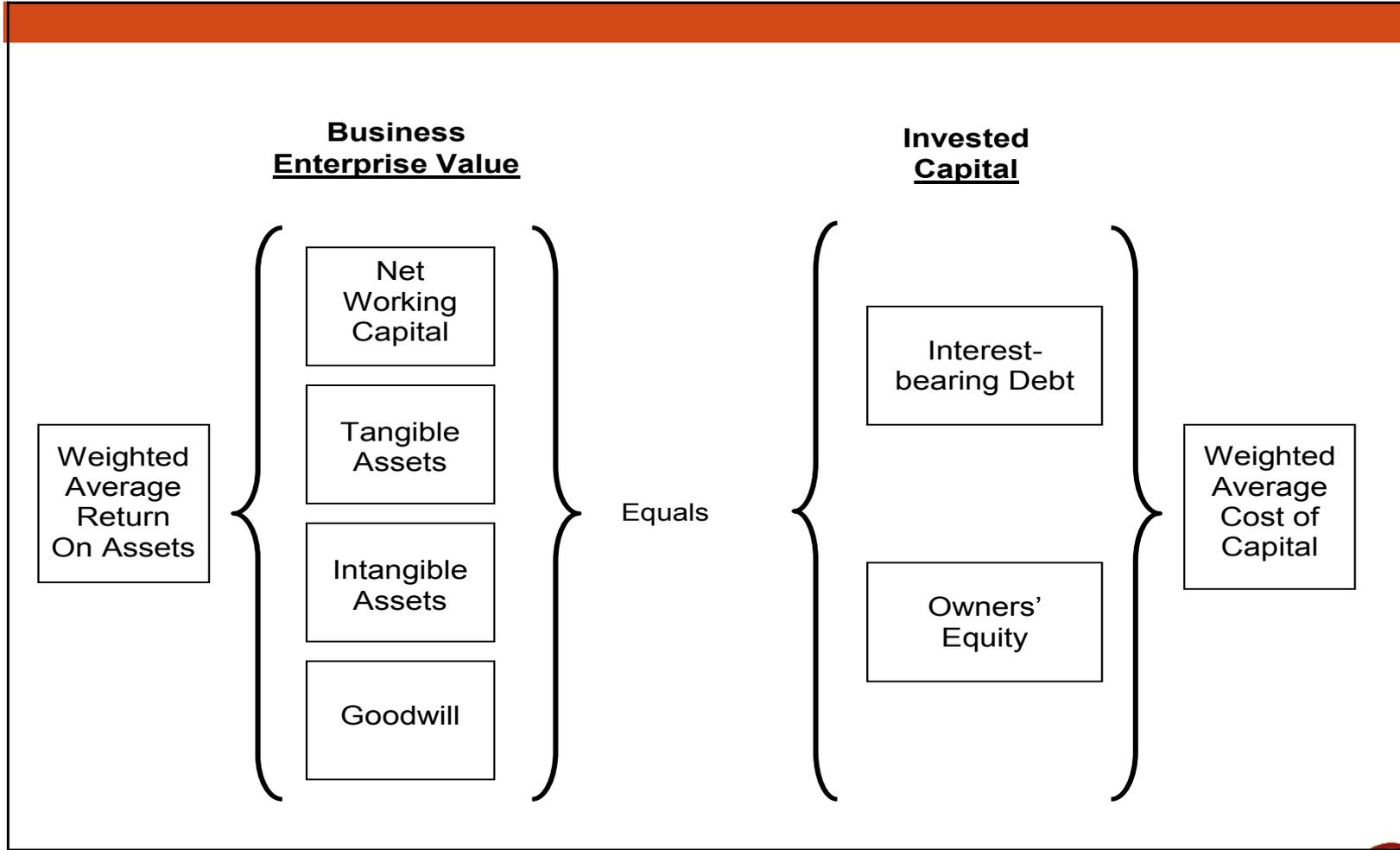
# Historic Cost Balance Sheet

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# Economic Balance Sheet

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# Fair Value Balance Sheet

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## Fair Value Assets

Current Assets

Tangible Assets

Intangible Assets

Goodwill

Equals

## Fair Value Liabilities & Owner's Equity

Current Liabilities

Long-Term Debt

Owners' Equity

# Best Practices for Contributory Asset Charges

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The Appraisal Foundation *Best Practices for Valuations in Financial Reporting: Intangible Asset Working Group – Contributory Assets*

- Issued May 31, 2010
- Companion “Toolkit” with sample spreadsheets that illustrate contributory asset charge (CAC) calculations
- Non-authoritative

# JT Austin – MPEEM Example

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- JT Austin's patented technology is going to be measured using the MPEEM because it is the company's most significant asset with respect to revenue generation.
- What tangible and intangible assets might contribute to the company's ability to generate revenues?
  - Working capital
  - Property and equipment
  - Assembled workforce
  - Customer relationships
  - Trademarks / tradenames
  - Non-compete agreements

# Contributory Asset Charges by Asset Category

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- What are appropriate sources for contributory asset charges?
- Working capital ?
  - bank prime lending rate (after-tax), or commercial paper rate, some equity financing required
- Fixed assets?
  - market participant bank financing rates for similar assets (after-tax), blended debt / equity rate
- Identifiable intangible assets?
  - rate based on relative risk of asset compared to WACC, required return is highly correlated with equity rate of return
- IPR&D?
  - rate similar to venture capital returns for early stage companies
- Goodwill attributable to assembled workforce ?
  - WACC
- Is unidentifiable goodwill a contributory asset?
  - Maybe, use a rate higher than identifiable intangible assets

**JT AUSTIN TECHNOLOGY INC**  
**AS OF OCTOBER 31, 20X1**  
**REQUIRED RETURN ON CONTRIBUTORY ASSETS**

('000s)		<u>20X1</u>	<u>20X2</u>	<u>20X3</u>	<u>20X4</u>	<u>20X5</u>	<u>Thereafter</u>
Total Revenue		12,593,002	13,250,000	14,150,000	15,150,000	15,750,000	16,222,500
Multiplied by: DFWC %		15.2%	15.2%	15.2%	15.2%	15.2%	15.2%
Debt-Free Working Capital Balance		1,914,136	2,014,000	2,150,800	2,302,800	2,394,000	2,465,820
Required Return On Working Capital	6.5%	124,598	131,099	140,004	149,898	155,834	160,509
Capital Expenditures		275,830	397,500	424,500	454,500	472,500	486,675
Depreciation		275,830	397,500	424,500	454,500	472,500	486,675
Net Fixed Assets Balance	\$ 1,175,200	1,175,200	1,175,200	1,175,200	1,175,200	1,175,200	1,175,200
Required Return On Capital Investment	7.0%	82,691	82,691	82,691	82,691	82,691	82,691
Non-competition Agreement Beginning Value	\$ 194,000						
Non-competition Agreement Required Return	23.0%	44,620	44,620	44,620	44,620	44,620	-
Assembled Workforce Beginning Value	\$ 530,000						
Assembled Workforce Required Return	23.0%	121,900	121,900	121,900	121,900	121,900	121,900
Customer Relationships Beginning Value	\$ 865,000						
Customer Relationships Required Return	25.0%	216,250	216,250	216,250	216,250	216,250	216,250
<b>Required Return on Contributory Assets</b>		<b>4.7%</b>	<b>4.5%</b>	<b>4.3%</b>	<b>4.1%</b>	<b>3.9%</b>	<b>3.6%</b>

# JT Austin Example

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- MPEEM is used to measure the value of JT Austin's patented technology
- Can you use a decay factor assuming that benefits accrue to the company for 15 years, even though depreciable life is 5 years?
- How do you determine the royalty rate for using the trade name?
- What two costs does the contributory asset charges cover?
  - ▣ Includes a return "on" the contributory asset and
  - ▣ Includes a return "of" the contributory asset, where appropriate
- How are the contributory assets are measured?
  - ▣ Appraised value
  - ▣ Replacement cost
  - ▣ DCF

**JT AUSTIN TECHNOLOGY INC**  
**OCTOBER 31, 20X1**  
**VALUATION OF PATENTED TECHNOLOGY**

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	20X1	20X2	20X3	20X4	20X5	20X5 Plus 10 Years
Projected Companywide Revenue	\$12,593,002	\$13,250,000	\$14,150,000	\$15,150,000	\$15,750,000	\$21,166,683
Decay Factor	0.98	0.88	0.72	0.59	0.48	0.06
Surviving Company Revenues	12,384,292	11,594,988	10,137,992	8,886,879	7,564,118	1,375,756
EBITDA	2,229,173	2,782,797	2,433,118	2,132,851	1,815,388	330,182
Average EBITDA Margin	18%	24%	24%	24%	24%	24%
Less: Depreciation	271,259	347,850	304,140	266,606	226,924	41,273
EBIT	1,957,914	2,434,947	2,128,978	1,866,245	1,588,465	288,909
Less: Charge for Use of Tradename	123,843	115,950	101,380	88,869	75,641	13,758
Adjusted EBIT	1,834,071	2,318,998	2,027,598	1,777,376	1,512,824	275,151
Less: Taxes	(696,947)	(881,219)	(770,487)	(675,403)	(574,873)	(104,557)
Debt-Free NI Before Contributory Charge	1,137,124	1,437,778	1,257,111	1,101,973	937,951	170,594
Less: Contributory Asset Charge	(581,190)	(522,881)	(434,508)	(361,575)	(298,140)	(49,394)
Contributory Asset Charge as a % of Revenue	4.7%	4.5%	4.3%	4.1%	3.9%	3.6%
DFCF to Patented Technology	555,935	914,898	822,603	740,398	639,810	121,200
Partial Period	0.17	1.00	1.00	1.00	1.00	1.00
Period	0.08	0.67	1.67	2.67	3.67	13.67
Present Value Factor	0.983	0.871	0.708	0.576	0.468	0.059
Present Value of Debt-Free Cash Flows	91,316	796,883	582,516	426,263	299,473	7,157
Sum of PV of DFCF	2,861,019					
Amortization Benefit Multiplier	1.13					
Preliminary Value	3,225,052					
<b>Value Patented Technology, Rounded</b>	<b>\$3,225,000</b>					

Assumptions	
Discount Rate	23%
Tax Rate	38%
Remaining Useful Life	5 years
Royalty Rate	1%



# Income Increment / Cost Decrement Method

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- Compares DCF from two sets of PFI
  - First scenario – assumes the subject intangible asset is being used to generate incremental cash flows for the entity
  - Second scenario – assumes the subject intangible asset is not available for use
  - The difference represents the fair value of the subject asset
- Most commonly used to measure the fair value of non-compete agreements

# JT Austin Example

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- The \$10.278 million value of invested capital shown in the DCF, includes the benefit from the previous owner's agreement not to compete.
  - ▣ It represents the “with” scenario.
- What assumptions would you need to make in order to calculate the business enterprise value without the non-compete agreement?
  - ▣ An estimate of the revenues lost because of competition
  - ▣ The probability that the previous owner will compete

**JT AUSTIN TECHNOLOGY INC**  
**AS OF OCTOBER 31, 20X1**  
**ANALYSIS OF NON-COMPETITION AGREEMENT**

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	20X1	20X2	20X3	20X4	20X5	Terminal Value
Revenue	\$12,593,002	\$13,250,000	\$14,150,000	\$15,150,000	\$15,750,000	\$16,222,500
Revenue Lost to Competition	3,148,251	3,047,500	2,830,000	2,424,000	1,575,000	-
x Probability of Competition	20%	20%	20%	20%	20%	
Adjusted Revenue	\$11,963,352	\$12,640,500	\$13,584,000	\$14,665,200	\$15,435,000	\$16,222,500
Cost of Sales	7,417,278	7,331,490	7,878,720	8,505,816	8,952,300	9,409,050
Gross Profit	4,546,074	5,309,010	5,705,280	6,159,384	6,482,700	6,813,450
SG&A Expenses	2,392,670	2,275,290	2,445,120	2,639,736	2,778,300	2,920,050
EBITDA	2,153,403	3,033,720	3,260,160	3,519,648	3,704,400	3,893,400
Depreciation	262,039	379,215	407,520	439,956	463,050	486,675
EBIT	1,891,365	2,654,505	2,852,640	3,079,692	3,241,350	3,406,725
Less: Taxes	(718,719)	(1,008,712)	(1,084,003)	(1,170,283)	(1,231,713)	(1,294,556)
Debt-Free Net Income	1,172,646	1,645,793	1,768,637	1,909,409	2,009,637	2,112,170
Plus: Depreciation	262,039	379,215	407,520	439,956	463,050	486,675
Less: Capital Expenditures	(262,039)	(379,215)	(407,520)	(439,956)	(463,050)	(486,675)
Less: Incremental Working Capital	(190,000)	(126,405)	(135,840)	(146,652)	(154,350)	(162,225)
Cash Flows to Invested Capital	982,646	1,519,388	1,632,797	1,762,757	1,855,287	1,949,945
Terminal Value in 20X5						9,749,723
Partial Period	0.17	1.00	1.00	1.00	1.00	1.00
Period	0.08	0.67	1.67	2.67	3.67	3.67
Present Value Factor	0.983	0.871	0.708	0.576	0.468	0.468
Present Value of Cash Flows to Invested Capital	161,407	1,323,399	1,156,243	1,014,856	868,396	4,563,511
Sum of PV of DFCF (20X1 to 20X5)	4,524,302			7,400,000		
PV of Terminal Value	4,563,511			/15		
Pv of Tax Benefit - Amortization of Intangibles	1,018,655			493,333		
Fair Value without Non-competition Agreement	10,106,468			38%		
Invested Capital with Non-competition Agreement	10,278,000			187,467		
Preliminary Value of Non-competition Agreement	171,532			5.43		
Amortization Benefit Multiplier	1.13			1,018,655		
<b>Value of Non-competition Agreement</b>	<b>\$194,000</b>					

<b>Assumptions:</b>	
Discount Rate	23%
Tax Rate	38%
Long-Term Growth	3.0%
Life Non-compete	5 years



# The Profit Split Method

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- A widely recognized method in the licensing and legal communities
  - Also known as the 25% rule
  - Commonly used in the valuation of intellectual property such as patented technology
- Assumes the fair value is based on what a third party would pay to license the asset
- Splits revenue and profits into two groups
  - Those attributable to the hypothetical license
  - Those attributable to the entity's other assets
- Would the profit split method use a one period or multi-period DCF model?
- The profit split can be a one period or multi-period method.

# TTT Technology Illustration

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- TTT Technology produces and sells microchips used in electronic toys
- The company markets its products under the name “Total Teknology”
- The name is widely recognized in the toy industry
- The company believes it could license the name for an amount equal to 25% of profits
- Projected revenues are \$35.4 million for next year
- What other DCF assumptions are inputs to the model?
  - Useful life
  - Capitalization rate

**TTT TECHNOLOGY, INC**  
**AS OF DECEMBER 31, 20X1**

**VALUATION OF TRADE-NAME USING THE PROFIT SPLIT METHOD**

Revenue	\$	35,400,000	
Operating Margin	x	35%	(1)
Profit Before Tax		12,390,000	
Less: Taxes @ 38%		(4,708,200)	
Profit After Tax		7,681,800	
Percentage Split		25%	(3)
		1,920,450	
Capitalization Rate		15%	(4)
<b>Concluded Value, Rounded</b>		<b>\$12,803,000</b>	

Assumptions:	Notes:
Operating Margin (1) 35%	(1) Based on management projections.
Income Tax Rate (2) 38%	(2) Estimated corporate tax rate.
Estimated Profit Split (3) 25%	(3) Based on management estimate of a hypothetical royalty rate of 5.4% of revenues.
Long-Term Growth Rate (1) 5%	(4) Discount rate less the long-term growth rate.
Discount Rate (5) 20%	(5) Equals the weighted average cost of capital.
Projected Life of Trade Name Indefinite	

# Options and Other Advanced Methods for Valuing Contingency Based Intangible Assets

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- Identify real options that have contingent characteristics
- Discover methods for applying options valuation methods to non-financial assets
- Understanding other valuation methods for valuing intangible assets

# Limitations of Traditional Approaches

65

- DCF typically uses “most likely” cash flows from PFI
- PFI is static, not providing for future changes in assumptions
- Cannot address management flexibility in the decision making process
- Do not consider valuation impact of contingent outcomes

# Advanced Methods

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- One of the fastest growing areas of financial theory and application
- Flexibility in decision-making and contingent events
- Ability to utilize models that are more in tune with the real world
- Widely used to value capital investments, intangible assets, and even companies themselves

# Examples of Advanced Valuation Methodologies for Intangible Assets

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- Option pricing models
  - ▣ Black-Scholes
  - ▣ Binomial Models
- Monte Carlo Simulations
- Decision Trees

# Real Options

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- A real option gives the owner the right, but not the obligation to do something
  - ▣ Similar to a financial option
- Real options are often derived from the ownership rights of intangible assets.
  - ▣ Real options provide flexibility in management decision making.

# Real Options – Flexibility in Management Decision Making

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- What are some examples of real options?
  - ▣ Abandonment
  - ▣ Expansion
  - ▣ Contraction
  - ▣ Interactions with other assets
  - ▣ Timing of entrances or exits
  - ▣ Flexibility to switch
  - ▣ Barrier option

# Sunrise Corp Example

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- Assume Sunrise Corp owns a patent that will allow it to develop a product to harness wind energy more efficiently
- The patent can be viewed as a real option
  - ▣ If expected cash flows exceed the cost to develop, the company will proceed with development
  - ▣ If costs to develop exceed expected cash flows, management will shelve patent and stop development
- Use Black-Scholes to measure the fair value of the patent

# Sunrise Corp Example

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- The present value of cash flows from this new product is expected to be \$100 million. (S)
- Cost of development is estimated at \$125 million. (X)
- The patent is for five years. (T)
- The current five-year Treasury bond rate is 3%. (R)
- The average earnings variance for publicly traded energy companies is 30%. ( $\Sigma$ )

**SUNRISE CORPORATION  
AS OF DECEMBER 31, 20X0  
VALUATION OF PATENT USING  
BLACK-SCHOLES OPTIONS PRICING METHOD**

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Exercise Price	\$ 125,000,000
Years to Expiration	5
Days to Expiration	1,825
Volatility	30%
Risk Free Rate - r	3.00%
d <sub>1</sub> (1)	0.2264
N(d <sub>1</sub> )	0.5895
N(-d <sub>1</sub> ) or [1-N(d <sub>1</sub> )]	0.4105
d <sub>2</sub> (1)	(0.4444)
N(d <sub>2</sub> )	0.3284
N(-d <sub>2</sub> ) or [1-N(d <sub>2</sub> )]	0.6716
Quarterly Dividend Rate	-
Dividend Yield	0.00%
Call Value (2)	<b>\$ 23,626,720</b>

Notes:

(1) N(d) = Cumulative density function (area under the normal curve) and d<sub>1</sub> and d<sub>2</sub> is as follows:

$$d_1 = \frac{\ln(\text{Market price}/\text{Exercise price}) + ((r + ((\text{Volatility}^2/2)) * \text{years to expiration})}{\text{Volatility} * (\text{years to expiration})^{1/2}}$$

$$d_2 = d_1 - ((\text{volatility}) * (\text{years to expiration})^{1/2})$$

(2) Call Price = Market Price \* N(d<sub>1</sub>) - [Exercise Price \* e<sup>-r(time to expiration)</sup> \* N(d<sub>2</sub>)]



# Useful Life Analysis of Intangible Assets

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- Understand why the useful life is an important consideration when measuring the fair value of an intangible asset
- Factors to consider when evaluating useful life

# Useful Life of an Asset

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## ■ Factors that should be considered in the estimation of the useful life of an intangible asset :

- Expected use of the asset
- Expected use of similar assets
- Legal, regulatory, and contractual provisions that may limit the useful life or enable renewal or extension
- The effects of obsolescence, demand, competition, and other economic factors
- Required future maintenance expenditures

# Useful Life of an Asset

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**The remaining useful life of an asset is often the shortest life in the factors presented below:**

- *Legal life* – The asset has some legal protection such as a patent, trademark or copyright.
- *Contractual life* – The contractual life is the contractual term involving the intangible asset, such as a lease, customer agreement or supplier agreement. Analysis of the life should include common renewal periods for the same or very similar terms.
- *Functionality and technological issues* – An asset's life may be limited by expected changes in technology. For example, the life of software that is continuously updated is defined by functionality and technological issues.
- *Economic life* – Economic life is the period during which the intangible asset generates positive cash flow.
- *Analytical (actual turnover)* – The analytical factor is based on a statistical analysis of turnover trends. This analysis can be performed on such intangible assets as customer

# Mark Zyla, CPA/ABV, CFA, ASA

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Mark L. Zyla is a Managing Director of Acuitas, Inc. an Atlanta Georgia based valuation and litigation consultancy firm. Mark received a BBA degree in Finance from the University of Texas at Austin and an MBA degree with a concentration in Finance from Georgia State University. Mark also completed the Mergers and Acquisitions Program at the Aresty Institute of The Wharton School of the University of Pennsylvania and the Valuation Program at the Graduate School of Business at Harvard University.

He was a member of The Appraisal Foundation's Business Valuation Best Practices Working Group on Contributory Asset Charges and the AICPA's Fair Value Resource Panel. He is currently working on the AICPA's Impairment Practice Aid Task Force. He is also the Chairman of the AICPA's *Fair Value Measurement* Conference Committee. Mark is a former member of the Business Valuations Committee of the AICPA, and a former Chairman of the ABV Examination Committee of the AICPA. He is also a member of the Business Valuation Standards Subcommittee of the ASA.

Mark is a frequent presenter and author on valuation issues. Mark is the co-author of the course, "*Fair Value Accounting: A Critical New Skill for All CPAs*" published by the AICPA. He is the author of *Fair Value Measurements: Practical Guidance and Implementation 2<sup>nd</sup> ed.* recently published by John Wiley & Sons.



# Mark Zyla, CPA/ABV, CFA, ASA

Managing Director

Acuitas Inc.

One Midtown Plaza

1360 Peachtree Street NE, Suite 950

Atlanta, GA 30309

404-898-1137

[www.acuitasinc.com](http://www.acuitasinc.com)

Fair Value Measurements Blog:

[www.acuitasinc.com/blog](http://www.acuitasinc.com/blog)

