Intellectual Property and Intellectual Property Management

MN 3060

Session 09: **IP Valuation**

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Overview of IP and Its Importance

What is Intellectual Property (IP)?

Patents, Trademarks, Copyrights, Trade Secrets, Industrial Designs

IP Valuation

Is the **process of determining the monetary value** of intellectual property (IP) assets, such as patents, trademarks, copyrights, or trade secrets.

This involves assessing the **economic, strategic, and market potential** of the IP based on its contribution to business outcomes.

Why Valuation Matters?

Licensing, commercialization, mergers, investments, and dispute settlements

Why IP Valuation is Important

Informed Decision-Making
– Supports licensing, selling, or investing in IP.

Attracts Investors & Funding
– Demonstrates value to potential investors and lenders.

Facilitates Mergers & Acquisitions
– Helps determine fair value in M&A deals.

Optimizes Business Strategy
– Aligns IP assets with company goals and market opportunities.

Supports Royalty Negotiations
– Ensures fair terms in licensing agreements.

Legal and Financial Reporting
– Required for compliance, tax, and balance sheet purposes.

Protects against Underutilization
– Identifies hidden value and monetization potential.

Mitigates Risk
– Provides insights into legal and market risks associated with IP.

Value of an IP

- **Intellectual Property** create value based on business
- Not regard IP itself as monetary value
- For produce value, value create mechanism is needed
- Valuation of intellectual property should be done based on the business value

Valuation Focus:

IP valuation should reflect **business outcomes**, such as market share, profitability, or enhanced operational performance—not just the IP's intrinsic worth.

Value Creation Mechanisms

1. **Competitive Advantage**
   IP protects innovations, keeping competitors at bay.
   Example: A patented process allows a company to produce high-quality solar panels at lower costs.

2. **Revenue Streams**
   IP enables licensing, partnerships, or franchising opportunities.
   Example: Software with copyright licenses sold to multiple enterprises.

3. **Market Positioning**
   Trademarks strengthen brand identity and customer trust.
   Example: The Apple logo attracts premium customers.

4. **Cost Efficiency / Process Improvement**
   Trade secrets reduce operational costs or enhance efficiency.
   Example: A secret formula reduces product wastage in food manufacturing.

Evaluating IP as a Group: Focus on Strategic Contribution

IP rights are more valuable when **evaluated as a portfolio** contributing to business strategy—not just as individual assets.

How IP Portfolio Creates Strategic Value

1. **Holistic Competitive Advantage**
   A **combination** of patents, trade secrets, and copyrights creates **barriers to entry**.
   Example: A tech company's patents, software code, and user-interface designs work together to maintain market leadership.

2. **Aligned with Business Goals**
   Grouped IP ensures that **innovation supports core strategy** (e.g., market expansion, product differentiation).
   Example: A mix of trademarks and brand-related IP enables global brand recognition in new markets.

3. **Synergistic Impact**
   IP rights together provide **cumulative value** beyond individual contributions.
   Example: Patent + Trademark + Copyright enhances product exclusivity and brand loyalty.

4. **Enables Flexible Monetization**
   Licensing and partnerships become more attractive when bundled IP offers diverse value.
   Example: A bundle of media copyrights sold as an entertainment package generates more revenue than selling them separately.

What is Value?

How much it contributes – The benefit or merit you gain.

Value is relative – Not fixed; depends on the context.

Value changes with company needs – Example: During mergers & acquisitions (M&A).

How you use it matters – Utilization affects value.

Aligned with company vision – Value reflects strategic goals.

Time matters – Value can grow or decline over time.

Value Acquired from IP

Benefits and advantages a business gains from owning, controlling, or leveraging its intellectual property

Benefits and advantages

Financial Gains:
IP can generate cash flow through royalty income, licensing, or sales.

Freedom to Operate:
Owning IP ensures the company can use its innovations without fear of legal challenges.

Brand and Reputation Building:
Trademarks and copyrights boost brand recognition and customer trust.

Access to New Technologies:
Through open innovation, IP enables collaboration and adoption of external technologies.

Risk Mitigation:
IP helps avoid lawsuits by protecting against infringement claims.

Competitive Advantage:
IP creates barriers to entry for competitors and protects market share.

Customer Loyalty:
Strong IP-backed brands foster trust and retain customers.

Financial Leverage:
IP can enhance the company’s valuation and attract investors or funding.

- IP is one of the key management resources of company
- IP contributes to create value by incorporate into the value creation mechanism of company
- Consider IP in relation to the value creation mechanism of company

Business Value Calculation

Present Value (PV) of future cash flows:

Formula for Business Value:
Business Value=

$$\text{Business Value} = \sum \left(\frac{C_t}{(1+r)^t} \right)$$

Where:

- C_t = Cash flow in year t
- r = Discount rate (accounting for time value of money, typically 8-12%)
- t = Year

Value of Intellectual Property = Business Value × Contribution Rate of IP

Interpretation:

- **Business Value**: Represents the overall worth of the business based on revenue, assets, market share, etc.
- **Contribution Rate of IP**: Reflects how much the IP contributes to the business's success (e.g., through competitive advantage, cost savings, or revenue generation).
- **Value of IP**: Signifies the estimated economic worth of the intellectual property to the business.

Calculating the Contribution Rate of Intellectual Property (IP) involves assessing how much the IP contributes to the overall business performance.

Common methods to determine the Contribution Rate of IP:

1. Revenue Attribution Method

- **Description**: This method estimates the revenue generated directly from products or services that rely on the IP.
- **Calculation**:

$$\text{Contribution Rate of IP} = \frac{\text{Revenue from IP-Related Products}}{\text{Total Revenue}} \times 100$$

- **Example**: If a company generates $500,000 from a patented product and has total revenue of $1,000,000:

$$\text{Contribution Rate of IP} = \frac{500,000}{1,000,000} \times 100 = 50\%$$

2. Cost Savings Method

- **Description**: This method estimates the cost savings achieved through the use of patented technologies or processes.
- **Calculation**:

$$\text{Contribution Rate of IP} = \frac{\text{Cost Savings from IP}}{\text{Total Costs}} \times 100$$

- **Example**: If a patented process saves the company $200,000 in production costs, and total costs are $800,000:

$$\text{Contribution Rate of IP} = \frac{200,000}{800,000} \times 100 = 25\%$$

3. Market Share Method

- **Description**: This method assesses how much of the company's market share is due to the unique advantages provided by its IP.
- **Calculation**:

$$\text{Contribution Rate of IP} = \frac{\text{Market Share Attributed to IP}}{\text{Total Market Share}} \times 100$$

- **Example**: If the company has a market share of 10%, and 3% of that is attributed to its IP:

$$\text{Contribution Rate of IP} = \frac{3}{10} \times 100 = 30\%$$

4. Investment Method

- **Description**: This method examines the investments made in developing and maintaining IP relative to the company's overall investments.
- **Calculation**:

$$\text{Contribution Rate of IP} = \frac{\text{Investment in IP}}{\text{Total Investment}} \times 100$$

- **Example**: If the company invests $100,000 in IP and has total investments of $500,000:

$$\text{Contribution Rate of IP} = \frac{100,000}{500,000} \times 100 = 20\%$$

More ….Intellectual Property Valuation

- Business model decide value
- Not only obtaining cash directly
- There is no market value intellectual property in itself
- Valuation from the view point of user or investor

Valuation of Intellectual Property: Qualitative and Quantitative

1. Qualitative Valuation

Assessing the value of IP based on non-numeric factors.

Key Aspects:

- **Superiority Assessment:** Basic and key technology, required patents, alternative technologies, product life cycle, market awareness.
- **Market Position**: The strategic advantage gained from the IP.
- **Brand Strength**: Impact on brand equity and customer perception.
- **Innovation Potential**: The capacity for future development and enhancements.
- **Legal Protection**: Strength and enforceability of IP rights.

Methods:

- Expert interviews
- Surveys and focus groups
- Case studies and precedent analysis

2. Quantitative Valuation

Assigning numeric values to IP based on measurable data.

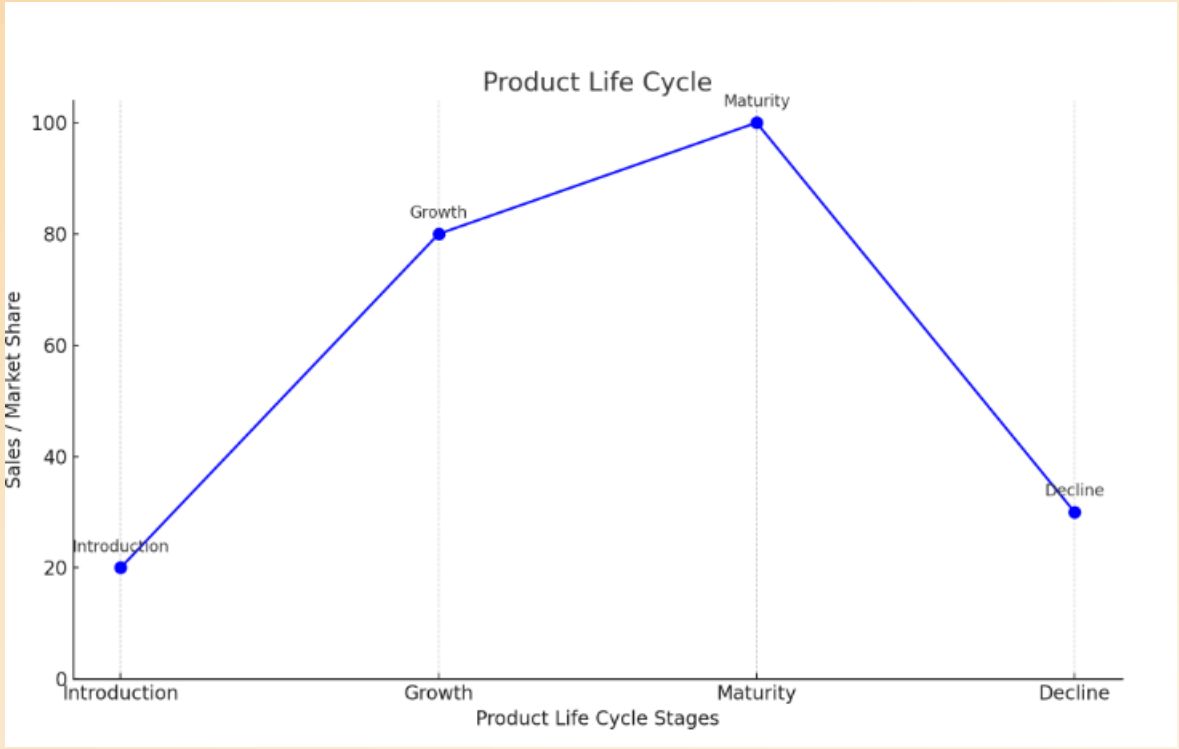
Key Aspects:

- **Revenue Generation**: Revenue attributed to IP-related products/services.
- **Cost Savings**: Financial benefits from efficiencies due to IP.
- **Market Share Impact**: Contribution of IP to overall market share.
- **Investment Returns**: ROI on investments made in IP development.

Methods:

- Discounted Cash Flow (DCF) analysis
- Market Comparables
- Cost-Based Approach

Product life cycle



1. Introduction Stage

Market Potential: Estimate demand and market size.
Costs: Assess R&D and patent costs.
Valuation: Use **Cost Approach** (total costs) or **Income Approach** (discounted cash flow).

2. Growth Stage

Sales Growth: Analyze growth rates and market penetration.
Licensing: Explore potential partnerships.
Valuation: Apply **Market Approach** (comparable transactions) or update **Income Approach** (revised cash flows).

3. Maturity Stage

Market Saturation: Assess market share and competition.
Efficiency: Look for cost management strategies.
Valuation: Use **Income Approach** (stable cash flows) or **Excess Earnings Method** (extra earnings from IP).

4. Decline Stage

Exit Strategy: Consider divestment or licensing.
Residual Value: Estimate remaining value.
Valuation: Calculate **Liquidation Value** or apply **Income Approach** (remaining cash flows).

Difficulty of Intellectual Property Valuation

- Worth of intellectual property changes with the usage and users
- IP has many different value
- Value decreases rapidly by external factors, such as technological innovation
- Worthless by invalid trial decision
- Operation period is variable
- Cash flow is unstable

Due Diligence of Intellectual Property

Due Diligence:

- Due diligence is the comprehensive investigation and evaluation process conducted before entering into a business transaction or agreement.
- Involves analyzing relevant information and documents to assess the financial, legal, operational, and market conditions of the entity involved.
- Primary aim is to identify potential risks, validate claims, and ensure informed decision-making, ultimately protecting the interests of the parties involved.

Due Diligence of Intellectual Property (IP)

- Examination and analysis of an organization's intellectual property assets before a transaction, such as a merger, acquisition, licensing agreement, or investment.
- Helps assess the value, ownership, risks, and legal standing of the IP involved.

Key Components of IP Due Diligence

1. IP Inventory:

Identify and catalog all existing IP assets, including patents, trademarks, copyrights, and trade secrets.

2. Ownership and Rights:

Verify the ownership of IP assets and ensure that rights are properly assigned and documented.

3. Legal Status:

Check the legal status of IP registrations (e.g., pending, granted, expired) and compliance with renewal requirements.

4. Validity and Enforceability:

Assess the validity and enforceability of IP rights, including potential challenges or infringements.

5. Licensing Agreements:

Review any existing licensing agreements, including terms, obligations, and restrictions.

6. Market Analysis:

Evaluate the market position and competitive advantages provided by the IP assets.

7. Potential Risks:

Identify potential risks associated with the IP, such as litigation, infringement claims, or non-compliance with laws.

8. Valuation:

Determine the economic value of the IP based on its contribution to revenue, market potential, and competitive

Direct value, Indirect value

- **Direct value**

It can connect to vision or business strategy directly
Calculation is possible with regards to profit and cost

- **Indirect value** (Defense patent, brand)

Since it is not connected directly to profit, calculation is difficult

Value of Intellectual Property as Decision-Making Objectives

1. Focus on Cash Flow

Assess potential revenue generation from IP assets.

Evaluate cash flow impact in business decisions.

2. Contribution to Corporate Value

Consider IP as part of overall corporate value, including:

Brand Value: Strengthening brand recognition and loyalty.

Barriers to Entry: Protecting market position against competitors.

3. Emphasis on Strategic Value

Analyze IP's role in future research and development (R&D).

Support long-term strategic planning and innovation initiatives.

The viewpoint of IP Valuation

(1) Superiority viewpoint

(2) Legal viewpoint

(3) Economic viewpoint

Superiority Viewpoint of IP Valuation

Evaluates IP based on its potential competitive advantage and differentiation in the market.

Key Characteristics

- **Market Position**: Assesses how IP contributes to the firm's competitive edge and market leadership.
- **Predominance to Prior Technology**: Evaluates how the IP builds upon or improves existing technologies.
- **Fundamental or Improvement**: Distinguishes between groundbreaking inventions and enhancements to existing solutions.
- **Core, Surrounding, and Complement**: Classifies IP based on its central role (core) or supportive role (surrounding/complement) in the product ecosystem.
- **Stage of Development & Reliability**: Considers how mature the IP is and its proven reliability in practical applications.
- **Completion Risk**: Analyzes risks associated with finalizing development and bringing the IP to market.
- **Standardization & Market Expansion**: Evaluates the potential for the IP to set industry standards and facilitate broader market acceptance.
- **Size of Business Solution Market**: Assesses the market size that the IP can effectively address.
- **Necessity for Additional Development**: Considers the further investment required to enhance the IP’s value.
- **Open and Closed Strategy (with Trade Secrets)**: Evaluates the strategic choice between sharing innovations (open) or keeping them confidential (closed).

Benefits

- **Enhanced Decision-Making**: Informs strategic investments and resource allocation.
- **Attracting Investment**: Increases attractiveness to investors by highlighting valuable assets.
- **Competitive Intelligence**: Helps assess competitors' strengths and weaknesses in IP.

Challenges

- **Subjectivity**: Reliance on qualitative assessments can lead to inconsistencies.
- **Market Dynamics**: Rapid changes in technology and market conditions can affect valuation.

Legal Viewpoint of IP Valuation

Evaluates IP based on its legal protections and enforceability within the regulatory framework.

Key Characteristics

- **Strong Implement ability**: Ability to enforce IP rights effectively in relevant jurisdictions.
- **Coverage of Strong and Large Range**: Ensures broad applicability and protection across various markets and technologies.
- **Low Infringement Possibility**: Assessing the likelihood of unauthorized use or infringement by competitors.
- **Effectiveness and Novelty**: Evaluates how well the IP meets legal requirements for novelty and serves its intended purpose.
- **Ease of Identifying Infringement**: The clarity of IP rights facilitates the detection of violations and unauthorized use.
- **Level of Protection**: The extent and type of protection afforded (e.g., patents, trademarks, copyrights).
- **Government Regulation**: Impact of legal frameworks and regulations that govern the use and protection of IP.

Benefits

- **Risk Mitigation**: Reduces legal risks associated with potential infringements and disputes.
- **Market Confidence**: Increases stakeholder confidence in the security and legitimacy of IP assets.

Challenges

- **Complexity of Regulations**: Navigating varying laws across jurisdictions can be challenging.
- **Changing Legal Landscapes**: Evolving regulations and legal interpretations can affect valuation.

Economic Viewpoint of IP Valuation

Evaluates IP based on its financial implications, market dynamics, and overall economic value.

Key Characteristics

- **Market Potential: Existence & Scale Expansion**: Assesses the size of the target market and opportunities for growth.
- **Value for Customer (Product Life Cycle - PLC)**: Considers the perceived value and benefits that the IP provides throughout its life cycle.
- **Competitiveness**: Evaluates how the IP positions the company relative to competitors in the marketplace.
- **Complement and Compatibility**: Examines how well the IP integrates with existing products and technologies, enhancing overall value.
- **Entry Barriers**: Analyzes how the IP creates obstacles for new entrants, contributing to market stability.
- **Price Sensitivity**: Considers customer responsiveness to price changes, impacting revenue potential.
- **Sustainability**: Evaluates the long-term viability and resilience of the IP in changing market conditions.

Benefits

- **Informed Investment Decisions**: Provides data-driven insights to guide resource allocation and strategic planning.
- **Enhanced Profitability**: Identifying economic value can lead to increased revenue and profit margins.

Challenges

- **Market Fluctuations**: External economic factors can unpredictably impact the valuation and profitability of IP.
- **Competitive Threats**: Rapid changes in the competitive landscape may affect the value proposition.

Quantitative valuation

- Quantitative valuation is quantified to what extent intellectual property have effect base on qualitative valuation
- Accuracy of quantitative evaluation of IP required varies depending on evaluation scene

Common Valuation Methods

- **Cost-Based Approach**:
  Evaluates the cost incurred to develop the IP, including research and development expenses.

- **Market-Based Approach**:
  Compares the IP to similar assets in the market to determine its value based on recent transactions or licensing agreements.

- **Income-Based Approach**:
  Projects future income streams generated by the IP and discounts them to present value, considering factors like revenue generation and risk.

Considerations in Choosing a Method

- Nature of the IP (patents, trademarks, copyrights)
- Purpose of the valuation (financial reporting, tax purposes, litigation)
- Availability of data and market comparable

Cost-Based Approach

Values IP based on the costs incurred in its development and maintenance.

Key Characteristics

- **Historical Costs**: Focuses on actual expenses related to R&D, materials, labor, and overhead.
- **Reconstruction Cost**: Estimates the cost to recreate the IP if it were to be developed anew.
- **Non-recoverable Costs**: Excludes costs that cannot be recouped (e.g., sunk costs).

Cost-Based Approach Continue….

Advantages:

- Easy to calculate using available data.
- Objective and fact-based, relying on actual costs incurred.
- Useful for valuing newly developed or innovative IP.
- Provides a baseline value for IP.

Disadvantages:

- Does not account for future income potential or market demand.
- May overlook the economic value of IP that has appreciated over time.
- Ignores market dynamics and competitor activities.
- Can lead to undervaluation of IP in rapidly changing markets.

Historical Costs

Focuses on actual expenses incurred during the development of intellectual property (IP).

Key Characteristics

- **Direct Costs**: Includes expenses directly tied to the creation of the IP, such as R&D, materials, and labor.
- **Indirect Costs**: Accounts for overhead and administrative expenses that support the development process.
- **Factual Basis**: Provides an objective, verifiable basis for valuation by using real expenditure data

How to Apply Historical Costs

1. Application

Data Collection: Gather all relevant invoices, payroll records, and expense reports related to the IP's development.

Total Cost Calculation: Sum all identified costs to determine the total historical cost of the IP.

2. Example Calculation
R&D Expenses: $250,000
Materials: $75,000
Labor: $125,000
Overhead: $50,000
Total Historical Costs:
{Total Historical Costs} = R&D + {Materials} + {Labor} + {Overhead}

=250,000+75,000+125,000+50,000=500,000

Valuation Based on Historical Costs: The IP is valued at **$500,000** based on historical costs.

Reconstruction Costs

Estimates the costs required to recreate the IP from scratch using current market conditions.

Key Characteristics

- **Current Market Rates**: Utilizes up-to-date costs for materials, labor, and overhead.
- **Modern Technologies**: Considers improvements in technology or processes that might lower development costs.
- **Valuation Insight**: Provides a relevant perspective on the value of IP in the context of current market conditions.

How to Apply Reconstruction Costs

1. Application

Research Current Costs: Gather data on current material and labor costs necessary to recreate the IP.
Estimate Total Reconstruction Costs: Sum the estimated costs based on the latest market data.

2. Example Calculation

Updated Material Costs: $80,000
Current Labor Rates: $130,000
Overhead Adjustments: $55,000

Reconstruction Cost Calculation:

Reconstruction Cost= Updated Materials + Labor + Overhead

=80,000+130,000+55,000=265,000

Valuation Based on Reconstruction Costs: The IP is valued at **$265,000** based on reconstruction costs.

Non-recoverable Costs

Costs that cannot be recouped from the development of the IP, such as sunk costs.

Key Characteristics

- **Exclusion Principle**: Focuses on costs that can potentially be recovered in the future, ignoring those that are irretrievable.
- **Sunk Costs**: Includes expenses already incurred that will not affect the future cash flows (e.g., past marketing expenses).
- **Realistic Valuation**: Provides a clearer picture of the current value of IP by excluding irrelevant past costs.

How to Apply Non-recoverable Costs

1. Identify Non-recoverable Costs:

Review past expenses and classify them as non-recoverable (e.g., marketing, failed projects).

2. Adjust Total Historical Costs:
Subtract identified non-recoverable costs from the total historical costs to arrive at a more accurate valuation.

3. Calculation

Total Historical Costs: $500,000 (as previously calculated)

Sunk Costs (e.g., past marketing expenses): $30,000

Adjusted Total Historical Costs:
Adjusted Total Historical Costs =Total Historical Costs−Sunk Costs
=500,000−30,000=470,000

Valuation Adjusted for Non-recoverable Costs: The IP is valued at **$470,000** after excluding non-recoverable costs.

How to Apply the Cost-Based Approach

1. Steps to Implement

Identify Relevant Costs:

Gather all costs associated with the development of the IP.

Calculate Total Costs:

Sum all identified costs.

Adjust for Depreciation:

If applicable, account for depreciation based on the age and condition of the IP.

2. Example Calculation

Total Development Costs:

- R&D Expenses: $200,000
- Materials: $50,000
- Labor: $100,000
- Overhead: $30,000

- **Total Costs = $200,000 + $50,000 + $100,000 + $30,000 = $380,000**

Market-Based Approach

Values IP by comparing it to similar assets in the market.

Key Characteristics

- **Market Comparable**: Utilizes data from recent transactions involving similar IP assets.
- **Sales Transactions**: Focuses on the sale price of comparable IP to derive valuation.
- **Licensing Agreements**: Considers licensing deals as benchmarks for value.

Market-Based Approach Continue….

Advantages:

- Reflects current market conditions and demand for similar IP.
- Provides a real-world context by using comparable transactions.
- Useful for established IP with available market data.
- Can lead to more accurate valuations based on recent trends.

Disadvantages:

- Limited availability of comparable data, especially for unique IP.
- May require adjustments that introduce subjectivity.
- Market conditions can fluctuate, affecting valuation stability.
- Not suitable for newly developed or niche IP with few comparables.

Market Comparable

Uses data from recent transactions involving similar IP assets to estimate the value of the subject IP.

Key Characteristics

- **Comparable IP Assets**: The selected IP must share similarities in technology, industry, or market potential.
- **Time Sensitivity**: Values are most accurate when based on recent transactions.
- **Adjustments for Differences**: Factors like geography, development stage, or exclusivity may require adjustments.

Sales Transactions and Licensing Agreements

Focuses on the sale price of comparable IP to derive the subject IP's value.

Characteristics:

- Provides a direct market-driven value.
- Reflects actual buyer-seller agreements.

Example:

If two similar patents sold for **$750,000** and **$800,000**, the subject IP could be valued around **$775,000**.

Licensing Agreements

Considers licensing deals as benchmarks, particularly for royalty-based IP.

Characteristics:

- Focuses on royalty rates and terms (e.g., 5% of revenue).
- Useful when IP is licensed rather than sold outright.

Example:

- Royalty Rate: 5% of annual sales
- Projected Sales: **$2,000,000 per year**
- Annual Royalty Income = **5% × 2,000,000 = $100,000**
- **Valuation = $100,000 / 10% (discount rate) = $1,000,000**

Application of the Market-Based Approach

1. Identify Comparable IP:

Research recent transactions or licensing agreements.

2. Adjust for Differences:

Make necessary adjustments based on market conditions or technology.

3. Calculate Average Value:

Derive an average or median value from adjusted comparables.

4. Example Calculation

Recent Transactions:

- IP A: Sold for $500,000
- IP B: Sold for $550,000
- IP C: Sold for $600,000

- **Average Value = ($500,000 + $550,000 + $600,000) / 3 = $550,000**

•**Valuation**: The IP is valued at **$550,000** based on market comparables.

Income-Based Approach

Values IP based on projected future income it can generate.

Key Characteristics

- **Revenue Projections**: Focuses on estimating future cash flows.
- **Discount Rate**: Uses a discount rate to account for risk and time value of money.
- **Terminal Value**: Considers value at the end of the projection period.

Income-Based Approach Continue….

Advantages:

- Focuses on the economic value generated by the IP, reflecting its true worth.
- Considers future income potential, providing a forward-looking perspective.
- Useful for established IP with predictable cash flows.
- Accounts for risk through the discount rate, enhancing accuracy.

Disadvantages:

- Relies on accurate projections of future income, which can be uncertain.
- Requires estimating an appropriate discount rate, introducing subjectivity.
- Sensitive to changes in market conditions and competitive landscape.
- May be complex to calculate, requiring financial expertise.

Revenue Projections

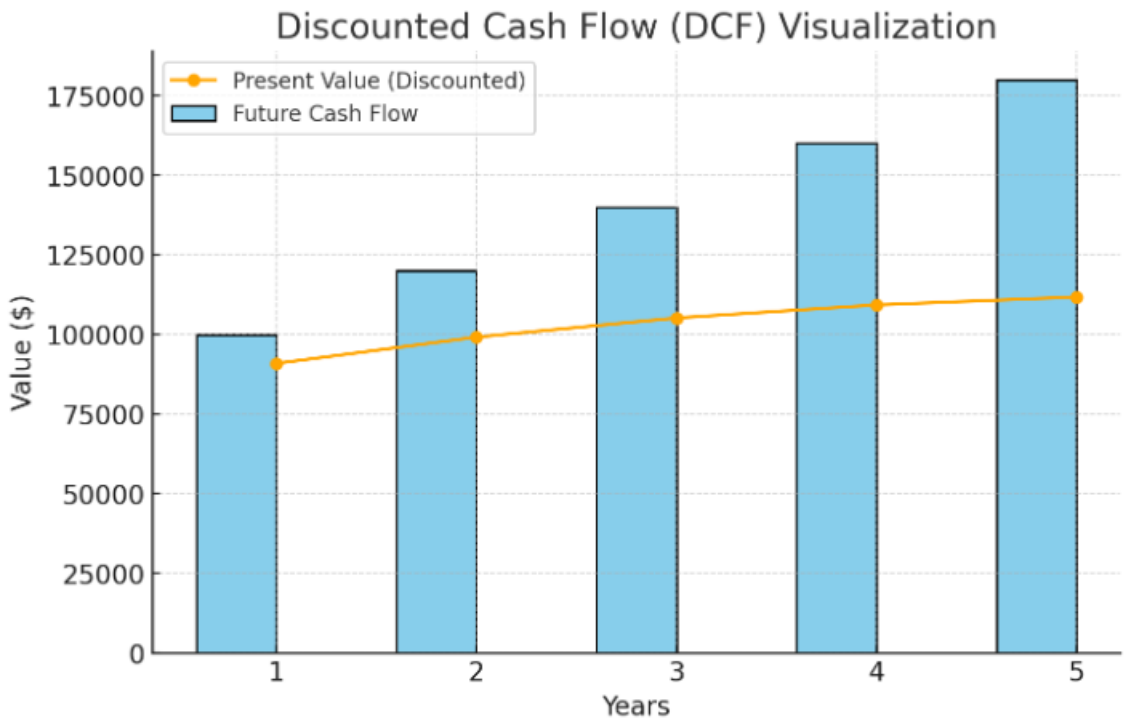
Focuses on estimating the future cash flows generated by the IP over a specific period.

Key Characteristics:

- Relies on expected market demand, product lifecycle, and pricing strategies.
- Estimates revenues across different years, accounting for sales growth and other market variables.
- Forms the foundation of valuation models like **Discounted Cash Flow (DCF)**.

What is Discounted Cash Flow (DCF)?

- **E**stimates the value of an asset (IP) by projecting future cash flows and discounting them to their present value using a discount rate.
- **Discounted Cash Flow (DCF)** method estimates the value of an IP asset by projecting **future cash flows** and converting them to **present value** using a **discount rate**. It captures the principle that **money today is worth more than money in the future** due to risks, inflation, and opportunity cost.
- **To c**aptures the **time value of money** and accounts for risks associated with future income.



Here's the **Discounted Cash Flow (DCF) graph**. It shows:

- **Bars**: Future cash flows projected for each year (in blue).
- **Line Plot**: Present values of those cash flows after applying a 10% discount rate (in orange).

Formula for DCF

$$PV = \frac{\text{Cash Flow}}{(1+r)^n}$$

Where:

- **PV** = Present Value
- **r** = Discount Rate (e.g., 10%)
- **n** = Year Number

Discount Rate

Adjusts the value of future cash flows to present value, accounting for risk and the time value of money.

Key Characteristics:

- Higher discount rates reflect greater uncertainty or market risk.
- Commonly used rates include **WACC (Weighted Average Cost of Capital)** or required returns.

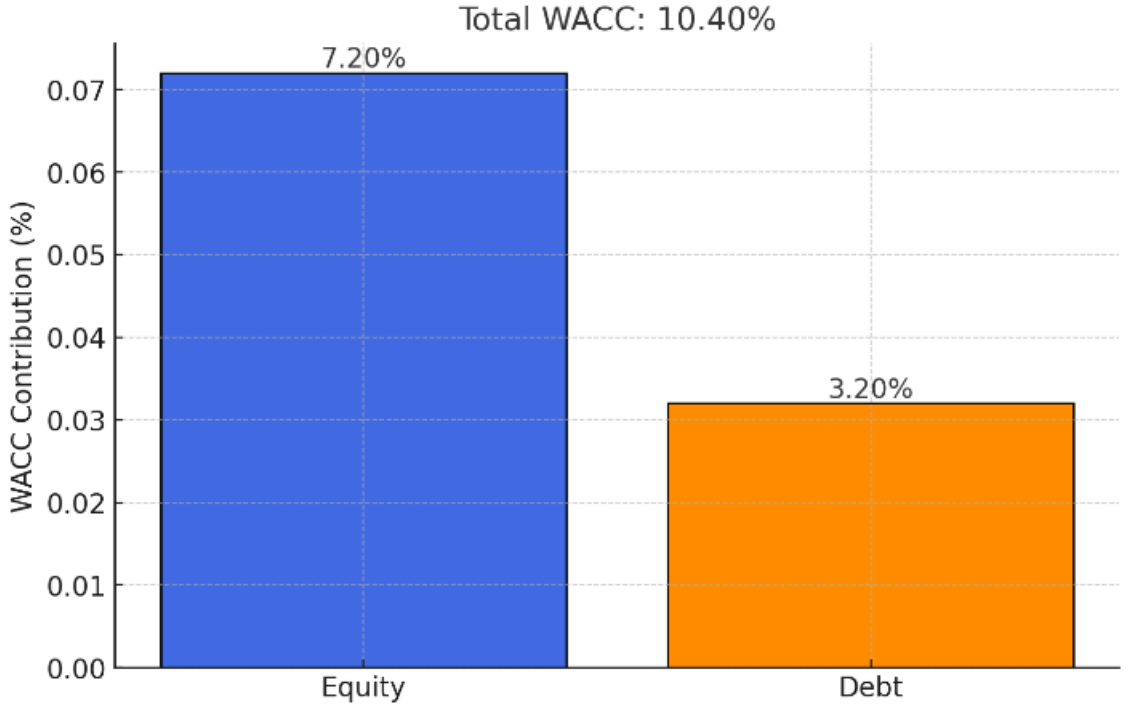
What is Weighted Average Cost of Capital WACC?

Average rate of return a company is expected to pay its investors (both equity and debt holders) to finance its operations or investments.

Represents the **minimum return** required to justify an investment, accounting for both debt (loans) and equity (shares).

Key Components

- **Cost of Equity (r_e)**: The return shareholders expect based on the risk of investing in the company.
- **Cost of Debt (r_o)**: The interest rate on loans, adjusted by **(1 – T)** to account for tax savings on interest payments.
- **Weight of Debt and Equity**: Reflects how much of the firm's funding comes from loans (debt) vs. shares (equity).



The graph illustrates the **contributions of equity and debt** to the overall WACC:

- **60% Equity** (Cost of equity: 12%)
- **40% Debt** (Cost of debt: 8%, adjusted for tax benefits)

Total WACC = 10.4%

weighted components of both equity and debt determine the **minimum return** required for investments. A higher WACC reflects **greater risk**, meaning the firm needs to earn more to satisfy investors. Conversely, a lower WACC implies cheaper capital, encouraging more investments.

Terminal Value

The value of the IP at the end of the projection period, assuming the asset generates income indefinitely or stabilizes.

Key Characteristics:

- Captures the value beyond the projection period.
- Two common methods: **Gordon Growth Model** (constant growth) and **Exit Multiple Method**.

What is GGM?

The **Gordon Growth Model** is used to calculate the **terminal value** of an asset (such as a business or IP) by assuming that its cash flows or dividends grow at a **constant rate** indefinitely.

GGM Formula

$$TV = \frac{C \times (1 + g)}{r - g}$$

Where:

- **TV** = Terminal Value
- **C** = Cash flow or dividend in the last forecasted year
- **g** = Constant growth rate (e.g., 3%)
- **r** = Discount rate (e.g., 10%)

How to Apply the Income-Based Approach

1.Project Future Income:

1. Estimate annual cash flows generated by the IP over a defined period.

2.Determine Discount Rate:

1. Select an appropriate discount rate based on risk factors (e.g., cost of capital).

3.Calculate Present Value:

1. Discount projected cash flows to present value using the formula:
   PV = CF / (1 + r)^n,
   where CF = cash flow, r = discount rate, n = year.

2. Example Calculation

•**Projected Cash Flows**:

- Year 1: $100,000
- Year 2: $120,000
- Year 3: $150,000

•**Discount Rate**: 10%

•**Present Value Calculation**:

- PV Year 1 = $100,000 / (1 + 0.10)^1 = $90,909.09
- PV Year 2 = $120,000 / (1 + 0.10)^2 = $99,173.55
- PV Year 3 = $150,000 / (1 + 0.10)^3 = $112,697.76

  Total PV = $90,909.09 + $99,173.55 + $112,697.76 = $302,780.40

Thank you!