

IP Valuation

WIPO - HEPTECH WORKSHOP

“Advanced TTO s Meet Early - Stage TTO s”

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Topics

- **What is IP Valuation ?**
- **Intangibles – Subject Matter of TT Agreements**
- **Qualitative and Quantitative Valuation**
- **Basic IP Valuation Methods and Approaches**
- **Practices of European R&D Institutions**
- **Conclusions**

What is IP Valuation ?

- Valuation: The process of identifying and measuring financial benefit and risk from an intangible asset.
- Benefit
- Risk

Intangibles – Subject Matter of TT Agreements

- **Intangible assets** – non-monetary assets.
- **“Legal Intangibles” – Intellectual property (IP)** refers to creations of the mind: inventions, literary and artistic works, symbols, names, images and designs used in commerce. Once protected under the relevant IP laws – IP becomes legally enforceable right.
 - Patents
 - Trademarks
 - Brands
 - Industrial Design
 - Copyright
 - Trade Secrets / Know-How etc.
- IP is not an asset by itself – only when strategically managed by skilled professionals.
- Number of patents or other protected IP is not an indicator of innovative effectiveness of the organization, the most important is IPR management.
- **“Competitive Intangibles”** – impact competitiveness, productivity, opportunity costs, revenues, market value and share price of the organization.
 - Human capital – primary source of competitive intangibles
 - Collaboration activities
 - Organizational processes
 - Know-How
 - Business Plan
 - List of customers
 - Good will, etc.

Intangibles – Subject Matter of TT Agreements

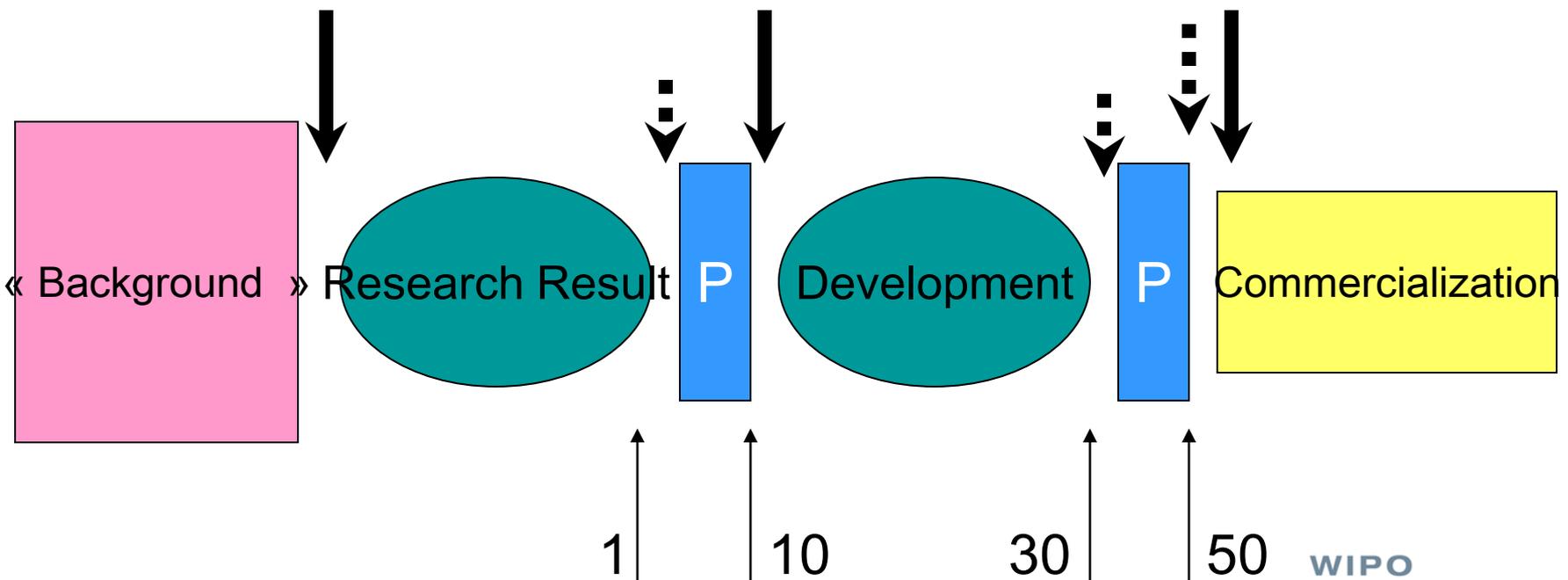
- **Technology transfer agreements have as a subject matter Intangible Assets – in particular intellectual property;**
- **Licensing Agreement – IP is an exclusive subject matter;**
- **Collaboration Agreement;**
- **Sponsored Research Agreement;**
- **Material Transfer Agreement;**
- **Consultancy Agreement;**
- **Confidentiality Agreement;**
- **Research Service Agreement, etc.**

Intangible Assets Valuation – What is so Different than Valuating Tangibles?

- Valuation – The process of identifying and measuring financial **benefit** of an asset.
- Valuation of Intangibles – The process of identifying and measuring financial **benefit** and **risk** of an asset, in a particular **context**.
- Risk
 - Time – What is the time needed to bring technology on the market? Sometimes even breakthrough technology can be « too early » for the market.
 - Money – How much more do we need to invest?
- Risk is a particularly important element in the valuation of early stage technologies – more time and money needed to bring technology on the market – less value.

Risk and Money?

Closer to the market, with and without financial partner – the value of IP will be different for the same asset.



Intangible Assets Valuation – What is so Different than Valuating Tangibles?

- The price is not the value of an intangible asset, while the price of a tangible asset is usually the expression of the real value.
- The price is what is proposed to the other side of the deal and it depends on how « thirsty » is the other side for that particular technology.
- The value of an intangible is the financial benefit that an asset can generate in a particular **context, taking fully into account the risk that the investment in the development of the asset may be higher than realized value.**
- The potential value of intangibles depends **on the context in which that value will be realized.**

Intangible Assets Valuation – What is so Different than Valuating Tangibles?

- Most intangibles are capable to generate more than one value stream **simultaneously**.
- In certain contexts the value is determinate by the authority, relevant laws (tax laws) or empirical experiences.
- It is important to define approach to value:
 - Understand actual value of an asset in use for actor,
 - Potential value in use,
 - Value construction – for negotiation purposes.



Qualitative and Quantitative Valuation

- IP valuation is both qualitative and quantitative in nature, as calculations are always based on qualitative analysis.
- **Qualitative methods** provide a value guide through the rating and scoring of IP based on factors which can influence its value.
- It examines, at a **micro level**:
 - the quality of intangible assets themselves;
 - their position and importance, relative to other business drivers;
 - the broader industry within which the business operates;
 - the potential value for business's competitors and potential competitors.
- The **macro-economic outlook**, over the useful life of the intangibles, for the economy in which the business operates.

Qualitative Valuation

- The qualitative study is used to formulate (and justify) assumptions on which the financial models, used to determine a numerical value to the IP under consideration, will be based.
 - Rating & Scoring
 - Components
 - (1) Scoring criteria
 - (2) Scoring system
 - (3) Scoring scale
 - (4) Valuing factors, and
 - (5) Decision rules.

Qualitative and Quantitative Valuation

- Quantitative methods attempt to calculate the monetary value of the IP and include:
 - Cost
 - Market
 - Income
 - “Rule of Thumb”
 - Monte Carlo
 - Industrial Standard
 - Real Option
 - Other Methods.

IP Valuation Methods and Approaches

■ Cost Method

- Cost-based models approximate IP value by determining the replacement/creation around cost of equivalent IP.
- The approach, while useful in the situation where there is no other available data – wholly disregards the innovation and uniqueness of the IP.
- There is no “equivalent” or “identical” IP – that negates the novelty and inventiveness – that define intangible assets.
- Intangible assets tend to grow over time, use and investment so their full value is not apparent at inception – that is why it is so difficult to project a real commercial value of early stage technology.

IP Valuation Methods and Approaches

■ Cost Method

- Correlation between the cost and value may arguably be used:
 - at the pre-commercialization outset of the IP;
 - as a starting point for licensor (R&D institution) in constructing a negotiation value of the IP – licensor would like to cover the costs of development of technology and protection of the IP;
 - helps to understand the position of the other negotiation party.

IP Valuation Methods and Approaches

- This method is more appropriate for tangible assets – where cost reflects the value of the asset.
- **Disadvantages of the Cost Method:**
 - Limited effect;
 - Does not show earning power of the technology and ultimate market share;
 - Cost to “create around” – not an indicator of the value of an asset as with the time needed the technology may become obsolete;
 - “Creating around” – there is a potential danger of an infringement of the model technology;
 - Cost of development – totally wasted or dramatically understated value of the product or service.
- In TT negotiation “cost of the development” of technology is rarely accepted as an argument – “I do not want to pay for an inefficient licensor!”

IP Valuation Methods and Approaches

■ Market Approach

- Postulates intellectual property value as the amount for which equivalent IP was either sold or offered for sale on the open market.
- As the cost approach, there is an assumption of the existence of intangible assets that are sufficiently **equivalent to those being valued**.
- Does not take into account that in the contractual context the **IP is valued in correlation with other key terms of the agreement** – exclusivity, territorial aspects, duration, available know-how, post contractual services, etc.
- The approach also suffers from the **scarcity of available information** – IP market is still not sufficiently developed.
- If a sale price / royalty rate is made public, the amount allocated to IP from the total purchase price is not reported or other terms of contract are unknown.
- **Useful:**
 - For tempering future-income-based forecasts;
 - For valuation of early stage technology – as a starting point in income based valuation, if there is no other indicators for determining the price of the future product containing new technology.

IP Valuation Methods and Approaches

■ Disadvantages of the Market Approach :

- Difficult to find similar transactions;
- If used following comparability factors should be identified:
 - Relevant time period – the future is a focal point! Expected cash flow – not price paid!
 - Financial situation of the parties – are both parties on equal footing?
 - Relevant industry transactions – similar technology in a similar industry sector – each industry has a set of unique economic forces:
 - Consumer electronics – highly competitive;
 - Airlines – oligopolies;
 - Foreign transactions – relevant only in the countries with similar economic development and legal framework;
 - What are complementary asset investment requirements – high infrastructure pre investment will diminish the value of IP;
 - Non-monetary compensation – “grant backs”, “technology share”;
 - Independent status of the parties – negotiations are different if parties are in alliances and joint ventures (Merck & Co – Johnson & Johnson).

IP Valuation Methods and Approaches

- **Income Method:** Projection of the future revenues that the IP asset can be expected to generate on the market over a certain period of time taking into account the time, value of the money and the risk that the income will not be realized.

- **Essential Elements of the Projection**
 - **Market Penetration**
 - **Sales Forecast (sales growth)**
 - Conditions of the general economy;
 - Developments in the industry in which product will be produced;
 - Conditions that will influence customers;
 - Competitors reaction.
 - **Time**
 - **Changing Value of Money (over the time)**
 - **Risk**

- **Pre-commercialization costs** – should be also taken into consideration.
- **Production Costs** – difficult to predict for an early stage technology, previous experience with similar technology can be an useful foundation.
- **Overhead costs** – historical experiences
 - Advertising;
 - Education about the new product;
 - Promotion of product on fairs;
 - Discount promotional fees;
 - Development of related intangible assets (know-how, services, training etc.).

IP Valuation Methods and Approaches

■ Different Approaches of Income Method

- Discounted Cash Flow

- Monte Carlo

- Real Option

- Royalty Revenues

- “Rule of Thumb” – 25% Rule

Income Method – Discounted Cash Flow Approach (DCF)

- DCF is the most frequently used approach of the Income Method;
- A projection of a **future net cash flow** expected from the commercial use of an intangible asset under review;
- Over a **period of the economic life of the IP**;
- “Discounted” by the time value of the money and **risk** (“discounted rate”);
- Objective: determination of the **Net Present Value** of the IP asset.

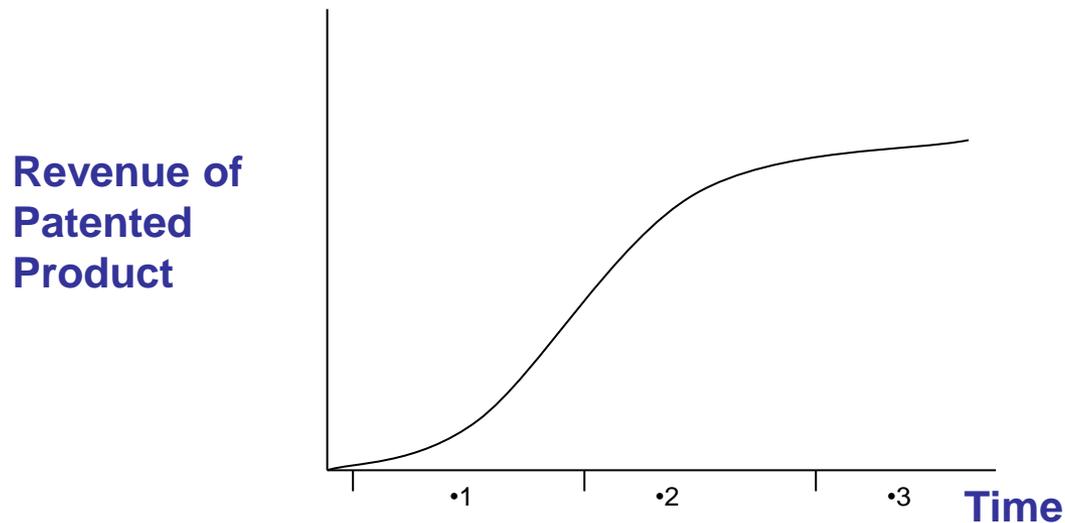
DCF – Basic Elements

- Projection of potential revenues and expected growth determined by using:
 - Past growth rates – if data available;
 - Similar technologies – Market Method (comparables);
 - Forecast by industry experts;
 - Management's own projection.
- Growth rate change in relation with the technology diffusion.



Growth of Technology Diffusion

- Market introduction – “market penetration”
- Growth phase
- Saturation of maturity



DCF – Basic Elements

- Time of the projection – **economic life** of the asset – efficient time of an exploitation.
- Usually shorter than the legal life, particularly in certain industries – IT, electronics.
- Pharmaceutical products – economic life prolonged even after the patent expiration – because of the strong trademark or follow-on technology.



DCF – Basic Elements

- Risk that the income will not be realized.
- “Discounting” – reducing a projected Net Cash Flow (by applying discount rate) to a Net Present Value (NPV) of the IP asset.
- Discount rate
 - the real interest rate;
 - inflation;
 - risk premium.



How DCF Calculation Works

1. **Identify the potential market** for the product containing the new technology that in general should provide higher quality or cost reduction;
2. **Determine cash flow** that the product may generate by using the new technology. Use available data – your own (for the same or similar technology that you had commercialized) or sectarian, industrial professional data base (if available – comparable method);
3. Estimate **the expected growth** of the cash flow over the economic life of the asset;
4. **Project expected cash flow** over the period of the economic life of the asset, taking into account growth rate for each year;
5. Subtract any costs (cash outflows) that are required to generate the income in order to determine **Net Cash Flow** (as a base for further calculation).

How DCF Calculation Works (continued)

6. Discount projected future net cash flow for every year under projection;
7. To do this, estimate and apply a “**discount rate**” based on:
 - Real interest rate;
 - Expected inflation rate;
 - Risk premium.
8. Lump Sum – **Net Present Value.**

How DCF Calculation Works (continued)

$$PV = \sum_{t=1}^n \frac{CF(t)}{(1+r)^t}$$

DCF – Early Stage Technologies

Early Stage Technology – high risk – as there is a delayed time to income and additional investment needed.

- **High discount rate counterbalances high risk;**
- **Delayed income and high discount rate – lower the value of technology;**
- **Technology risk very high;**
- **Commercial risk very high:**
 - Inflation
 - Competition
 - Changing economic climate.

- **Expected returns and “paydays” should be proportional to the risk and stage of technology development :**
 - Start up (protected idea) – 50%
 - First stage (prototype) – 40%
 - Second stage – 30%
 - First stage – 25%

DCF – Early Stage Technology

- Discount rate reflects risk, usually similar in the same industry sector.
- Biotechnology and pharmaceutical industry – early stage technology particularly risky.

- Professional estimations:
 - Discovery – 80 %
 - Preclinical – 60%
 - Phase I Clinical trials – 50%
 - Phase II Clinical trials – 40%
 - Phase III Clinical trials – 25%
 - New drug application – 22,5%
 - Product launch – 15%-17,5 %

- **Venture capitalists** – short term investors – 5 to 7 years to get out of investment.
- Often VC for an investment in an early stage technology would consider 50% as a reasonable discount rate – and would like to realize proportional return on investment.

DCF Approach in the Context of Licensing

- Value based on a royalty savings hypothesis, essentially asking (and hopefully, answering) the following question:
“Over the useful life of the intellectual property, what would I save by owning, rather than licensing, the intellectual property under consideration?”
- Projection of the future royalty stream (instead of “net cash flow”), discounted for the risk and money value over the time.

Monte Carlo

- Monte Carlo Simulation – computer based sophisticated version of the multiple scenario DCF.
- For each DCF element it provides a range of possible values and different options for the distribution of these values.
- It provides projection of thousands scenarios and net present values, in a form of a frequency chart – easy to visualize the probabilities of net present outcomes.



Real Option

- **Real Option – 1972 Black and Scholes article** – model for valuing financial options (the right to buy or sell a specific asset at the fix price prior to some expiration date) can be used for IP valuation
- Analogies made on the similar volatility of the context between financial options and IP;
- Based on income approach and DCF principles;
- Mathematically very complex;
- Required inputs difficult to determine:
 - Current value of the asset – NPV – as a starting point;
 - The variance of the value of the asset in the future (similar as volatility of the stock);
 - Expected income generated by the asset (“dividend – paid” for option – “net cash flow”);
 - “Strike price” of the option – investment needed to launch the product;
 - “Economic life” of an asset – the time before expiration of the option;
 - Riskless interest rate – during the economic life of the option – long time government bond.
- **Real option method is considered by some expert as particularly applicable for valuation of an early stage technology.**

Industrial Standard

- **Standard Industrial Royalties**
- Some industries have developed standard royalty rates over the years based on what could be considered “rules of thumb”.
- Inconvenient for IP – patents and other IP aren’t commodities and thus can not be accurately valued at a set rate.
- However, if a patent is being valued for an **external transaction** within an industry that traditionally applies standard royalty rates, then the use of this standard rate in the valuation can not be totally dismissed.
- For an internal valuation, the use of standard royalty rates is not recommended.

“Les Nouvelles” – LESI Journal (September 2010)

**Table 1. Running Rates by Agreement Type and Industry¹
Median (Average in Parentheses)**

Agreement Type	Industry				
	All	Software	Hardware	Medical	Pharma
All Types	5.0% (8.2%) n = 2,963	10.0% (17.3%) n = 515	5.0% (7.0%) n = 489	5.0% (5.6%) n = 520	5.0% (6.2%) n = 1,439
Product/ Distribution ²	10.0% (15.4%) n = 339	14.4% (18.9%) n = 180	6.0% (12.8%) n = 58	5.0% (7.9%) n = 44	8.0% (12.6%) n = 57
Development/JV ³	6.5% (9.5%) n = 482	17.0% (21.2%) n = 65	4.0% (8.1%) n = 71	6.0% (6.7%) n = 53	6.0% (7.7%) n = 293
Acquisition ⁴	5.7% (9.1%) n = 350	10.0% (16.4%) n = 90	5.0% (6.4%) n = 78	5.0% (6.1%) n = 56	5.0% (6.8%) n = 126
Settlement ⁵	5.0% (6.1%) n = 87	4.6% (7.6%) n = 10	6.0% (7.1%) n = 12	5.0% (5.5%) n = 33	4.6% (5.9%) n = 32
Patent (+) ⁶	4.5% (5.1%) n = 570	4.0% (4.4%) n = 17	4.4% (4.9%) n = 95	5.0% (5.4%) n = 109	4.5% (5.1%) n = 349
Research ⁷	4.0% (4.4%) n = 118	5.5% (5.5%) n = 2	3.0% (5.3%) n = 5	3.6% (4.0%) n = 18	4.0% (4.4%) n = 93
Bare Patent ⁸	3.0% (3.7%) n = 343	3.0% (3.3%) n = 17	3.5% (3.9%) n = 56	3.5% (3.9%) n = 73	3.0% (3.6%) n = 197
Other ⁹	5.0% (8.9%) n = 674	11.6% (18.1%) n = 134	5.0% (6.9%) n = 114	4.0% (5.6%) n = 134	5.0% (6.9%) n = 292

“Rule of Thumb”

- Licensor, as developer of the technology, considers as a fair deal to get 25% - 33% of the licensee’s **profit** (not income).
- Different opinions about the value of the method.
- In practice often used as an indicator.
- It would be difficult to apply for the valuation of early stage technology as the technology is not mature for the market.

Practices of European R&D Institutions

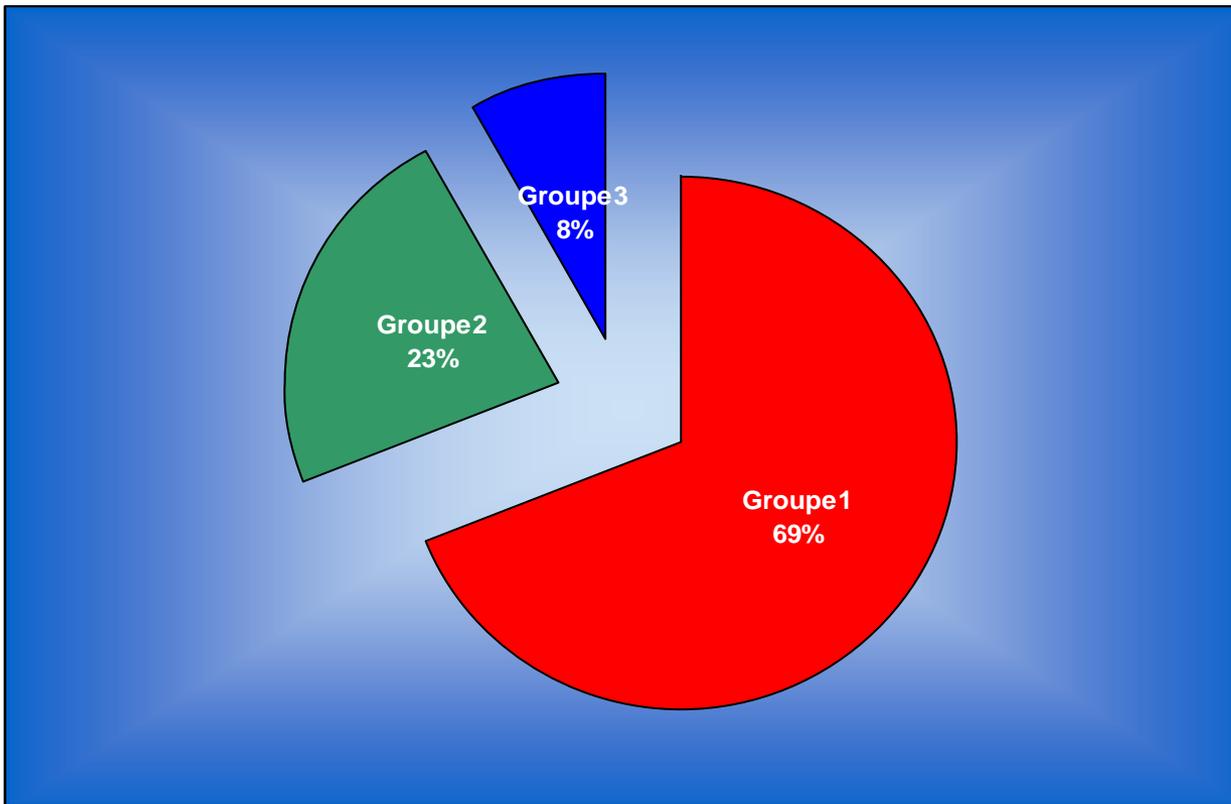
**Survey of European “TTO Circle”
October 2011**

In a given year, how often on average do you perform valuation of early stage technologies?

Group I – Performing Valuation 1 – 20 times per year

Group II - Performing Valuation 40 – 50 times per year

Group III – Performing Valuation more than 100 times per year

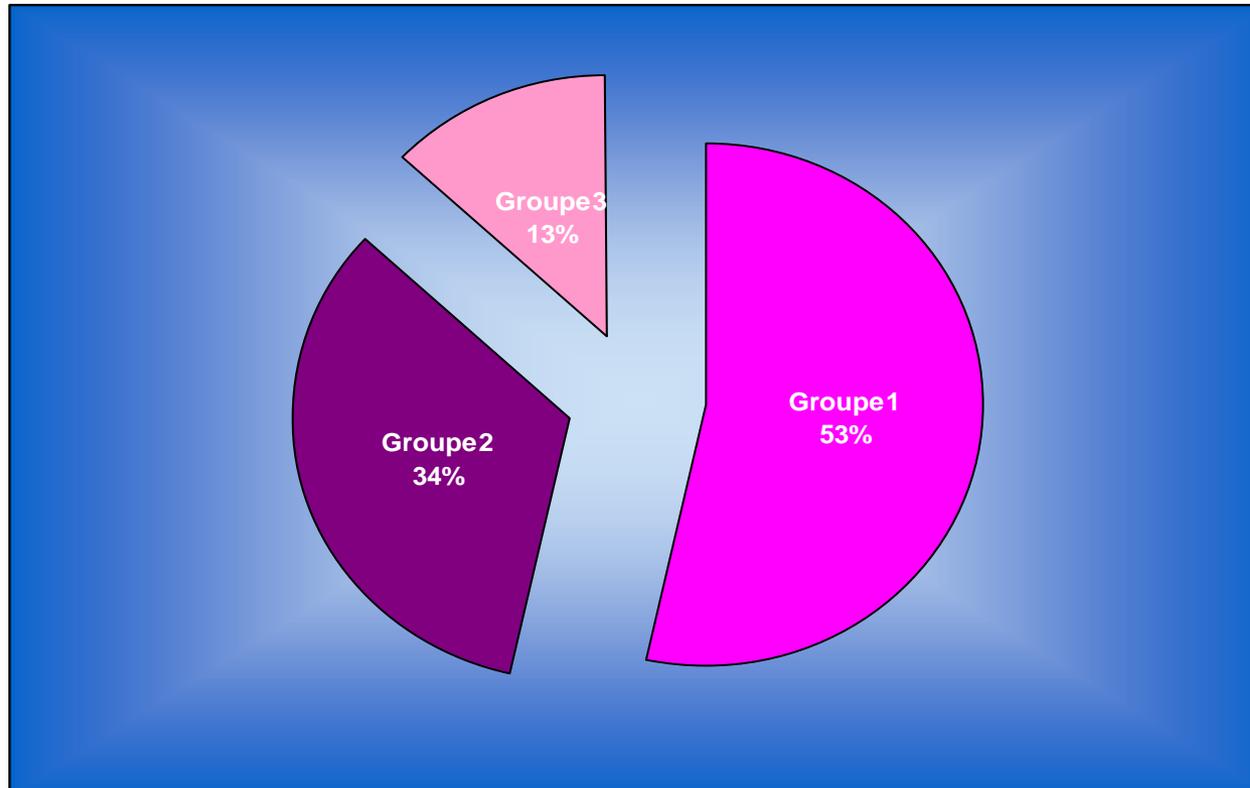


Do you perform valuation of early stage technology internally or do you use external consultants?

Group I – Only Internal Resources

Group II – Combination of Internal Resources and Consultancy

Group III – Only Consultancy

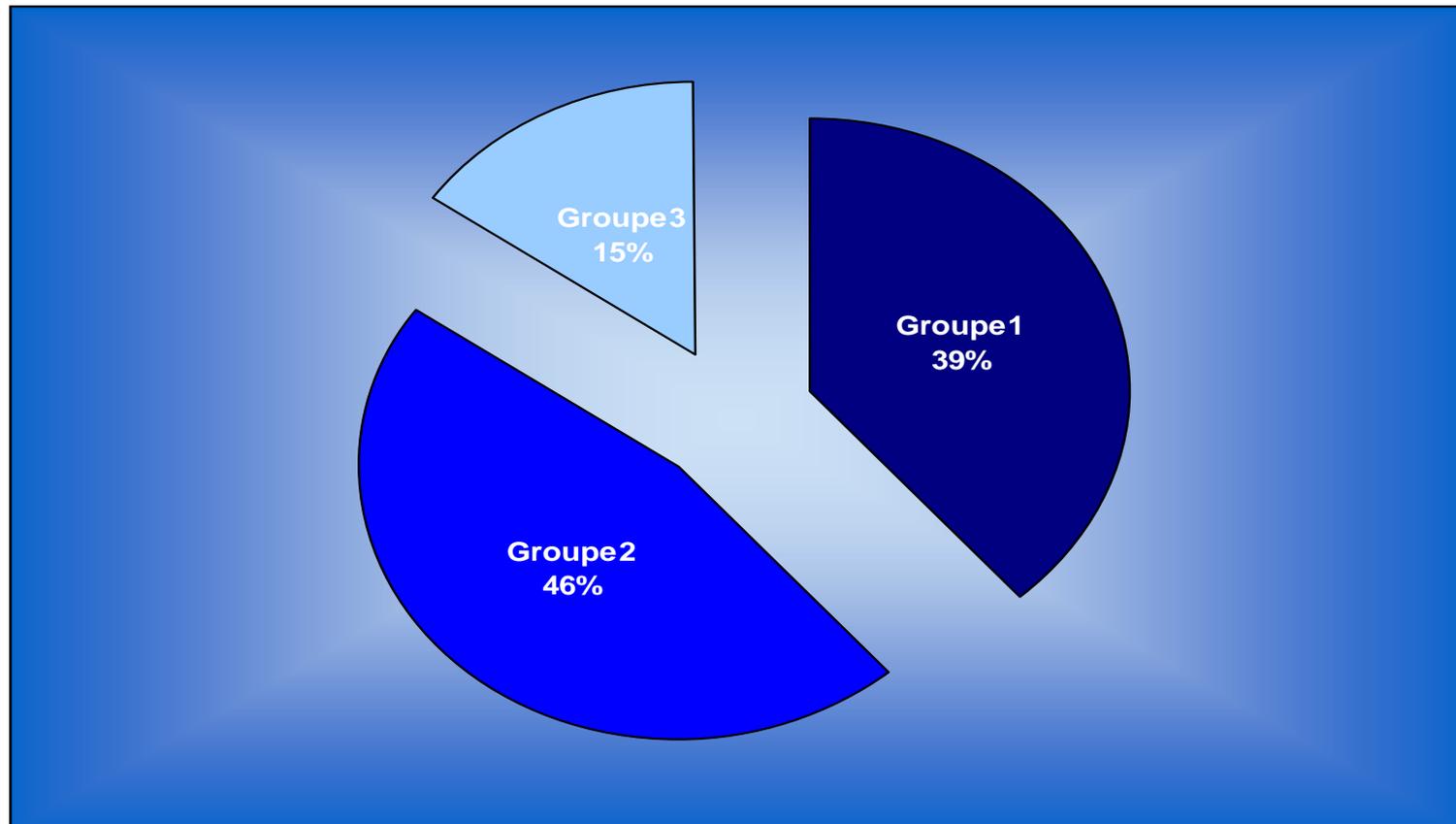


Can you please give an estimate of the internal human resources used for performing valuation of early technologies on average on a yearly basis?

Group I - 0,25 to 1 man/month / year

Group II - 1 – 25 man/month/ year

Group III - 30 to 100 man/month/year

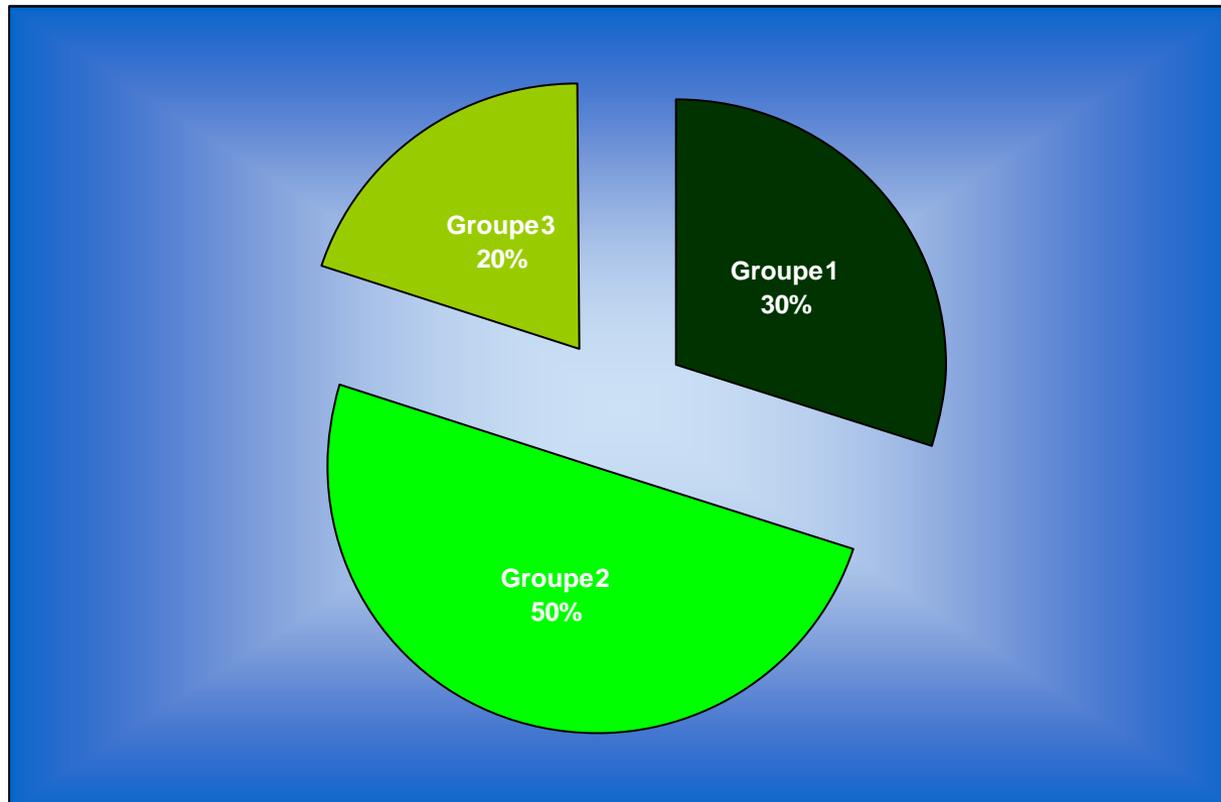


Can you please give an estimate of the budget dedicated to the use of external consultants for the valuation of early stage technologies?

Group I – 500 – 20 000 Euros

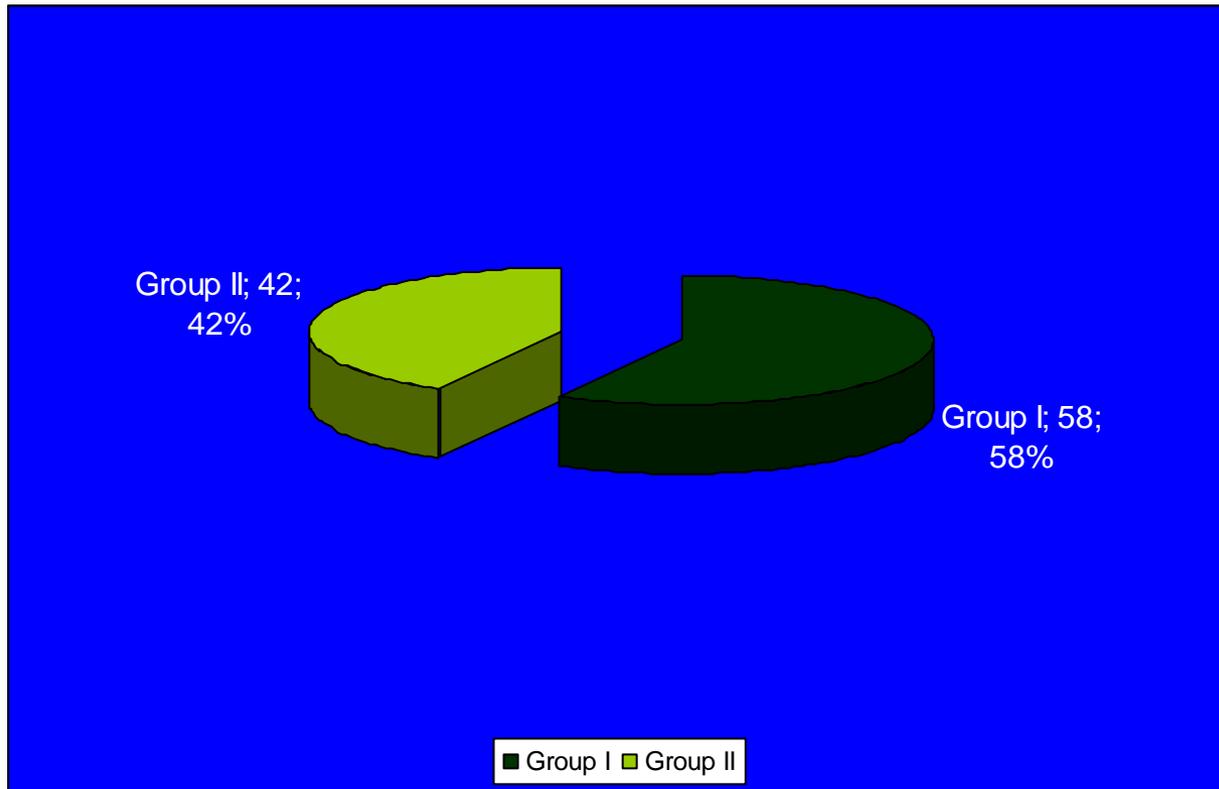
Group II – 50 000 – 200 000 Euros

Group III – 800 000 – 1 000 000 Euros



Group I – Using “combination” of the methods for valuation of the early stage technology

Group II – Using only Qualitative method



Can you please indicate which qualitative method (s) you use to value technologies (e.g. rating, ranking, scoring methods)?

- Focus of the **qualitative** approach is the analyze of the **quality of the technology** from different standpoints:
 - Technical – development status (early stage, proof of concept, pilot..);
 - IP point of view (solidity of the patent, degree of novelty, freedom of operation);
 - Market point of view – existence of similar technologies and their geographical distribution, potential partners;
 - Financial.

- **Internally developed ranking criteria, such as “8 leading factors”:**
 - Suitability for Suggested Application
 - Cost
 - Development Status
 - Exploitation Rights
 - Degree of Novelty
 - Marketing Interest of Partner
 - Quality of Technology Information
 - Sociability of Technology Provider

- Or
 - Patentability
 - Patent Strength
 - Status of Invention
 - Market Situation
 - Inventor’s History – Supportive or not in the process of transfer?
 - Additional Services for the Partner (potential for continuation of collaboration)
 - To whom shall invention be licensed

- In addition some institutions are using **“competence “ criteria – scientific and management skills of the team.**

Can you please indicate which quantitative method (s) you use to value technologies (e.g. market approach, income based)?

- One third of the participating institutions did not give concrete response.
- “Finger in the air” - we still do not use quantitative valuation methods!”
- “Informal one, without rigorous framework” – or
- Defined “pricing policy” for services, trainings etc.
- Majority of the respondents are using a combination of few different tools.
- The most frequently used method is Income Method – 77% of the responses indicated IM.
- Income method is used in a variety of its approaches – mostly Discounted Cash Flow (NPV), 25 % (one organization) and Monte Carlo approach in combination with other methods (one organization)..
- Market / Comparable Method – 44,5 %.
- Cost Method – in combination with other data – patent based and know how based – two organizations.
- Industry standards – one organization.
- Scoring based on quantitative information – one organization.

In the case of licensing, how do you transform the value of a particular technology to obtain its "price" to be paid by the licensee?

- Pragmatic approach and bottom line – **“price” has to cover cost of:**
 - Development of the technology;
 - IP protection;
 - Incentives for the researchers.
- Negotiation approach – valuation supports negotiation strategy, but the real “price” depends on what the partner is ready to pay – how “hungry” for technology he is!!
- Price is in some institutions always determined by the experienced staff of the institution.

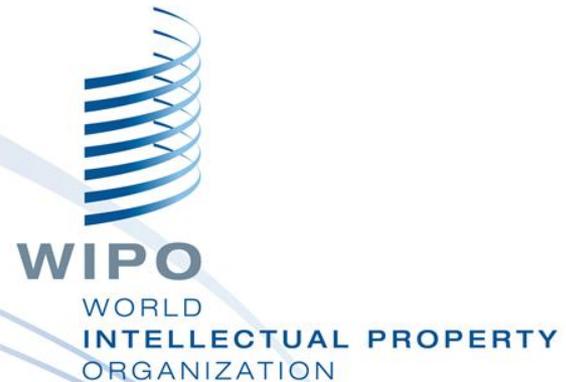
- Some institutions have particular rules:
 - Royalty rate is always 10% of the net sales price.
 - The total income should be 25% of the NPV.
 - Market comparisation of the royalty rates of the product.
 - Old technology – compensation of the cost – New technology – Market approach.

Can you please give the reason (s) for choosing a different approach in the case of early stage technologies valuation related to the creation of spin-off companies:

- Creation of the spin – off involves two aspects:
 - Valuation of the technology
 - Mixed methods;
 - Higher risk rate;
 - Shorter period of projection – up to 5 years;
 - Equities;
 - Evaluation of the additional elements such as competence of the team.
 - “Stronger” file to be defended in relation with potential investors and VC.
 - Licensing Conditions and Pricing
 - “Make the start up fly!!!”
 - Lower upfront payments;
 - Running Royalty Rates instead lump sum or upfront payments;
 - Delayed starting point of payments.

Conclusions

- IP Valuation is an ESTIMATION of an intangible asset value, thus it is not a precise figure.
- It is always qualitative and quantitative, and potentially subjective (having access to more or less same data, two valuers can always come out with different figures).
- Experience is essential!
- In contractual relations it is important to develop “starting point” for negotiation – even if there is a reasonable difference in the projection of the value, it is an advantage to be able to show reasoning behind the “value structure”.



Thank you!

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