Fundamental principles of patent valuation
Methodologies to value patents, including cost-based methods, market-based methods, income approach, Combined evaluation of know-how and trade secrets

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Athens, March 20, 2014

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Patent Valuation

- Basics -

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Valuation approaches

Market approach

Cost approach

Income approach

Valuation approaches

Market approach

Def.: The value of the patent is derived from comparable market prices.

Cons:

- Is a patent comparable to another patent?
- Comparable parties / situation / market?

Pros:

- If there is something like a market = reference point

Valuation approaches

Cost approach

Def.: The value of the patent is determined by costs.

Cons:
- historic costs of the patent?
- costs of reproduction?

Pros:
- costs of an alternative = upper limit

Valuation approaches

Income approach

Def.: The value of the patent is derived from future income expectations.

Cons:

- The future is difficult to predict.

Pros:

- That is what value is about.

Discounted Cash Flow (DCF)

- In any valuation, we're interested in three things:
  - The quantity of cash that the asset under consideration will generate
  - When that cash arrives
  - What the risk is that the cash won't materialise

- Intuitively, the greater the risk that cash won't materialise in the future, the lower the value of a project (other things equal)

- To find the value of a project, forecast future cash flows, discount them back to the present at an appropriate discount rate, and sum:

$$\text{Value} = \frac{FCF_1}{(1+r)^1} + \frac{FCF_2}{(1+r)^2} + \ldots \frac{FCF_n}{(1+r)^n}$$

- This is "discounted cash flow valuation" (DCF), and it is the standard technique for valuing many kinds of assets, and for taking decisions

Income approach

$$value = \sum_t \frac{Income_t - cost_t}{(1 + WACC)^t}$$

All values are expectation values (E)

E(Income) = Income * Probability(Income)

Income approaches

Incremental cashflow method

Isolation of patent related cash flows by comparison with comparable products:

- Identification of a patent related increased market share
- Identification of a patent related premium price
- Identification of patent related cost reductions

Relief from Royalty

Isolation of patent related cash flows by asking the question: How much would the patent owning company have to pay in royalties to a third party, if this party was the patent owner?

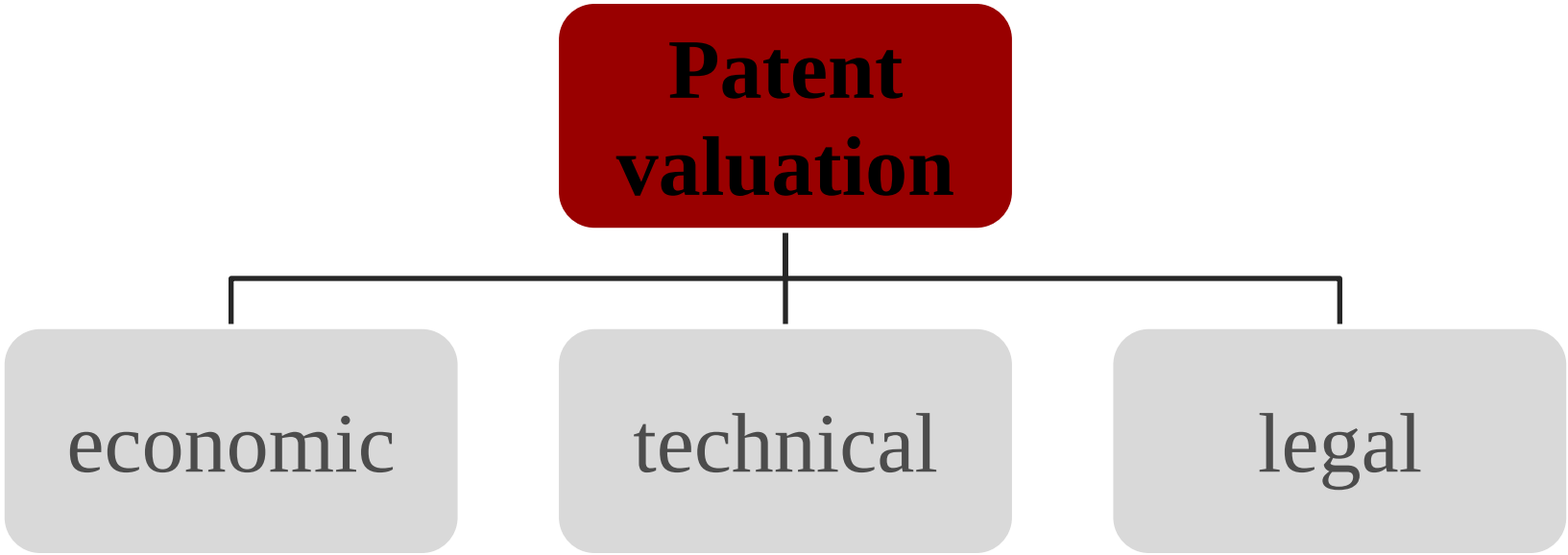
The license analogy method is especially applicable, if there is a non sufficient information basis for the application of the incremental cash flow method

Income approach

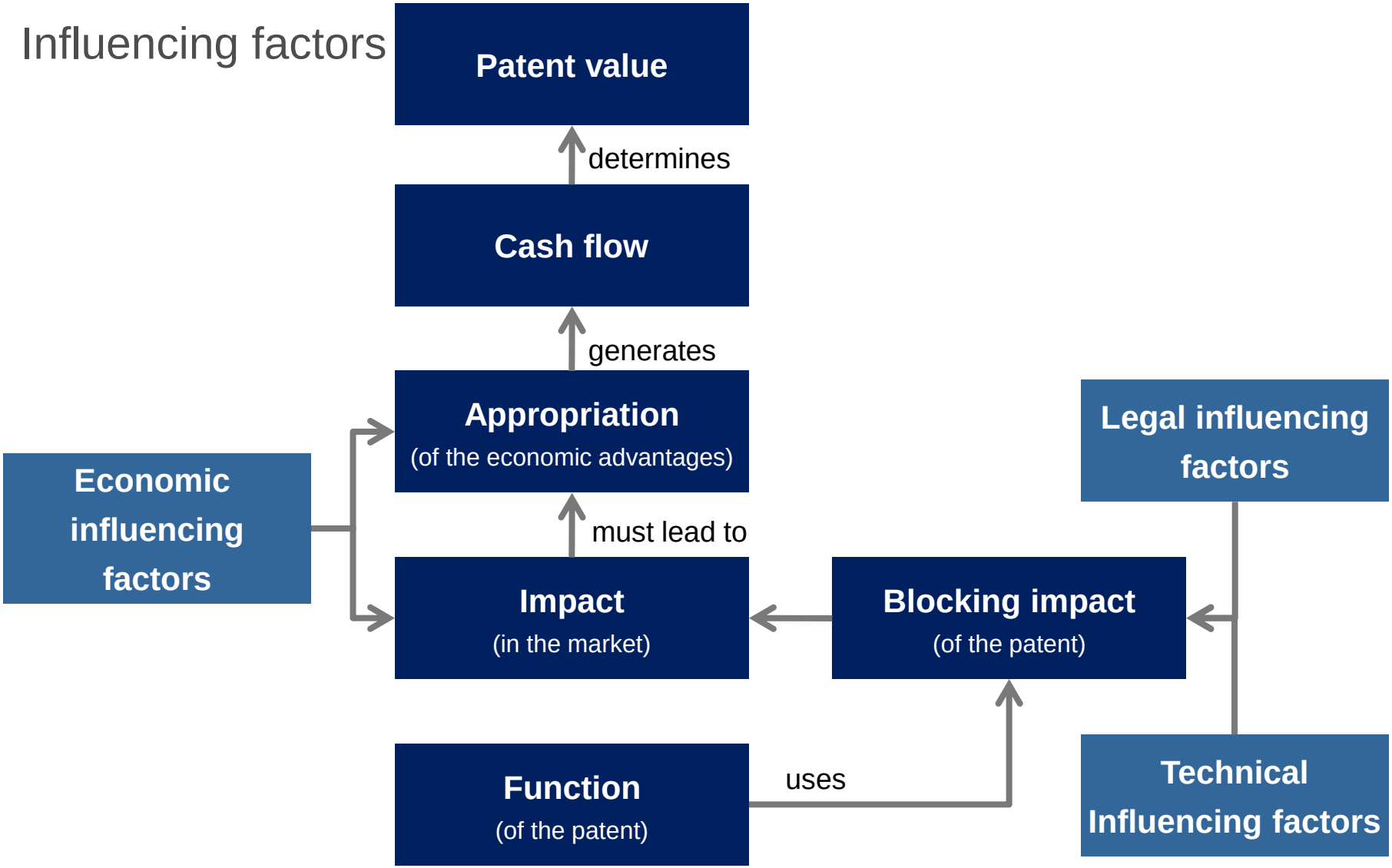
$$value = \sum_t \frac{Income_t - cost_t}{(1 + WACC)^t}$$

Object of valuation	Relevant income
Patent	Income due to patent
Know-how	Income due to know-how
Trade-secret	Income due to trade-secret
Patent + know-how	Income due to patent + know-how
Company	turnover of company

Patent valuation



Influencing factors



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Functions of a patent

Protection	Protection of actual or future revenues by protection of a competitive advantage
Reserve	Early protection of interesting technology fields
Blocking	Hindering of competitive activities in particular technology fields
Cost reduction	Achievement of cost reductions by using the patent in the production process
Licensing	Providing exclusive or simple licenses to third parties
M&A / Cooperations	Consideration of the patent in company transactions and cooperations

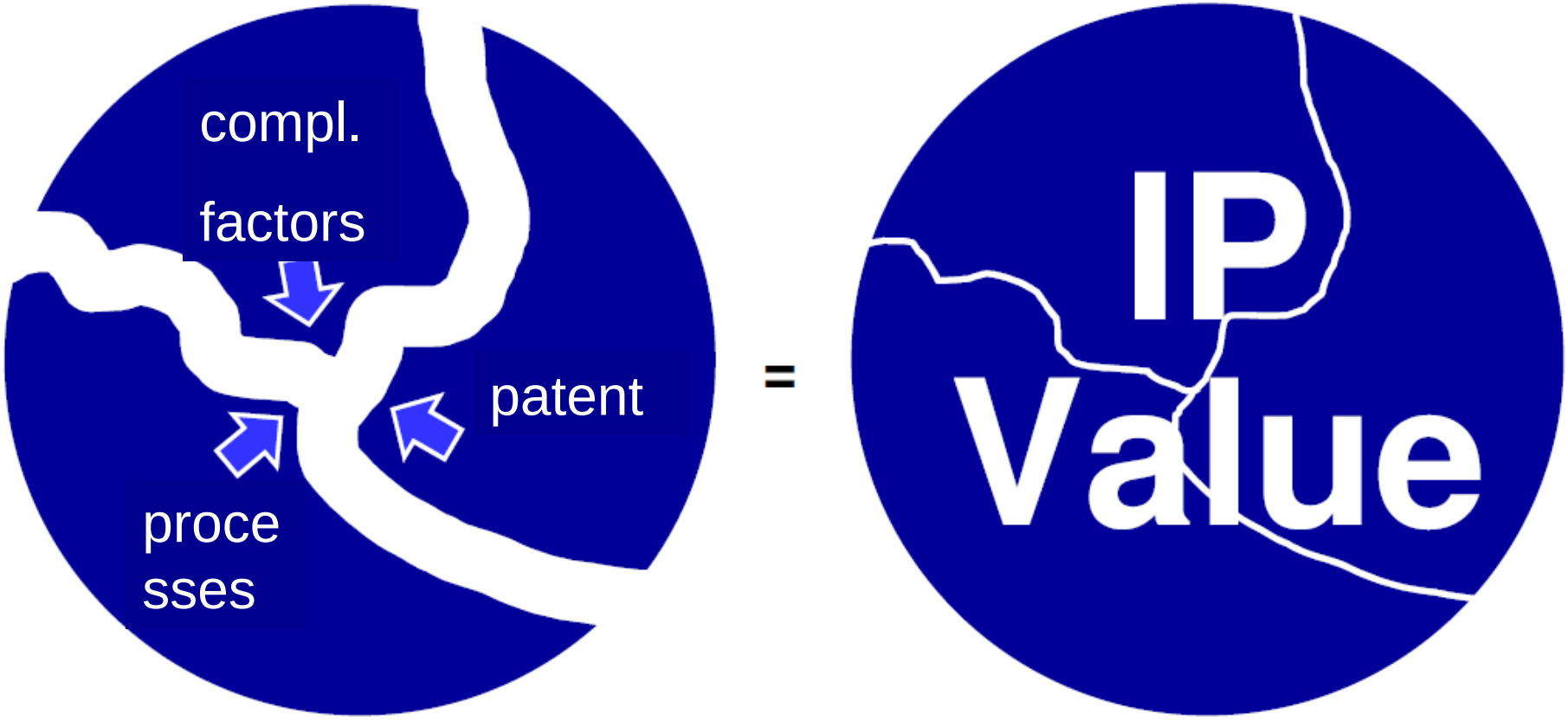
Complementary factors to generate income

To generate the income, you need more than the patent alone, namely:

- ✓ Know-how
- ✓ Capital
- ✓ skilled persons
- ✓ a factory
- ✓ a sales force
- ✓ a big market / customers
- ✓ processes / things must really happen
- ✓ ...

Value is in the eye of the beholder.

Complementary factors



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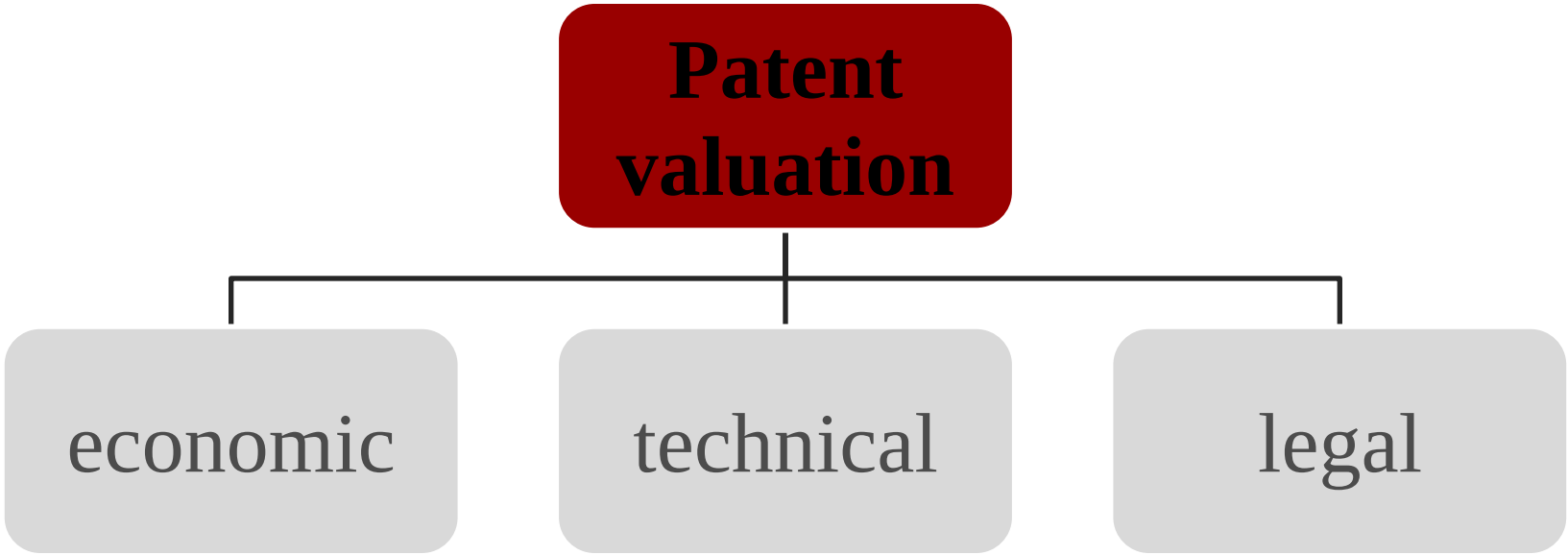
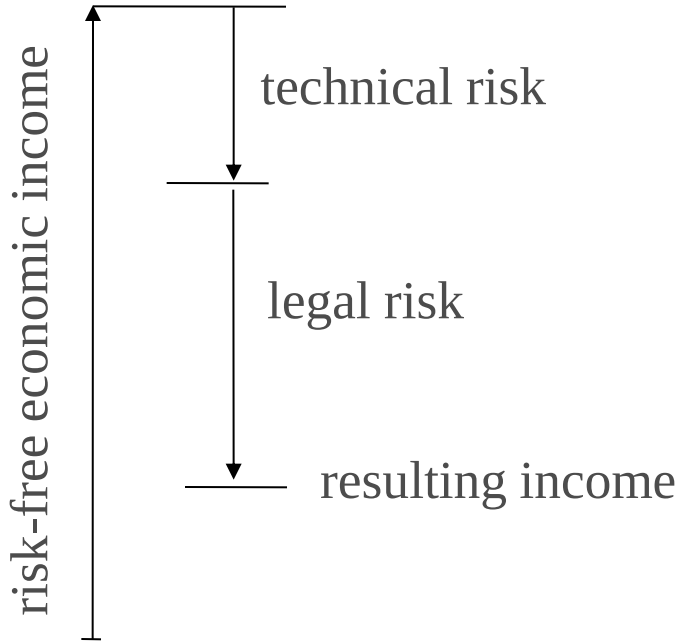
Patent valuation



risk and patent income



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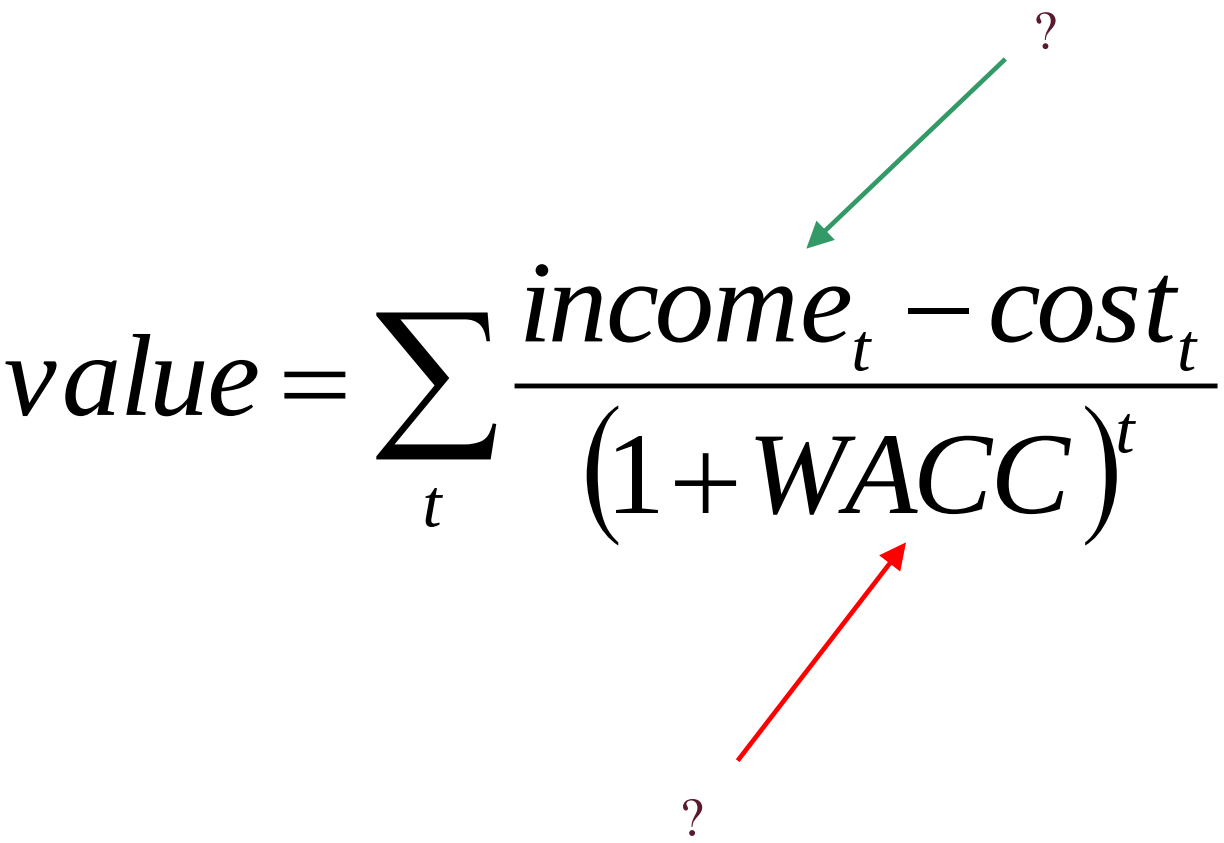
Where to discount legal risk?



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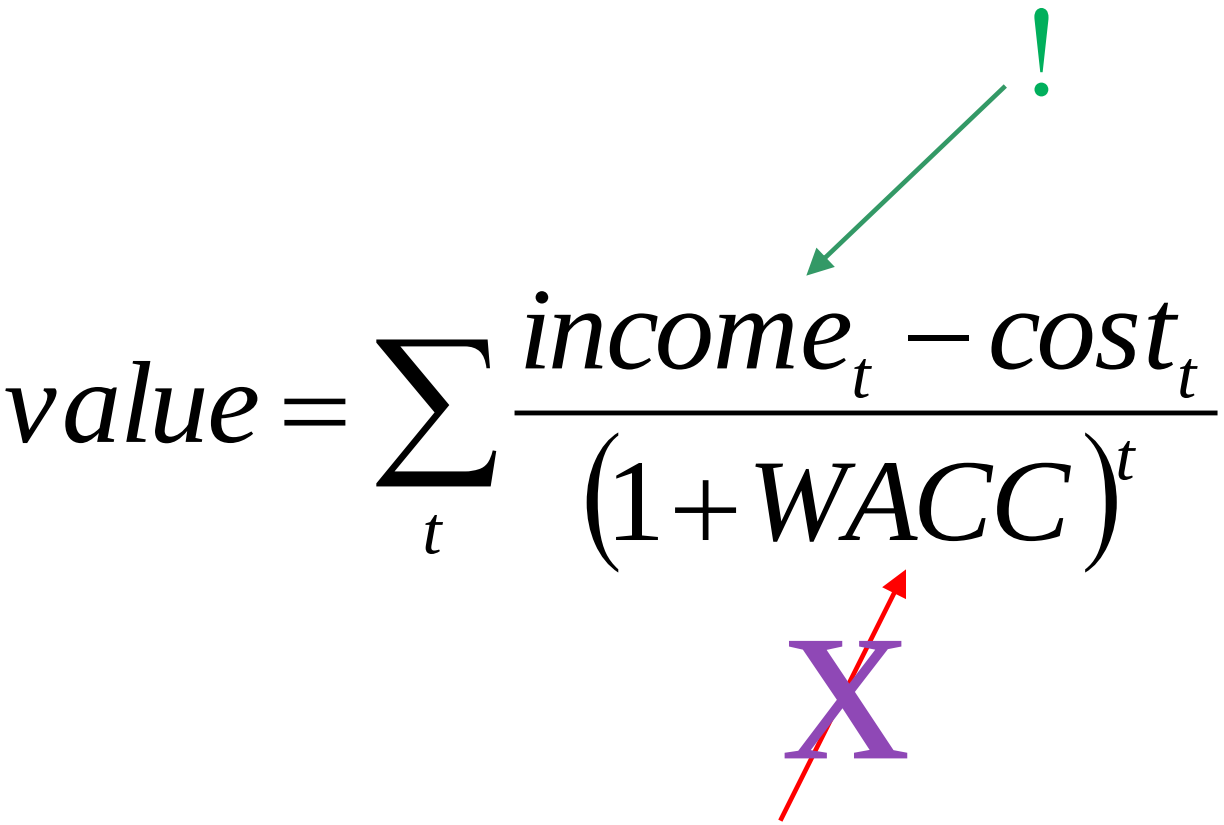
patent specific WACC?

„Schwieriger gestaltet sich die Ableitung des patentspezifischen Risikomaßes. Die Möglichkeit der direkt marktgestützten Ermittlung des Betafaktors existiert für Patente regelmäßig nicht, da für Patente keine Eigenkapitalanteile unmittelbar am Kapitalmarkt gehandelt werden. Zur Ableitung der patentwertspezifischen Eigenkapitalkosten ist daher zu prüfen, ob Betafaktoren für Peer Group Unternehmen gewonnen werden können, die eine dem Patent vergleichbare Risikostruktur aufweisen. Da sich das Risikoprofil eines patentspezifischen Zahlungsstroms jedoch von dem Risikoprofil eines aggregierten Unternehmenszahlungsstroms in aller Regel unterscheidet, sind zumeist entsprechende Anpassungen vorzunehmen. Diese erfolgen dabei entweder rein intuitiv oder können unter Berücksichtigung des Risikos von Patenten des gleichen Technologiefeldes indirekt abgeleitet werden.“

(Rainer Kasperzak, Katja Witte: „Monetäre Patentbewertung auf Basis der Lizenz Preisanalogie – Eine kritische Betrachtung unter besonderer Berücksichtigung patentwertspezifischer Eigenschaften“, DStR 2009, 1549)

Where to discount?



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Simple formula

Patent income =

(risk-free patent income) * (1 – $discount_{legal\ risk}$)

Dealing with legal risk

Requirements:

1. Complete list of all legal topics
2. The topics must be disjoint.
   - Do not take risk into account twice!

Legal topics / aspects

- ✓ **Status of the patent**
  - Is it in force?
  - countries covered?
  - remaining lifetime?
- ✓ **Ownership and contractual issues**
  - ArbErfG?
- ✓ **Patententability / Invalidity**
  - Has it been granted?
  - If not, is it patentable?
  - If yes, can it be invalidated
- ✓ **Freedom-to-Operate**

Mixed aspects

- ✓ **Coverage**
  - Does the patent really cover the product or process that it is meant to cover.
  - Does it cover “your own” product?
- ✓ **Circumvention and breadth of coverage**
  - Which “third party products” does it cover?
- ✓ **Detectability and Enforceability**
  - Can infringement of the patent be detected?
  - Can the patent be enforced?

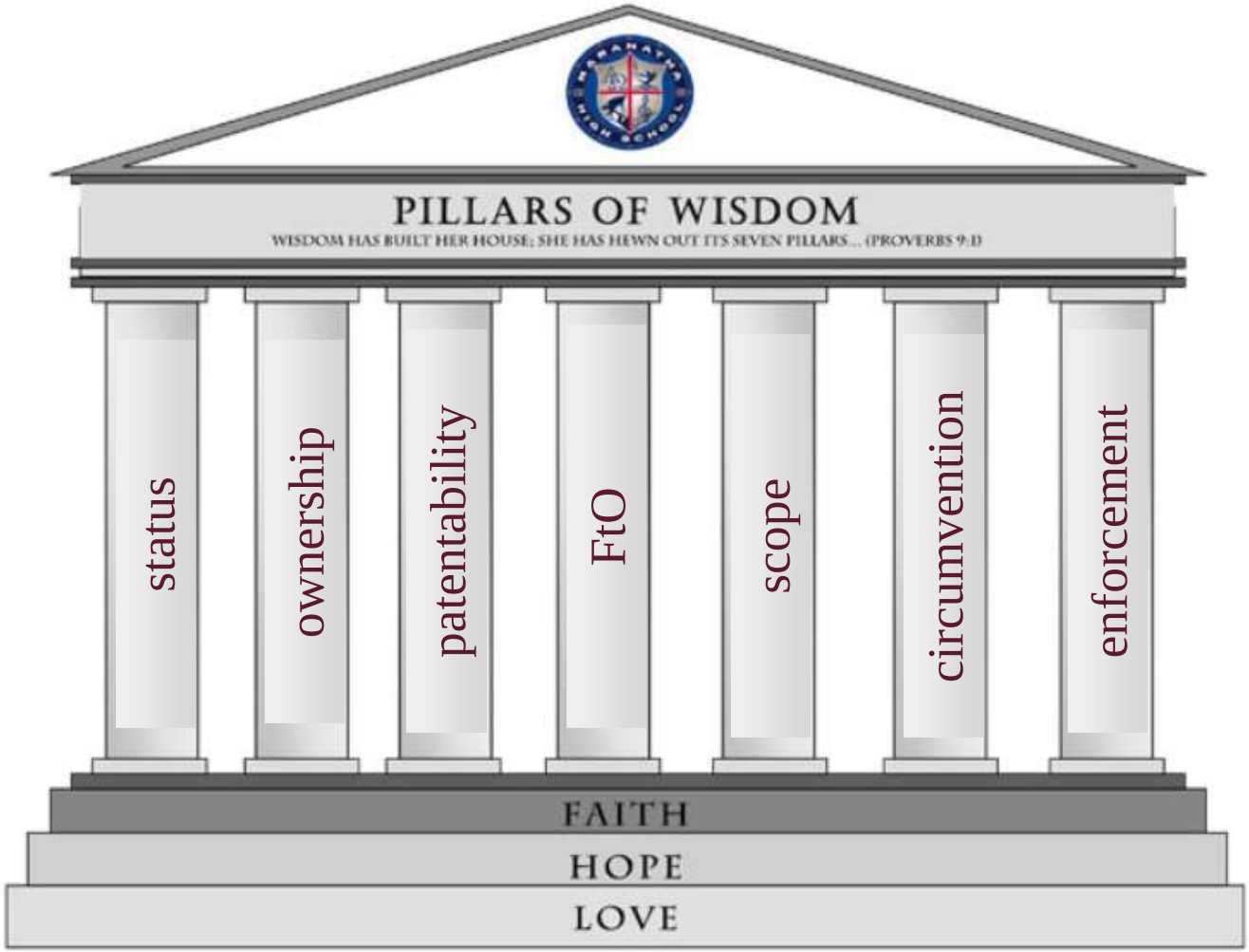
(Complete and disjoint.
There are different lists imaginable.)

aspect overview

	your product	**their product**
your patent	coverage (defensive)	circumvention detectability / enforceability (offensive)
their patent	FtO	-

status
ownership
patentability

7 Pillars of Wisdom / risk for patents



Wisdom has built her house; she has hewn out its seven pillars… (Proverbs 9:1)

Discount

Discount

= Risk

= legal uncertainty

= **probability** of a severe problem

Probably no problem

For a valuable patent:

All topics A, B, C, ... must turn out well.

(A+, B+, C+, ...)

All topics are related by a logical AND,

because they are disjoint and complete.

Probability (P)

$$P(\text{patent has value})$$
$$= P(A^+ \wedge B^+ \wedge C^+ \wedge \ldots)$$
$$= P(A^+) \cdot P(B^+ | A^+) \cdot P(C^+ | A^+ \wedge B^+) \cdot \ldots$$

$P(B^+ | A^+)$ = probability of B+ under the condition A+

(„multiplication formula" for *conditional probabilites*)

w.a.w.: Don‘t take anything into account twice.

conditional probability

Each dicsount is appraised under the assumption of all aspects, taken into account so far, did not show any problems.

P(patent is NOT enforceable) ≈ 50%
P(patent is NOT enforceable | patent is valid AND infringed) ≈ 15%

Statistical independence is not required and not given.

Probabilities

$$\text{Patent income} = (\text{risk - free patent income}) * (1 - \text{discount})$$

$$=: E(W) =: W_r \cdot (1 - discount)$$

$$= W_r \cdot \left(1 - P\left(R^-\right)\right)$$

$$= W_r \cdot P\left(R^+\right)$$

$$= W_r \cdot P\left(A^+ \wedge B^+ \wedge C^+ \wedge \ldots\right)$$

$$= W_r \cdot P\left(A^+\right) \cdot P\left(B^+ \middle| A^+\right) \cdot P\left(C^+ \middle| A^+ \wedge B^+\right) \cdot \ldots$$

$$= W_r \cdot \left\{1 - P\left(A^-\right)\right\} \cdot \left\{1 - P\left(B^- \middle| A^+\right)\right\} \cdot \left\{1 - P\left(C^- \middle| A^+ \wedge B^+\right)\right\} \cdot \ldots$$

$$= W_r \cdot (1 - discount_A) \cdot \left(1 - discount_{B|A^+}\right) \cdot \left(1 - discount_{C|A^+ \wedge B^+}\right) \cdot \ldots$$

Summary

$$
\begin{aligned}
&Patent\ income = \\
&(riskfree\ patent\ income) \\
&\cdot (1 - discount_A) \\
&\cdot \left(1 - discount_{B|A^+}\right) \\
&\cdot \ldots
\end{aligned}
$$

Example

risk-free economic value 1.000.000 €

- ✓ monopoly situation
- ✓ a patent application is to be valued
- ✓ impact factors as usual

Example
legal discounts after due diligence

aspect	example discount
status of the patent	0 %
ownership / contracts	2 %
patentability / invalidity	37 %
Freedom-to-Operate	20 %
scope	7 %
circumvention	0 %
detectability / enforceability	10 %

qualitative -> quantitative

Example

$$legal\ \ discount$$

$$= \left(1 - \ discount_A \cdot impact_A\right) \cdot \left(1 - \ discount_{B|A^+} \cdot impact_B\right) \cdot \ldots$$

$$= \left(1 - \ 0\% \cdot 100\%\right) \cdot \left(1 - \ 2\% \cdot 100\%\right) \cdot \left(1 - \ 37\% \cdot 100\%\right) \cdot \left(1 - 20\% \cdot 50\%\right) \cdot$$
$$\left(1 - \ 7\% \cdot 100\%\right) \cdot \left(1 - \ 0\% \cdot 100\%\right) \cdot \left(1 - \ 10\% \cdot 100\%\right)$$

$$= 0{,}47 = \left(1 - 53\%\right)$$

$$Patent\ \ income$$

$$= \left(riskfree\ \ patent\ \ income\right) \cdot \left(legal\ \ discount\right)$$

$$= 1.000.000\ € * 0{,}47$$

$$= 470.000\ €$$

Valuation without Due Diligence?

Default discounts

aspect	default discount
status of the patent	5 %
ownership / contracts	10 %
patentability / invalidity	20 %
Freedom-to-Operate	20 %
scope	7 %
circumvention	50 %
detectability / enforceability	15 %

The default discounts are taken from statistics.

Summary (income approach)

$$value = \sum_t \frac{income_t - cost_t}{(1+WACC)^t}$$

$$income_t = (riskfree\ \ income_t) \cdot (1 - discount_{t,A}) \cdot \left(1 - discount_{t,B|A^+}\right) \cdot \ldots$$

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World‘s Leading Lawyer (Chambers)

World‘s Leading Patent Strategists (IAM)

Vice-Chairman German standards committee on patent valuation

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