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VALUATION, TRANSFER AND COMMERCIALIZATION OF AGRICULTURAL TECHNOLOGIES IN KOREA

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1. Valuation in Technology Transfer

2. Methods of Technology Valuation
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Valuation in Technology Transfer
Valuation in Technology Transfer

Reliable information ⇨ active technology transfer
- Information on value – most important factor

Tools can assist technology transfer process itself
- Guide in developing technology suitable for transfer
- Key information to base decisions
- Income from licensing and establishment of subsidiaries
  - R&D institutions more financially sustainable
- Optimize value creation
Decisions require **cooperation**

- Internally all parties
  - Fully understand potential value
  - Make well founded decisions
- Support **before** transfer
- **Information**
  - help achieve **cooperation**

**Information** gained from valuation can help below

- benchmark values, forecast income, market outlook
- Identify the **key uncertainties**
- Identify **problem areas**
Valuation in Technology Transfer

External communication

- Potential transfer partners, parties active within the industry
- Partners interested in licensing

“A reasonable technology valuation allows both the licensor and licensee to consider their specific needs and to estimate ideal financial terms for both parties”
Methods of Technology Valuation
Methods of Technology Valuation

Object of valuation: technology designated as intellectual property

- Technologies that are **not IP** are difficult to assess in regard to their value independent of the owner
  - Uncommon to be the object of valuation

Value refers to the **opportunity cost**

- Opportunity cost ~ standard of transaction
  - market price ~ exchange value

- A market for IP cannot be created easily
  → Difficulty determining the exchange value through the market mechanism

- Additional projections are required
  - suppose a competitive market

💰 Fair Market Value
Methods of Technology Valuation

General concept of value: Fair Market Value

- Definition
  “the price at which willing parties, who have not been coerced and possess rational information, have agreed to trade their assets.”

Almost impossible to come across such a perfect deal in reality.

- FMV assumes a transaction between virtual buyer and seller.

- Capital market in advanced stage – nearly perfectly competitive form.

- Technology valuation attempts to estimate this market value.
Outlook regarding technology evaluation

- Government prioritizing R&D investment projects
  - economic impact analysis, technology assessment
- Corporation interested in economic potential
  - Technology Valuation, cost benefit analysis, competence evaluation
Methods of Technology Valuation

Approaches to technology valuation

- **Quantitative Method**
  - Calculate the monetary value
  - Cost, Market, Income based

- **Qualitative Method**
  - Provide a value guide
  - Rating, Scoring

“To gain accurate and usable results, it is important that the valuer selects the most appropriate method or combination of methods on a case by case basis.”
**Methods of Technology Valuation**

**Cost Approach**

<table>
<thead>
<tr>
<th>Cost based Approach</th>
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<tbody>
<tr>
<td>Calculating the costs of developing technology</td>
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<tr>
<td>Historic cost approach</td>
</tr>
<tr>
<td>– Calculating cost <strong>at the time technology was developed</strong></td>
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<tr>
<td>Principle of substitution</td>
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<tr>
<td>~ <strong>Replacement, Reproduction</strong> cost</td>
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<tr>
<td>– Calculating costs of developing <strong>similar technology</strong></td>
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<tr>
<td>– <strong>At the date of the valuation</strong></td>
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<td>– Externally or internally</td>
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Methods of Technology Valuation

Replacement cost approach
- Especially useful for license negotiations
- Develop technology with similar functionality
  – Valid benchmark

Use of Cost approach ~ guideline for true value
- Future benefits are not yet obvious
- Assessing intangible assets – software

Weakness of Cost approach
- Equal amount of investment does not result in same level
- Not take into account important elements – future risks, benefits

“There is no correlation between cost of development and the future income potential of the technology.”
Methods of Technology Valuation

Market based Approach

- **Comparing** ~ similar technologies licensed or sold before
  - Idea behind this “active market decides an accurate price”

- Process taken to the value
  1. Price is established on the market for other similar technologies
  2. Adjusted for specific environment

- Looking at **recent comparable transactions**
  - License, sale & purchase deal
  - Terms and price
  ~ deals made within same industrial sector
Comparable Market Price vs. Comparable Royalty Rate

- Comparable market price method
  - similar IP **bought or sold**

- Comparable royalty rate method
  - similar IP **licensed** ~ terms of license, **royalty rates**

Weakness of Market approach

- No Information or not publicly available
- Limited active markets ~ few comparable exchanges of IP

“Even though the market based approach is the most suitable method in theory, it can’t be used often.”
Methods of Technology Valuation

Income Approach

Income based Approach

- Measure future potential income
  - Disregard costs of development

- Basic definition of value
  ~ based on ability to generate income
  - Potential to generate a stream of income

- Income stream discounted back ~ Present value
  - Properly adjusted for the risks surrounding commercialization
  - discount rate must include all risks impact on income
Things Needed to estimate

- Income stream from sales or licensing
- Duration of IP asset’s useful life
- Risk factors reflected in discount rate
  - Based on observations of relevant markets
    - Market size, growth trends, structure, market share dynamics
    - Overall market risk factors

Use of Income approach ~ most often used method

- Commonly understood approach to asset valuation
- Most useful when valuing technology that actively generate income
Methods of Technology Valuation

DCF (Discount Cash Flow) method

- Most common method of income approach
- Calculate potential future cash flows during useful life
  - Appropriately discount these ➔ Present value

\[
V(\text{Value}) = \sum_{t=1}^{n} \frac{CF_t}{(1 + r)^t}
\]

\[
\text{FCF} = \text{EBIT}(1-t) + \text{Dep} - \text{CE} - \Delta \text{NWC}
\]

Relief from royalty method

- Main method next to DCF in Korea ~ simpler
  - Distinction in estimating potential future income
Qualitative Approach

- Provide a value guide or driver
  ~ analysis and scoring of factors
- Insufficient for specific decisions
  Cf. quantitative approaches
  - indication of the estimated monetary
- Used to assist decision maker
  - comparing, categorizing, ranking ~ against competitors’

“Until now the main approach of technology valuation in Korea has been the income approach. The DCF method and the RFR method are most widely used in Korea, including the agribusiness sector.”
Technology Financing
Smooth procurement of business funds ~ commercializing

- Valuation supports procurement of funds
  - technologies with outstanding potential

Definition of Technology Financing

- (Broad) “high risk enterprise financing that covers the lifecycle of start-up, research, development, commercialization of R&D output”
- (Narrow) “loans or investments executed as a result of reports by technology appraisal institutions, not depending on tangible collateral”
## Technology Financing

<table>
<thead>
<tr>
<th>Venture capital ~ Invest in technology based startups</th>
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<td>- Facilitation based on technology valuation</td>
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<th>Banks ~ expand loans for startups and tech firms</th>
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<tr>
<td>- Small percentage ~ complete system to evaluate</td>
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<tr>
<td>- Work subjectively</td>
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<td>- Evaluations by Technology credit Bureaux (TCB)</td>
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<td>- Valuations by agencies designated by government</td>
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<th>The FACT ~ Conduct technology valuation</th>
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<tr>
<td>- Interest subsidies, IP security, IP guarantees, venture capital</td>
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<td>~ Crowd–funding</td>
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Sale and License-Back (SLB) ~ test trial

- Financing with technology transaction
- Suitable for new companies – having good technologies
  ~ lacking in securities
- Plant variety protection rights – more suitable than patents
Technology Valuation ～ Transfer, Commercialization

- Applicable to agricultural sector

FACT as public institution for technology transfer

- Approximately 3,300 tech transfers (until end of August 2016)
  ~ Founded in Sep. 2009

FACT as technology valuation agency

- Designation by a law in 2010
- Approximately 2,200 cases – 324 cases of valuations
- Procurement of business funds – 115 million US $  
  (until end of August 2016)
Thank you for your attention!