Technology Appraisal

KOTEC (Korea Technology Finance Corporation)

KOTEC leads Technology Financing, Creating Value through Innovation
Technology Appraisal

To evaluate, in a comprehensive manner, the technology competency, marketability, and business feasibility related to the technology-based business and to express the results in terms of opinion, score, rating or monetary value, etc.

Essential Tool for Technology Financing

Technology Financing

Supplying necessary funds based on technology appraisal of technologies and ideas with profit potential.

- Ministerial Committee on Economic Relations (JAN 2004), “Measures to establish technology evaluation system for activating technology financing”
Credit Rating vs. Technology Appraisal

**Credit Rating**
- Evaluates Credit Risk
- Forecasts the Likelihood of Default
- Focuses on Company’s Past history
  e.g. Financial Track Records
- Evaluates Tangible Assets
- Financial Measures are dominant
- Suits for Mature Enterprises

**Technology Appraisal**
- Evaluates Future Economic Benefits
- Forecasts the Possibility of Successful Technology Commercialization
- Focuses on Company’s Future Potential
  e.g. Technology Competency
- Appraises Intangible Assets
- Non-Financial Measures are dominant
- Suits for Startups and Ventures
Types of Technology Appraisal

- Technology Business Feasibility Assessment
- Technology Valuation
- Comprehensive Technology Appraisal
- Technology Guarantee Venture Certification Inno-Biz Certification...
- Investment In Kind IP Collateral Technology Transfer...
- Investment IPO Eligibility Stock Valuation...
- Technology Rating Systems
- Technology Valuation Methodologies
- Comprehensive Appraisal
- Score or Grade
- Monetary Value
- Opinion, Score, Grade and/or Monetary Value
TECHNOLOGY APPRAISAL

TECHNOLOGY RATING SYSTEMS

### KTRS Series Model
- General
- Startups within five years from establishment
- Revenue no greater than KRW 1 billion

### Policy-purpose Model
- For R&D and financial support for prototype creation after completion of R&D
- For younger generation (founders aged 17 to 39) startups (within five years from establishment)
- For companies run by CEO alone, for the guarantee
- For businesses satisfying industry eligibility criteria and for the guarantee
- Cultural content firms
- For green growth industry businesses
- For would-be entrepreneurs
- For businesses seeking investment
- For climate technology firm
- Social Venture firm

### KTRS (8 areas)
- KTRS-SM (8 areas)
- KTRS-SM (8 areas)

### Policy-purpose Model (continued)
- For R&D appraisal model (two areas)
- Younger generation startup appraisal model
- One-person creative company appraisal model (two areas)
- Innovative Knowledge Service Appraisal Model (six areas for startup/non-startup)
- Cultural content appraisal model (13 genres)
- Green technology appraisal model (three areas)
- Pre-startup Rating Model
- Investment purpose technology appraisal model
- Climate technology appraisal model (two areas)
- Social Venture technology appraisal model (two areas)

### Technology-based companies
- Startup
- R&D (engineering)
- R&D (liberal arts)
- R&D (liberal arts)
- Advertisement development
- Security system
- Medical
- Education
- Theater, Film
- Drama
- Online games
- Mobile games
- Other movies/ animations
- Character business
- Other game
- Other performance
- TV animation
- Musical performance
- Energy support technology
- High efficiency technology
- Eco-friendly production, and post processing technology

### Knowledge-based companies
- General companies
- Startup, Post-commercialization
- Manufacturing technology
- Startup, Pre-commercialization
- Manufacturing technology
- IT
- Others

65 Technology Appraisal Models under 13 Categories are operational
Technology Business Feasibility Assessment: KIBO Technology Rating System
KTRS (KIBO Technology Rating System)

Overview
✓ Systematic Tool for Evaluating Commercial Viability and Risks associated with a Technology Business
✓ Produces Technology Rating, which serves as an input to the decision-making process
✓ Provides Technology Appraisal Report, which contains the rationales for the technology rating

Key Features
✓ Structured Methodology
✓ Data-driven Approach
✓ Balanced quantitative and qualitative indicators
✓ Designed for Efficiency and Consistency
Structure of KTRS

- **Input**
  - Technology assessment indicators
    - KTRS : 33
    - KTRS-SM : 23
    - KTRS-BM : 18
  - Internal/external environmental variables

- **Rating**
  - Technology Business Scoring Model
  - Business Growth Model
  - Business Growth Probability Model
  - Business Risk Model
  - Environmental Risk Model
  - Technology Business Competence Score
  - Business Growth Potential Score
  - Business Growth Probability Score
  - Business Risk Score
  - Environmental Risk Score
  - Technology Business Score
  - Risk Score
  - Environmental Risk Score
  - Measure of Growth Potential
  - Measure of Insolvency Possibility
  - Final Score (weighted sum)

- **Output**
  - Technology Rating (AAA~D)

₁ Technology Business Score, which measures growth potential, ₂ Risk Score, which measures the possibility of insolvency.

³ Final Score and ⁴ Technology Rating are calculated by weighting ₁ Technology Business Score, which measures growth potential, ₂ Risk Score, which measures the possibility of insolvency.
Structure of KTRS: Measure of Growth Potential

① Technology Business Scoring Model: Scoring Model based on assessment indicators with AHP weights.

② Business Growth Model (multiple regression analysis):

   Statistical Model based on “assessment indicators → estimated sales”

③ Business Growth Probability Model (logit model):

   Statistical Model based on “assessment indicators → sales growth, net income”
Structure of KTRS: Measure of Insolvency Possibility

INPUT
- Technology assessment indicators
  - KTRS: 33
  - KTRS-SM: 23
  - KTRS-BM: 18
- Internal/external environmental variables

RATING
1. Business Risk Model
2. Environmental Risk Model
3. Business Risk Score
4. Environmental Risk Score
5. Risk Score
Measure of Insolvency Possibility
Final Score (weighted sum)

OUTPUT
- Technology Rating (AAA~D)

① Business Risk Model (logit model):

Statistical Model based on “assessment indicators → corporate insolvency”

② Environmental Risk Model (logit model):

Statistical Model based on “internal, external environmental variables → corporate insolvency”
Assessment Indicators of KTRS

**CEO Competencies**
- Knowledge Level
- Management Capability
- Management Structure and Teamwork

**Technology Competency**
- R&D Capability
- R&D Status
- Innovation Level
- Technology Readiness & Scalability

**Marketability**
- Market Status
- Competition Factors
- Competitiveness

**Business Feasibility**
- Commercialization Capability
- Profit Potential

**Further Details**
- Experience in the industry
- Technological expertise
- Technological understanding
- Management of technical employees
- Management competency
- Technology management strategy
- Professional expertise of the management
- Capital participation
- Teamwork and relationship between CEO and management

- R&D organization
- Technology workforce
- Technology development achievements & awards
- Retention of IPRs
- R&D investment
- Uniqueness of technology
- Difficulty of imitation
- Phases in technology life cycle
- Commercialization stage of technology
- Independence of technology
- Ripple effect of technology

- Size of target market
- Market growth potential
- Competition
- Legal factors
- Awareness
- Market share
- Competitive advantage of product(s)

- Production capacity
- Appropriateness of investment size
- Funding capacity
- Marketing capacity
- Diversity and stability of markets
- Return on investment (ROI) potential
KIBOT

an artificial intelligence-based autonomous evaluation robot that automatically analyzes technology appraisal big data with artificial intelligence algorithms and automatically predicts the rating for each non-quantitative assessment indicator of KTRS.
Globalization of KTRS

EU IPF (INNO-Partnership Forum)
In 2012, KOTEC's technology rating system also earned recognition from Europe, with its INNO-Partnering Forum (IPF) introducing the system as a "good practice" in a report submitted to the European Commission.

EIB (European Investment Bank)
In a 2018 EIB report, the KTRS was referred to as a "global best practice".

Sharing Knowledge on Technology Rating System

- **Vietnam** (2014 – 2016)
  - Vietnam Technology Rating System
- **Thailand** (2015 – 2017)
  - Thailand Technology Rating System
- **Peru** (2017 – 2018)
  - Peru Technology Rating System
- **EU** (2019 – 2021)
  - InnoRate Technology Rating System