Society of Investment Professionals in Germany

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via Email

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**Call for evidence on Call to CESR for technical advice on possible measures concerning Credit Rating Agencies**

**Response by DVFA – Society of Investment Professionals in Germany**

Dear Mr Demarigny,

DVFA – Deutsche Vereinigung für Finanzanalyse und Asset Management – is the Society of Investment Professionals in Germany with more than 1,100 members representing over 400 investment firms, banks, asset managers, consultants and counselling businesses. DVFA is a member of EFFAS, the umbrella organisation of European Analysts Societies, building a network of more than 14,000 investment professionals in 23 nations.

The four core issues to be addressed by CESR's technical advice and consequently by the responses to the Call for Evidence have been identified as follows:

1. potential conflicts of interests within rating agencies
2. transparency of rating agencies' methodologies
3. legal treatment of rating agencies' access to inside information
4. concerns about possible lack of competition in the market for provision of credit ratings

In the following, DVFA will also focus on these four issues. DVFA's views are in general in accord with the high level principles published in September 2003 in the IOSCO Statement of Principles regarding the Activities of Credit Rating Agencies.

## 1. General observations

The similarities in the activities of rating agencies and of investment and research firms in equity research are such that these activities should essentially be subject to the same rules and regulations. Minor differences between these two different areas may be taken into account when the individual requirements and standards are formulated.

The stringent standards which apply to equity research ought to be applied to rating analysis for the simple reason that their role in and influence on capital markets are as important and any abuse of this role might be even more damaging than abusive behaviour in equity research. The latter concerns mostly the equity sector of capital markets whereas the ratings of credit issues by these agencies affect also public entities and, thus, entire macroeconomic structures.

Restrictive standards should not apply only to the agencies as business entities but also to their research staff as individuals similar to the two pronged approach in equity analysis.

IOSCO Principles No. 2.1, 2.3, 2.4

## 2. Potential conflicts of interests within rating agencies

### 2.1. Provision of advisory/ancillary services by credit rating agencies

Such side activities to gainfully exploit the information gathered during the rating analysis is likely to influence the rating of these issuers being advised.

In the interest of the objectivity of the rating, such advisory/ancillary services should be prohibited. The rating agencies should be forced to divest such parts of their business. In the interest of objectivity, also the auditing profession is subjected to similar requirements. Rating agencies should even more be bound by this principle.

IOSCO Principles No. 2.2

### 2.2. Rated issuers commissioning credit ratings from agencies

Whereas in equity research reports and recommendations as a rule are not solicited or commissioned and paid for by the issuer, such practice seems to be more prevalent in the rating industry. In both cases, there is a need for commissioned research and rating for which the issuers must pay lest they be ignored by research or rating firms. In these cases, prominent disclosure of this potential conflict of interests is a solution to protect capital markets. The same applies to a change of status (unsolicited ratings turned into solicited ratings or termination of rating coverage). The change of status and the reason for it ought to be disclosed.

IOSCO Principles No. 2.5, 2.6, 3.2

### 2.3. Affiliation or other links with issuers

In the interest of objectivity, credit rating agencies ought to give up any material interests in issuers. Where this is not possible, they should refrain from rating such issuers and leave these ratings to unaffiliated competitors. As a minimum requirement, such affiliations or links should be prominently disclosed by the credit rating agency.

IOSCO Principles No. 2.2, 2.5

### 2.4. Credit analysts and managers as staff members of credit rating agencies.

The call for technical advice does not specifically mention conflicts of interests of responsible individuals acting for the credit rating agencies. CESR should include those in their technical advice. The principles outlined above ought to apply, mutatis mutandis, also to those individuals. The primary goal is conflict avoidance. Where this is not possible, potential conflicts should be disclosed.

IOSCO Principles No. 2.1, 2.3, 2.4

## 3. Appropriate skills and fair presentation of ratings

### 3.1. Level of skills of agencies' staff

Fair presentation of credit ratings as well as of recommendations on equity issues require that the analyst possess the necessary skills to accomplish this task. Unfortunately, the existing directives MAD and MiFiD do not explicitly emphasise this latter requirement whereas, for instance, the Insurance Mediation Directive does in Article 4 Par. 1. However, it is generally accepted that a properly organised investment or research firm must provide services with the necessary skills. The same applies to credit rating agencies.

CESR should urge the commission to introduce provisions in the applicable level 2 legislation that equity and credit analysts be subject to requirements of initial and continuing education regarding their research skills.

IOSCO Principles No. 1.4, 1.5

### 3.2. Disclosure of methodologies used for building credit ratings

Credit rating agencies should as well as investment firms develop and disclose their research standards on which their ratings are based. The ratings are far too important for capital markets to allow ratings under a black box policy.

IOSCO Principles No. 3.3

DVFA opts for a provision which leaves the development of research and rating standards to the research and rating industry and other market participants. Such rating standards have been developed by a DVFA commission with the participation of representatives of the industry itself, of the banking sector, of the academia and last but not least of members with a supervisory background. We enclose a copy of these Rating Standards – Transparency for the Company Rating.

Only the requirement and extent of disclosing of such standards and their application should be regulated by the European legislator.

Rating agencies should be required to archive the basis of their ratings (reports, working papers, data collection) for an appropriate time period.

IOSCO Principles No. 1.3

## 4. Relationship between issuers and rating agencies

### 4.1. Inside information

Credit rating agencies should not actively solicit inside information from the issuers. If they are confronted by the issuer with such information, they should urge the issuer to make such information public. Under these circumstances, the former inside information can be used freely by the rating agencies in their analysis. If the issuer fails to release such inside information, the rating agency must be allowed to reflect such information in its ratings but it may not specifically disclose this information to any third party. The handling and use of inside information of issuers should be subject to a compliance regime within the rating agency.

IOSCO Principles No. 4

### 4.2. Discussion of research results with issuer

Discussions of research results between rating agency and issuer should be restricted to a review by the issuer of the factual information from which the agency derives the rating. The rating itself should not be an object of discussions between rating agency and issuer. The risk is too high that the issuer will take undue influence on the evaluation of the rating agency and the eventual rating.

We support the approach that an issuer may not discriminate between rating agencies but should provide all covering (registered) rating agencies with the same information. This applies also to agencies providing unsolicited ratings.

IOSCO Principle No. 3.5

## 5. Entry Barriers

The present situation is characterised by the existence of an oligopoly of a few rating agencies. This situation is not satisfactory.

We recommend the approach to upgrade equity research and credit rating to a separate core business of financial services, yet without solvency regulation and supervision, the regulation rather being restricted to conduct of business rules. Such regulation may be delegated to Self Regulatory Organisations. Parallel to this move, the European legislator ought to create a favourable regulatory environment for such registered agencies to operate as rating entities under the Basel II and CAD II rules. This could prompt also existing equity research firms to expand their operations into credit rating. This is the preferable way to create a competitive environment.

One other possible approach to overcome this situation is the approach taken in the US to foster independent equity research, i.e. establishment of a trust fund out of which independent research is financed which is made mandatory. DVFA does not agree with such mandated solutions. It is best for the legislator to create a regulatory environment favourable to competition and let the market for these services develop.

Yours sincerely,

Fritz H Rau
Chairman of DVFA

Enclosure: DVFA Rating Standards – Transparency for the Company Rating
(Final Draft August 2004)

DVFA

Society of Investment Professionals in Germany

# DVFA Rating Standards
# Transparency for the Company Rating

# FINAL DRAFT August 2004

## A Goal of the Standards

The rapid expansion and increasing international focus of financial markets, have greatly increased financial market participant demand for comparable and concise methods to evaluate companies. The resulting need for information has been further underscored by discussions surrounding the third consultative document of the Basel Committee in Banking Supervision, released in June 2003.

According to "**The New Basel Capital Accord**", a company's rating can considerably influence the minimum capital requirement necessary for borrowing. In addition to the internal rating systems used by banks, numerous external rating services have surfaced in response to this demand. This plethora of services, as well as proposals contained in the Basel consultative paper, make it necessary to develop standards that permit the user, the client, or the supervisory authority to evaluate the various rating methods in use.

To this end, DVFA established a commission in September 2000. This commission has narrowed the initial scope of the rating standards to the key topics of principles, input, throughput and output that make up the individual phases of the rating process. The commission will not evaluate the various rating systems currently in the market or used by banks. Instead, adherence to transparency standards should be sufficient to permit financial market participants or supervisory authorities to critically evaluate available rating systems.

Members of the Commission, of which Professor Dr. Jens Leker (University of Münster) serves as Chairman, represent rating agencies,

banks, investment, accounting and consulting firms, and universities. Four working groups led by Professor Dr. Dr. h.c. Jörg Baetge (University of Münster), Dr. Harald Krehl (DATEV eG), WP StB Dieter Pape (URA Unternehmens Ratingagentur AG) and Professor Dr. Heinrich Rommelfanger (University of Frankfurt) work on selected topics. The Commission serves as a communications platform for all financial market participants involved in the rating process and for interested professional people.

It pursues the following goals:

- Creating a catalogue of information by which financial market participants can evaluate the method and results of a particular rating method.
- Promoting a comparable representation of the rating result by disclosing pertinent information.
- Assuring acceptance of rating standards by incorporating various financial market participants and institutions expertise.

## B Definitions

### 1 Company Rating

The term "**rating**" refers to the general method by which certain criteria in defined categories are rated and ranked. The commission uses its own, substantially narrower rating definition as the basis for its work, in order to limit the scope of the rating standard. It considers only those rating methods that evaluate the economic situation of commercial enterprises on the basis of specific criteria.

There are different kinds of rating systems available in the market for the credit rating of an issuer, a financial instrument, a client or supplier, or equity.

For this kind of system to function, individual rating requirements and specific rating standards are needed. The standards currently in use, were initially developed to rate the creditworthiness of enterprises. Such a rating involves the comprehensive analysis of a company. It takes into consideration all available and pertinent information, with the goal of calculating an estimate of the probability of default - in accordance with subsequent reference default definitions.

## 2 Default

The criterion of comparable probabilities of default presupposes a uniform definition of "**default**." The New Basel Capital Accord proposes using the following reference definition of default. (See also the Basel Committee on Banking Supervision consultative document, The New Basel Capital Capital Accord, Nr. 414 - 415).

"414. A default is considered to have occurred with regard to a particular obligor when either or both of the two following events has taken place.

- The bank considers that the obligor is unlikely to pay its credit obligations to the banking group in full, without recourse by the bank to actions such as realising security (if held).
- The obligor is past due more than 90 days on any material credit obligation to the banking group. Overdrafts will be considered as being past due once the customer has breached an advised limit or been advised of a limit smaller than current outstandings.

415. The elements to be taken as indications of unlikeliness to pay include:

- The bank puts the credit obligation on non-accrued status.
- The bank makes a charge-off or account-specific provision resulting from a significant perceived decline in credit quality subsequent to the bank taking on the exposure.
- The bank sells the credit obligation at a material credit-related economic loss.
- The bank consents to a distressed restructuring of the credit obligation where this is likely to result in a diminished financial obligation caused by the material forgiveness, or postponement, of principal, interest or (where relevant) fees.
- The bank has filed for the obligor's bankruptcy or a similar order in respect of the obligor's credit obligation to the banking group.
- The obligor has sought or has been placed in bankruptcy or similar protection where this would avoid or delay repayment of the credit obligation to the banking group."

The commission is also in favor of a uniform definition of default. In this regard, it is necessary to further specify the proposed reference default definition.

# C Questionnaire

## 1 Rating Basics

### 1.1 Describing the Rating Approach in General

#### 1.1.1 Reason for the Rating Institution to rate a Company

What goal does the rating institution pursue? Does the rating serve the primary objective of the rating institution or not?

#### 1.1.2 Sequence of the Rating Process

Which defined stages does the rating process undergo? How rapidly is a rating result available?

#### 1.1.3 Informational Basis of the Rating

What kind of basis information does the rating system use?

##### 1.1.3.1 Information Sources

What are the sources of information used as the basis of the rating system?

##### 1.1.3.2 Data Timeliness

What time horizon do data utilized have?

##### 1.1.3.3 Data Collection Methods

How are data collected? To what extent are rating institutions and the company being rated involved in the rating process?

#### 1.1.4 Rating Method

What rating method is used to process information on a company being rated into a rating result? How are the criteria formed and consolidated?

#### 1.1.5 Quality Assurance

Which structure and sequencing principles does the rating system follow? Does the system follow a segregation of duties principle? Is there a separation of the data collection and evaluation

processes? Are there external comparisons of the rating system? Which additional quality assurance procedures are used?

#### 1.1.6 **Rating Result**

##### 1.1.6.1 **Rating Scale**

Is a scale in use to illustrate the rating result? Can the scale be mapped to a master scale? Which historical default rates were associated with the individual rating categories of the selected scale?

##### 1.1.6.2 **Publication**

How is the rating result made public?

### 1.2 **Describing the Relationship between Rating Institutions and Companies being rated**

#### 1.2.1 **Autonomy of Rating Institution and Company being rated**

Is the rating institution independent of the company being rated?

#### 1.2.2 **Adherence to Ethical Standards**

To what extent is there reference to ethical standards?

#### 1.2.3 **Adherence to Business Terms**

To what extent is there reference to terms of business?

#### 1.2.4 **Identification of a Qualified Contact Person**

Has a qualified person in the rating institution been designated as a contact for rating users?

#### 1.2.5 **Assurance of Complete Information and Authorized Information Sources**

Is there assurance that the management and designated contact persons will immediately make all relevant information available to the analyst team? Has the type and scope of requirements for relevant information been communicated to the designated contact persons and the legal representative of the company being rated?

### 1.3 Internal Independence

Is the rating analyst independent of the rating institution? Is the rating reviewer independent of the rating analyst? Is the rating result independent of subsequent decisions?

## 2 Informational Basis of the Rating Result

### 2.1 Evaluation of Input Data

#### 2.1.1 Selecting Criteria

On what basis are criteria selected?

#### 2.1.2 Aggregation

To what extent are available data already aggregated? Was valuable information lost or falsified by means of the aggregation undertaken?

#### 2.1.3 Reliability

How reliable are the input data?

#### 2.1.4 Preparation

How are data or information gaps handled? How are outliers handled?

#### 2.1.5 Consistency

How is the consistency of the actual data verified?

#### 2.1.6 Scaling

How are input data scaled?

#### 2.1.7 Internal Controls

How are data input? How are input errors avoided?

### 2.2 Information Categories

Which data are included in the rating?

# 3 Data Related to Information Processing

## 3.1 General Criteria for Evaluating the Rating System Quality

### 3.1.1 Rating Method Used

Which combination of rating methods does the rating institution use?

### 3.1.2 Transparency and Accountability

#### 3.1.2.1 Is the rating result based exclusively on reported and accountable criteria?

#### 3.1.2.2 Are rating system structures comprehensibly presented for an expert third party?

### 3.1.3 Validity

Is the rating system capable of delivering an issuer rating?

### 3.1.4 Accuracy

How large is the rating system's probability of error?

### 3.1.5 Reliability

Does the rating system reach the same conclusion with the same initial position? To what extent are different rating analysts in agreement?

### 3.1.6 Granularity

Are there enough rating categories available to ensure adequate differentiation?

### 3.1.7 Clarity and Completeness

Can every company being rated be assigned to one and only one rating category?

### 3.1.8 Timeliness and Robustness

How frequently is the rating system examined, and if necessary modified? What factors prompt an examination of the rating system? Who is responsible for modifying the rating system?

### 3.1.9 **Materiality**

Is all information relevant to forecasting creditworthiness being utilized?

### 3.1.10 **Influence of the Criteria of the Analyzed Company**

Do sectoral, legal, size or other criteria of the company being analyzed influence the rating system?

## 3.2 **Criteria for Evaluating the Quality of the Rating Method using Statistical Models**

### 3.2.1 **Database**

Does the underlying database fulfill the requirements of the statistical model?

### 3.2.2 **Selection of Criteria**

Does the way of selecting criteria fulfill the requirements of the statistical model used?

### 3.2.3 **Selection of Model Parameters**

Does the estimation of the model parameters fulfill the requirements of the statistical model used?

### 3.2.4 **Performance of the Model**

Does the performance measurement fulfill the requirements of the statistical model used?

## 3.3 **Criteria for Evaluating Other Rating Models**

### 3.3.1 **Scoring Methods**

#### 3.3.1.1 **Determination of the Goal Framework**

Is reference made in favor of selecting individual factors?

#### 3.3.1.2 **Determination of Goal Achievement of Alternatives**

Is information provided to determine the achievement of the objective by alternatives?

### 3.3.2 **Criteria for Expert Systems**

#### 3.3.2.1 **Knowledge Base**

What makes up the knowledge base? What are the sources of available knowledge?

#### 3.3.2.2 **Management System**

Which scaling requirements apply to the input data due to the selected aggregation methods? Are these requirements fulfilled?

Are linguistic evaluations of the criteria sufficiently and comprehensibly described? Is the evaluation process accountable? How frequently is the expert system examined and, if necessary, modified? How long has the expert system been in use and how accurate have the decisions been?

### 3.3.3 **Criteria for Neural Networks**

#### 3.3.3.1 **Constructing a Neural Network**

How many neurons are in the input layer, the intermediate layers, and the output layer?(check Begriffe für layers)

#### 3.3.3.2 **Training the Neural Network**

Is reference made to training the neural network? Is reference made to reliance on a holdout sample?

## 3.4 **Criteria for Evaluating Rating Categories Based on Expert Judgment**

### 3.4.1 **Qualification of the Rating Analyst**

What references are made concerning the qualification and independence of the expert(s) involved in producing the rating result?

### 3.4.2 **Rating Process**

How high is the degree of standardization of the process used to produce the rating result? How detailed are the guidelines by which experts must abide?

### 3.4.3 **Ensuring Rating Quality**

How is rating quality assured?

## **4 Rating Result**

### 4.1 **Evaluating the Rating Result**

### 4.1.1 **Comparability**

Can the results be mapped to a master scale?

### 4.1.2 **Transparency**

Does the rating institution allow insight to the rating system?

### 4.1.3 **Control**

Does the rating institution regularly publish quality checks of its results?

### 4.2 **Interpretability of the Rating Result**

What information is reported in the rating result?

# **D Examples and Explanations**

## **1 Rating Basics**

### 1.1 **Describing the Rating Approach in General**

### 1.1.2 **Reason for the Rating Institution to rate a Company**

The following objectives for rating a company could apply:

a) **External Rating**: the rating is the primary objective of the company or institution. The company or institution makes the rating available as a product to external market participants.

b) **Internal Rating**: the rating serves internal company objectives. The rating is not a primary company objective. The rating is not made available to external market participants.

### 1.1.3 **Sequence of the Rating Process**

The rating process is divided into the following stages:

a) **Zero or few stages** (data collection, data evaluation)

b) **Detailed stages** (preliminary discussion, conclusion of a contract, data collection and evaluation, production of the result, public disclosure of the rating) Depending on the scope of the underlying stages of the rating process, the rating result is:

a) **Rapid**, available within a week

b) **Less rapid**, available within one to three months

### 1.1.3 **Informational Basis of the Rating**

#### 1.1.3.1 **Information Sources**

The following quantitative and qualitative information sources can be distinguished:

a) **Accounting data** of the company being rated based on the balance sheet and the profit and loss statement.

b) **Supplemental accounting data** of the company being rated (notes, management discussion, voluntary statements).

c) **Comparative data** from other companies, industry data, information on competitors, information on industry development and industry risks, economic data.

d) **Data on company internal rating criteria** (turnover, employment, marketing, R&D, staff, organization, management, etc.).

e) **Inclusion of External Rating Results**

#### 1.1.3.2 **Time Horizon of the Data**

The data used are:

**a**) From last year

**b**) From previous years

**c**) From several time series

**d**) Planning data for the near future based on automatic forecasts of the company being rated

**e**) Planning data for the near future based on automatic forecasts of the rating agency

**f**) Planning data for the near future based on planning assumptions of the company being rated

#### 1.1.3.3 **Data Collection**

The data used can be:

a) **Primary**: collected directly from the company being rated by the rating institution

b) **Secondary**: collected from data provided by the company being rated

c) **Mixed**: primary and secondary collection. As concerns participation in the rating process, the following situations can be distinguished:

- The company being rated does not play an active role.
- The company being rated plays an active role in information collection.

### 1.1.4 **Rating Methods**

The following rating methods can be distinguished:

**a**) Selection of criteria (default…), formation of criteria (definition…), aggregation of criteria (summary and weighting...) by means of a statistical model

**b**) Selection of criteria (default…) by means of experts, formation of criteria (definition…) and aggregation of criteria by means of a statistical model

**c**) Selection of criteria (default…) and formation of criteria (definition…) by means of experts, aggregation of criteria by means of a statistical model

**d**) Selection of criteria, formation of criteria, and aggregation of criteria by means of experts

### 1.1.5 **Quality Assurance**

The following quality assurance measures can be distinguished:

**a**) All phases of the rating process are accompanied by an internal control system, e.g. during data collection and production of the rating. Particular care is taken to follow principles guiding the segregation of functions.

**b**) A results-oriented linkage of the rating result with data collection is not possible (no modification of the rating result can occur if the outcome is not favorable).

**c**) Rating results will be compared to the results of other external rating systems to the extent possible.

### 1.1.6 **Rating Result**

#### 1.1.6.1 **Rating Scale**

Illustration of the rating result takes place through:

**a**) Use of an internationally recognized scale to illustrate the rating result that allows conversion to a master scale.

**b**) Use of an individual scale to illustrate the rating result; conversion to a master scale is undertaken and specified.

**c**) Use of an individual scale to illustrate the rating result; conversion to a master scale is not possible

The following are to be specified:

**a**) The rating category…is characterized by a default rate of … %.

**b**) The default rate was calculated on the basis of … over a period of … years.

#### 1.1.6.2 **Public disclosure**

Rating institutions should publish their findings following the principles of sound reporting. This report should make it possible to

compare the track records of various rating institutions. Rating agencies must indicate whether:

**a**) Rating results will be released publicly in any case.

**b**) Public disclosure will only take place at the request of the company being rated.

**c**) The rating result will only be used for internal purposes and will not be released publicly.

## 1.2 **Describing the Relationship between Rating Institutions and Companies being rated**

### 1.2.1 Autonomy of Rating Agencies and Companies being rated

The rating should be independent of business policy interests. Autonomy of the rating institution means, e.g. that a rating analyst may not simultaneously serve as consultant to the company being rated. The rating institution may not be influenced in its rating result by any political or economic pressures. The rating production process may not be burdened by conflicts of interest that may arise through the composition of the management or ownership of the rating institution.

Rating institutions in principle should not offer any opinions on the purchase or sale of shares, on market price, or on the suitability of a company for a particular investor.

### 1.2.2 Adherence to Ethical Standards

Institutions such as rating agencies and individuals such as credit experts and other rating professionals are subject to ethical standards. Their activities must conform to legal requirements, especially the applicable European and German capital market laws, and adhere to the ethical standards of the German academic profession as well as relevant international professional standards. Adhering to ethical standards should be documented according to the following non-comprehensive list of basic principles of ethical professional conduct at the institutional and personal level:

- Evidence of professional and ethical competence.

- Performance of professional activities taking into account the latest relevant knowledge; regular updating to the state-of-the art knowledge base.

- Establishment of organizational structures to avoid conflicts of interest; obligation to adhere to rules of compliance.

- Disclosure of potential conflicts of interest, in particular concerning business links to the company being rated and potential for conflict that could endanger a professional and fair evaluation.

- Recognition of the incompatibility of evaluative and consultative functions, in particular the prohibition on representing conflicting interests.

- Performance of professional functions taking into account individual responsibility, independence, and neutrality and impartiality of the rating expert as the basis of a qualified evaluation.

- Production of rating results only after the professional, careful, and conscientious application of rating methods.

- Release of information relevant to the production of the rating under consideration of the rating standards.

- Regular updating of data and informing the market in a timely manner of any changes in the rating result.

- Adherence to the obligation to exercise due diligence during data procurement, processing, and release of information. Observance of the prohibition of making public incorrect and incomplete information as well as withholding important circumstances that could influence the rating result. Technically incorrect information must be immediately and publicly corrected.

- Adherence to the obligation to exercise confidentiality.

- Observance of the prohibition on unacceptable business practices, in particular insider trading laws and cronyism.

- Observance of copyright laws and the prohibition on plagiarism.

### 1.2.3 Adherence to Business Terms and Conditions

Business terms and conditions must be included in the contract between rating institutions and companies being rated.

### 1.2.4 Designation of Professional Contact Partners

The rating institution should designate the author(s) of the rating study who will be available to the company being rated as a knowledgeable contact partner.

### 1.2.5 Ensuring Complete Information and Authorized Information Sources

In order to guarantee that all known or latent risks are identified during the rating process, the following organizational rules can be distinguished:

**a**) All relevant information will be collected during the rating process and does not require a special request.

**b**) The type and scope of required information are clearly defined in the rating contract and the obligation to provide it will be accepted by the legal representatives upon the signing of the contract.

**c**) All relevant information will be collected during the rating process; at the end of the collection process the legal representatives will provide a statement verifying that all relevant information was made available to the analysts. This statement is usually in checklist form, naming the authorized information person(s) and signed by the legal representatives.

Examples:

Existing or latent risks (process, liability, guarantee risks, etc.) have not been indicated or have been discovered during the rating process. Thus, for example:

**a**) Essential patents could be claimed or otherwise used in an unauthorized manner by third parties.

**b**) Recent tests reveal that certain substances used could pose possible health hazards.

**c**) Important suppliers may soon experience distribution bottlenecks that cannot be compensated for.

## 1.3 Internal Independence

Independence of the rating institution, rating analyst, and rating auditor. See section 1.2.2.

# 2 Informational Basis of the Rating Result

## 2.1 Evaluation of Input Data

### 2.1.1 Selecting Criteria

Criteria will be selected individually, on a case-by-case basis, systematically, or on a statistical distribution basis.

### 2.2.2 Aggregation

During aggregation, care should be taken to avoid losing or falsifying important information. Cases can be distinguished in which:

**a**) Raw data used for the rating will be compressed by the rating institution.

**b**) Raw data used for the rating will be compressed by the company being rated.

### 2.1.3 Reliability

**a**) Planning and forecasting data of the company being rated are used.

**b**) Data from third parties (public and private institutions) are used.

**c**) The company's annual, semi-annual, or preliminary financial statements are used.

**d**) Audited financial statements are used.

### 2.1.4 Preparation

If statistical models are used, care should be taken to properly deal with outliers and missing data.

### 2.1.5 Consistency

Measures or methods used to judge consistency should be selected by the rating institution.

### 2.2.6 Scaling

Input data can follow a nominal, ordinal or metric scale.

### 2.2.7 **Internal Controls**

The method used to collect and process data must be identified.

## 2.2 **Information Areas**

Those wishing to evaluate the quality of a rating need insight into the information base of the institution producing the rating. The following possible sources of information are in the form of a checklist to which the rating institution can refer to describe the sources of information used for the rating:

### 2.2.1 **Inputs on Company Identity**

#### 2.2.1.1 **Company Name**

#### 2.3.1.2 **Legal Form**

#### 2.3.1.3 **Headquarters and Location**

- Register entry
- Nationality
- Multiple headquarters if applicable
- Only one location
- Multiple company locations if applicable;
  if so, where…

#### 2.3.1.4 **Date of Establishment**

#### 2.3.1.5 **Industry Sector Classification(s)**

- Industry code (Federal Statistical Bureau categories, Schlüssel Statistisches Bundesamt).
- Regional concentration of business concerning production and sales.

2.3.1.6 **Criteria on Company Size from the Perspective of Disclosure and Worker Participation Legislation** (Publizitäts- und Mitbestimmungsgesetze)

- Balance Sheet Totals (3 Jahre)
- Turnover (3 years)
- Employees (3 years)

2.3.1.7 **Company Ownership**

- As controlling company
- As dependent company owned by…

2.3.1.8 **Structure of Ownership**

- Owner …

  - Person
  - Function
  - Share in the company

- Family

  - Share structure

- Other companies

  - Shareholders structure

- Public sector

2.2.1.9 **Data on Company Development**

2.2.2 **Accounting Information of the Company being rated**

2.2.2.1 **Scope of Consolidation of the Entity being rated**

- Individual financial statements
- Group financial statements

2.2.2.2 **Legal Basis of the Financial Statements**

- German Commercial Act (HGB)
- IFRS
- US GAAP
- Tax law
- Other country-specific standards
- Conversion of … to … on …

#### 2.2.2.3 **Type of Financial Statements**

- Regular annual financial statements
- Quarterly financial statements
- Extraordinary financial statements

#### 2.2.2.4 **Audit Opinion/Certification**

- Opinion by an auditor

  - unqualified

  - qualified

- Certification by a concurring tax consultant.
- Any change in auditor or tax consultant?

#### 2.2.2.5 **Formal Approval of the Financial Statement**

- By the supervisory board
- By the general assembly

#### 2.2.2.6 **Timeframe**

- Number of business years considered
- Gaps (missing years)

- Current business year
- Lump business year

#### 2.2.2.7 **Financial Statements Forecast Indicated by the Forecast Timeline**

- Complete financial statements
- Individual data /coefficients

#### 2.2.2.8 **Other Financial Forecasting Data Indicated by the Forecast Timeline**

- Forecasted turnover, detailed by:

  - Products
  - Regions

  - Customer groups

- Forecasting of important expenditures:

  - Staff expenditures

  - Material expenditures

  - Expenditures for other external services

- Financial forecasting
- Investment forecasting
- Capital cost forecasting

### 2.2.3 **Company Potential not Evident from Accounting Information**

#### 2.2.3.1 **Sales Market and Market Position of the Company being rated**

- Maturity of the sector, e.g. contracting, expanding
- Sectoral characteristics, e.g. cyclical, seasonal, capital-intensive

- Cost structure, concentration trends
- Sectoral economic trends
- Barriers to entry for potential competitors

  - Patents

  - Registered designs

  - Other trade mark rights, e.g. concessions
- Market regulation
- Market share
- Dependence from large customers, e.g. % of turnover with the largest customers

**Quality and innovation of products and programs** (e.g. production innovation rate)

- Product lifecycle
- Distribution strengths
- Other

2.2.3.2 **Production and Procurement**

- Vertical integration
- Commitment to certain technologies or materials
- Dependence from large suppliers, e.g. % of cost of sales with the largest supplier
- Cost advantages based on:

  - Process technology

  - Modernity of plant

  - Capacity utilization

- Scale effects

- Other

- Dependence from Production Factor Bottlenecks

  - Special technical staff

  - Quality of inputs

  - Rights, e.g. patents, licenses, exploitation and production rights

  - Other

- Security of raw materials and energy supply

- Other

2.2.3.3 **Management**

- Size of management (senior management, board of directors)

  - Age

  - Average

  - Dispersion

  - CVs/Careers

  - Special features

- Professional orientation

  - Dominance of particular subject area

  - Diversity

- Recruitment

  - From within

  - From without

- Fluctuation of Top Management

  - based on irregular causes

- Company dependence on a particular person
- Top management network

  - Numerous appointments to board of directors

  - Supervisory board seats in unrelated companies

  - In professional societies

- Incentive systems, e.g. stock options
- Corporate governance
- Strategies and their communication
- Norms and documentation, e.g. ISO 9000
- Quality control management
- Organization of accounting and controlling
- Management information system
- Corporate organization, e.g. departmental structure, flat hierarchies
- Company information policy

#### 2.2.3.4 **Human Resources**

- Staff structure
- Dependence on key persons
- Staff planning

- Staff development
- Recruitment

2.2.3.5 **Location/Environment**

- Security of the political framework
- Legal security
- Economic incentives
- Restrictions
- Tax law framework
- Local economic development
- Infrastructure
- Environmental management
- Environmental audit

2.2.4 **Risk Analysis and Risk Management**

2.2.4.1 **Definition of Potential Risks**

- Insolvency Risk
- Performance (Equity) Risk

2.2.4.2 **Significant Potential Individual Risks**

- Bottleneck risks

  - Default risk produced by plant bottlenecks

  - Default risk produced by staff bottlenecks

  - Default risk produced by top managers

- Default risk produced by customer receivables

- Employee-related risks, e.g. strikes
- Product liability risks
- Exchange rate and derivative risks
- Pollution risks:

  - Ecological

  - Other
- Other

#### 2.2.4.3 **Risk Management**

- Risk planning available?
- Risk management instruments

  - Insurance

  - Risk transfer

  - Inventory maintenance

  - Other
- Is risk management organized as a single unit?
- Attestation on risk management:

  - Negative

  - Non-binding

  - Positive

#### 2.2.4.4 **Support Mechanisms**

- Recourse to:

  - Ownership

  - Banks

- Government

- Potential partners

### 2.2.5 **Information on Competitor Companies**

#### 2.2.5.1 **Time Comparison**

- One year
- Multiple years

#### 2.2.5.2 **Benchmarking**

- Name of the competitor company
- Size
- Legal form
- Specific industrial classification
- Important structural differences to the company being rated
- Database (see section 2.2.2)

#### 2.2.5.3 **Industrial Comparison**

- Sectoral classification category
- Number of comparable companies
- Comparable size:
  - Mean
    - Weighted
    - Non-weighted
  - Median
- Standard deviation

#### 2.2.5.4 **Inter-Sectoral Comparison**

- Subjective evaluation
- Data-supported evaluation
- Historical default ratio within the sector

#### 2.2.5.5 **Comparison Outside of the Sectoral Classification Category** (e.g. analysis using statistical models)

- Size of comparative samples
- Listing of comparative samples, e.g. time frame, company size, exclusion of certain sectors)
- Comparison time frame

## 3 Data Related to Information Processing

### 3.1 General Criteria for Evaluating the Rating System Quality

#### 3.1.1 Rating method used

A rating method is made up of several components. At best in the case of unambiguous evaluations do analysts avoid introducing other information to verify a rating result produced using a particular rating method. A statistical model is frequently used to evaluate creditworthiness. Other criteria related to management quality, industry situation, market situation, etc. are then factored in to arrive at the final assignment of a rating category. This can also occur by using another method and/or through expert judgment.

#### 3.1.2 Transparency and Accountability

The rating institution must provide input that addresses any issues concerning transparency and accountability.

#### 3.1.3 Validity

In order to guarantee the validity of the rating system, it must be ascertained that the rating result measures what it was intended to measure. In the case under consideration it must deal with an issuer rating.

### 3.1.4 **Accuracy**

Accuracy means that the rating result accurately represents the creditworthiness position of the company being rated. One way of ensuring accuracy is to consider the level of significance. This is generally expressed through the alpha/beta error. The alpha error (type I error) refers to the empirical probability that an insolvent enterprise is deemed as solvent. The beta error (type II error) refers to the empirical probability that a solvent enterprise is deemed as insolvent. Further control criteria are power curves (Gini curve, Accurancy ratio, ROC curve) or the error band, which permit conclusions to be reached about the discriminatory ability of the rating model.

### 3.1.5 **Reliability**

A rating method operates reliably when the same inputs yield the same result. In addition to reliability checks, the training system's sensitivity should be analyzed in terms of subjective expert opinions.

### 3.1.6 **Granularity**

The number of rating categories should be in proportion to the amount of input data and extent of information compression.

### 3.1.7 **Clarity and Completeness**

Each company should receive a rating that will allow the company to be assigned to one and only one rating category.

### 3.1.8 **Timeliness and Robustness**

The rating system should be continually checked as to its adequacy. In particular, care should be taken to assure that any significant changes in the economic framework immediately result in an update of the rating system.

### 3.1.9 **Fundamentality**

Information can be regarded as fundamental when its absence leads to a different rating outcome. In principle, all information used to analyze a company's creditworthiness should also be used in the rating process.

### 3.1.10 **Influence of the Criteria of the Analyzed Company**

The rating system should indicate whether industry affiliation, legal form, size, or other specific criteria are being used in the evaluation.

## 3.2 **Criteria for Evaluating the Quality of the Rating Method using Statistical Models**

### 3.2.1 **Database**

For the sample, elements (such as companies) must be procured that have a known group affiliation (e.g. solvent – insolvent). The group variable is nominally scaled. Companies elected for the sample should be representative of the population under consideration. Although there is no generally valid approach to guaranteeing representation, increasing the scope of the sample may increase the probability of reaching meaningful conclusions. It should be possible to separate the underlying database into discrete groups by means of significant criteria.

Criteria are distinctive and therefore significant if their occurrences on average in the groups under consideration show significant differences.

### 3.2.2 **Selection of Criteria**

The number of explanatory variables and their total characteristics should not exceed a reasonable upper limit. This is dependent on the scope of the training sample. The selection of explanatory variables should cover the most important aspects of the criteria area. The criteria variables (e.g. financial statement indicators) should be as little correlated with each other as possible. In the case of financial statement indicators: in order to comprehensively illustrate the information potential of the financial statement, the criteria (in this case, indicators) should reflect different areas (asset situation, financial situation, revenue situation, etc.).

### 3.2.3 **Estimation of Model Parameters**

The estimation of model parameters should take place using a portion of the entire sample, the so-called training sample. The training sample should represent as good a cross sample as possible of current and future obligors. The training sample should be large enough so that the available affiliation of training sample criteria is a good estimator for the actual affiliation of the group to which the company being rated belongs. Care should be taken that the model

parameters being estimated, lend themselves to meaningful economic interpretation.

#### 3.2.4 **Performance of the Model**

In order to determine the classification performance of the rating model, the available data set (entire sample) should be divided into at least one practice and one test sample (holdout sample). Companies included in the training sample serve to calibrate the model parameters. Test sample(s) serve(s) to validate the model (backtesting). "As yet unaffected" companies, i.e. those companies that have not already been included in the model calibration, should be included in the test sample(s). A quality measure should be provided that permits evaluation of the discriminatory function of the rating model.

## 3.3 **Criteria for Evaluating other Rating Methods**

### 3.3.1 **Scoring Methods**

#### 3.3.1.1 **Determination of the Goal Framework**

Information about the selection of individual factors (subjective, statistical analysis) must be provided.

#### 3.3.1.2 **Determination of the Goal Achievement of Alternatives**

The range of the evaluation scale must correspond to the criterion being evaluated. The distance between the highest and lowest value in the scale does not have to be uniform for all objectives. Points on the scale must be specified and described in such a way to make the evaluation scale quasi metric. Information on the approach used to select criteria and to define weights (subjective statistical analysis) should be provided.

### 3.3.2 **Criteria for Expert Systems**

#### 3.3.2.1 **Knowledge Base**

The knowledge base can consist of:

**a**) (Internal/external) databases

**b**) (Non-standardized) expert observations, e.g. individual expert opinions about a particular corporate division

**c**) (Standardized) expert experience that can be applied to the selection of criteria, composition of rating categories, applied aggregation operators or processing rules, etc.

Information on the qualification of experts participating in building the system should be made available. Assigned expertise used must be documented in detail.

#### 3.3.2.2 **Management System**

Which scaling requirements apply to the input data due to the selected compression method? Are these requirements fulfilled? In the case of an operator-based aggregation, several metrically scaled input data should be available, whereas in the case of a rule-based aggregation ordinally scaled input data will be sufficient. Are linguistic evaluations of the criteria sufficiently and comprehensibly described?

In the case of classic systems, linguistic variables are described by intervals, in the case of fuzzy logic-based systems by fuzzy intervals represented by membership functions.

In this regard, the construction of evaluation intervals should be elaborated and it should be clearly indicated whether, in addition to expert knowledge, data knowledge also was enlisted. Is the evaluation process accountable?

The aggregation structure should be comprehensible to a knowledgeable third party. The aggregation operators and/or set of rule sets should be documented.

How frequently is the rating system examined and, if necessary, modified? The reasons for reevaluating the knowledge base should be indicated. Experts involved in any modification should be identified. How long has the expert system been in use and how accurate have decisions been? The length the expert system has been in use should be indicated. Regarding accuracy, see section 3.1.4.

### 3.3.3 **Criteria for Neural Networks**

#### 3.3.3.1 **Constructing a Neural Network**

The number of neurons, hidden layers, and connections should be indicated.

#### 3.3.3.2 **Training the Neural Network**

The computational algorithm used (supervised or non-supervised), the pruning methods used, and the number of training runs undertaken should be indicated.

Moreover, it should be indicated whether there has been any monitoring of the influences of the input parameters through sensitivity analysis. The forecast results of the holdout sample should be used as a measure for the performance and validity of the neural network. The homogeneity of the holdout sample and the training sample should be examined by means of statistical tests.

### 3.4 Criteria for Evaluating Rating Categories Based on an Expert Judgment

#### 3.4.1 **Qualification of the Rating Analyst**

The rating institution should disclose its general (minimum) qualification requirements and work standards for analysts in its employ (training, education, experience, adherence to professional standards, etc.)

#### 3.4.2 **Rating Process**

The rating process should be documented and the number of experts involved in the rating process indicated. Moreover, it should be stated which defaults for selecting criteria and timeliness the experts receive and the extent to which benchmarks and knockout criteria are used.

#### 3.4.3 **Ensuring Rating Quality**

The rating conclusion arrived at by (the) expert(s) should be examined by additional persons. Documentation should indicate that segregation of opinions principles as well as ongoing quality control measures were followed.

# 4 Rating Result

## 4.1 Evaluating the Rating Result

### 4.1.1 Comparability

If various rating scales from different rating agencies are used, each of these rating scales must be able to be recomputed to fit a "generally accepted scale" (master scale). Satisfying these requirements, however, presupposes standardization of the definition of "default". If individual scales are used to rate small and medium sized companies, they should be made comparable to the scales commonly use. Default rates should be provided. So far, the problem exists that a seemingly uniform rating category symbol suggests comparability of non-comparable ratings. This does not apply when a uniform master scale is implemented by all rating institutions.

### 4.1.2 Transparency

The rating result should be reproduceable. It should be indicated how the criteria used are linked to the overall result. Public and individual transparency is also necessary.

#### 4.1.2.1 Public Transparency

Public disclosure of the ratings result depends on the kind of rating, which is primarily determined by the client or, alternatively, by his objectives. If a ratings result is released it should be in an understable manner.

#### 4.1.2.2 Individual Transparency

The rating result must be individually verified with the company being rated in order to ensure that it has been understood. The results may not be changed subsequently at the request of the company being rated. Any errors, however, must be corrected. Minutes of discussions between the rating institution and the company being rated must be produced.

### 4.1.3 Control

Monitoring and checking a rating is an activity that primarily should occur in the market. Rating institutions should regularly publish historical default rates according to rating categories (track records). Information on the quality of the classification can be

gathered by use of statistical methods such as alpha/beta errors, monotony of historical default rates, or error bands.

## 4.2 **Interpretability of the Rating Result**

### 4.2.1 **Report on Rating Result**

#### 4.2.1.1 **Company Identity**

See section 2.2.1.

#### 4.2.1.2 **Rating Result**

#### 4.2.1.3 **Timeliness**

The release of the rating should be date-stamped. The timeliness of data collection used for the rating is important. It is therefore important to the ratings user to have documentation on the time data was collected and the time the rating was produced. The rating is valid as long as the rating institution does not withdraw or change it. Changes in the rating result must be documented by the rating institution. Any modification to a rating should be conducted rapidly. The rating institution should modify ratings immediately after receiving new information (quarterly or annual financial statements, ad-hoc communications). Substantive changes in the creditworthiness of a company being rated should result in a rapid modification of the rating.

#### 4.2.1.4 **Consideration of Country Risk**:

**a**) Explicit consideration

**b**) Implicit consideration in the rating result

#### 4.2.1.5 **Loss Ratios (Loss Given Default)**

### 4.2.2 **Information on the Rating Scale**

#### 4.2.2.1 **Description of the Rating Scale**

#### 4.2.2.2 **Definition of Default Events**

#### 4.2.2.3 **Default Probability of Individual Rating Categories**

The mean default probability must be provided for each rating category. Information on intervals should be provided for each rating category if possible.

4.2.3 **Scope of the Rating**

4.2.3.1 **Forecast Horizon in Years**

**a**) Short term (< 1 year)

**b**) Long term (> 1 year)

4.2.3.2 **Legal Form**

4.2.3.3 **Industry**

Industry descriptions should be provided that conform to the industry code (e.g. Federal Statistical Bureau category WZ 93: production, manufacturing, banking/insurance, services, other).

4.2.3.4 **Company size**

Information about the company size should follow §§ 267, 293 German Commercial Act (HGB) and §§ 1, 11 PublG.

4.2.3.5 **Regional Scope of Application**

a) Local

b) National

c) International

## E Appendix

## Special Criteria for Evaluating Individual Statistical Models

### 1 Criteria for Linear Discriminant Analysis

#### 1.1 Database (Sample Requirements)

Does the underlying database fulfill the requirements for linear discriminant analysis? The method can only be reasonably applied to metrically scaled input data without modification. Nominally or ordinally scaled data can only be used if they can be sufficiently illustrated on a metric scale.

## 1.2 **Selection of Criteria and Formulation of Discriminatory Function**

Does the choice of criteria fulfill the requirements of the linear discriminatory function?

In order to take into account the theoretical requirements of linear discriminatory analysis, the criteria used for the grouping should be as normally distributed as possible and their dispersion in the grouping as equally sized as possible (same variance-covariance matrices). Are references made to the form of the discriminatory function? If linear discriminatory analysis is selected as the methodological basis, the discriminatory function to be determined takes the following form:

## 1.3 **Estimation of the Discriminatory Coefficient in the Discriminatory Function**

Does estimating the model parameters fulfill the requirements of the linear discriminatory function?

Estimating discriminatory coefficients should take place with a portion of the entire sample, the so-called training sample. When estimating discriminatory coefficients, care should be taken to ensure that the associated coefficients and thus the indicator combinations in a classification function are interpreted as being economically consistent. The selection of model parameters should take place using a portion of the entire sample, the so-called training sample. The training sample should represent as good a cross sample as possible of current and future obligors. The training sample should be large enough so that the available affiliation of training sample elements is a good estimator for the actual affiliation of the group to which the company being rated belongs.

Care should be taken when estimating the model parameters to ensure that they lend themselves to meaningful economic interpretation.

Economic consistency implies that criteria evaluated as economically positive are given a different mathematical sign in the computed classification function than those rated as economically negative. Functions fulfilling these requirements are considered to be economically consistent.

### 1.4 **Measuring the Performance of Estimated Discriminatory Functions**

Does the performance measure fulfill the requirements of the linear discriminatory function?

The quality measure used to judge the ascertained discriminatory function should be indicated. The correlation between the discriminatory value Z and the rating categories likewise should be indicated.

## 2 Criteria for Logistic Regression

### 2.1 **Selection of the Criteria and Formulation of the Classification Function**

Does the criteria selection fulfill the requirements of logistic regression? All soft factors entered into the model should be in the form of independent variables. Is reference made regarding the form of the logistic regression function? Estimated a-posteriori probability possesses a logistical function progression. The equation has the estimated s- formed logistical function:

### 2.2 **Estimation of Coefficients in the Logistic Regression**

Does the estimate of model parameters fulfill the requirements of logistic regression?
The estimate of model parameters should be based on the learning sample. The estimated classification function of the logistic regression should be economically consistent. For more on economic consistency see Tz. 84.

## 3 Criteria for the General Cluster Method (e.g. Support Vector Machines)

### 3.1 **Database (Sample Requirements)**

Does the underlying database fulfill the requirements of the cluster method? The method can only be reasonably applied without modification to metrically scaled input data. Nominally or ordinally scaled data must be transformed in approximately metric scaled data. For support vector machines: The method implements a Bayes' estimator for the classification.

This allows for an optimal a-priori allocation of "imprecise" (subsiding) input vectors to their categories. Missing data must be represented in

the entry vectors accordingly. Care thus must be taken to ensure that these missing data are identified as such in the method.

### 3.2 **Estimation of an Approximation or Classification Function**

Does the underlying database fulfill the requirements of the cluster method? If a large number of variably scaled input data are present, a common, multidimensional scaling of the input data can be useful.

For support vector machines:

The support vector machine is a statistical method. Certain free modeling parameters (e.g. the form of the risk function or modification for missing variables) therefore must be determined by an expert. Results of the modeling estimate are support vectors and Lagrange multipliers. These represent category prototypes for the classification exercise. The economic relevance of input criteria of these prototypes should be examined.

## 4 Criteria for Decision Tree Methods (e.g. CART)

### 4.1 **Formulation of the Classification Function**

Is reference made to formulating the classification function of the decision tree method?

The definition of the possible (rating) classification affiliation of the subject being evaluated (obligor) should be indicated and described. The selection of possible discriminatory variables should be described. The definition of the impurity function that determines the characteristic of the separation criteria should be indicated. Selection of this function should be justified. The use of substitution splits in the case of missing criteria values for the object being classified, i.e. the use of other criteria values with a similar classification effect, is permitted provided it is sufficiently documented.

### 4.2 **Estimation of the Default Classification Rate and Determination of End Nodes**

Is reference made to determining the method's default classification rate? The definition of the applied resubstitution estimator or of another estimator of the default classification rate to determine the optimal magnitude of the decision tree, i.e. the optimal number of decision steps to reach a final grouping (end node of the decision tree) of the evaluated entity, should be presented. The

selection of this estimator should be justified. Is reference made to the method of determining end nodes? The method of assigning the end nodes of a decision tree to categories should be presented. In particular, it should be stated that the degree of default classification of the learning sample elements of the selected allocation is optimal.

The method for the final definition of the tree size using default classification rates should be presented. The default classification rate of the defined decision tree based on the test sample method should be examined and documented. The test sample method should be described. In particular, it should be mentioned if the original learning sample has been allocated to a new learning sample and an associated test sample.

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