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Datasheet for the decision of 25 May 2020

Case Number: T 1798/13 - 3.5.01

Application Number: 05796344.9

Publication Number: 1958141

IPC: G06Q40/00

Language of the proceedings: EN

Title of invention:
A METHOD AND A COMPUTER SYSTEM FOR FORECASTING THE VALUE OF A STRUCTURED FINANCIAL PRODUCT

Applicant:
Swiss Reinsurance Company Ltd.

Headword:
Forecasting the value of a structured financial product/SWISS REINSURANCE COMPANY LTD

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - improving a weather forecast (no - not technical)

Decisions cited:
T 0641/00, T 2079/10, T 2331/10

Catchword:
The "weather" is not a technical system that the skilled person can improve, or even simulate with the purpose of trying to improve it. It is a physical system that can be modelled in the sense of showing how it works. This kind of modelling is rather a discovery or a scientific theory, which are excluded under Article 52(2)(a) EPC and thus do not contribute to the technical character of the invention (see point 2.10ff.).

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Case Number: T 1798/13 - 3.5.01

D E C I S I O N
of Technical Board of Appeal 3.5.01
of 25 May 2020

Appellant: (Applicant)	Swiss Reinsurance Company Ltd. Mythenquai 50/60 8022 Zürich (CH)
Representative:	Leimgruber, Fabian Alfred Rupert ThomannFischer Elisabethenstrasse 30 4010 Basel (CH)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 7 March 2013 refusing European patent application No. 05796344.9 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	W. Chandler
Members:	N. Glaser
	C. Schmidt

Summary of Facts and Submissions

I. This appeal is against the decision of the examining division to refuse the European patent application No. 05796344.9 pursuant to Article 97(2) EPC on the ground of lack of inventive step (Article 56 EPC), because no technical problem was overcome.

II. In the statement setting out the grounds of appeal, the appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the set of claims annexed as "Anhang A" and "Anhang C" (main request), or, alternatively, on the basis of the set of claims annexed as "Anhang B" and "Anhang C" (auxiliary request).

III. In a subsequent letter, the appellant requested on an auxiliary basis a personal or a telephone interview with "the examiner", or oral proceedings. However, since this letter was related to the appeal proceedings, the Board interpreted it as an auxiliary request for oral proceedings before the Boards of Appeal.

IV. In a communication accompanying the summons to oral proceedings, the Board set out its preliminary opinion that the invention did not involve an inventive step (Article 56 EPC).

V. In a reply, dated 16 September 2019, the appellant provided arguments and filed a new main, first and second auxiliary request. It was requested that the decision under appeal be set aside and that the case be remitted to the examining division for a search and further prosecution on the basis of the set of claims

annexed as "Anhang A" (main request), or, alternatively, that the patent be granted on the basis of annexed "Anhang A" or "Anhang B" (first and second auxiliary request). "Anhang A" and "Anhang B" both refer to the dependent claims in "Anhang C".

VI. At the oral proceedings, the appellant withdrew its first and second auxiliary request. Thus, its final request was that the decision under appeal be set aside and that the case be remitted to the examining division for a search and further prosecution on the basis of the set of claims submitted as "Anhang A" and "Anhang C" with letter dated 16 September 2019.

VII. After deliberation by the Board, the Chairman announced that a decision would be given in writing.

VIII. Independent claim 1 of the sole request reads as follows:

"1. A method for forecasting a value of a weather-based structured financial product for steering of an optimal weather derivative portfolio based on specified weather measures comprising temperature and/or precipitation and/or hours of sunshine and/or heating degree days and/or cooling degree days and/or wind speed retrieved from a weather data measuring and monitoring system comprising:

calculating reference weather data at least including temperature data from historical weather data at least including temperature data stored in a database (16) or retrieved from an external weather-data measuring system (5) by means of a weather reference module (11) for a defined time period and a defined geographical area, wherein the historical weather data covering a

plurality of years as a time series, is decomposed in portions with deterministic data and a portion with stochastic data, wherein the deterministic portions include historical trend data and seasonal pattern data, and wherein the reference weather data is determined for the defined time period and the defined geographical area defined in correspondence with the parameters of the structured financial product to be forecasted by establishing the reference weather data from the deterministic data, applicable to the defined time period, through auto regression, and from stochastic data determined for the time period;

establishing forecasted weather data by means of a weather forecast module (12) based on multi-year historical weather data and long-term weather forecast data covering one or more months and storing the forecasted weather data as multiple sets of forecasted weather data for subsequent time periods in database (16) assigned to their respective time period;

calculating weighted forecasted weather data by means of a weighting module (121) from the multiple sets of forecasted weather data stored in the database (16), wherein each set of forecasted weather data is weighted by a weighting factor having a value that increases from one time period to the next subsequent time period;

calculating a forecasted weather index at least including an average temperature, a cumulative temperature a number of heating degree days or a number of cooling degree days for the defined time period and the defined geographic area from the forecasted weather data, wherein the type of index is defined by a respective parameter of the financial product to be

forecasted, and calculating a forecast value of the structured financial product based on forecasted weather data for a defined time period and a defined geographical area, wherein the forecast value is calculated by applying structural parameters of the financial product to the forecasted weather index determined from the forecasted weather data;

calculating a reference weather index at least including an average temperature, a cumulative temperature a number of heating degree days or a number of cooling degree days for the defined time period and the defined geographic area from the reference weather data by means of a reference module (13), wherein the type of index is defined by a respective parameter of the financial product to be forecasted, and calculating a reference value of the structured financial product based on the reference weather data, wherein the reference value is calculated by applying the structural parameters of the financial product to the reference weather index determined from the reference weather data;

calculating a ranked probability score for the reference weather data by integrating a cumulative distribution function of the forecasted weather data representing the actual relevant weather situation, and calculating a ranked probability score for the forecasted weather data, by integrating a cumulative distribution function of the forecasted weather data representing the actual relevant weather situation,

calculating a quality indicator by means of a quality indicator module (15), indicative of a forecasting quality associated with the forecasted weather data, based on the forecasted weather data and the reference

weather data, wherein the quality indicator is calculated as a ranked probability skill score from the ranked probability score for the forecasted weather data and the ranked probability score for the reference weather data, the ranked probability skill score indicating the accuracy of the forecast of the weather data compared to the reference weather data according to the percentage of improvement in accuracy of the forecast weather data over the reference weather data; and

calculating the value of the financial product by means of a value forecasting module from the reference value and from the forecast value weighted by the quality indicator, wherein the influence of the forecasted value on the calculated value of the financial product is adjusted."

Reasons for the Decision

1. The invention

1.1 The invention concerns forecasting the value of a weather-based structured financial product. The values of these products are based on specific weather measures, such as temperature, precipitation, hours of sunshine, heating degree days, cooling degree days or wind speed (page 1 of the application as filed).

1.2 Looking at Figure 2 of the application, the forecast value of the product S13 is based on forecasted weather data S11 for a defined time period and a defined geographical area relevant to the financial product

S12. A quality indicator S34 is calculated, based on the accuracy of the forecasted weather data S31 compared to reference whether data S32, S21. This is said to "enable[] both investors and providers of the financial product to make better-informed decisions concerning the value of the financial product" (page 2, last paragraph). The quality indicator is used S4 to calculate the final value of the financial product S41.

2. Main request - Article 56 EPC

2.1 The examining division essentially considered that the invention had two aspects, namely a) defining and calculating a weather forecast and b) defining and calculating the influence of the weather forecast on a particular financial product. They could not find a technical problem solved by the implementation of either of these aspects. The decision further considered that the introduction of mathematical equations in claim 1 would not render it technical because it was not clear what technical problem these solved, cf. paragraphs 5 and 6-2 of the decision.

2.2 The appellant attempted to "boost" the technical nature of claim 1 by adding the following features to it :

(i) insertion of "*optimal*" and "*based on specified weather measures comprising temperature and/or precipitation and/or hours of sunshine and/or heating degree days and/or cooling degree days and/or wind speed retrieved from a weather data measuring and monitoring system*" in line 2 of claim 1 to further define a weather derivative portfolio;

(ii-1) replacement of the feature "*by applying a stochastic time series model to the historical weather*

data" in lines 6 of method step "***calculating reference weather data ...***" with "*wherein the historical weather data covering a plurality of years as a time series, is decomposed in portions with deterministic data and a portion with stochastic data, wherein the deterministic portions include historical trend data and seasonal pattern data, and wherein the reference weather data is determined for the defined time period and the defined geographical area defined in correspondence with the parameters of the structured financial product to be forecasted by establishing the reference weather data from the deterministic data, applicable to the defined time period, through auto regression, and from stochastic data determined for the time period*";

(ii-2) insertion of "*at least including temperature data*" in lines 1 and 2 of the method step "***calculating reference weather data ...***" to further qualify reference weather data and historical weather data;

(ii-3) insertion of "*or retrieved from an external weather-data measuring system (5)*" in line 3 of the method step "***calculating reference weather data ...***" to define from where historical weather data is retrieved;

(iii) insertion of "*at least including an average temperature, a cumulative temperature a number of heating degree days or a number of cooling degree days for the defined time period and the defined geographic area*" in line 1 of the method step "***calculating a forecasted weather index ...***";

(iv) insertion of "*at least including an average temperature, a cumulative temperature a number of heating degree days or a number of cooling degree days for the defined time period and the defined geographic*

area" in line 1 of the method step "***calculating a reference weather index ...***".

2.3 The appellant agreed that the use of the weather forecast to define a financial product had no technical character, but argued that the invention improved the reliability and predictability of weather forecast data in general, which was a technical problem. Claim 1 contained more technical features than a general purpose computer and databases and it was based on physical data and not on business data alone.

2.4 Firstly, the forecasting was based on specified weather measures, such as temperature, precipitation, hours of sunshine, heating degree days, cooling degree days or wind speed, which represented physical, hence technical data, see page 1, lines 13 to 16, and page 10, line 9.

2.5 Secondly, the invention did not only retrieve and use this measurement data, for example, from an external provider, such as the European Center for Medium range Weather Forecasting (ECMWF), see page 8, lines 12 to 18, but specifically calculated and further processed reference weather data and forecasted weather data. Figure 3 and page 7, line 2, to page 8, line 10, explained the steps for calculating reference weather data, and Figure 4 and page 8, lines 11 to 29, explained the steps for the establishing forecast weather data. These steps operated on physical data and achieved the technical effect of improving this data.

2.6 Thirdly, the calculated quality indicator gave the percentage of improvement in accuracy of the forecast over the reference simulation, page 13, lines 1 to 11. This was a novel and inventive approach because conventional solutions to improve predicability of

weather forecasts would have been to provide more sensors and to make more measurements.

2.7 Regarding the first argument, the Board agrees that a system for weather forecasting, for example, comprising sensors for measuring specific weather data, has technical character. The invention, however, relies on the use of already measured weather data. It could be argued that this (raw) weather data represents measurements about the physical world and is therefore also technical. The situation would thus be similar to that in T 2079/10 (Steuerung von zellulär aufgebauten Alarmsystemen / SWISSRE), reasons 4.2 and 4.3, which considered that physical parameters represent technical data and the choice of which physical parameters are to be measured are competences of the technical skilled person.

2.8 In T 2079/10, however, the invention was seen to lie in the improvement of the measurement technique itself, which involved technical considerations about the sensors and their positions. In the present case, the measurements themselves do not play a role, the improvement is in the processing of data to provide a better weather forecast.

2.9 The applicant's second argument is essentially that also an improvement in the weather data by calculating and further processing it is also technical. In the Board's view this leads to the key issue in this case, namely whether improving the accuracy of given data of a weather forecast is technical. If it is not, then the details of the algorithm, the "mathematics" as the division put it, does not help.

2.10 The Board judges that it is not. The "weather" is not a technical system that the skilled person can improve, or even simulate with the purpose of trying to improve it. It is a physical system that can be modelled in the sense of showing how it works. In the Board's view, this kind of modelling is rather a discovery or a scientific theory, which are excluded under Article 52(2)(a) EPC.

2.11 As Mellulis puts it (see Benkard, EPC, 3rd ed. (2019) on Art. 52, paragraph 232, translation from German by the Board): *like the discovery, scientific theories also contain instructions for (technical) action. They are an attempt at a rational explanation of observed or expected processes based on natural laws or logical considerations. They are frequently based on a knowledge, expectation or presumption of laws, which can also be based on empirically gained knowledge. In terms of content, they resemble discoveries; there is some overlap here. They are not patentable even if they provide an explanation for activities that are in use.*

2.12 This applies in the Board's view to the understanding of "weather" in the present application. The modelling of weather in terms of historic or calculated reference data, predictions or established forecast data, trends and seasonal patterns etc. aim at a better understanding of "weather", of the causal relationships and correlations between different kinds of weather data, thereby enabling better use of previous experiences. Thus, in the Board's view, the improvement of the data in this case is rather an improvement of a model utilising a scientific theory and thus does not contribute to the technical character of the application.

2.13 Furthermore, the parametrisation of these models is ultimately influenced by the business requirements. The application explains at page 1, lines 9 to 26, that weather-based financial instruments have a start date, maturity date, are defined for a specific geographical region and at least one weather condition, such as temperature, precipitation, hours of sunshine, heating degree days, cooling degree days or wind speed. It is also the business person who, as an expert in weather-based financial derivates, has not only expertise about finance, but also about mathematical models and methods and weather-based parameters which are required to define these financial instruments.

2.14 The appellant's third argument is that the quality indicator is technical because it improves the data in a way that would conventionally have been done by technical means. In the Board's view this also fails for the reasons given in the previous paragraph.

2.15 The situation in this case is comparable to T 2331/10 (Operating wind turbines / GENERAL ELECTRIC COMPANY), which concerned forecasting electric power production based on weather forecasts and wind turbine parameters. The Board considered that the improvement lay in the area of modelling and algorithms which by themselves did not achieve a technical effect (reasons 5.2). The Board also found that the predicted forecast data signal was not a physical variable of an underlying technical system and was not linked to its functioning, but it had a business purpose, namely to make sales of electric power generation with increased confidence (reasons 5.4 to 5.5). In the present case, the weather forecast and the quality indicator do not serve a technical purpose, such as improving the measurement system, the collection of measurement data, the

arrangement of sensors, or the like, but are (mathematical) values with a business purpose, namely determining the value of the financial product.

2.16 In summary, the Board concludes that the sole technical elements in claims 1 and 9 remain the storage of data in a database and a computer-implementation. The closest prior art therefore is indeed a general purpose computer system for the processing and storage of data, as known and in use well before the priority year 2005. Such a computer system and its use are common general knowledge, and are even notorious. The existence of such systems before the priority date of the application does not require further evidence.

2.17 The objective technical problem is how to implement the non-technical method of forecasting the value of weather-based financial products on such a computer system. As stated in the COMVIK decision, point 7, it is legitimate to include the non-technical aspects and features of the invention in the formulation of the technical problem.

2.18 From the point of view of the relevant person skilled in the art, the task of programming such a forecasting system on a general purpose computer system is per se a normal and obvious aim. The technical features of the implementation, however, follow directly from the requirements specification concerning the non-technical concept.

3. Reciprocal technical effect

3.1 The appellant also argued that the invention concerned the automated management of portfolios comprising structured financial products. The portfolios were

generated and controlled based on stable forecast values. A parametrisation of these structured financial products allowed them to be coupled with weather-based measurement data. This coupling of parameters of structured financial products with weather-based measurement data achieved a *reciprocal technical effect* between the financial products and the "real-world". The structural parameters had a direct implication and interaction with the generation of the forecast values. The data processing was adapted according to these structural parameters. Contrary to the opinion of the examining division, the method of claim 1 comprised at least the following four technical steps:

(a) generation of a forecast value based on the structural parameters of the financial product,

(b) generation of a reference value based on the structural parameters of the financial product,

(c) generation of a quality indicator by ranked probability skill score and

(d) generation of a weighted process value for the financial product.

3.2 These steps were technical, because a person skilled in the art was not be able to perform them in the defined order without a processor-based system. The internal structure of these steps allowed for a modular approach and achieved an optimisation of the underlying data processing. Furthermore, the implementation of these steps was not trivial for a normal computer programmer, because it required specific knowledge about the structured financial products to implement the control of such a portfolio based on specific weather measures.

The invention associated specific structural parameters with specific forecasted weather index values and achieved thereby the *reciprocal technical effect*.

3.3 The Board does not disagree that the above four steps are likely computer-implemented, despite the fact that the feature "computer-implemented" was deleted from claim 1, and are technical due to their implementation on a data processing system. The Board also does not disagree with the appellant that specific knowledge about the structured financial product may be required when implementing the invention, i.e about the structural parameters, but this knowledge is part of the business specification, see paragraph 2.12 and 2.13 above.

3.4 However, the Board cannot recognise any *reciprocal* effect between the specific structural parameters of a financial product and the specific forecasted weather index values. The value of the financial product depends per definition on weather data, but not vise versa. There is no influence on the quality of the weather or weather-based measurements from the parameters of the financial product.

4. The Board concludes that claim 1 of the sole request does not involve an inventive step (Article 56 EPC).

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

T. Buschek W. Chandler

Decision electronically authenticated