Commissioner's Decision # 1373
Décision du Commissaire # 1373

TOPICS: J-00, J-10
SUJETS: J-00, J-10

Application No: 2,312,726
Demande no: 2,312,726

IN THE CANADIAN PATENT OFFICE

DECISION OF THE COMMISSIONER OF PATENTS

Patent application 2,312,726, having been rejected under subsection 30(3) of the *Patent Rules*, has consequently been reviewed in accordance with paragraph 30(6)(*c*) of the *Patent Rules* by the Patent Appeal Board and by the Commissioner of Patents. The findings of the Board and the ruling of Commissioner follow.

Agent for the Applicant

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Introduction

[1] This decision deals with a review of the findings of the examiner in respect of Canadian patent application No. 2,312,726, entitled "*Financial Advisory System*", filed on 03 December 1997 and currently assigned to Financial Engines, Inc. The application pertains to a computer implemented system for advising a user regarding an optimal financial investment portfolio.

[2] The examiner in charge issued a Final Action to the Applicant on 23 August 2010, and rejected the application for lack of statutory subject matter and obviousness. Having found that the Applicant's response to the Final Action did not overcome the defects, the examiner forwarded the application and a Summary of Reasons (SOR) to the Patent Appeal Board ("the Board") on 18 March 2013. The SOR maintained the rejection of the application on the grounds of subject matter but dropped the grounds pertaining to obviousness. Two new defects were identified (new matter and indefiniteness) as a result of the claim amendments submitted by the Applicant.

[3] A panel of three PAB members was formed ("the panel"), and following an initial review of the application, the panel invited the Applicant to a hearing and requested additional information in a letter dated 01 April 2014. The Applicant's written reply was received 02 June 2014.

[4] The Applicant declined the offer of a hearing, and instead asked that the panel's recommendation be based on the written record on file. Accordingly, three issues are before the panel for determination in this recommendation:

1. Are claims 1 to 69 directed to non-statutory subject matter and therefore non-compliant with section 2 of the *Patent Act*?

2. Do claims 55 and 65 define new matter not reasonably inferred from the description as originally filed and therefore non-compliant with subsection 38.2 of the *Patent Act*?

3. Are claims 55 and 65 indefinite and therefore non-compliant with subsection 27(4) of the *Patent Act*?

[5] For the reasons that follow, we find that the rejection of the application on the grounds that claims 1-69 are not compliant with section 2 of the *Patent Act* ought to be sustained. Since this finding is sufficient to dispose of the matter before us, we need not decide on the second and third issues.

The Application

[6] The application relates to the field of financial advisory services, and in particular, software tools or packages directed to an investor making their own investment decisions. The application discloses methods, systems and computer program products for advising an investor (or user) regarding feasible and optimal investment portfolio allocations based on the expected returns of various asset classes, the available financial products that map onto those assets classes, and realistic economic and investment return scenarios.

[7] Asset classes may represent common investment categories such as cash, bonds, or equities, etc. The financial products may represent the set of products available to the user from their financial institution, such as a balanced mutual fund, a bond fund or a GIC, which may each cover a mix of asset classes. The invention creates one or more feasible scenarios, by mapping the available financial products that an investor can purchase with the asset classes being considered, using future-looking realistic economic and investment return scenarios. The invention will then identify an optimal portfolio from these feasible scenarios, taking into account the user's personal requirements, such as risk tolerance, expected contributions, time until retirement, etc. Optimization is achieved using a "mean-variance utility function", which is calculated to determine the best portfolio for an individual investor's needs.

[8] In this manner, the system bridges the gap between choosing asset classes and choosing financial products, by determining feasible exposures to asset classes that are achievable

by the particular investor, given the future performance of the available financial products that the investor may select. Additionally, the system allows a user to monitor the value of the portfolio on an ongoing basis, for a given time horizon, to inform the user as to whether or not their financial goal (e.g. retirement date) is likely to be achieved. Overall, the invention seeks to provide more realistic and personalized investment advice than that given by the existing financial advisory tools.

The Claims

[9] There are 69 claims on file, including 10 independent claims. Claims 1-37 were on file at the time the Final Action was written, while claims 38-69 were added by amendment in response to the Final Action. The claims under review are:

a) Claims 1-27, which define system and computer product claims pertaining to determining a optimal feasible portfolio based on asset classes, available financial products and a user's parameters (risk, time horizon, contributions, etc);
b) Claims 28-37, which define additional computer product claims pertaining to forecasting the projected value of a financial product based on future returns of an asset class; and
c) Claims 38-69, which define method claims comprising the same or similar features as claims 1-27.

[10] We first refer to claims 27 and 65, which are representative of the broadest financial advisory system and method claims, respectively:

> 27. A system comprising:
>
> a factor model module operative to generate return scenarios for each asset class of a plurality of asset classes based upon future scenarios of one or more economic factors;
>
> a mapping module operative to determine feasible exposures to a plurality of asset classes achievable by a particular investor by determining a combination of one or more asset classes of the plurality of asset classes and proportions of the one or more asset classes

of the plurality of asset classes that characterize future performance of each financial product of a set of financial products available to the particular investor for investment in one or more financial accounts; and

an optimization module operative to determine an optimal feasible portfolio comprising one or more financial products of the set of financial products available to the particular investor for investment [available set of financial products] based upon the feasible exposures determined by the mapping module and taking into consideration the particular investor's risk tolerance, savings rate, financial goal, time horizon and expected contributions to and expected withdrawals from the one or more financial accounts.

65. A computer-implemented method comprising:

a step, performed by a financial product mapping module being executed by one or more processors of one or more computer systems, for determining feasible exposures to a plurality of asset classes achievable by a particular investor based upon a limited set of financial products available to the particular investor for investment, wherein the limited set of financial products available to the particular investor is a proper subset of a set of all financial products available for investment via public markets; and

a step, performed by a portfolio optimization module being executed by the one or more processors, for identifying a recommended efficient portfolio of financial products from the limited set of financial products.

[11] We have added square brackets around the phrase "available set of financial products" in claim 27 above, because the phrase appears to be redundant in view of the remainder of the claim as drafted. Ignoring the phrase does not affect the meaning of the claim nor the outcome of our recommendation.

[12] The remaining independent claims define alternative embodiments of the invention, incorporating similar method steps (or alternatively, computer product features). We reproduce two more as exemplary claims: first, computer product claim 1 is representative of the mathematical aspect of the advisory system, including the disclosed mean-variance utility function:

1. In a financial advisory system, a computer-readable memory having stored thereon a plurality of instructions that, when executed by a processor, cause the processor to perform the steps of:

generating return scenarios for each asset class of a plurality of asset classes based upon future scenarios of one or more economic factors;

creating a mapping from each financial product of an available set of financial products onto one or more asset classes of the plurality of asset classes by determining exposures of the available set of financial products to each asset class of the plurality of asset classes;

simulating return scenarios for one or more portfolios including combinations of financial products from the available set of financial products based upon the mapping;

determining an optimal feasible portfolio comprising one or more financial products of the available set of financial products based upon the step of simulating return scenarios and taking into consideration expected contributions and expected withdrawals; and

maximizing a mean-variance utility function of the form:

$$U = E(W_T) - \frac{Var(W_T)}{\tau}$$

where for a given scenario,

$E(W_T)$ is the expected value of wealth at a time T,

$Var(W_T)$ is the variance of wealth at time T,

τ is a user's risk tolerance, and

$$W_T = X_1 \sum_{t=0}^{T-1} C_t \prod_{j=t+1}^{T} (1 + R_{j1}) + \ldots + X_n \sum_{t=0}^{T-1} C_t \prod_{j=t+1}^{T} (1 + R_{jn}) + g$$

where:

X_i represents a recommended constant proportion of each net contribution that should be allocated to financial product i,

C_t represents a net contribution at time t,

R_{ji} represents expected returns for financial product i in year j,

n is the number of financial products that are available for optimization, and

g is a value of constrained assets for a given scenario.

[13] Finally, claim 28 is representative of the monitoring aspect of the financial advisory system, wherein a projected value of a particular portfolio is presented:

28. A computer program product, comprising:

memory having computer-readable code embodied therein, for execution by

> a central processing unit of a computer system for projecting a value of a financial product holding, said code comprising:
>
> exposure analysis code means for performing exposure analysis on a financial product in which an investor holds an interest to determine how the financial product behaves relative to a set of asset classes;
>
> forecasting code means generating a forecast for the financial product holding at a configurable time horizon based on forward-looking scenarios of one or more asset classes of the set of asset classes; and
>
> user interface code means for causing information to be presented regarding a projected value of the financial product holding at the configurable time horizon based on the forecast.

[14] The dependent claims add additional limitations which clarify several of the financial optimization steps and financial variables defined in the independent claims. As neither the Applicant nor the Examiner identified any specific considerations regarding the compliance of the dependent claims with section 2 of the *Patent Act*, we will focus our review on the independent claims.

[15] From a literal reading of the representative claims above, the claimed embodiments define both computer components and financial processes involving certain mathematical calculations. The financial processes and calculations pertain to forecasting returns for asset classes, mapping financial products, determining feasible exposures, determining an optimal portfolio, maximizing a mean variance utility function, and comparing future values against financial goals. The computer components in the claims pertain to the computer implementation involving processors, memories, code means, modules, and stored instructions. Our purposive construction in the following paragraphs determines whether or not these computer-related components are essential to the claimed invention.

Purposive Construction

[16] Following the Federal Court of Appeal decision in *Canada (Attorney General) v Amazon.com Inc*., 2011 FCA 328 [*Amazon*], the Office released two examination memos which clarified examination practice with respect to the Office's approach to purposive

construction (PN2013-02) and computer-implemented inventions (PN2013-03), in light of the relevant Canadian jurisprudence. Both of these memos were cited in the SOR and our initial review letter.

[17] Purposive construction of a patent application seeks to determine the meaning of terms used in the claims and which elements are essential to the invention: *Free World Trust v Electro Santé Inc*, 2000 SCC 66 [*Free World Trust*]. Purposive construction is performed through the eyes of the person skilled in the art, considering the specification as a whole against the background of the common general knowledge (CGK), including an understanding of the problem and solution addressed by the application. As noted in PN2013-02, one should recognize "that a patentable invention is an inventive solution to a practical problem" and "that an invention must be disclosed (and ultimately claimed) so as to provide the person skilled in the art with an operable solution".

[18] Once identified, the solution informs the determination of which elements are essential to the claimed invention. PN 2013-02 further indicates that "not every element that has a material effect on the operation of a given embodiment is necessarily essential for the operation of the invention. Some elements of a claim merely define the context or the environment of a specific working embodiment, but do not actually change the nature of the solution to the problem."

The person skilled in the art and their relevant common general knowledge

[19] The identification of the skilled person and their CGK was not an issue between the examiner and the Applicant. We provided the Applicant our assessment of both the skilled person and the CGK in our initial review letter. The Applicant did not contest that assessment, and we therefore adopt it for our review.

[20] In summary, our letter identified the skilled person to be a team comprised of a financial advisor (e.g. advisor, planner, analyst, or investment specialist), familiar with financial products, markets, asset classes, investments, etc., and a computer/software programmer, familiar with financial software products.

[21] As explained in our initial review letter, in light of the Background of the Invention (pages 1-3), this person would have at least the following knowledge:

a) knowledge of financial advisory services, and prior art financial software packages;
b) knowledge of financial investment concepts: asset classes, asset allocation, portfolios, return on investment, defined contribution/benefit, retirement horizon projections, risks, feasibility, expected returns, inflation, interest rates, real returns, economic predictions, future values, and various other financial terms, concepts, or mathematical parameters, either estimated or calculated;
c) knowledge of common investor goals, intentions, ambitions, choices or decisions that typical investors/users will make (e.g. retirement dates, various risk tolerances, expectations on growth, contributions, etc) as related to financial advice; and
d) knowledge of common programming techniques and software processes used in making financial software, running on either specialized hardware or a generic, general purpose computer.

The problem and the solution the invention addresses

[22] The Background to the Invention (description, pages 1-3) indicates that while financial software packages were commonly available to allow a user to plan and manage their own retirement investment portfolios, these tools had several shortcomings. First, they typically use generic asset allocation suggestions, leaving to the user the complicated task of selecting from the available financial products those which correspond to the suggested asset allocation. Furthermore, these prior art software tools depend on the user to enter estimates on future inflation rates, interest rates and expected returns on investments, leading to unattainable portfolios. Finally, the prior art software packages do not give realistic estimates of investment risk-return tradeoffs based on a user's specific circumstances, and thus they may not achieve maximum performance in their portfolios. As a result of these shortcomings, users of these prior art software packages

often created unattainable portfolios based on unrealistic economic factors. In essence, the prior art systems failed to provide satisfactory financial advice.

[23] The description (page 2, para. 3) discloses that these shortcomings can be overcome with an improved financial advisory system which uses advanced financial techniques to provide realistic advice to users on how to reach their financial goals, by:

> a) generating future looking realistic economic and investment return scenarios for asset classes to allow for a feasible portfolio for the user;
> b) creating a feasible optimal portfolio by maximizing the "utility function" of the user: i.e. the preference of the user for different combinations of available products based on one or more characteristics of the products and one or more parameters specific to the user; and
> c) allowing for plan monitoring on an ongoing basis to provide feedback/advice on steps the user can take to improve their chances of meeting financial goals.

[24] A key aspect of the disclosed financial system is that forecast scenarios for asset classes are generated based on future economic factors, and then the financial products available to an investor are mapped onto these asset classes. Investment return scenarios are then simulated to generate feasible portfolios made up of combinations of the available financial products. A further aspect of the solution is that it employs portfolio optimization based on calculating a "mean-variance" utility function for a user. The utility function considers both characteristics of the user (such as risk tolerance, investment horizon and savings level) and characteristics of a financial product (expected return, variance, etc.) and thereby determines the optimal portfolio for the specific user**.**

[25] The skilled person reading the specification would observe that a significant focus of the description is on the details of the financial processes involving certain mathematical calculations embodied by the advisory system. Beginning on page 9, the description informs the reader of the exemplary analytic models: a pricing module, a factor module, a financial product mapping module, a tax adjustment module, an annuitization module, a simulation processing module, a portfolio optimization module, a user interface module,

and a plan monitoring module. These models represent the mathematical processing that is undertaken to determine, monitor and adjust the investment portfolios. The user interface module is described as a mechanism for data input and output with a user, although the details of the interface are indicated as the subject of a separate patent application. The bulk of the remaining pages of the description (pages 16 through 23) detail the specific mathematical calculations for asset scenarios, factor models, product exposures, and portfolio optimization routines.

[26] Similarly, the skilled person reading the specification would find neither the disclosure of any challenging problem relating to the computer implementation of the advisory system, nor any other apparent technical problem in the implementation of the features of generating return scenarios, creating a mapping, simulating feasible scenarios and determining an optimal portfolio. Brief reference is made (see description, pages 8-9) to various exemplary computer components that may be used in an exemplary embodiment of the invention, including conventional processors, memory, data storage, input and output devices, and data communications means. The commonly known "client-server" architecture is identified as a possible configuration for a distributed advisory system. However, the specification does not require any specific computer hardware or architecture that must be used in the invention, nor does the specification set out any unique modifications or changes to these components or architecture, which would not already be known to the skilled person.

[27] Accordingly, the skilled person would understand that the problem being addressed by the application is not a computer problem involving the implementation of the financial advisory system or method, but rather a problem with the financial processes and calculations used for determining an optimal investment portfolio. The solution being offered is an improvement in the manner of determining and monitoring an optimal investment portfolio using advanced mathematical techniques to maximize the utility function for an individual's investment goals, taking into account asset classes and available financial products. The various computer components set out in the description do not form part of the solution to the identified problem.

Essential elements

[28] After considering the guidance in PN2013-02, the examiner summarized the construction of all claims (SOR, page 2) by indicating that the computer features were not considered to be an essential element for solving the problem faced by the inventors. The SOR states that despite many of the claims being directed to computer components (e.g. computer readable memory or systems), said computer components merely provide the context for the solution to the problem. The SOR surmises that the computer components could be replaced and the solution to provide improved financial advice would remain intact.

[29] In their response to the SOR (pages 3 to 10), the Applicant raises several points specifically addressing to the examiner's construction of the claims. Citing *Free World Trust*, the Applicant argues that the construction in the SOR is incorrect in the following ways (our paraphrase):

a) the inventor intended the computer components to be essential by the fact they are claimed, and absent any indication they are not essential;
b) the skilled person would not consider that the computer components could be omitted or varied without a material effect on the structure or operation of the invention; and
c) the claimed features of "simulation" and "mapping" are by definition computer-based and thus require the presence of a processor and memory.

a) Does the intent of the inventor mean the computer components are essential?

[30] With regard to point (a), we do not agree that the intent of the Applicant is an overriding factor in determining whether or not an element is essential (*Re Application 2,237,438 of IGT,* Commissioner's Decision No. 1346 (2013) [CD1346], at paras. 26-33). While purposive construction is anchored in the language of the claims, the analysis cannot be based solely on a literal reading of the claims (see *Amazon,* para. 43); an element is not

automatically considered essential by its mere presence in the language of the claim as drafted by the inventor. Instead, as the practice notice in our view correctly indicates, it must be determined whether or not an element is essential because it cannot be varied or omitted without a material effect on the invention.

b) Could the computer components be omitted or varied?

[31] In regard to point (b) above, the Applicant specifically argues in their response (page 6) that unless there is at least some evidence "that a person skilled in the art would agree that the system of claim 27 or method of claim 38 'would obviously work in the same way' with or without the computer elements", then those components must be essential.

[32] In response, initially we observe that neither claim 27 nor claim 38 explicitly define any computer elements or components. Both claims define fundamental financial processes and associated calculations of the disclosed solution, such as mapping and optimizing, to arrive at an optimal portfolio. In claim 27, the use of the term "module" is understood as defining sub-components of the overall solution. The skilled person would not read in any computer limitations based on the language defined in either claim.

[33] With regard to the substantive issue raised in point (b) above (i.e. could the computer components be varied or omitted), we note that it is clear from the description and the CGK discussed above, that the use of processors, software, computer memory devices, interfaces or client-server architecture to implement financial planning and advisory methods as disclosed in the specification was commonly known. One skilled in the art would consider that these features define one of a finite number of conventional operating environments of a financial advisory software package, tool or system.

[34] While the processors, servers, memory devices or computer implemented steps provide a convenient supporting architecture (technical environment) to efficiently calculate, communicate and disseminate the financial advisory data and information, the computer components themselves do not have a material effect on the financial concepts involving certain mathematical calculations for optimizing an investment portfolio. The computer

components merely operate as they are designed to operate, such as a general purpose computer performing calculations, and conventional input devices, output devices, and network architectures processing data. The claimed computer components do not alter or affect the nature of specific calculations or algorithms. Although part of the operating embodiment for the invention, the computer components "do not actually change the nature of the solution to the problem." (see para. [18], above). Accordingly, the skilled person would not construe the computer components to be essential elements in that solution.

[35] Likewise, the financial concepts involving certain mathematical calculations or algorithms for optimizing an investment portfolio do not materially affect the operation of the claimed computer components. The calculations and financial processes do not provide any specific solution to a computer problem, nor improve or alter the way any of the claimed computer components function. As we have found, the solution of the disclosed invention is the use of specific financial concepts including certain mathematical calculations to optimize a feasible portfolio. The essential elements of this solution thus are the calculations, algorithms or mathematical formulae that define the financial processes necessary to optimize a portfolio. The skilled person would not construe the computer components to be essential elements in providing that solution.

c) Are "simulation" and "mapping" by definition computer-based processes?

[36] With regard to point (c) above, the claimed terms "simulation" and "mapping", although often used in relation to computer operations, can be understood from the description to mean broader, non-computer specific operations. Mapping entails determining how the available financial products represent, or are represented by, certain asset classes, so as to reveal how the products behave relative to the returns of the asset classes; this mapping would encompass a simple mental comparison. 'Mapping' as used in the specification does not require a computer for performing the mapping.

[37] As for 'simulations', our reading of the description (page 7) leads us to conclude that the skilled person would construe the term as meaning the iterative process of manipulation

of various scenarios and investment parameters (e.g. risk, savings rate, etc.), so as to observe and determine the impact these changes have on a portfolio. Although it may be more convenient to use a processor to automate the simulation of scenarios, the mere presence of the term "simulate" in the claims does not necessarily imply that a processor is required, based on a reading of the specification. The computer components simply provide the operating environment for efficiently and routinely performing the innovative financial calculations, as any general purpose computer is designed to do.

[38] In conclusion, the skilled person would consider the claimed computer components are not part of the claimed solution to the problem, and thus are not essential elements of the invention. The essential elements of the independent claims are those elements that relate to financial concepts involving certain mathematical calculations for optimizing an investment portfolio, such as exposure analysis, mapping products, simulating scenarios, optimizing portfolios, determining future values of holdings, or monitoring portfolios for the achievement of investment goals.

[39] In the instant application, conventional computer components are used to perform calculations in the manner that they have been designed to do, producing an output that is simply information. In circumstances such as this, we are of the view that unless the solution claimed solves a computer problem or provides some further practical improvement to a computer implementation or a problem related to computers, merely using a computer to process an algorithm (e.g. perform calculations or logic functions) is insufficient to render the computer an essential element of the claimed invention.

[40] Returning to the representative claims (see paras [10]-[13] above), in claim 27, the essential elements of the system are the components of: generating return scenarios, determining feasible exposures to asset classes, and determining an optimal portfolio.

[41] In method claim 65, the essential elements are the financial advisory steps defined, absent the computer implementation language, by the step of determining feasible exposures to a plurality of asset classes, and the step of identifying a recommended efficient portfolio from the limited set of financial products.

[42] In claim 1, the essential elements involve the steps of generating a return scenario, creating a mapping, simulating a return scenario, determining an optimal feasible portfolio and maximizing the claimed mean variance utility function.

[43] Finally, claim 28 defines the essential elements of financial operations for performing exposure analysis on a product relative to a set of asset classes, generating a forecast of the product at a configurable time horizon, and presenting information regarding the projected value of the product at that time.

[44] While we have read and construed all claims, we need not list the results for every independent claim here. The relevant issues on construction have been addressed in view of the discussion of claims 27, 65, 1, and 28 above. Our conclusions as to the lack of any essential computer components also applies to the remaining independent claims, specifically claims 18, 25, 26, 37 , 38, and 55.

[45] None of the dependent claims (claims 2-17, 19-24, 29-36, 39-54, 56-64, or 66-69) define any essential computer components either. We note also that the prosecution history reveals no disagreement between the Applicant or examiner as to the meaning or understanding of the dependent claims. Accordingly, the above conclusions respecting the non-essentiality of the computer components apply to all claims.

Issue 1 *Are claims 1 to 69 directed to non-statutory subject matter and thus non-compliant with section 2 of the Patent Act?*

Legal Principles and Guidelines

[46] Section 2 of the *Patent Act* sets out the categories of statutory subject matter:

> "invention" means any new and useful art, process, machine, manufacture or composition of matter, or any new and useful

> improvement in any art, process, machine, manufacture or composition of matter.

[47] In *Amazon*, the Federal Court of Appeal referred to the decision in *Schlumberger Canada Ltd. v. Canada (Commissioner of Patents)*, [1982] 1 F.C. 845 (C.A.) [*Schlumberger*] as reaching a conclusion consistent with the principles of purposive construction. *Schlumberger* is the only Canadian case prior to *Amazon* which dealt with the patentability of computer-related inventions and, significant to our review, the patentability of invention involving a computer programmed to perform calculations. *Schlumberger* can be characterized as a case in which, what on its face was a claim to a computerized method of making certain calculations was nevertheless identified as being a claim to only an unpatentable abstract principle and mental process. As reasoned in *Amazon* (para. 69), the claims in *Schlumberger* were not saved by the fact that they defined the use of a physical tool (a computer) to give the novel mathematical formula a practical application.

[48] As discussed in *Amazon* [paras. 62 to 69], because a patent cannot grant for an abstract idea, it is implicit in the definition of invention that the subject matter of the claim must be something with physical existence or something that manifests a discernible effect or change: the physicality requirement cannot be met merely by the fact that the claim is limited to a practical application such as by the presence of a computer.

[49] PN2013-03 addresses the finding of the court in *Amazon* and other relevant Canadian jurisprudence on the meaning of invention under section 2 of the *Patent Act*, as read in conjunction with subsection 27(8) of the *Patent Act*. The practice notice (page 2) provides a general summary of those inventions which are not included within the meaning of invention in the *Patent Act:*

> a) inventions that fall within a defined exclusion from patentability;
>
> · e.g. fine arts (i.e. things “that are inventive only in an artistic or aesthetic sense”); methods of medical treatment, etc.

b) disembodied inventions (including those lacking a method of practical application);
   - e.g. inventions that lack physicality (i.e. are not "something with physical existence, or something that manifests a discernible effect or change");
   - e.g. inventions where the claimed subject-matter is a mere idea, scheme, plan or set of rules.

Analysis

[50] In the SOR, the examiner indicated that the only essential elements of claims 1-69 pertain to the scheme for providing financial advice or projecting the future value of a financial product, in accordance with the algorithms (mathematical calculations) disclosed. The examiner did not identify any essential physical features or elements in the claims. The examiner concluded the claims defined a scheme or plan for providing financial advice, and did not relate to a patentable category of invention under section 2 of the Patent Act.

[51] Considering the independent claims first, on a purposive construction, we likewise have found that the essential elements of the claimed invention relate to financial concepts involving certain mathematical calculations for optimizing an investment portfolio. We have not identified any essential physical features or elements in the claims. For the reasons below, we agree with the examiner that the essential elements are the rules to provide financial advice based on certain calculations, which like the calculations in *Schlumberger*, are considered to define unpatentable abstract principles and mental processes.

[52] The Applicant, apart from disagreeing that the computer components are non-essential, provides argument in their response letter (pages 10 through13) to the fact that the claims define statutory subject matter, because (our paraphrase):

a) the claims are directed to a patentable category of invention;
b) the mere presence of calculations is not dispositive of patentability; and
c) the claimed invention manifests a discernible effect or change.

a) Are the claims compliant because they define a patentable category of invention?

[53] In regards to a) above, the panel does not consider that the mere inclusion of words such as computer-readable memory, machine-readable medium, computer program product, or computer-implemented method provides sufficient substantiation that the claims therefore define statutory subject matter. Such an approach would inappropriately exalt a literal interpretation of the claim over a purposive one. Paraphrasing the Court in *Amazon* (para. 44), an invention which appears on its face to be a claim to a 'computer-implemented method', a 'computer product', or a 'computer system', may be expressed in language which is deliberately or inadvertently deceptive, and which upon a purposive construction, is a claim for an abstract principle and therefore not patentable subject matter.

[54] Following the reasoning in *Schlumberger* (at page 206), the use of a computer (or memory, or code means) to generate mappings, forecasts, simulations or otherwise optimize a financial portfolio cannot have the effect of transforming into patentable subject matter what would otherwise be clearly not patentable, namely abstract calculations or mental processes.

b) Is the mere presence of calculations dispositive of patentability?

[55] In regards to b), above, the panel would agree that the inclusion of calculations or other algorithms *per se* in the purposively construed claims is not dispositive of patentability. As directed by the Court in *Amazon*, the Office instead considers the purposive construction of the claims to determine whether or not the calculations, algorithms or mathematical formula are "not the whole invention but only one of a number of essential elements in a novel combination" (*Amazon*, para. 63). As we have found in our claim construction, the computer components defined throughout the claims are not essential to

the invention. What remains are the financial concepts including specific mathematical calculations to realize the optimization of an investment portfolio.

c) Does the claimed invention manifest a discernible effect or change?

[56] In reference to point (c) above, the Applicant argues that the claimed subject matter, apart from the presence of computer components, still manifests a discernible effect or change. This occurs, for example, in the methods of claims 38-69, which the applicant submits the steps of generating scenarios, mapping products or providing interactive simulations all comprise a manifestation of a discernible effect or change, and therefore constitute patentable subject matter according to the *Amazon* decision.

[57] The panel does not agree that the claims define any physical steps or features which cause a discernible effect or change. As we have discussed (para.[36]), mapping, simulating scenarios, and by extension, generating return scenarios are all concerned with the manipulation and presentation of financial data, numbers and other related information. We consider such operations to be financial calculations and transactions. The nature of such operations are abstract themselves, and thus cannot be considered to provide any discernible change or effect to the user, other than the intellectual significance that the individual derives from reading such information.

[58] Furthermore, we do not find the outputs defined by the claims to manifest a discernible effect or change. All outputs are of the same subject matter as above, relating to abstract numbers (i.e. financial data). In claims 28-37, for example, the resulting output is a projected value of a product or the projected retirement income. In claims 1-27 and 38-69, the output is a recommended portfolio of financial products, and in some of the same claims, the calculation of a mean variance utility function. We do not find that the outcome of the invention causes any physical change or effect; the output is simply (financial) information or numerical data. Any subsequent transaction by the user based on the advice obtained (which may or may not involve a physical effect or discernible change) is beyond the scope of the claimed solution. Any gains or losses in wealth of the

optimized portfolio related to such transactions, by themselves, have only intellectual meaning, and are abstract.

[59] In conclusion, the independent claims define financial concepts involving certain mathematical calculations for optimizing an investment portfolio. There are no additional essential elements. Financial concepts, and the mathematical equations or calculations that are performed to realize such financial concepts, are considered abstract as they define a set of rules. We therefore agree with the conclusions in the SOR, that the purposively construed claims are a plan or set of rules for optimizing an investment portfolio according to certain formulae or calculations. The claims are not saved by the fact that they contemplate the use of a computer, computer readable memory, or computer implemented steps to give the set of rules a practical application.

[60] Therefore the subject matter of the independent claims pertains to an abstract scheme or set of rules for providing financial advice, which fails to manifest a discernible effect or change.

Dependent claims

[61] Having earlier concluded from the construction that the computer components or other physical features (input of data, output of data) were not essential to the matter of the dependent claims, the panel concludes that there is nothing in these claims that would rectify the abstract condition of the independent claims.

Conclusion on Issue 1

[62] Therefore, as found by this panel, claims 1-69 define a scheme, plan or set of rules for providing financial advice which are considered abstract and disembodied, and therefore they do not define an invention under section 2 of the *Patent Act*.

Issues 2 and Issue 3: New matter and Indefiniteness (claims 55-69)

[63] The SOR identified two new defects as a result of the term "proper subset" having been introduced by the Applicant's amended claims in response to the Final Action. The examiner found that the term was not found in the specification as originally filed and further, that it was unclear what constituted a "proper subset". The Applicant disputed these findings in their response to the SOR.

[64] As we stated at the outset of this recommendation (para. [5]), having found that claims 1-69 fail to define any statutory subject matter, the panel need not consider these two issues in detail. However, we would agree that these issues as identified by the examiner are defects in the claims. We do not find support for the term in the original specification, and further, we would agree that the term should be considered ambiguous; it is not clear what, exactly, constitutes a "proper subset" of financial products in contrast to an "improper" subset of financial products.

Recommendation

[65] In view of the above findings, the Board recommends that the application be refused on the grounds that claims 1 to 69 do not define statutory subject matter and are therefore non-compliant with section 2 of the *Patent Act.*

Andrew Strong	Ed MacLaurin	Paul Sabharwal
Member	Member	Member

Decision

[66] I concur with the findings and the recommendation of the Board that the application be refused as claims 1 to 69 do not comply with section 2 of the *Patent Act.* Therefore, in accordance with section 40 of the *Patent Act*, I hereby refuse the application.

[67] Under section 41 of the *Patent Act*, the Applicant has six months within which to appeal my decision to the Federal Court of Canada.

Sylvain Laporte
Commissioner of Patents

Dated at Gatineau, Quebec,
this 10 th day of October 2014