Intellectual Property Office

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PATENTS ACT 1977

APPLICANT	Tata Consultancy Services Limited
ISSUE	Whether patent application GB1204971.4 complies with sections 1(2) & 76(2)
HEARING OFFICER	Dr S Brown

DECISION

Introduction

1 This decision concerns the issue of whether the invention claimed in patent application GB1204971.4 relates to excluded subject matter. The examiner has maintained throughout the examination process that the invention is excluded from patentability under section 1(2) of the Patents Act 1977 as a business method and/or a program for a computer as such.

2 The examiner also considers that the application as amended discloses subject matter which was not present in the original application. The matters of novelty, inventive step and support have been deferred, and I will also defer any consideration of clarity in this decision. In his letter dated 23 February 2017, the applicant requested a decision based on the papers on file.

The patent application

3 The application is entitled "A system and method for budget-compliant, fair and efficient manpower management" and was filed as a PCT application on 16 November 2010, claiming priority from an earlier application filed on 16 November 2009. It was published on 19 May 2011 as WO2011/058583 and was republished as GB 2487852 on 8 August 2012.

4 No international search was conducted during the international phase. The European Patent Office (EPO), in its capacity as International Searching Authority, found that the claimed subject matter related to processes for which no search is required under PCT Article 17(2)(a) and rule 39. PCT rule 39 states that no International Searching Authority shall be required to search an international application if, and to the extent to which, its subject matter falls under various excluded categories. The excluded categories include schemes, rules or methods of doing business, and computer programs to the extent that the International Searching Authority is not equipped to search prior art concerning such programs. The EPO indicated that the only identifiable non-excluded aspects of the claimed invention relate to the use of conventional, general-purpose data processing technology which is considered to have been widely available at the priority date.

5 The claims were most recently amended on 20 January 2017. There are two independent claims: Claim 1 which relates to a method for providing a manpower plan and schedule, and claim 9 which relates to a system for providing a manpower plan and schedule.

6 Claim 1, as amended, reads as follows:

A method for providing a scalable, time efficient, budget compliant, optimized manpower plan and schedule to a remote location using a manpower management system located at a corporate location having a centralized computing architecture, the method comprising the computer implemented steps that are executed, using a computerized processor of the centralized computing architecture in communication with a plurality of separated servers, the computer implemented steps comprising of:

forecasting at least one of business drivers and indicators using a forecasting engine (**120**) installed on a first server of the plurality of separated servers, wherein the forecasting is provisioned according to requirements including for special days and normal days, and wherein the first server is fully dedicated to the forecasting engine;

optimizing the manpower plan and schedule with a scheduling engine installed on a second server of the plurality of the separated servers, wherein optimizing the manpower plan and schedule with the scheduling engine comprises:

estimating manpower hours by converting the at least one of the business drivers and the indicators in the manpower hours;

adjusting the estimated manpower hours and costs against budget expense by matching cost of the manpower hours and budget expenses (**240**) for building consistency and fairness between manpower budget allocations and costs of the manpower hours; wherein the costs of the manpower hours are made compliant to the budgetary manpower allocation based on negotiation between a budget owner responsible for allocating the manpower budget, and a schedule owner responsible for expending the cost on manpower, wherein the budget expense and the manpower budget are aggregated and scaled as per band specified in at least one of business rules;

allocating the manpower using a scheduling engine (130) based on the manpower hours to generate the manpower plan and schedule, wherein the manpower plan and schedule is generated based on a fairness criterion indicating a weighted sum of costs

pertaining to a plurality of dimensions, and wherein the plurality of dimensions comprising:

i. between times of day and days of week, to avoid bunching of deficit or understaffing and surplus or overstaffing at some specific time;

ii. between job-types, over entire week, to avoid bunching of deficit or understaffing and surplus or overstaffing in some jobs; and

iii. between people, over entire week; and

generating the optimized manpower plan and schedule by iteratively computing an objective function value corresponding to the manpower plan and schedule wherein the optimized manpower plan and schedule is iteratively computed under control of a randomized scheme, comprising:

generating an initial solution;

iteratively modifying the initial solution to produce the objective function value (Z) for a new solution;

comparing the objective function value (Z) of the new solution to the initial solution; and

accepting the new solution based on a control parameter value;

wherein the objective function value (Z) is computed by using a formula, Z = Wage Cost + Under staffing Cost + Overstaffing Cost + Constraint Violation Cost + Employee Preference Violation Cost + Daily Unfairness Cost + Weekly Unfairness Cost + Unfairness Across Associate Cost + Unfairness Across Jobs Cost.

7 Claim 9, as amended, reads as follows:

A system for providing a scalable, time efficient, budget compliant, optimized manpower plan and schedule using a manpower management system interfaced between a centralized corporate location and a remote location, the system comprising:

a corporate location having a centralized computing architecture, the centralized computing architecture comprising:

a first server having a memory and processor, the memory having thereon a forecasting engine to forecast at least one of business drivers and indicators wherein the forecasting is provisioned according to requirements including for special days and normal days wherein the first server has only the forecasting engine installed thereon;

a second server having a memory and processor, the second server separate from the first server, wherein the memory of the second server has only a scheduling engine thereon, wherein the scheduling engine:

estimates manpower hours by converting the at least one of the business drivers and the indicators in the manpower hours;

adjusts the estimated manpower hours and costs against budget expense by matching cost of the manpower hours and budget expenses (**240**) for building consistency and fairness between manpower budget allocations and costs of the manpower hours; wherein the costs of the manpower hours are made compliant to the budgetary manpower allocation based on negotiation between a budget owner responsible for allocating the manpower budget, and a schedule owner responsible for expending the cost on manpower wherein the budget expense and the manpower budget are aggregated and scaled as per band specified in at least one of business rules;

allocates the manpower based on the manpower hours to generate the manpower plan and schedule, wherein the manpower plan and schedule is generated based on a fairness criterion indicating a weighted sum of costs pertaining to a plurality of dimensions, and wherein the plurality of dimensions comprising:

i. between times of day and days of week, to avoid bunching of deficit or understaffing and surplus or overstaffing at some specific time;
ii. between job-types, over entire week, to avoid bunching of deficit or understaffing and surplus or overstaffing in some jobs; and
iii. between people, over entire week; and

generating the optimized manpower plan and schedule by iteratively computing an objective function value (Z) corresponding to the manpower plan and schedule wherein the optimized manpower plan and schedule are iteratively computed under control of a randomized scheme, comprising:

generating an initial solution;

iteratively modifying the initial solution to produce the objective function value (Z) for a new solution;

comparing the objective function value (Z) of the new solution to the initial solution; and

accepting the new solution based on a control parameter value;

wherein the objective function (Z) is computed by using a formula, Z = Wage Cost + Under staffing Cost + Overstaffing Cost + Constraint Violation Cost + Employee Preference Violation Cost + Daily Unfairness Cost + Weekly Unfairness Cost + Unfairness Across Associate Cost + Unfairness Across Jobs Cost;

wherein the scheduling engine and forecasting engine host analytical modules including forecasting module, workload generator module, matching budget and hours modules, positioning fixed hours module and scheduling module;

an internal database in communication with the first and second servers;

a remote location comprising local computers installed with Scheduling engine module, computerized user interface module and data upload to corporate local machine module in communication with the centralized computing architecture of the corporate location through a network and at least one firewall, wherein the generated optimized manpower plan and schedule is communicated from the centralized computing architecture of the corporate location to the remote location.

The law and its interpretation

8 The relevant parts of section 1(2) of the Patents Act read as follows:

> *1(2) It is hereby declared that the following (among other things) are not inventions for the purposes of this Act, that is to say, anything which consists of-*
>
> *…*
>
> *(c) a scheme, rule or method for performing a mental act, playing a game or doing business, or a program for a computer;*
>
> *...*
>
> *but the foregoing provision shall prevent anything from being treated as an invention for the purposes of this Act only to the extent that a patent or application for a patent relates to that thing as such.*

9 In order to decide whether an invention relates to subject matter excluded by section 1(2), the Court of Appeal has said that the issue must be decided by answering the question of whether the invention reveals a technical contribution to the state of the art. In A*erotel/Macrossan*[1], the Court of Appeal reviewed the case law on the interpretation of section 1(2) and approved the following four-step approach to help decide the issue:

> *1) properly construe the claim;*
> *2) identify the actual (or alleged) contribution;*
> *3) ask whether it falls solely within the excluded subject matter;*

[1] *Aerotel Ltd v Telco Holdings Ltd (and others) and Macrossan's Application* [2006] EWCA Civ 1371

4) check whether the actual or alleged contribution is actually technical in nature.

10 The operation of this approach is explained at paragraphs 40-48 of the judgment. Paragraph 43 confirms that identification of the contribution is essentially a matter of determining what it is the inventor has really added to human knowledge, and involves looking at substance, not form. Paragraph 47 adds that a contribution which consists solely of excluded matter will not count as a technical contribution.

11 The case law in relation to the computer program exclusion has been further elaborated in *Symbian*[2], *AT&T/CVON*[3] and *HTC v Apple*[4]. In particular, *AT&T/CVON* provided five helpful signposts to apply when considering whether a computer program makes a relevant technical contribution. In *HTC v Apple*, Lewison LJ reconsidered the fourth of these signposts and felt that it had been expressed too restrictively. The signposts, as modified in *HTC v Apple*, are:

i) whether the claimed technical effect has a technical effect on a process which is carried on outside the computer;
ii) whether the claimed technical effect operates at the level of the architecture of the computer; that is to say whether the effect is produced irrespective of the data being processed or the applications being run;
iii) whether the claimed technical effect results in the computer being made to operate in a new way;
iv) whether the program makes the computer a better computer in the sense of running more efficiently and effectively as a computer;
v) whether the perceived problem is overcome by the claimed invention as opposed to being merely circumvented.

Application of the *Aerotel* test

Step 1: Properly construe the claim

12 There are two independent claims: claim 1 relates to a method for providing a manpower plan and schedule to a remote location using a manpower management system; claim 9 is directed to a system for providing a manpower plan and schedule to a remote location.

13 The common subject matter of the two independent claims is a computer-implemented system for providing a scalable, time efficient, budget compliant, optimised manpower plan and schedule to a remote location. The system uses distributed architecture so that central servers are interfaced with local computers at a remote location. One central server has a forecasting engine, and nothing else, installed on it. A scheduling engine is installed on a separate central server. The forecasting engine forecasts business drivers and/or indicators according to certain requirements. The scheduling engine uses this forecast to estimate manpower hours, adjusts the estimated manpower hours and costs to provide consistency with a budget, based on negotiation between a schedule owner and a budget owner, and generates the manpower plan and schedule based on certain criteria. The

[2] *Symbian Limited's Application* [2008] EWCA Civ 1066
[3] *AT&T Knowledge Ventures LP and CVON Innovations Limited* [2009] EWHC 343
[4] *HTC Europe Co Ltd v Apple Inc* [2013] EWCA Civ 451

manpower plan and schedule is then optimised by making iterative changes to test whether the "objective function value" can be improved, wherein the objective function value is the sum of certain costs.

14 The method set out in claim 1 uses the system as set out in the common subject matter above, and in addition specifies that the central servers are in communication with a computerised processor.

15 The system set out in claim 9 includes the features of the common subject matter above and in addition specifies that: the central servers each have a memory and processor; the scheduling engine and forecasting engine host various analytical modules; there is an internal database in communication with the two central servers; the local computers at the remote location are installed with a scheduling engine module, a computerised user interface module and a "data upload to corporate local machine module" and communicate with the central servers through a network and firewall, such that the manpower plan and schedule is communicated from the central servers to the remote location.

Step 2: Identify the actual (or alleged) contribution

16 This step involves determining what it is the inventor has really added to the stock of human knowledge. In my view this step is relatively straightforward, the contribution is clearly an improved system for producing a manpower plan and schedule. I accept the various points made in the correspondence from the applicants as to the benefits of the system and improvements over previous systems. These include that: the system can produce more practical and attractive manpower plans and schedules and can evenly disperse the desirable and undesirable features of the schedules; that the schedules produced meet planned manpower budgets whilst being driven by business forecasts; and that the distributed architecture reduces staff and budget loads on the system. These are all benefits of the claimed system for producing a manpower plan and schedule.

17 In their correspondence, the applicants also argue that the contribution includes providing a manpower plan and schedule *to remote computers using a system located at a corporate location with centralized computing architecture in communication with a plurality of separated servers* (my emphasis). They argue that the distributed computer system described in the claims allows the system to produce manpower plans with increased processing speed and decreased computational time. The examiner, however, considers these features to simply be the products of using conventional distributed computer architecture. In turn, the applicants counter this line of argument by stating that this distributed architecture has not been deployed for manpower planning and scheduling with the constraints of budgets and fairness.

18 I think this last point is key. It may well be that the claimed distributed architecture has indeed not been used before for manpower planning, however, that does not mean that it is part of the contribution in its own right – i.e. as new standalone hardware. The use of distributed computer systems to increase processing speed and decrease computational time was well known at the priority date. I can see nothing in the application to suggest that the computer system is better in and of itself, independent of whether or not it is producing manpower plans. The system may well be better at producing manpower plans but I can see no support for the argument that it is a better computer.

19 As such, I conclude that the hardware arrangement does not form part of the inventor's contribution to the stock of human knowledge. Thus, I come back to the contribution being an improved system for producing a manpower plan and schedule.

Steps 3 and 4: Ask whether the contribution falls solely within excluded subject matter and whether it is technical in nature

Scheme, rule or method for doing business

20 The examiner has argued that the invention is excluded from patentability under section 1(2)(c) of the Patents Act 1977 as a scheme, rule or method for doing business and/or a program for a computer as such. The applicant disagrees, arguing that the claimed method is not a method for doing business but is a technical solution to the technical problem of the impact of factors such as variable shift length, work force, work rules and discontinuous operations of the business units. The applicant further argues that the claimed method overcomes the problem that existing methods lead to impractical and unattractive schedules which ultimately cannot be used by the business. The applicant explains how the claimed invention overcomes a number of problems which exist in previous methods and systems for manpower planning.

21 I do not disagree that there may be many benefits to a business of using the claimed system and method. Nonetheless, to my mind, these benefits are clearly all business related – I can see nothing of a technical nature about them. As reasoned above, I consider the contribution to be an improved system for producing a manpower plan and schedule. The production of such a plan and schedule, and the factors considered as part of it, are part of the normal course of managing a business. I therefore conclude that the contribution falls squarely within the sec.(1)(2)(c) exclusion as a scheme, rule or method for doing business, as such. I cannot see any features within the claimed system and method which do not relate to a method for doing business.

22 Thus the invention fails step 3 of the Aerotel test. As explained above, in paragraph 10, a contribution which consists solely of excluded matter will not count as a technical contribution. It follows that the contribution is not technical in nature and thus the invention also fails step 4 of the test.

Program for a computer

23 Having reached the above conclusion relating to the business method conclusion, I do not have to consider whether the present invention falls within the computer program exclusion as well. The examiner has previously referred to the comments of Birss J in paragraphs 32 and 33 of his judgment in *Halliburton*[5], which confirm this approach:

> *32 Thus when confronted by an invention which is implemented in computer software, the mere fact that it works that way does not normally answer the question of patentability. The question is decided by considering what task it is that the program (or the programmed computer) actually performs. A computer programmed to perform a task which makes a contribution to the art which is technical in nature, is a patentable invention and may be claimed as such. Indeed (see Astron Clinica [2008] RPC 14) in*

[5] *Halliburton Energy Services Inc* [2011] EWHC 2508 (Pat)

those circumstances the patentee is perfectly entitled to claim the computer program itself.

33 If the task the system performs itself falls within the excluded matter and there is no more to it, then the invention is not patentable (see Symbian paragraph 53 above). Clear examples are from the cases involving computers programmed to operate a method of doing business, such as a securities trading system or a method of setting up a company (Merrill Lynch and Macrossan). Inventions of that kind are held not to be patentable but it is important to see why. They are more than just a computer program as such. For example, they self evidently perform a task which has real world consequences. As Fox LJ said in Merrill Lynch (p569 at line 27), a data processing system operating to produce a novel technical result would normally be patentable. However that is not the end of the analysis. He continued: "however it cannot be patentable if the result itself is a prohibited item" (i.e. a method of doing business). When the result or task is itself a prohibited item, the application fails.

24 As reasoned above, I consider the contribution to be an improved method/system for producing a manpower plan and schedule. The fact that the method is enacted on computers is not enough to save it from exclusion. While the distributed computer system clearly performs a task which has real-world consequences, I consider that task, and its consequences, to be a method of doing business. To use the language of the first AT&T signpost, while there is an effect outside the computer it is not, in my opinion, a technical effect. There is therefore no need for me to consider further which aspects of the claimed method/system would also be excluded by reason of being a program for a computer as such.

Added matter

25 The examiner also raised objections to added matter in claims 1, 7, 8 & 9. In claim 1 the only added matter raised by the examiner relates to a change of terminology from “fairness” values to “unfairness” values. Whilst the examiner is quite correct that the application as filed was consistent in its reference to fairness values and fairness costs, I consider that the skilled person would understand, in the context of the application as a whole, the initial term to have been intended to refer to the extent to which additional costs are created (for example as a result of overstaffing or understaffing). I believe the skilled person would be led to this interpretation whether the term “fairness” or “unfairness” value is used. I therefore do not consider this change in terminology to constitute added matter. The term “unfairness” values is also present in claim 9, and the same reasoning applies.

26 The examiner considers that there is added matter in two other places in claim 9. Firstly, that the installed scheduling module and data upload module communicate through a firewall, whereas the only reference to a firewall in the application as filed was that the user interface embodied as a web page communicated through a firewall (see page 9, line 19 of the PCT application as filed). Here I agree with the examiner that this constitutes added matter contrary to section 76(2) of the Patents Act, as I can see no disclosure in the application as filed to support this change.

27 Secondly, in claim 9 a scheduling engine module is installed on the local computers at the remote location in addition to the scheduling engine being installed on the

second centrally-located server. Whilst the application as filed discloses that the modules may be distributed on different networked computing systems in a plurality of possible architectures and configurations, I can see no clear and unambiguous disclosure of the scheduling engine being installed both centrally *and* as a module on the local computers. I therefore agree with the examiner that this also constitutes added matter contrary to section 76(2) of the Patents Act.

28 However, neither of these features affect the assessment I have made above as regards to exclusion under section 1(2). Thus the invention would remain excluded whether these features were present in claim 9 or not. The examiner also considers that there is added subject matter in claims 7 and 8 and the description. However, since this does not affect the scope of the independent claims I do not need to consider it any further.

Decision

29 I have found that the contribution made by the invention falls solely within matter excluded under section 1(2) as a scheme, rule or method for doing business, as such. The compliance period expired on 23 February 2017 and so it is no longer possible for any amendments to be made to the application. In any event, having reviewed the application, I do not consider that any saving amendment would have been possible. I therefore refuse this application under section 18(3).

Appeal

30 Any appeal must be lodged within 28 days.

Dr S BROWN
Deputy Director, acting for the Comptroller