

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TERADATA OPERATIONS, INC.
Petitioner

v.

BERKLEY*IEOR, L.L.C.,
Patent Owner

Case CBMR {____}

Patent 8,612,316

OMNIBUS DECLARATION OF BRUCE WEBER, PH.D. REGARDING

U.S. PATENT NO. 8,612,316

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I, Bruce Weber, declare as follows:

1. My name is Bruce Weber. I am Dean and Professor at the University of Delaware Alfred Lerner College of Business & Economics. I have prepared this report as an expert witness retained by Teradata Operations, Inc. (“Petitioner”). In this report I give my opinions as to whether certain claims of U.S. Patent No. 8,612,316 (“the ‘316 Patent”) are invalid. I provide technical bases for these opinions as appropriate.

2. This report contains statements of my opinions formed to date and the bases and reasons for those opinions. I may offer additional opinions based on further review of materials in this case, including opinions and/or testimony of other expert witnesses. I make this declaration based upon my own personal knowledge and, if called upon to testify, would testify competently to the matters contained herein.

I. BACKGROUND AND QUALIFICATIONS

3. I have summarized in this section my educational background, career history, publications, and other relevant qualifications. My full curriculum vitae is attached as Appendix 1 to this declaration.

4. I am an expert in the field of information technology management, including accounting and financial technology systems as well as their applications in a database environment. I have studied, taught, practiced, and

researched in the field of information technology management for over thirty years. Currently, I am Dean of the University of Delaware Alfred Lerner College of Business & Economics, where I am also a Professor. I have had this position since 2011. Prior to that, I was a faculty member at the London Business School at the University of London, where I taught in the subject of Information Management and was the Subject Area Chair for Management Science & Operations. Prior to that, I was a professor at Baruch College, City University of New York and also a professor at the Stern School of Business, New York University

5. I received my Doctor of Philosophy (Ph.D.) degree in the field of Decision Sciences from the Wharton School, University of Pennsylvania in 1991. I received my Masters of Arts (M.A.) degree in Decision Sciences from the Wharton School, University of Pennsylvania and my Bachelor of Arts (B.A.) degree in Applied Mathematics from Harvard University.

6. Prior to receiving my Masters and Ph.D. degrees, I worked in industry as a Consultant and Analyst at The MAC Group, Moody's Investors Service, and Oliver, Wyman & Co.

7. I have been involved in research related to information systems, and specifically management accounting systems and financial markets software since 1989. My research has been funded by governmental agencies, including the U.S. Congressional Office of Technology Assessment and the City of London, and

numerous private organizations including Nasdaq, the New York Stock Exchange, Cantor Fitzgerald, and Oracle.

8. I regularly teach courses to graduate students and executives in Information Technology Management, Financial Information Systems, and Trading and Financial Market Structure.

9. I am the co-author of two books: “Mastering the Art of Equity Trading Through Simulation: The TraderEx Course”, (R. Schwartz, G. Sipress, B. Weber) John Wiley & Sons, 2010, and “The Equity Trader Course”, (R. Schwartz, R. Francioni, B. Weber) John Wiley & Sons, 2006.

10. I am the author or co-author of well over 70 articles, book chapters, and conference papers.

A. Compensation

11. For my efforts in connection with the preparation of this declaration I have been compensated at my standard rate for this type of consulting activity. My compensation is in no way contingent on the results of these or any other proceedings relating to the above-captioned patent.

B. Materials and Other Information Considered

12. I have considered information from various sources in forming my opinions. I have reviewed and considered each of the exhibits listed in the attached Appendix 2 (Appendix of Exhibits) in forming my opinions.

II. UNDERSTANDING OF THE LAW

13. I have applied the following legal principles provided to me by counsel in arriving at the opinions set forth in this report.

A. Legal Standard for Prior Art

14. I am not an attorney. I have been informed by attorneys of the relevant legal principles and have applied them to arrive at the opinions set forth in this declaration.

15. I understand that the petitioner for Covered Business Method Review may request the cancelation of one or more claims of a patent based on grounds available under 35 U.S.C. §§ 102 and 103 using prior art that consists of patents and printed publications as well as under 35 U.S.C. §§ 101 and 112.

1. Anticipation and Prior Art

16. I understand that § 102 specifies when a challenged claim is invalid for lacking novelty over the prior art, and that this concept is also known as “anticipation.” I understand that a prior art reference anticipates a challenged claim, and thus renders it invalid by anticipation, if all elements of the challenged claim are disclosed in the prior art reference. I understand the disclosure in the prior art reference can be either explicit or inherent, meaning it is necessarily present or implied. I understand that the prior art reference does not have to use the same words as the challenged claim, but all of the requirements of the claim must be disclosed

so that a person of ordinary skill in the art could make and use the claimed subject-matter.

17. In addition, I understand that § 102 also defines what is available for use as a prior art reference to a challenged claim.

18. Under § 102(a), a challenged claim is anticipated if it was patented or described in a printed publication in the United States or a foreign country before the challenged claim's date of invention.

19. Under § 102(b), a challenged claim is anticipated if it was patented or described in a printed publication in the United States or a foreign country more than one year prior to the challenged patent's filing date.

20. I understand that a challenged claim's date of invention is presumed to be the challenged patent's filing date. I also understand that the patent owner may establish an earlier invention date and "swear behind" prior art defined by § 102(a) by proving (with corroborated evidence) the actual date on which the named inventors conceived of the subject matter of the challenged claim and proving that the inventors were diligent in reducing the subject matter to practice.

21. I understand that the filing date of patent is generally the filing date of the application filed in the United States that issued as the patent. However, I understand that a patent may be granted an earlier effective filing date if the patent owner properly claimed priority to an earlier patent application.

22. I understand that when a challenged claim covers several structures, either generically or as alternatives, the claim is deemed anticipated if any of the structures within the scope of the claim is found in the prior art reference.

23. I understand that when a challenged claim requires selection of an element from a list of alternatives, the prior art teaches the element if one of the alternatives is taught by the prior art.

B. Obviousness

24. I understand that even if a challenged claim is not anticipated, it is still invalid if the differences between the claimed subject matter and the prior art are such that the claimed subject matter would have been obvious to a person of ordinary skill in the pertinent art at the time the alleged invention.

25. I understand that an obviousness must be determined with respect to the challenged claim as a whole.

26. I understand that one cannot rely on hindsight in deciding whether a claim is obvious.

27. I also understand that an obviousness analysis includes the consideration of factors such as (1) the scope and content of the prior art, (2) the differences between the prior art and the challenged claim, (3) the level of ordinary

skill in the pertinent art, and (4) “secondary” or “objective” evidence of non-obviousness.

28. Secondary or objective evidence of non-obviousness includes evidence of: (1) a long felt but unmet need in the prior art that was satisfied by the claimed invention; (2) commercial success or the lack of commercial success of the claimed invention; (3) unexpected results achieved by the claimed invention; (4) praise of the claimed invention by others skilled in the art; (5) taking of licenses under the patent by others; (6) deliberate copying of the claimed invention; and (7) contemporaneous and independent invention by others. However, I understand that there must be a relationship between any secondary evidence of non-obviousness and the claimed invention.

29. I understand that a challenged claim can be invalid for obviousness over a combination of prior art references if a reason existed (at the time of the alleged invention) that would have prompted a person of ordinary skill in the art to combine elements of the prior art in the manner required by the challenged claim. I understand that this requirement is also referred to as a “motivation to combine,” “suggestion to combine,” or “reason to combine,” and that there are several rationales that meet this requirement.

30. I understand that the prior art references themselves may provide a motivation to combine, but other times simple common sense can link two or more

prior art references. I further understand that obviousness analysis recognizes that market demand, rather than scientific literature, often drives innovation, and that a motivation to combine references may come from market forces.

31. I understand obviousness to include, for instance, scenarios where known techniques are simply applied to other devices, systems, or processes to improve them in an expected or known way. I also understand that practical and common-sense considerations should be applied a proper obviousness analysis. For instance, familiar items may have obvious uses beyond their primary purposes.

32. I understand that the combination of familiar elements according to known methods is obvious when it yields predictable results. For instance, obviousness bars patentability of a predictable variation of a technique even if the technique originated in another field of endeavor. This is because design incentives and other market forces can prompt variations of it, and predictable variations are not the product of innovation, but rather ordinary skill and common sense.

33. I understand that a particular combination may be obvious if it was obvious to try the combination. For example, when there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. This would result in something obvious because the result is the product not of innovation but of ordinary skill and common

sense. However, I understand that it may not be obvious to try a combination when it involves unpredictable technologies.

34. It is further my understanding that a proper obviousness analysis focuses on what was known or obvious to a person of ordinary skill in the art, not just the patentee. Accordingly, I understand that any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed.

35. It is my understanding that the Manual of Patent Examining Procedure §2143 sets forth the following as exemplary rationales that support a conclusion of obviousness:

- Combining prior art elements according to known methods to yield predictable results;
- Simple substitution of one known element for another to obtain predictable results;
- Use of known technique to improve similar devices (methods, or products) in the same way;
- Applying a known technique to a known device (method, or product) ready for improvement to yield predictable results;

- Choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success;
- Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to one of ordinary skill in the art;
- Some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art reference teachings to arrive at the claimed invention.

36. A person of ordinary skill in the art looking to overcome a problem will often use the teachings of multiple publications together like pieces of a puzzle, even though the prior art does not necessarily fit perfectly together. Therefore, I understand that references for obviousness need not fit perfectly together like puzzle pieces. Instead, I understand that obviousness analysis takes into account inferences, creative steps, common sense, and practical logic and

applications that a person of ordinary skill in the art would employ under the circumstances.

37. I understand that a claim can be obvious in light of a single reference, if the elements of the challenged claim that are not explicitly or inherently disclosed in the reference can be supplied by the common sense of one of skill in the art.

38. I understand that obviousness also bars the patentability of applying known or obvious design choices to the prior art. One cannot patent merely substituting one prior art element for another if the substitution can be made with predictable results. Likewise, combining prior art techniques that are interoperable with respect to one another is generally obvious and not patentable.

39. In sum, my understanding is that obviousness invalidates claims that merely recite combinations of, or obvious variations of, prior art teachings using understanding and knowledge of one of skill in the art at the time and motivated by the general problem facing the inventor at the time. Under this analysis, the prior art references themselves, or any need or problem known in the field of endeavor at the time of the invention, can provide a reason for combining the elements of or attempting obvious variations on prior art references in the claimed manner.

C. Unpatentable Subject Matter

40. I understand that a patent claim is invalid under 35 U.S.C. § 101 if it claims a law of nature, natural phenomenon, or an abstract idea.

41. I further understand that a patent claim would be ineligible for patent protection, and therefore invalid under 35 U.S.C. § 101, if it claims a “building block of human ingenuity,” or if it merely recites a generic computer implementation of an abstract idea.

42. I further understand that a patent claim is invalid under 35 U.S.C. § 101, if, setting aside any insignificant computer-based or field of use limitations, the claim is directed solely to an abstract idea.

43. I further understand that adding token post-solution elements does not make an abstract concept patentable.

44. I understand that “If this threshold determination is met, we move to the second step of the inquiry and consider the elements of each claim both individually and as an ordered combination to determine whether the additional elements transform the nature of the claim into a patent-eligible application.” This step entails the “search for an inventive concept – i.e., an element or combination of elements that is sufficient to ensure that the patent in practice amounts significantly more than a patent upon the” ineligible concept itself.

45. I understand that an abstract idea with nothing more than “well-understood, routine, conventional activity” added is not patentable. Similarly, I understand that merely requiring a generic computer implementation fails to transform an abstract idea into a patent-eligible invention.

46. I further understand that although not dispositive of the “inventive concept” inquiry, one can use the “machine-or-transformation” test as “a useful and important clue” to assess whether a claim is patent-eligible. I further understand that under this test, a “claimed process is surely patent-eligible under § 101 if: (1) tied to a particular machine or apparatus; or (2) it transforms a particular article into a different state or thing.” Thus, I further understand that the “machine or transformation” test examines whether the claims are tied to a particular machine or apparatus, or transform a particular article into a different state or thing and if neither, then the test points to unpatentability. I understand that a general purpose computer is not a “particular machine or apparatus” under this test.

47. I further understand that in determining whether a patent claim recites patentable subject matter, the claim must be considered as a whole.

D. Indefiniteness

48. I understand that under 35 U.S.C. § 112, ¶ 2 a patent must include one or more claims that at least distinctly claim the subject matter that the inventor regards as his invention. I understand that a claim is indefinite if it fails to inform,

with reasonable certainty, a person of ordinary skill in the art about the scope of the invention when read in light of the patent's specification and prosecution history. I further understand that a claim is indefinite if it impermissibly mixes two distinct classes of patentable subject matter, such as a mixture of an apparatus element and a method step.

E. Legal Standard for Claim Construction

49. I understand that before any invalidity analysis can be properly performed, the scope and meaning of the challenged claims must be determined by claim construction.

50. I understand that a patent may include two types of claims, independent claims and dependent claims. I understand that an independent claim stands alone and includes only the limitations it recites. I understand that a dependent claim depends from an independent claim or another dependent claim. I understand that a dependent claim includes all the limitations that it recites in addition to the limitations recited in the claim (or claims) from which it depends.

51. In comparing the challenged claims to the prior art, I have carefully considered the patent and its file history in light of the understanding of a person of skill at the time of the alleged invention.

52. I understand that to determine how a person of ordinary skill would have understood a claim term, one should look to sources available at the time

of the alleged invention that show what a person of skill in the art would have understood disputed claim language to mean. It is my understanding that this may include what is called “intrinsic” evidence as well as “extrinsic” evidence.

53. I understand that, in construing a claim term, one should primarily rely on intrinsic patent evidence, which includes the words of the claims themselves, the remainder of the patent specification, and the prosecution history. I understand that extrinsic evidence, which is evidence external to the patent and the prosecution history, may also be useful in interpreting patent claims when the intrinsic evidence itself is insufficient. I understand that extrinsic evidence may include principles, concepts, terms, and other resources available to those of skill in the art at the time of the invention.

54. I understand that words or terms should be given their ordinary and accepted meaning unless it appears that the inventors were using them to mean something else or something more specific. I understand that to determine whether a term has special meaning, the claims, the patent specification, and the prosecution history are particularly important, and may show that the inventor gave a term a particular definition or intentionally disclaimed, disavowed, or surrendered claim scope.

55. I understand that the claims of a patent define the scope of the rights conferred by the patent. I understand that because the claims point out and

distinctly claim the subject matter which the inventors regard as their invention, claim construction analysis must begin with and is focused on the claim language itself. I understand that the context of the term within the claim as well as other claims of the patent can inform the meaning of a claim term. For example, because claim terms are normally used consistently throughout the patent, how a term is used in one claim can often inform the meaning of the same term in other claims. Differences among claims or claim terms can also be a useful guide in understanding the meaning of particular claim terms.

56. I understand that a claim should be construed not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the entire specification. I understand that because the specification is a primary basis for construing the claims, a correct construction must align with the specification.

57. I understand that the prosecution history of the patent as well as art incorporated by reference or otherwise cited during the prosecution history are also highly relevant in construing claim terms. For instance, art cited by or incorporated by reference may indicate how the inventor and others of skill in the art at the time of the invention understood certain terms and concepts. Additionally, the prosecution history may show that the inventors disclaimed or disavowed claim scope or further explained the meaning of a claim term.

58. With regard to extrinsic evidence, I understand that all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises, can also be considered. For example, technical dictionaries may indicate how one of skill in the art used or understood the claim terms. However, I understand that extrinsic evidence is considered to be less reliable than intrinsic evidence, and for that reason is generally given less weight than intrinsic evidence.

59. I understand that in general, a term or phrase found in the introductory words or preamble of the claim, should be construed as a limitation if it recites essential structure or steps, or is necessary to give meaning to the claim. For instance, I understand preamble language may limit claim scope: (i) if dependence on a preamble phrase for antecedent basis indicates a reliance on both the preamble and claim body to define the claimed invention; (ii) if reference to the preamble is necessary to understand limitations or terms in the claim body; or (iii) if the preamble recites additional structure or steps that the specification identifies as important.

60. On the other hand, I understand that a preamble term or phrase is not limiting where a challenged claim defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention. I understand that to make this determination, one should review the entire

patent to gain an understanding of what the inventors claim they invented and intended to encompass in the claims.

61. I understand that 35 U.S.C. § 112 ¶ 6 created an exception to the general rule of claim construction called a “means plus function” limitation. These types of terms and limitations should be interpreted to cover only the corresponding structure described in the specification, and equivalents thereof. I also understand that a limitation is presumed to be a means plus function limitation if (a) the claim limitation uses the phrase “means for”; (b) the “means for” is modified by functional language; and (c) the phrase “means for” is not modified by sufficient structure for achieving the specified function.

62. I understand that a structure is considered structurally equivalent to the corresponding structure identified in the specification only if the difference between them are insubstantial. For instance, if the structure performs the same function in substantially the same way to achieve substantially the same result. I further understand that a structural equivalent must have been available at the time of the issuance of the claim.

III. LEVEL OF ORDINARY SKILL IN THE ART

63. In determining the characteristics of a hypothetical person of ordinary skill in the art of the ‘316 Patent at the time of the claimed invention,¹ I considered several things, including various prior art techniques relating to accounting and finance software, the type of problems that such techniques gave rise to, and the rapidity with which innovations were made. I also considered the sophistication of the technologies involved, and the educational background and experience of those actively working in the field. I also considered the level of education that would be necessary to understand the ‘316 Patent. Finally, I placed myself back in the relevant period of time and considered the engineers, programmers, finance professionals, and accountants that I have worked with and managed in the field of accounting and finance software. I came to the conclusion that a person of ordinary skill in the art (“POSITA”) of the ‘316 Patent would have been a person with a bachelor’s degree in computer science, accounting, or management information systems, or a similar field with at least two years of experience in accounting or finance software or a person with a master’s degree in computer science, accounting, or management information systems, or a similar

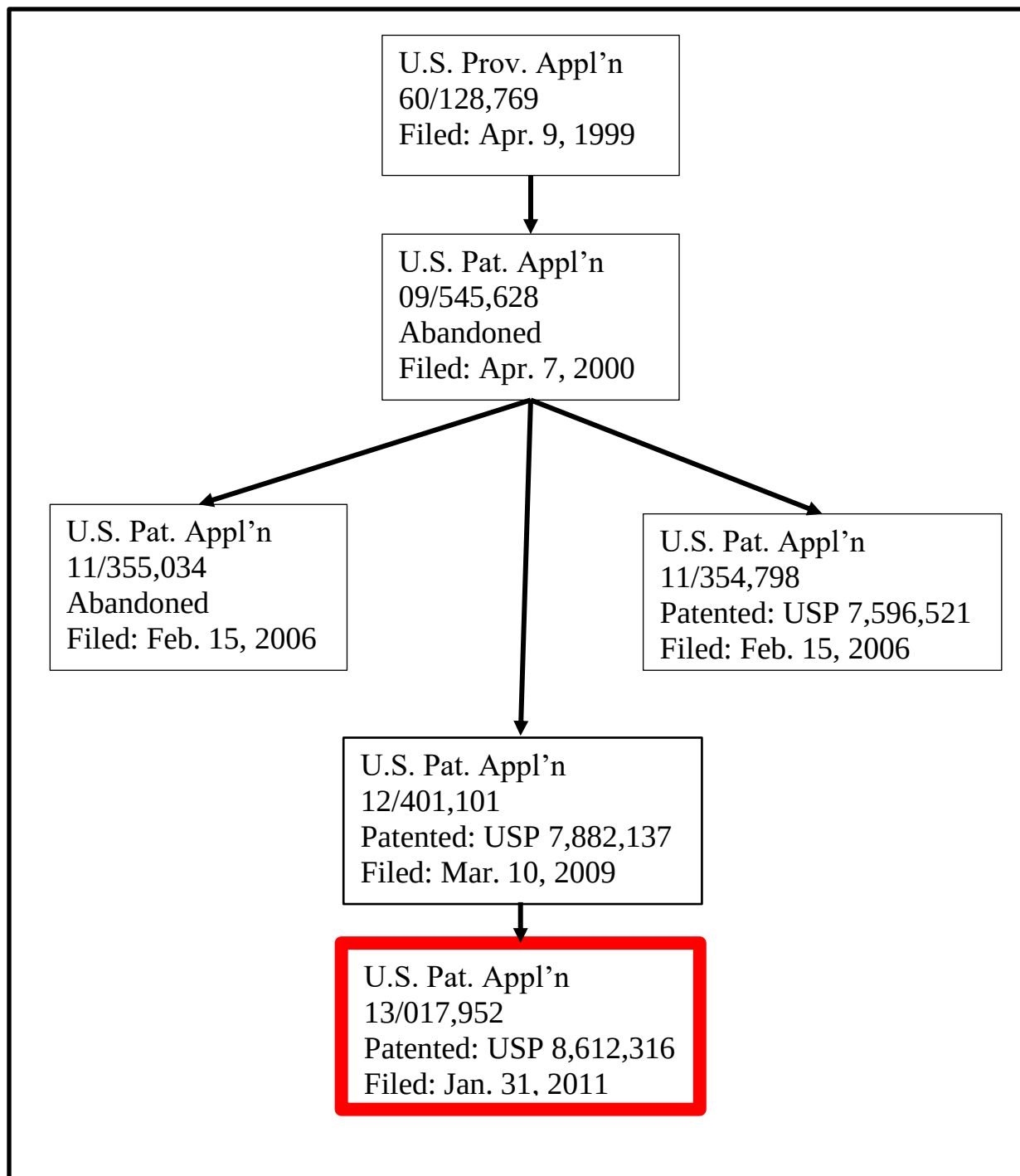
¹ I considered the level of ordinary skill in the art on April 9, 1999, the earliest claimed priority date for the ‘316 Patent. I understand that Petitioner is not aware of any claim by the Patent Owner that the ‘316 Patent is entitled to an earlier priority date.

field with a specialization in accounting or finance software. A person with less education but more relevant practical experience may also meet this standard.

IV. THE ‘316 PATENT

A. ‘316 Patent Priority

64. The ‘316 Patent was filed on May 26, 2009, and ultimately claims priority to U.S. Provisional Patent Application No. 60,128,769, filed on April 9, 1999. I understand that the ‘316 Patent is one of many patents that claim priority to this provisional patent application, which are related to each other as shown in the diagram below. The ‘316 Patent is outlined with a thick red line.



A. Challenged Claims

65. I understand that Petitioners are challenging the validity of Claims 1-30 of the '316 Patent in the Petition for Covered Business Method Review to which this declaration will be attached.

B. Overview of the '316 Patent

66. The '316 Patent describes a “process for determining object-level profitability” using a relational database. Ex. 1001 at 4:42-43, Abstract. The '316 Patent explains that “[t]he process of measuring profit is an important business activity” where “[p]rofit measures are the primary basis for understanding financial performance and value creation in a business.” Ex. 1001 at 1:16-19. The '316 Patent describes two types of profit measurements that businesses calculated at the time of the invention as external profit reports and internal performance measurements. For example, the '316 Patent describes the external reports as:

Once a business is owned publicly, an independent review of a firm's financial position becomes a mandatory process well known as measuring profit according to "generally accepted accounting principles" (GAAP.) While these standards and regulations are adequate for an external view of a company's financial condition, the measurement

of profit contribution amongst the business is required for proper management of the franchise.

Ex. 1001 at 1:27-34. The ‘316 Patent continues to describe the importance of internal performance measurements as:

Internal financial performance measurement is especially complex for a multi-product, multi-location, and/or large customer based businesses. The use of internal financial performance measures drives most businesses planning processes, management incentive processes and control processes. Many businesses have found that internal profit measures can be consistent with the external financial statement measures.

Ex. 1001 at 1:27-34. However, the ‘316 Patent explains that “businesses today are struggling to accurately measure profit contribution at a level necessary to accurately measure profit contribution of individual customer interactions.” Ex. 1001 at 1:40-44. The ‘316 Patent explains that since the external profit reporting aggregates all the cash flows of a business, businesses have lacked the ability to provide accurate internal measurements of profit contribution at a very detailed level. Ex. 1001 at 1:44-63, 3:66-4:5.

67. In order to address the shortcomings of existing detailed profit measurements, the ‘316 Patent purports to be “designed to use micro profit measurement rules applied at a granular level consistent with standard accounting practice using a combination of actuarial science and mathematical set theory.” Ex. 1001 at 4:1-4:5. The ‘316 Patent claims achievement of the goal of detailed profit measurement “through a consistent application of measures to a class of business entities which represent the smallest common component of profit measurement desired – *the Profit Object*.” Ex. 1001 at 4:9-12. The ‘316 Patent provides examples of the “profit object,” including:

an airline using “seat” as the profit object, an insurance company using a “policy” object or a bank using an “account” object – these objects represent the lowest level of detail required to support consistent internal multi-dimensional internal profit analyses.

Ex. 1001 at 7:33-38. The ‘316 Patent also describes the profit object as including a particular customer, product, or organization within a business, explaining that:

The present invention gives businesses the ability to resolve profit measures at a level of detail necessary for all types of applications of profit oriented performance measurement or detailed profitability data as an output for

enabling aggregation to a particular customer, product or organization within a business.

Ex. 1001 at 7:18-23. In order to provide consistency between the internal and external reporting, the ‘316 Patent adheres to a “sum-of-the-parts equals the whole criterion which is the basis of financial accounting theory and practice.” Ex. 1001 at 4:19-21.

68. The alleged solution to the problems of determining object level profitability presented by the ‘316 Patent was accomplished by:

1. Preparing information to be accessed electronically;
2. Establishing rules for processing the prepared information;
3. Calculating at least one marginal value of profit using established rules as applied to a selected set of prepared information;
4. Calculating a fully absorbed value of profit adjustment using established rules as applied to the selected set of prepared information; and,
5. Combining the at least one marginal value of profit and fully absorbed value of profit adjustment to create a measure for object level of profitability.

Ex. 1001 at 4:45-55. The ‘316 Patent explains that calculating “at least one marginal value of profit” includes calculating any of “net interest, other revenue, direct expense and/or provision.” Ex. 1001 at 4:67-5:1. The ‘316 Patent also explains that

indirect expense is “an apportioned profit value adjustment for all non-object related resource consumption by the business”. Ex. 1001 at 5:12-14.

C. ‘316 Patent Prosecution History

69. I reviewed the prosecution file history of the ‘316 Patent (Ex. 1002) and am aware of the following facts. On January 31, 2011, the patent application that ultimately issued as the ‘316 Patent was filed as U.S. Patent Application 13/017,952. Ex. 1001.

70. I understand that *E&Y*, *Blain*, *SAP-IS-B*, *Kimball*, and *McKenzie* were not cited or considered during prosecution of the ‘316 Patent, or any of the Patent Applications to which the ‘316 Patent claims priority. Specifically, none of these references were listed on the face of the ‘316 Patent, or any of the Patent Applications to which the ‘316 Patent claims priority.

V. CLAIM CONSTRUCTION

71. For purposes of this Covered Business Method review, I have considered the claim language, specification, and portions of the prosecution history, to determine the meaning of the claim language as it would have been understood by a person of ordinary skill in the art at the time of the invention. I understand that traditionally there have been two different standards for claim construction that may be applied by the Patent Trial and Appeal Board. The “broadest reasonable interpretation” is the standard that has traditionally been applied to claim

construction issues when considering claims during prosecution and in post-grant proceedings. Under a BRI approach, a claim term is given its broadest reasonable interpretation in view of the specification from the view point of a person of ordinary skill in the art. The “plain and ordinary meaning” or *Phillips* standard has traditionally been applied in district court litigation and in post-grant proceedings (when the claims will expire before the post-grant proceedings are completed) Under a plain and ordinary meaning approach, a claim term is given its plain and ordinary meaning in view of the specification from the view point of a person of ordinary skill in the art.

72. I understand that the BRI approach may give a claim term a broader meaning than its plain and ordinary meaning. I have been asked to consider the claim terms and analyze invalidity using the broadest reasonable interpretation of the claims and the plain and ordinary meaning of the claims. Having considered the prior art grounds presented in this petition for the challenged claims, it is my opinion that there are no substantial differences between the BRI and plain and ordinary meaning of the claim language as applied to these prior art grounds.

A. “profit information”

73. Based on my review of the claims and specification of the ‘316 Patent, it is my opinion that a POSITA would have understood that the term “profit

information” (Claim 1) to mean “financial and/or non-financial data related to calculating profit.” I note that the specification states that, in relation to Claim element 1[c]:

More specifically *in the step of preparing information* to be accessed electronically, the database is prepared, ***object attributes*** are extracted, conditioned and loaded into the database, and ***financial statement attributes*** are extracted, conditioned and loaded into the database. If desired the step may also include extracting, conditioning and loading the ***event attributes*** into the database, and calculating funds transfer treatment rates.

Ex. 1001 at 4:56-63. The ‘316 Patent, above, explains that in the step of “preparing the profit information” of Claim element 1[c], object attributes, financial statement attributes, and event attributes are loaded into the database. The ‘316 Patent explains that the object attributes are “data about the object being measured,” including “balances, rates (or interest accrued), product identification, exposures, expected loss frequency, and various dates.” Ex. 1001 at 7:30-42. The ‘316 Patent thus identifies both financial (*e.g.*, balances, rates, expected loss frequency) and non-financial (*e.g.*, product identification, dates) information to be stored in the database. The ‘316 Patent also explains that the financial statement attributes refer to “data

about the company's financial statement," including "balance sheet and profit statement amounts." Ex. 1001 at 7:51-56. Thus, the '316 Patent describes "profit information" as including at least financial and non-financial data that is used in the calculation of profit.

74. The only reference to the term "profit information" in the '316 Patent (other than Claim elements 1[a] and 1[c]) is as follows:

The present invention gives management profit measures tailored to its need for accurate decision oriented ***profit information*** required to manage a large organization based on profit measurement.

Ex. 1001 at Abstract (beginning with "The inventive process gives management. . ."), 5:24-27. This description of "profit information" does not help to define the term as depicted in the Claims. The '316 Patent also describes the profit information stored in the database as:

FIG. 3 illustrates DPM data flow: where systems of record (SOR's) (31) data source object (32) and object oriented event (33) data; where General Ledger data sources apportionment data; and, where event and general ledger data are used with activity based costs (35).

Ex. 1001 at 6:44-48. The data described above includes both financial (*e.g.*, event data, general ledger data) and non-financial (*e.g.*, data source object, object oriented event data) information, and refers to the information stored in the database (*i.e.*, profit information).

VI. SUMMARY OF THE PRIOR ART

75. There are a number of patents and publications which constitute prior art to the ‘316 Patent. I have reviewed and considered the following prior art.

A. E&Y (Exhibit 1005)

76. I understand that Exhibit 1005 is *The Ernst & Young Guide to Performance Measurement for Financial Institutions* (“E&Y”). Ernst & Young, a major accounting firm, published this book in 1995 as a guide for financial practitioners based on their experience with implementing performance measurement systems in financial institutions. *E&Y* describes in great detail various methods of measuring performance in financial institutions, including cost accounting, activity-based costing, and product profitability analysis. See Ex. 1005. *E&Y* was not considered during the prosecution of the ‘316 Patent or any of its parent applications.

77. In describing the motivation for writing the book, *E&Y* explains that, with the changes happening in the financial services industry, “[i]t became

increasingly important for financial institutions to measure their profitability in as many ways as possible: by product, customer relationship, branch, etc.” Ex. 1005 at

3. *E&Y* further explains that:

The *Ernst & Young Guide to Performance Measurement* has been developed to assist financial institutions with the design, implementation, and management of performance information. It is intended to explain the latest strategies and practices in performance measurement, drawing the experiences of many of the top commercial, retail, and wholesale banks, investment companies, and mutual fund businesses.

Ex. 1005 at 5. *E&Y* explains that the importance of calculating profit in performance management, explaining that:

The drivers of real value are the profits generated by products, product lines, business segments, and customers. Information is needed on the performance of each of these components of the institution's total profits so that tactical or strategic actions can be taken to ensure that each contributes to shareholder value.

Ex. 1005 at 21-22.

78. *E&Y* explains that the detailed profit can be calculated by accumulating associated revenues and activity costs to a “cost object”. Ex. 1005 at 125, 320. *E&Y* describes the cost object as:

A cost object is any product, service, customer, market, distribution channel, project, etc., for which a unique cost measurement is desired. Initially, the costs of the institution's resources (e.g., salaries, equipment, capital) are assigned to business process/activity cost pools. A process/activity cost pool simply groups all processes and activities and their related costs into a cost pool. Next, these process/activity pooled costs are assigned to cost objects, based on a cost object's use or consumption of an activity, often volume drivers.

Ex. 1005 at 126. A cost pool in my opinion is often referred to as a responsibility center or a cost center. *E&Y* explains that profitability of the various cost objects is used to drive changes within the organization, explaining that:

Once cost and profitability information have been developed for any unit, product, customer or other cost object, the most immediate opportunity for using the results of this information centers on implementing both

near-term actions and long-term strategic improvements for those cost objects that are the most unprofitable or out of line with their intended goals and performance requirements.

Ex. 1005 at 320.

79. As described in the paragraphs below, *E&Y* discloses the steps of calculating object level profitability including preparing information to be accessed electronically, establishing rules to process the prepared information, calculating opportunity values, calculating at least one marginal value of profit, and combining the marginal value of profit.

80. *E&Y* discloses using an “integrated database storing financial and nonfinancial data on products, customers, segments, delivery channels, and the like” to provide a “multidimensional picture of the contribution of products, customers, organizations, and segments toward an institution’s total profits.” Ex. 1005 at 29. *E&Y* teaches using a “relational database platform” which can “aggregat[e] data from many vertical, product-account-based databases into a single customer-oriented picture of behavior and profitability.” Ex. 1005 at 277, 288. *E&Y* describes a “relational database platform” as:

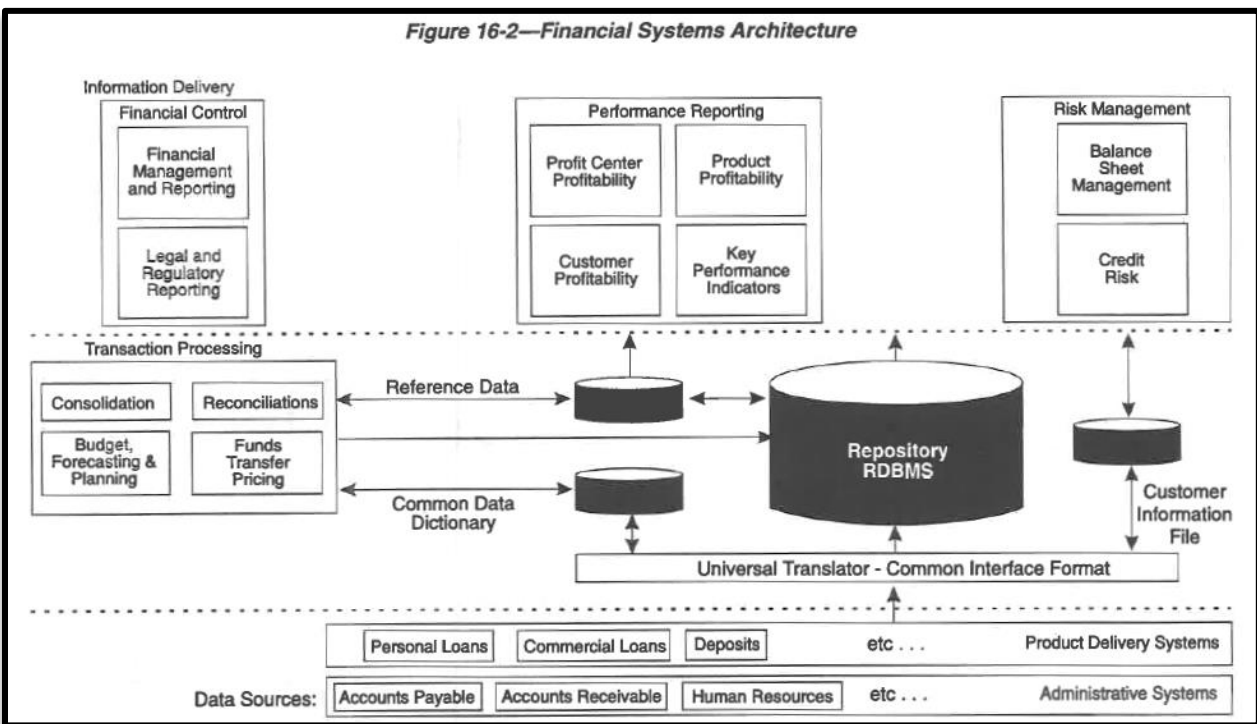
Central Data Repository

The most important component of the architecture is the use of a data

repository that spans all the applications and houses all the common data elements. This is vital to assure consistency and credibility, and produce operating efficiency. Because flexibility is an essential requirement of the system, this repository is almost always built upon a relational database platform.

Ex. 1005 at 277.

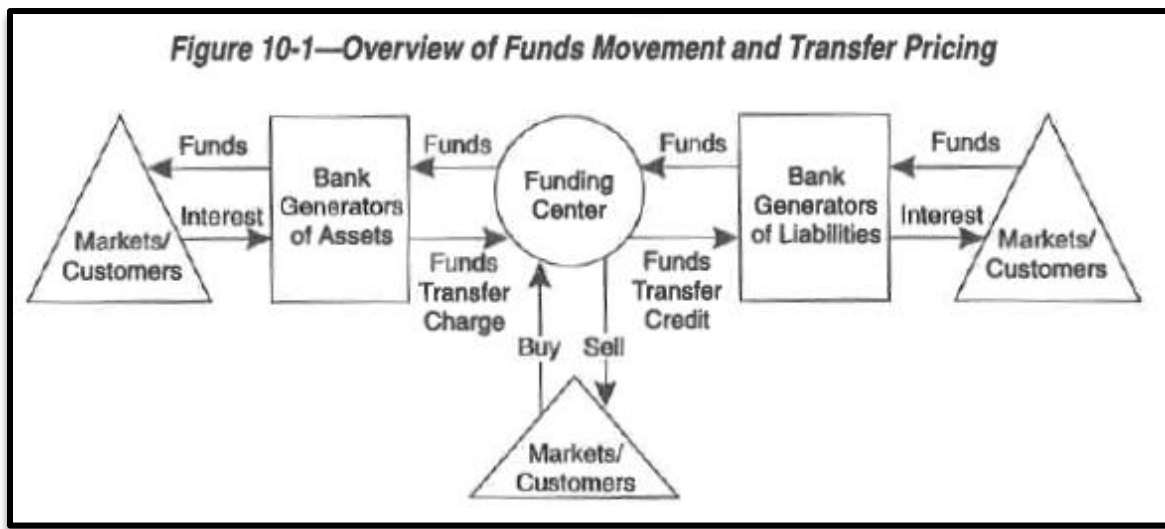
81. *E&Y*, in the figure below, illustrates an example environment a financial service institution may use to calculate profit using a relational database.



Ex. 1005 at 275.

82. *E&Y* discloses calculating opportunity costs at various levels of granularity (e.g., product, customer, account, branch, organization). Ex. 1005 at 56,

87, 175-177. *E&Y* discloses that “funds-transfer pricing represents a series of management-accounting mechanisms that measure the opportunity cost of funds provided and used” in order to accurately determine “the profitability of business units, products, customers, etc.” Ex. 1005 at 175. *E&Y* describes the process of calculating opportunity values and funds transfer pricing in great detail, including an entire chapter titled “Chapter 10: Transfer Pricing of Funds.” Ex. 1005 at 175. *E&Y* also discloses the process of funds transfer pricing in the figure below:



Ex. 1005 at 177. *E&Y* describes calculating opportunity values using funds transfer pricing as a method to “calculate charges for funds used and credits for funds provided by organizational units, products, and customers.” Ex. 1005 at 175-186 (“Chapter 10: Transfer Pricing of Funds”), 260.

83. *E&Y* discloses various methods for calculating marginal values of profit, including calculations of net interest, other revenue, direct expense,

provision for loan loss, all at various levels of granularity. Ex. 1005 at 56, 184, 204. *E&Y* describes that marginal costs “consist of expense items incurred as a result of adding one incremental item” and that “[m]arginal cost development can play an integral role in product management and pricing decisions.” Ex. 1005 at 56. After calculating marginal values of profit, *E&Y* discloses generating profitability reports including net interest, other revenue, direct expense, and provision for loan loss at the product, customer, and business division levels:

Figure 5-2—Typical Organizational Profitability Statement

Interest Income
Interest Expense
Credit/Charge for Funds
Net Interest Income
Provision for Loan Loss
Net Interest Income after Provision for Loan Loss
Other Income
Net Revenue
Direct Expense
Salaries and Benefits
Furniture and Equipment
Occupancy
Telephone
Professional Fees
Travel and Entertainment
Other Direct Expenses
Total Direct Expense
Indirect Expense
Total Noninterest Expense
Income before Taxes

Ex. 1005 at 42.

Figure 5-4—Sample Product Profitability Statement

Interest Income
Interest Expense
Credit/Charge for Funds

Net Interest Income
Provision for Loan Loss

Net Interest Income after
Provision for Loan Loss
Other Income

Net Revenue
Direct Expense
Indirect Expense
 Data Processing
 Loan Processing
 Item Processing
 Branch System
 Marketing
 Other

Total Noninterest Expense

Income before Taxes

Ex. 1005 at 43. *E&Y* provides a sample profitability report for the customer object as depicted below:

Figure 5-6—Sample Customer Profitability

	Total	Lines and Commitments	Loans	Fee Services	Deposits
Interest Income	\$50		\$50		
Interest Expense	(10)				\$(10)
Credit/(Charge) for Funds	(10)		(40)		30
Net Interest Income	30	—	10	—	20
Provision for Loan Losses	(1)	—	(1)	—	—
Net Interest Income after Provisions for Loan Losses	29		9		20
Waived Fees	(29)			\$(29)	
Other Income	42	\$10	2	30	
Noninterest Expense	(39)	(2)	(1)	(35)	(1)
Contribution	3	<u>\$ 8</u>	<u>\$10</u>	<u>\$(34)</u>	<u>\$19</u>
Overhead Expense	(4)				
Income before Taxes	<u>\$(1)</u>				

Ex. 1005 at 45.

84. *E&Y* also discloses calculating indirect expenses apportioned to a cost object. Ex. 1005 at 46. For example, *E&Y* describes the approach of fully absorbed accounting to calculate indirect expense as:

Fully Absorbed Accounting Approach

Under this approach, the sum of the profits/losses of all reported units equals the profits/losses of the entire institution, regardless of whether the reported units are organizational units, products, customers, or any other aspect of an institution's business. All income statement items are assigned or allocated and are "fully absorbed" in

the individual income statements. For example, if reported units are products, then the sum of the reported profits of the products would equal the institution's overall profits.

The fully absorbed approach requires that all expenses ultimately be distributed among the reported units of the institution and that no expenses be left undistributed at any level.

The advantages of this approach are:

- All expenses are included when profitability is reported and analyzed. This reduces the possibility that certain expense items will be ignored and remain unmanaged or not factored into such decision-making issues as establishing product prices.
- Managers become aware of all expenses in an institution, which facilitates expense management.
- Having fully accounted for all income statement items, individual business line, branch, product, or customer 'hurdle rates' can be established that are congruent with the overall organization's goals. Every measure is in line with the corporate goal as it all contributes to the total.

Ex. 1005 at 46. *E&Y*, in the paragraph above, discloses calculating indirect expense at different object levels (*e.g.*, product profitability, customer profitability). Figure 5-6 depicts Overhead Expense as an Indirect Cost of \$4 that applies to this particular customer object. Explaining this, *E&Y* discloses that:

The first step in developing an appropriate costing methodology is ***deciding what and how much of the organization's expenses will be assigned***—especially overhead and administrative expenses. There are three main approaches and several nuances in dealing with this issue. ***Full-absorption costing is a method under which, by definition, all costs are fully accounted for.***

Ex. 1005 at 85. *E&Y* further explains that “full-absorption costing creates the additional advantage of assuring that the entire institution's profitability equals the sum of the profitability of its components.” Ex. 1005 at 87.

85. Finally, *E&Y* discloses combining the marginal values of profit to arrive at a profitability report at various levels of detail. These profitability statements include a product profitability statement and an organization profitability statement as shown below:

Figure 5-2—Typical Organizational Profitability Statement

Interest Income	
Interest Expense	
Credit/Charge for Funds	
Net Interest Income	
Provision for Loan Loss	
Net Interest Income after Provision for Loan Loss	
Other Income	
Net Revenue	
Direct Expense	
Salaries and Benefits	
Furniture and Equipment	
Occupancy	
Telephone	
Professional Fees	
Travel and Entertainment	
Other Direct Expenses	
Total Direct Expense	
Indirect Expense	
Total Noninterest Expense	
Income before Taxes	

Figure 5-4—Sample Product Profitability Statement

Interest Income	
Interest Expense	
Credit/Charge for Funds	
Net Interest Income	
Provision for Loan Loss	
Net Interest Income after Provision for Loan Loss	
Other Income	
Net Revenue	
Direct Expense	
Indirect Expense	
Data Processing	
Loan Processing	
Item Processing	
Branch System	
Marketing	
Other	
Total Noninterest Expense	
Income before Taxes	

Ex. 1005 at 42-43.

86. Thus, years before the '316 Patent was allegedly invented, *E&Y* described the same problem, the same informational objectives, and the same solution.

B. Blain (Exhibit 1006)

87. I understand that Exhibit 1006 is *Using SAP R/3*, by ASAP World Consultancy and Jonathon Blain (“Blain”). *Blain* describes the SAP R/3 product, developed by SAP AG and launched in 1992, that provides enterprise resource planning software (“ERP”) for companies using a modular suite of integrated business management applications. SAP R/3 is an enterprise software platform that integrates a database, application server, and client graphical interface to coordinate resources, information, and activities needed to complete a wide array of business practices including billing, human resources management, order fulfillment, profitability accounting, financial reporting, tax calculation, and operations management. Ex. 1006 at 19-20, 27-28, 37-42. SAP R/3 incorporates a relational database management system (using an SAP or third-party database) to store, retrieve, and calculate the business information according to rules defined by the user. Ex. 1006 at 210, 216, 281-282. *Blain* was not considered during the prosecution of the ‘316 Patent or any of its parent applications.

88. SAP R/3 is a modular product – it comprises a “Basis module” to which additional application modules may be added to provide functionality for the particular business. Ex. 1006 at 67. SAP R/3 modules are organized into sets which identify their general area of application, such as the CA-Cross Application, FI-Financial Accounting, CO-Controlling, IM-Capital Investment Management,

EC-Enterprise Controlling, TR-Treasury, MM-Materials Management, and SD-Sales and Distribution modules. Ex. 1006 at 66-67, 74-78. Within each of these module sets, identified by a two-letter code, are several individual modules. For example, within the CO-Controlling set are the CO-OM Overhead Cost Control, CO-PC Product Cost Controlling, CO-ABC Activity-Based Costing, CO-PA Sales and Profitability Analysis, and CO-PRO Project Control modules. Ex. 1006 at 75.

89. *Blain* discloses using SAP R/3 to calculate profitability for a product, customer, or business unit based on allocating costs and revenues to a profit object. Ex. 1006 at 277-279, 289-292, 304-311. Specifically, *Blain* discloses integrating a database into SAP R/3 to store general ledger information, including costs and revenue data. Ex. 1006 at 36-37, 304-311. *Blain* discloses using SQL with the database integrated into the SAP R/3 architecture. Ex. 1006 at 36. *Blain* also discloses establishing rules within the SAP R/3 RDBMS to perform profit calculations. Ex. 1006 at 284-290.

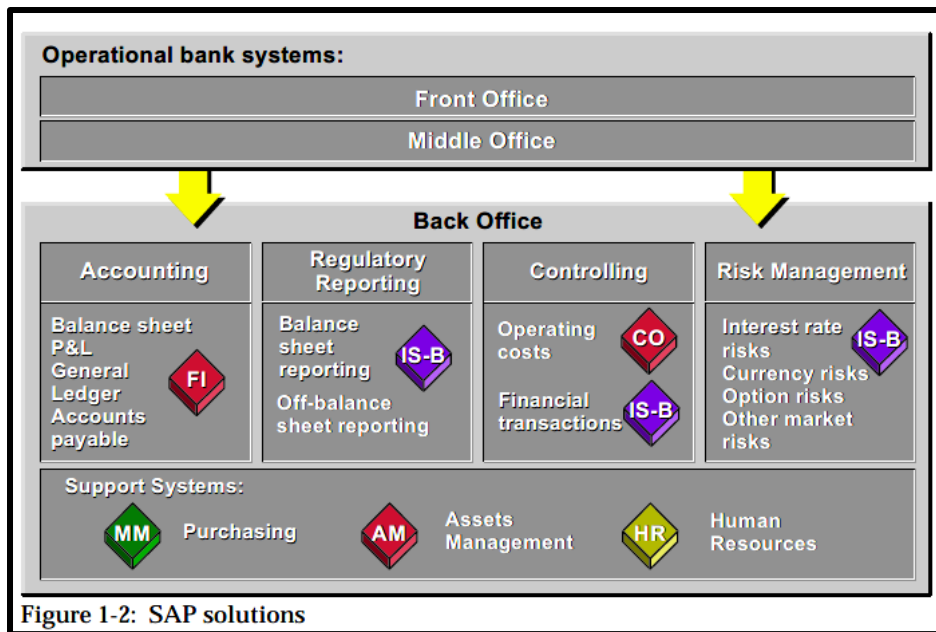
90. *Blain* describes calculating opportunity values (including transfer pricing) for cost or profit objects. Ex. 1006 at 311-312. *Blain* also discloses calculating marginal profit values, including direct expenses, other revenue, and provisions. Ex. 1006 at 286-289, 306-315. *Blain* further discloses calculating indirect expenses at a cost or profit object level, including fully allocating indirect expenses. Ex. 1006 at 306-307, 309-317. Based on these profit calculations, *Blain*

discloses using SAP R/3 to generate a profitability report at the level of detail required by the SAP R/3 customer. Ex. 1006 at 309-317.

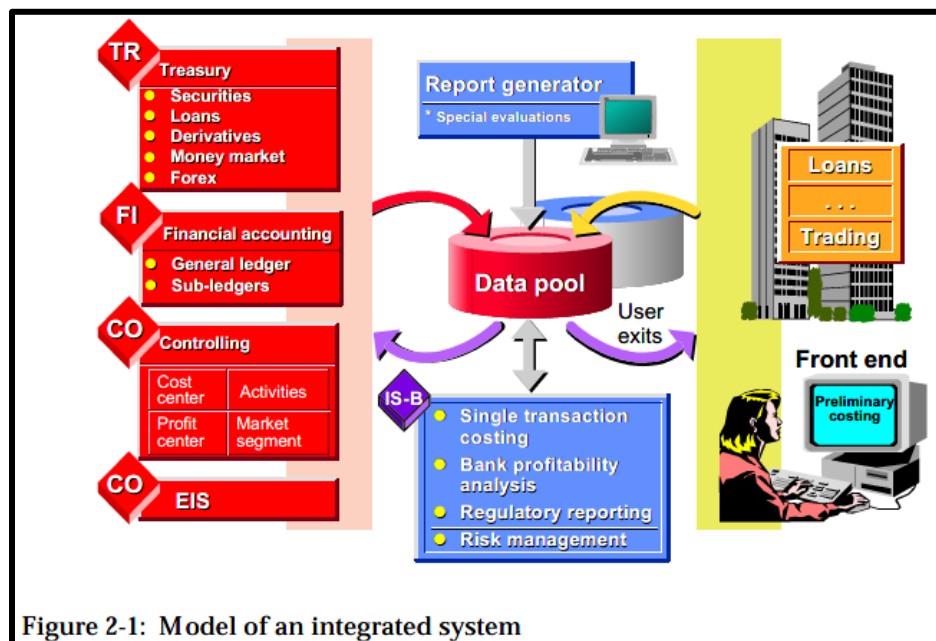
91. Thus, years before the '316 Patent was allegedly invented, *Blain* described the same problem and the same informational objectives, and the same solution. However, in the case of *Blain*, the solution was an enterprise product, SAP R/3, that was being used globally across many industries.

C. SAP-IS-B (Exhibit 1007)

92. I understand that Exhibit 1007 is *System R/3® IS-B: The SAP Industry Solution for Banks*, by SAP AG (“SAP-IS-B”). SAP-IS-B is a reference created by SAP AG to provide functional details on integration and implementation of the Industry Solution for Banks (IS-B) with SAP R/3. The IS-B is fully integrated with the general SAP R/3 product, and allows a user to integrate “IS-B with both existing banking systems and already implemented SAP R/2 and R/3 applications.” Ex. 1007 at 6. This integration into the overall SAP R/3 product is depicted in the two figures below:



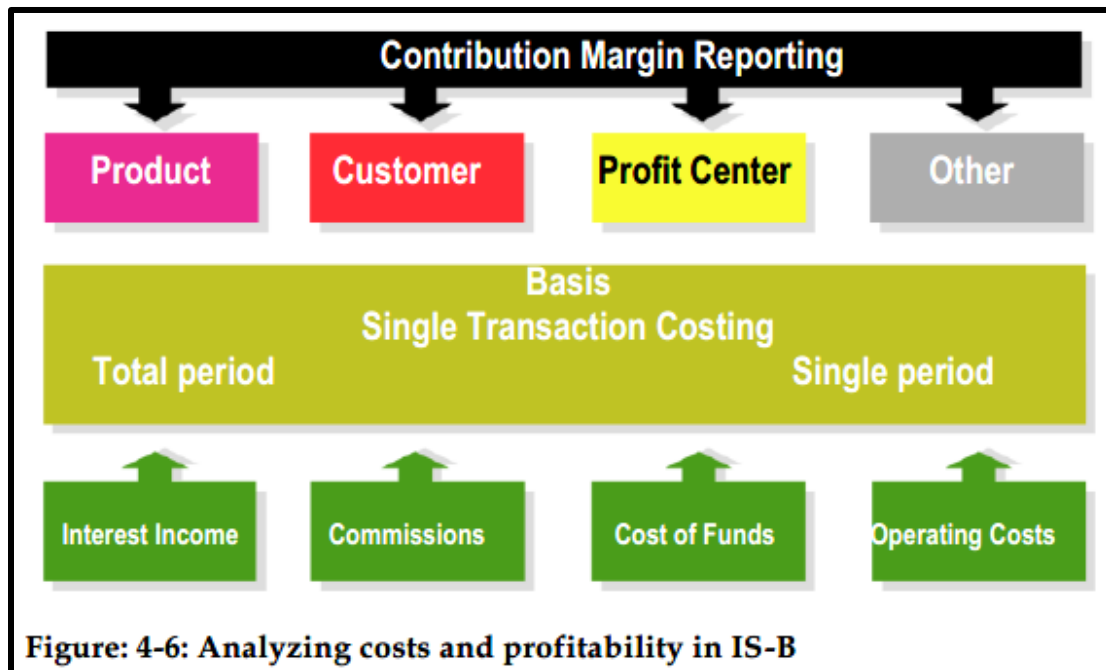
Ex. 1007 at 8.



Ex. 1007 at 9. Each of the figures above depict the integration of the IS-B module into the overall SAP R/3 solution. The IS-B module focuses on regulatory reporting, financial transactions, single transaction costing for bank profitability analysis, and

risk management. The IS-B module integrates with a database (*i.e.*, data pool) to access cost, revenue, profit, and other information to perform bank profitability analysis. Ex. 1007 at 7-8. *SAP-IS-B* was not considered during the prosecution of the ‘316 Patent or any of its parent applications.

93. *SAP-IS-B* discloses that the IS-B module, and the overall SAP R/3 solution, is “based on relational database technology.” Ex. 1007 at 21. *SAP-IS-B* discloses storing, in the database, cost and revenue information for each transaction, information needed to identify the bank’s organizational structure, product catalog, costing rules, regulatory reporting rules, financial term types, interim profit calculations, and other information. Ex. 1007 at 27-32. *SAP-IS-B* discloses calculating opportunity values for each transaction, and allocating those transaction costs to products, customers, organizational unit (profit center), and/or other objects of measurement. Ex. 1007 at 42. *SAP-IS-B* also discloses calculating marginal values of profit, including net interest income, other revenue (*e.g.*, commission income), direct costs, and provisioning (*e.g.*, minimum reserve costs, risk costs, deposit protection costs). Ex. 1007 at 55-64. *SAP-IS-B* also discloses calculating indirect costs. Ex. 1007 at 55-58. *SAP-IS-B* depicts these calculations being applied to a single transaction, and then being allocated to a particular object in the following figure:



Ex. 1007 at 42.

94. *SAP-IS-B* also discloses combining the marginal values of profit in the following figure:

Interest income					
- Opportunity income					
= Interest terms contribution - active					
+ Commission income					
- Commission costs					
= Commission contribution (subtotal)					
= Contribution margin I					
- Standard unit costs					
- Standard cancellation costs					
- Equity capital costs					
= Contribution margin II					
- Indirect costs					
= Contribution margin III = market result					

Interest Income/Expense
± Opportunity Values (COF/VOF)
(± Equity Capital Costs)
Net Interest

+ Other Revenue

- Direct Expenses

- Direct Expenses

- Provisioning

- Indirect Expenses

Ex. 1007 at 63 (emphasis added). The figure above depicts calculating multiple marginal values of profit by calculating:

- net interest (*i.e.*, Interest Income, Opportunity Income, Equity Capital Costs),
- other revenue (*i.e.*, Commission Income),
- direct expense (*i.e.*, Commission costs, Standard unit costs), and
- provisioning (*i.e.*, Standard Cancellation Costs).

with

- indirect expenses (*i.e.*, Indirect Costs),

to create

- a measure of object level profitability (*i.e.*, market result).

Net interest, in the figure above, is calculated by taking interest income and adjusting for the opportunity income and equity capital costs.

95. Thus, years before the '316 Patent was allegedly invented, *SAP-IS-B* described the same problem, the same informational objectives, and the same solution.

96. A POSITA interested in software and systems related to accounting or management information systems would have known about SAP R/3 as a well-known system in use in the field. A POSITA would have known to go to SAP's website (www.sap.com) for information about SAP's available products in this field. I have considered SAP's website as it existed in 1997 by going to: <https://web.archive.org/web/19970724121232/http://www.sap.com:80/>. A POSITA researching SAP's available products in the banking industry would have known to click on "Industry Solutions" (<https://web.archive.org/web/19970721211010/http://www.sap.com:80/products/industry/index.htm>) and then "SAP Banking" (https://web.archive.org/web/19970721213816fw_/http://www.sap.com:80/products/industry/banking/index.htm). And a POSITA at that time would know that information related to those banking products would be found in the "Media Center" (<https://web.archive.org/web/19970722003811/http://www.sap.com:80/products/in>

[dustry/banking/media/mc_bank.htm](http://industry/banking/media/mc_bank.htm)). I have confirmed that the “Functions In Detail” document, which is Ex. 1007, was available on that website. In addition to generally knowing to go to the SAP website for information about SAP/R3 and IS-B, *Blain* also informs POSITAs about the existence of SAP/R3 and IS-B and tells POSITAs to go to SAP’s website for information about the products. Ex. 1006 at 79, 585, 595. In addition to the website, a POSITA interested in this art would also have known to search libraries for the terms “SAP R/3” (which was SAP’s well-known accounting product), “Bank,” and/or “Kalkulation” (the German word for calculation, which makes sense because SAP was a German company).

D. *Kimball* (Exhibit 1010)

97. *Calculating and Using Risk-Adjusted ROE for Lines of Business* is an article written by Ralph C. Kimball (“*Kimball*”) published in Volume 7, Number 1 of the journal *Bank Accounting & Finance*, the issue dated Fall 1993. Ex. 1017 at ¶¶86-92. *Kimball* provides additional detail on allocating equity to lines of business.

E. *McKenzie* (Exhibit 1011)

98. *Economic Effects of Dividend Taxation* is a federal document created by Kenneth J. McKenzie and Aileen J. Thompson (“*McKenzie*”) and issued by the Canadian Department of Finance in 1996. Ex. 1017 at ¶¶74-79. *McKenzie*

was published by the Technical Committee on Business Taxation and identified as a Working Paper in December 1996. Ex. 1017 at ¶74.

F. Other Cited Art

99. In addition to the prior art described above, other references will be used throughout this petition. None of the following references were considered during prosecution of the ‘316 Patent or any of its parents.

100. *Cost Accounting: A Managerial Approach*, 9th Edition, by Charles T. Horngren, George Foster, and Srikant M. Datar (“*Horngren*”) is a college textbook on Cost Accounting, published in 1997. Ex. 1017 at ¶¶44-49; Ex. 1013. *Horngren* describes in detail methods of calculating costs at a granular level for any type of business. See Ex. 1013. *Horngren* describes various methods of cost allocation to a “cost object,” such as funds transfer pricing, marginal values of profit, and indirect expenses. *Supra* VII.A.1; Ex. 1013. *Horngren*, in its 9th Edition by 1997, was available to college students in the fields of finance and accounting for the purpose of teaching methods of assigning costs and calculating profitability. Ex. 1017 at ¶¶44-49. *Horngren* was publicly available by March 1996. Ex. 1017 at ¶¶44-49.

101. *A Guide to the SQL Standard*, 2nd Edition, is a book written by C.J. Date (“*Date*”) issued by Addison-Wesley in 1989. Ex. 1017 at ¶¶56-61; Ex. 1004. It was publicly available by January 1989. Ex. 1017 at ¶¶56-61. The 1st

edition of this book is incorporated by reference in the '316 Patent. Ex. 1001 at 2:53-55.

102. *Introduction to Database Systems*, 6th edition, is a book written by C.J. Date (“*Database Systems*”) and issued by Addison-Wesley in 1995. Ex. 1017 at ¶¶80-85; Ex. 1014. It was publicly available by February 1994. Ex. 1017 at ¶¶80-85.

103. *Wells Fargo: 1996 Annual Report* is an annual financial report issued by Wells Fargo & Company and available to the public in 1997. Ex. 1017 at ¶¶95-96; Ex. 1018.

104. *Mabberley* is a book written by Julie Mabberley and issued by Pitman Publishing in 1992. Ex. 1017 at ¶¶62-67. It was publicly available by March 1993. Ex. 1017 at ¶¶62-67.

105. *Weber* is a working group paper by Nic Stuchfield and Bruce Weber and issued by New York University in 1992. Ex. 1017 at ¶¶68-73. It was publicly available by March 1993. Ex. 1017 at ¶¶68-73.

106. *Frei* is a technical paper written by Frances X. Frei, Patrick T. Harker, and Larry W. Hunter and issued by The Wharton School at the University of Pennsylvania in January 1998. Ex. 1017 at ¶¶93-94. It was publicly available by January 1998. Ex. 1017 at ¶¶93-94.

VII. INVALIDITY

107. Based on my review and analysis of the materials cited herein, my opinions regarding the understanding of a person of ordinary skill in the art before April 9, 1999, and my training and experience, it is my opinion that Claims 1-30 of the '316 Patent are directed to unpatentable subject matter. In addition, it is my opinion that Claim 1, as well as various dependent claims from Claim 1 are anticipated by each of *E&Y*, *SAP-IS-B*, and *Blain*. In addition, it is my opinion that claims 1-30 of the '316 Patent are rendered obvious in view of *E&Y*, *Blain*, *SAP-IS-B*, *Kimball*, and *McKenzie* either individually or in combination. The reasons for my conclusions are explained more fully below.

108. According to the Hall-Ellis declaration (Ex. 1017), *E&Y*, *Blain*, *SAP-IS-B*, *Kimball*, and *McKenzie*, are prior art to the '316 Patent. Ex. 1017.

109. With respect to each claim, I have considered the limitations of the claim as a whole, and did not simply determine whether each limitation can be found in the prior art. For dependent claims, this means that I have considered how the additional limitations recited by the dependent claim fit with the limitations recited in the parent claim. In this declaration, I have included headings that recite the relevant claim language as an aid to the reader. However, I have considered the claims as they appear in the patent, and any errors in the headings or recitations of the claim language are unintentional and do not affect my analysis.

110. Furthermore, I have analyzed obviousness from the standpoint of a POSITA at the time of the invention, which is April 1999. I am not aware of any reasons why my analysis would change if the date of invention is found to have been a few years earlier than this date.

A. Claims 1-30 are Directed to Patent-Ineligible Subject Matter

111. It is my opinion that each of Claims 1-30 are directed to patent-ineligible subject matter. It is my opinion that Claim 1 is directed to the abstract idea of “calculating object level profitability.”

112. Claim 1 of the ‘316 Patent also fails to recite any “inventive concept” that would be sufficient to ensure that the patent in practice amounts to significantly more than a patent on the abstract idea discussed above. Claim 1 of the ‘316 Patent recites the generic technologies of a “database” and a “relational database management system” which fail to transform the abstract idea of Claim 1 into patent-eligible subject matter. Not only does the claim recite generic computing components, the ‘316 Patent admits that most of the elements recited in Claim 1 already existed at the time of the invention. For example, Claims 1-30 can be viewed as taking the abstract idea of calculating object level profitability described in *Horngren*, and applying it to a generic computing environment with a generic database.

113. The limitations of Claims 1-30, both individually and as an ordered combination, fail to provide significantly more than the abstract idea of calculating object level profitability.

1. Claim 1

(i) Claim element 1[preamble]

1[preamble]	A process for determining object level profitability in a relational database management system, comprising the computer implemented steps of:

114. To the extent the preamble is limiting, the preamble fails to disclose any inventive step. As seen in the discussion of the other Claim 1 elements, the disclosed invention simply takes a pre-existing database, calculates new values, and stores or does not store those new values in the database. The recitation of an RDBMS does not disclose an inventive concept, but simply recites technology that was well-known, routine and conventional at the time of the disclosure.

(ii) Claim element 1[a]

1[a]	providing a computerized profit database having profit information

115. Claim element 1[a] fails to disclose an inventive concept when it recites a “computerized profit database.” The ‘316 Patent specification describes the profit database as known in the art when it describes the general ledger as “General Ledgers (double entry book keeping systems) (11) were early adapters of

automated data processing solutions due to the match between computing capabilities of computers and the execution of the accounting process.” Ex. 1001 at 2:1-4. Calculating profitability using a general ledger attempts to solve a business problem, not a technical one. The specification further describes the use of computer automation for traditional accounting process as well known, explaining that

“The first large scale use of automated computing technology is frequently found to be the automation of the financial control or accounting processes, since it is easy to develop software to implement accountancy rules and there were large benefits in staff productivity easily observable.”

Ex. 1001 at 3:55-60.

116. Database technologies, and using databases on a computer, were well-known at the time of the ‘316 Patent application. Ex. 1004; Ex. 1014 at 4-6, 9-10, 21-23; 77 Fed. Reg. 48,764. Storing information was a primary purpose of a database. Ex. 1014 at 4-6. Storing profit information in a database was well within the routine use of a database, and calling such a database a “computerized profit database” does not transform the generic technology into an inventive concept.

117. Database technology was well known before the 1980s. Ex. 1014 at 21, 23, 776. *Database Systems* explains that, as of 1993, “[a]lmost all of the

database products developed since the late 1970s have been based on what is called the relational approach.” Ex. 1014 at 21. *Database Systems* describes the ubiquitous nature of relational databases, explaining:

The first relational products began to appear in the late 1970s and early 1980s. At the time of writing (1993), there are well over 100—perhaps as many as 200—such products commercially available, and those products run on just about every kind of hardware and software platform imaginable. Examples of such products include DB2 from IBM Corporation; Rdb/VMS from Digital Equipment Corporation; ORACLE from Oracle Corporation; INGRES from the Ingres Division of The ASK Group Inc.; SYBASE from Sybase Inc.; and many, many more.

Ex. 1014 at 23. Thus, database technology was ubiquitous by the early 1990s, and was certainly a well-known, routine, and conventional technology.

118. Storing information related to profit in a database was also a well-known, routine, and conventional use of database technology. Ex. 1004 at 2-3; Ex. 1005 at 29, 183, 275-277; Ex. 1006 at 196-198, 209-217, 234, 329; Ex. 1014 at 9-12, 21-23. For example, *Database Systems* explains that:

Any enterprise must necessarily maintain a lot of data about its operation. This is the "persistent data" referred to above. The enterprises just mentioned would typically include the following among their persistent data:

1. Product data
2. Account data
3. Patient data
4. Student data
5. Planning data

Ex. 1014 at 9-10.

119. *Horngren* describes companies like Hewlett-Packard using data warehouses to store product information for profitability calculations. Ex. 1013 at 597. *Mabberley* describes a profit database where “[m]uch of the information required for product costs and profitability reporting, can be obtained from a ***comprehensive financial database that holds items with some form of product indicator***. This type of system is becoming much more common.” Ex. 1008 at 88.

120. As discussed in Section VII.B.1[a], *E&Y* discloses using a database to store profit information. Ex. 1005 at 29, 183, 275-277. For example, *E&Y* discloses a “performance measurement system” structured “as an integrated database storing financial and nonfinancial data on products, customers, segments,

delivery channels, and the like.” Ex. 1005 at 29. As discussed in Section VII.C.1[a], *Blain* discloses storing profit information in a general ledger database. Ex. 1006 at 41, 196-198, 209-217, 234, 329. Additionally, in Section VII.D.1[a], *SAP-IS-B* discloses storing profit information in a database for profitability calculations. Ex. 1007 at 7, 14, 16, 19, 21, 58-60, 88. Thus, Claim element 1[a] as well-known, routine and conventional at the time of the invention.

121. For these reasons, Claim element 1[a] fails to provide an inventive step sufficient to transform Claim 1 into a patent-eligible subject matter.

(iii) Claim element 1[b]

1[b] providing a relational database management system operable in association with the computerized profit database

122. Claim element 1[b] describes a generic technology when it recites providing a “relational database management system” operable in association with a “computerized profit database.” As discussed in relation to Claim element 1[a], a computerized profit database was well-known, routine and conventional in the field. Ex. 1014 at 9-12, 21-23; *supra* VII.A.1[a]. Using a relational database management system (an “RDBMS”) was also well-known and conventional in the art. Ex. 1014 at 9-12, 21-23; Ex 1004 at 2-3. The ‘316 Patent incorporates by reference the first edition of “*A guide to the SQL standard; a user’s guide to the standard relational language SQL*” by C.J. Date. Ex. 1001 at 2:53-55; see Ex. 1004.

The second edition of this reference is included as Ex. 1004. Incorporating by reference a book on SQL indicates that using SQL with RDBMSs was well-known and conventional at the time of the invention. Further, Ex. 1004 describes relational database systems widely available in 1987, including at least the DB2 database made by IBM, ORACLE database made by Oracle Corp., and the SYBASE database made by Sybase Inc. Ex. 1004 at 1-3; Ex. 1001 at 2:53-55. These admissions by the '316 Patent and its incorporated references demonstrate that element 1[b] was well-known, routine, and conventional at the time of the invention.

123. The interoperation of a relational database management system with the computerized profit database also fails to provide an inventive concept. The purpose of a RDBMS is precisely to operate in association with a database, and indeed most RDBMSs are packaged with a particular database. Ex. 1004 at 1-3; Ex 1014 at 31-37.

124. As discussed in Section VII.B.1[b], *E&Y* discloses operating a relational database with a profit database. Ex. 1005 at 183, 275-277. As discussed in Section VII.C.1[b], *Blain* discloses operating a relational database management system with a profit database. Ex. 1006 at 36-38, 41, 54-55, 75. Additionally, in Section VII.D.1[b], *SAP-IS-B* discloses using a relational database management system to calculate profit. Ex. 1007 at 19-24. Thus, Claim element 1[b] as well-known, routine and conventional at the time of the invention.

125. For these reasons, Claim element 1[b] fails to provide an inventive step sufficient to transform Claim 1 into a patent-eligible subject matter.

(iv) Claim element 1[c]

1[c] preparing the profit information to be accessed electronically through the relational database management system, including the step of calculating opportunity values for funds used or supplied by each object being measured

126. Claim element 1[c] recites the technological elements of “profit information to be accessed electronically” and a “relational database management system.” As discussed in Claim elements 1[a] and 1[b] above, both of these generic technological recitations were well-known, conventional, and routine in the art at the time of the invention. *Supra* VII.A.1(ii)-VII.A.1(iii).

“calculating opportunity values for funds used or supplied”

127. The step of “calculating opportunity values for funds used or supplied” also describes a step that was well-known in the art and fails to provide an inventive concept. The only reference to the term “opportunity” in the ‘316 Patent specification is: “DPM's funds transfer pricing method uses maturity opportunity rates used in valuing each object's marginal use or source of internal funds.” Ex. 1001 at 7:61-64. The only other reference to “opportunity” is to “opportunity values” in Claim 8, “wherein the opportunity values are based on matched maturity funds transfer pricing theory.” Ex. 1001 at 29:41-44. Thus, there is no reference or

definition given to “opportunity values” as being anything other than marginal consideration of internal funds, or describing “transfer pricing.” Even element 1[c] refers to calculating opportunity values “for funds used or supplied,” implying the use of transfer pricing. Ex. 1001 at Claim 1. The failure to describe “opportunity values” in detail in the specification implies that the claim element was well known in the art. See *In re Myers*, 410 F.2d 420, 424 (CCPA 1969) (“A specification is directed to those skilled in the art and need not teach or point out in detail that which is well-known in the art.”); see also *Lindemann Maschinenfabrik GMBH v. Am. Hoist & Derrick Co.*, 730 F.2d 1452, 1463 (Fed. Cir. 1984) (“[T]he specification need not disclose what is well known in the art.”). Thus, to the extent “opportunity values” is enabled in the specification, the concept was well-known, routine, and conventional in the art at the time of the invention.

128. Calculating opportunity values according to transfer pricing theory was well-known in accounting at the time of the invention, as described by at least six prior art references incorporated into the ‘316 Patent:

- *Controversies on the Theory of the Firm, Overhead Allocation, and Transfer Pricing*
- *The Transfer Pricing Problem*
- *Transfer Pricing*
- *Internal Transfer Pricing of Bank Funds*

- *Transfer Pricing: Economic, Managerial, and Accounting Principles*
- *International Intracorporate Pricing*

Ex. 1001 at 3:16-31. The specification further explains that the concept of Transfer Pricing was well-known by explaining that the “**common name** for this approach to valuing is know[n] as ‘Matched Maturity Funds Transfer Pricing.’” Ex. 1001 at 8:43-47.

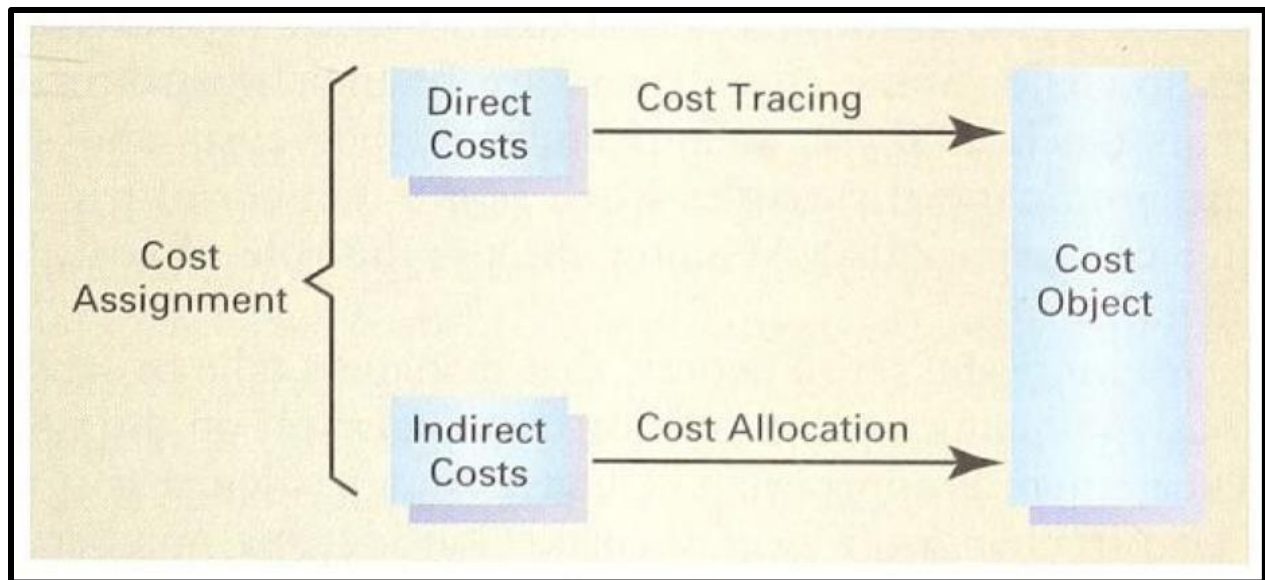
129. Calculating opportunity values based on transfer pricing was well-known in the art at the time of the invention. Ex. 1013 at 899-914 (“Chapter 25: Control Systems, Transfer Pricings, and Multinational Considerations”). For example, *Horngren* describes three methods for calculating transfer pricing, including “Market-based transfer prices,” “Cost-based transfer prices,” and “Negotiated transfer prices.” Ex. 1013 at 905. *Mabberley* describes the “calculation of the cost of funds and earnings credit” using interest rates applied to “balances by pool, activity, responsibility centre, product, or customer.” Ex. 1008 at 95.

130. Additionally, the references in Sections VII.B.1[c], VII.C.1[c], VII.D.1[c] describe calculating opportunity values and funds transfer pricing, including the explanation that “[f]unds-transfer pricing represents a series of management-accounting mechanisms that measure the value of opportunity costs of funds provided and used.” Ex. 1005 at 175.

“each object being measured”

131. The claim language in element 1[c] of “by each object being measured” does not add an inventive concept to the claim. The “object being measured” is defined within the specification as encompassing 1) a seat, policy, or account object, or 2) a customer, product, or organization. Ex. 1001 at 6:57-61, 7:18-37, Figs. 3 and 4. Using Transfer Pricing theory at a product (*e.g.*, seat, policy, or account) and organizational level, was well-known within the art as described by references cited in the specification. *See Internal Transfer Pricing of Bank Funds*; Ex. 1001 at 3:16-32; Ex. 1013 at 908-920. Further, the prior art references cited in Sections VII.B.1[c], VII.C.1[c], and VII.D.1[c] show that applying transfer pricing at various levels of granularity within the organization was well-known in the art, including the explanation that “[p]roperly setting funds-transfer prices is important to accurately determining the profitability of business units, products, customers, etc.” Ex. 1005 at 175.

132. Additionally, the concept of consolidating and/or aggregating costs and revenues to an “object” was well-known in the art. *Horngren* describes a “cost object” as “anything for which a separate measurement of costs is desired. Examples include a product, service, project, customer, brand, category, activity, department, and program.” Ex. 1013 at 46. *Horngren* depicts this concept as:



Ex. 1013 at 27. *Horngren* provides examples of the cost objects:

Cost Object	Illustration
◆ Product	A ten-speed bicycle
◆ Service	An airline flight from Los Angeles to London
◆ Project	An airplane assembled by Boeing for Singapore Airlines
◆ Customer	All products purchased by Safeway (the customer) from General Foods
◆ Brand category	All soft drinks sold by a Pepsi-Cola bottling company with "Pepsi" in their name
◆ Activity	A test to determine the quality level of a television set
◆ Department	A department within a government environmental agency that studies air emissions standards
◆ Program	An athletic program of a university

Ex. 1013 at 26.

133. *Blain* also describes a "cost or profit object" as "a convenient conceptual destination that can appear in the accounts with accrued costs or revenues," and as a method that "enables an accurate system of accounting that will

help you control the value-adding business processes of your company.” Ex. 1006 at 275, 278. The idea of creating an “object” to attribute costs, including opportunity costs, and revenues to was well-known in the art and fails to provide an inventive concept.

134. For these reasons, Claim element 1[c] fails to provide an inventive concept for Claim 1.

(v) Claim element 1[d]

1[d] establishing, in the relational database, rules for processing the prepared information, including the steps of providing information necessary to select objects and performing a profit calculus

135. Claim element 1[d] includes the technical recitation of the “relational database,” which fails to provide an inventive concept as explained above for Claim elements 1[b] and 1[c]. *Supra* VII.A.1(iii)-VII.A.1(iv). The further limitations of “establishing, in the relational database, rules for processing,” “providing information necessary to select objects,” and “performing a profit calculus” similarly fail to provide significantly more than the abstract idea of calculating profit. It is important to note that the ‘316 Patent describes the invention as a software application:

As shown in the accompanying drawings for purposes of illustration, *the present invention* is concerned with a

detail profit metric (DPM) designed to be a computer database application (i.e. software) for profitability measurement.

Ex. 1001 at 5:62-65.

“establishing . . . rules for processing the prepared information”

136. Establishing rules for processing information in a database is an essential component of relational databases, and a fundamental feature of any RDBMS that implements a version of a relational database management language (*e.g.*, structured query language, data manipulation language, data definition language). *See* Ex. 1004; Ex. 1014 at 52-72. Relational databases, at their core, are based on the “relational model” defined by an entity-relationship model of tables and the data stored in those tables. Ex. 1014 at 52-72. To create a relational database, an entity-relationship model must be defined. Ex. 1014 at 79-106. In order to define the entity-relationship model, a user must establish rules, in the relational database, that define the entities, how the entities are interrelated, and how information can be inserted or used within the relational database, usually using a data definition file. Ex. 1004 at 49-56; Ex. 1014 at 31-38.

137. The ‘316 Patent explains the rules as:

Rules definition is by association of specific, non-iterative calculation, as described below, a set of object or event attributes defined as a data filter (*see Relational Data Base Management System textbooks*).

Ex. 1001 at 11:25-28. The '316 Patent above admits that rule definitions, generally, are well-known in the art and are described by textbooks on "Relational Data Base Management System[s]." This is consistent with what is described in the "*Using SQL*" book incorporated by reference and cited in this section. Ex. 1004 at 15-17, 212.

138. Additionally, within the SQL standard used in many database systems well-known at the time of the invention, there are many operations that are defined to establish rules in a relational database system for selecting and processing information. Specifically, SQL provides at least the capability to define stored procedures (executable programmatic logic stored in the database system), stored functions, macros, triggers, views, and indexes. Ex. 1004 at 15-17, 212; Ex. 1014 at 122, 453, 469-470. Each of these functions provides the capability inherent in most databases to establish rules within the database for processing information. Ex. 1004; Ex. 1014 at 110-130; 159, 275. SQL also provides the capability to select various objects in the database through, at least, the SELECT query function. Ex.

1004 at 78. Each of these functions is defined in the open standard for SQL, and is well-known, routine and conventional within the art.

139. As discussed in Section VII.C.1[d], *Blain* discloses calculating profitability using rules, explaining that “cost data are allocated according to rules which are under your control” and that the system can “[a]llocate, or set up rules to allocate, activity costs.” Ex. 1006 at 284, 311. As discussed in Section VII.D.1[d], *SAP-IS-B* discloses calculating profitability using “costing rules, regulatory reporting rules, [and] risk management rules.” Ex. 1007 at 27. *SAP-IS-B* also describes mapping rules for data transferred to or from external regulatory reporting systems as:

Conversion Rule

The conversion rules for mapping sender to receiver structures are ***maintained by the user within customizing.***

The ***rules support the conversion of data structures*** from the external (operational) systems to the IS-B data structures.

Ex. 1007 at 87. *SAP-IS-B* also teaches that:

Customizing

Within IS-B, customizing (or configuration) involves the adjustment ***(parametrization) of the standard sample***

bank model provided as part of the IS-B System. The *system is customized per installation so that it meets the individual requirements of the respective bank*. The aim is to align the internal business processes of the bank and the pre-defined structures of the R/3 System.

Ex. 1007 at 87.

“performing a profit calculus”

140. The claim limitation of “performing a profit calculus” also fails to provide an inventive concept to Claim 1. Calculating profit values using a relational database was well-known in the art and was a conventional use of a relational database. See Ex. 1006; see also Ex. 1007.

141. As discussed in Section VII.B.1[d], *E&Y* discloses a calculating profit using cost drivers to allocate activity costs to cost objects, in order to generate a profitability report. Ex. 1005 at 139, 275-277. As discussed in Section VII.D.1[d], *SAP-IS-B* explains that the “Bank Profitability Analysis” is performed for any “customer group, product, risk class, branch” based on user-assigned rules. Ex. 1007 at 60. As discussed in Section VII.C.1[d], *Blain* disclose that a user can “display a business-oriented profit and loss analysis” that is “scrutinized down to the details of the individual transactions,” where the “cost data are allocated according to rules which are under your control.” Ex. 1006 at 311.

142. Thus, Claim element 1[d] fails to provide an inventive concept sufficient to turn Claim 1 into patent-eligible subject matter.

(vi) Claim element 1[e]

1[e]	using the relational database management system to independently calculate at least one marginal value of profit for each object being measured using the established rules as applied to a selected set of prepared information

143. Claim element 1[e] recites the generic technology, discussed previously, of an RDBMS to “independently calculate” at least one “marginal value of profit” using the established rules. As discussed in claim elements 1[b-d], using an RDBMS does not constitute an inventive concept. *Supra* VII.A.1(iii)-VII.A.1(v).

144. As discussed in Section VII.D.1[e], *SAP-IS-B* discloses independently calculating marginal values of profit, explaining that “all selected costing methods are analyzed simultaneously.” Ex. 1007 at 36. *SAP-IS-B* also discloses that “[w]ithin the Cost Accounting module, various cost accounting systems can run in parallel” and that “you can directly assign those revenues and costs which cannot be assigned to single transactions to profitability segments.” Ex. 1007 at 10, 60. As discussed in Section VII.C.1[e], *Blain* discloses that the “system automatically updates a subtotal of a balance sheet account for every business transaction.” Ex. 1006 at 221.

“marginal value of profit”

145. The claim language of calculating “at least one marginal value of profit” is also well-known in the art and fails to provide an inventive concept. The ‘316 Patent defines “marginal value of profit” in multiple ways, including by calculating “provisioning (P),” “net interest (NI), other revenue (OR) and direct expense (DE).” Ex. 1001 at Claims 3-4. The prosecution history further describes “methods of marginal pricing (activity based costing or funds transfer pricing),” indicating that a “marginal value of profit” includes at least activity based costing and funds transfer pricing. Ex. 1015 at 256. As explained in Claim element 1[c], funds transfer pricing was well-known in the art at the time. *Supra* VII.A.1(iv). The concept of activity-based costing is explained in detail by prior art, by at least *E&Y*, *Mabberley*, and *Blain*. Ex. 1005 at 123-140; *see* Ex. 1008 (entitled “*Activity-based Costing in Financial Institutions*”); Ex. 1006 at 284-298. The prior art, as described in Sections VII.B.1[e], VII.C.1[e], and VII.D.1[e], also demonstrates that calculating values for provisioning, net interest, other revenue, and direct expense at a product level was well-known and routine in the art. *E&Y* depicts calculating each of NI (“net interest income”), OR (“other income”), DE (“noninterest expense”), and P (“provision for loan losses”) at a customer level in the following table:

Figure 5-6—Sample Customer Profitability

	Total	Lines and Commitments	Loans	Fee Services	Deposits
Interest Income	\$50		\$50		
Interest Expense	(10)				\$(10)
Credit/(Charge) for Funds	(10)		(40)		30
Net Interest Income	30	—	10	—	20
Provision for Loan Losses	(1)	—	(1)	—	—
Net Interest Income after Provisions for Loan Losses	29		9		20
Waived Fees	(29)			\$(29)	
Other Income	42	\$10	2	30	
Noninterest Expense	(39)	(2)	(1)	(35)	(1)
Contribution	3	<u>\$ 8</u>	<u>\$10</u>	<u>\$(34)</u>	<u>\$19</u>
Overhead Expense	(4)				
Income before Taxes	<u>\$(1)</u>				

Ex. 1005 at 45. *E&Y* also discloses calculating object level profit using prepared information stored in the database. Ex. 1005 at 129, 239, 255-257, 320. *Blain* also discloses multiple methods of using prepared information to calculate profitability, including methods of identifying data in legacy databases and using rules to process the prepared data. Ex. 1006 at 36-38, 54-57, 89, 283-299, 302-309, 315, 356.

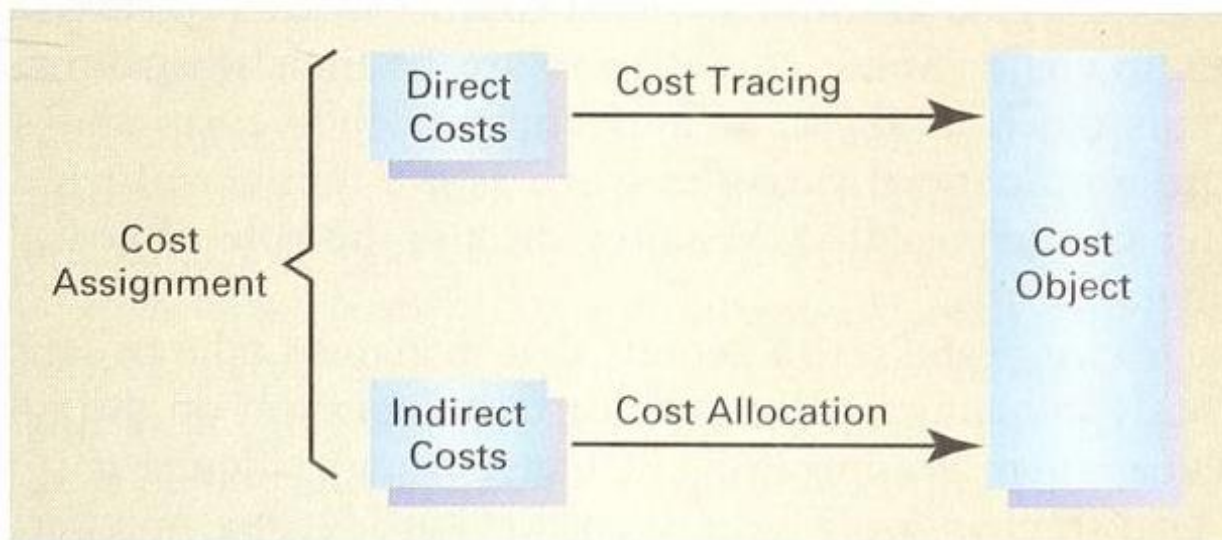
146. For these reasons, Claim element 1[e] fails to provide an inventive concept sufficient to turn Claim 1 into patent-eligible subject matter.

(vii) Claim element 1[f]

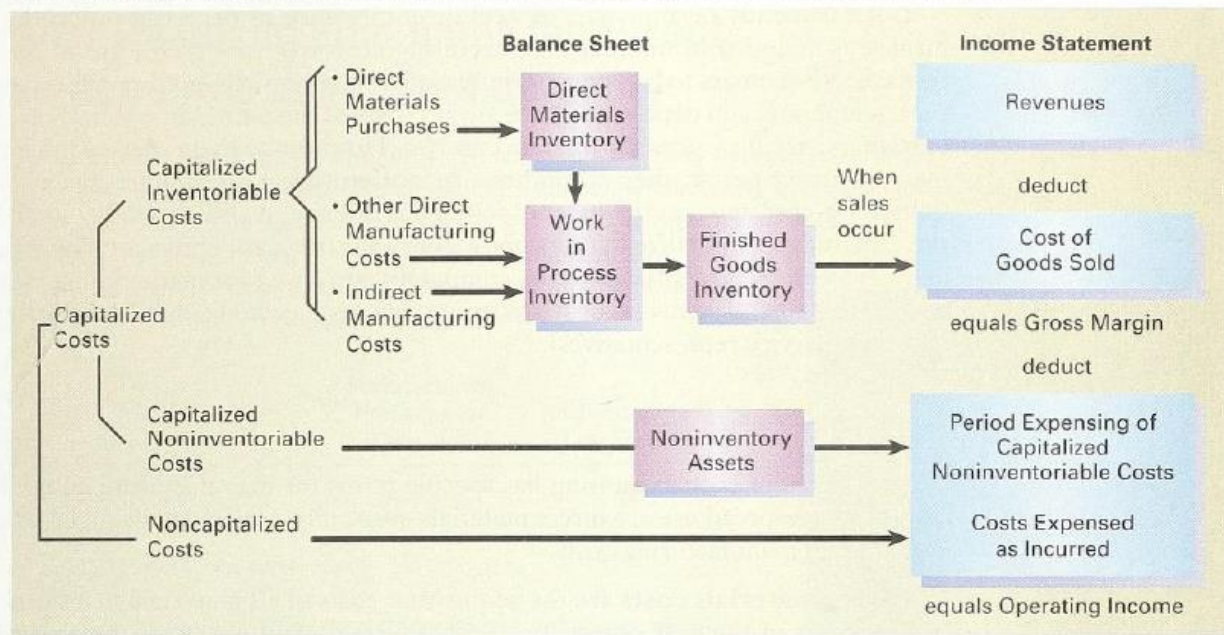
1[f] combining the at least one marginal value of profit to create a measure for object level profitability

147. Element 1[f] recites combining “the at least one marginal value of profit” to “create a measure for object level profitability.” As described in relation to Claim element 1[e], calculating a marginal value of profit was well known in the art. See VII.A.1[vi]; Ex. 1005 at 42-45. Simply combining a marginal value of profit in a conventional fashion does not provide an inventive step.

148. *Horngren* depicts combining a marginal value of profit (i.e., direct costs, indirect costs) into a cost object used for calculating object level profitability, as depicted below:



Ex. 1013 at 27. *Horngren* also depicts combining the direct and indirect costs with revenue elements (i.e., net interest, other revenue) to calculate object level profitability:

EXHIBIT 2-10**Manufacturing-Sector Income Statement: Relationship of Capitalized and Noncapitalized Costs**

Ex. 1013 at 39.

149. As discussed in Section VII.B.1[f], *E&Y* depicts combining a marginal value of profit (*i.e.*, net interest income, provision for loan losses, other income, direct expense, indirect expense) at a product, customer, or organization level. Ex. 1005 at 42-45. As discussed in Section VII.D.1[f], *SAP-IS-B* also depicts combining a marginal value of profit for every transaction. Ex. 1007 at 63.

“create a measure for object level profitability”

150. The recitation of creating a “measure for object level profitability” does not provide an inventive step sufficient to turn the abstract idea of “calculating object level profitability” into patent-eligible subject matter. As described in relation to Claim element 1[c], the measurement of profit at various

levels of granularity (*e.g.*, at a product, customer, or organization level) was well-known in the art. *See supra* VII.A.1(iv). Combining a “marginal value of profit” to create a measure of profitability at different levels of granularity were also well-known in the art. Ex. 1005 at 42-45. Thus, element 1[f] fails to provide an inventive step.

151. The particular combination of elements in claim 1 also fails to provide an inventive concept, as they merely combine conventional components in a conventional manner to implement the abstract idea. For example, calculating opportunity values and marginal values of profit were well-known in the art at the time of the invention. Additionally, the combination of these elements, using an RDBMS, was well-known routine, and conventional. *See* Ex. 1013. Since none of Claim elements 1[a-f] provide an inventive concept, Claim 1 fails to provide “significantly more” than the abstract idea of “calculating object level profitability.” Using the generic technologies of a computer, a relational database, and an RDBMS to calculate the well-known accounting concepts of opportunity values and marginal values of profit at various levels of granularity fails to transform Claim 1 into patent-eligible subject matter.

2. Elements recited in the dependent claims do not alter the analysis.

152. Like independent Claim 1, the elements of the dependent claims are directed to various abstract ideas or formulas, and recite no “inventive concept” that would transform the claims into eligible subject matter. Instead, the other recitations in the claims add nothing more than insignificant post-solution activity that does not transform the abstract idea into an inventive concept. *Apple*, 2016 WL 6958650, at *8-10; *Mayo*, 132 S. Ct. at 1298 (“[T]he prohibition against patenting abstract ideas cannot be circumvented by ... adding insignificant post-solution activity.”).

153. Claims 3, 6, and 9-30 simply recite formulas for calculating profit that are themselves abstract ideas. The Supreme Court, in *Flook*, held that “a claim for an improved method of calculation, even when tied to a specific end use, is unpatentable subject matter under § 101.” *Parker v. Flook*, 437 U.S. 584, 595 n.8 (1978).

154. Additionally, Claims 3-30 simply further specify the calculations depicted in Claim 1, and fail to provide anything more than the abstract idea of “collecting information, analyzing it, and displaying certain results.”

(i) Claim 2

2	The process of Claim 1, wherein the relational database comprises a structured query language (SQL).

155. Claim 2 simply recites the generic technology of a “relational database” that comprises a “structured query language (SQL).” Claim 2 does not improve on the technologies of SQL or relational databases; it just uses them in a generic way.

156. As discussed throughout, and particularly in Sections VII.A.1(iii)-VII.A.1(v), relational databases were well-known in the art. *See* Ex. 1004; Ex. 1014 at 52-72; *see also* Ex. 1018. Using SQL with a relational database was also well-known, routine and conventional in the art, having been adopted as an official relational database language standard in the United States by the American National Standards Institute (“ANSI”) in 1982, and internationally by the International Organization for Standardization (“ISO”) in 1987. Ex. 1004 at 3; Ex. 1014 at 65-68. In fact, using SQL with a relational database was so commonplace that the only reference to SQL within the ‘316 Patent specification is in the title of an incorporated prior art reference (Ex. 1004). Ex. 1001 at 2:53-55; *see* Ex. 1004. Inasmuch as Claim 2 is enabled within the written description, it is enabled because the use of SQL with a relational database was well-known, routine, and conventional in the art.

157. As discussed in Section VII.C.2, *Blain* expressly discloses using SQL with a relational database to calculate object level profitability. Ex. 1006 at 36, 57-58, 181, 1060. Similarly, as discussed in Section VII.D.2, *SAP-IS-B* discloses

using SQL with a relational database to calculate object level profitability. Ex. 1007 at 23, 60-62. Thus, using SQL with a relational database was well-known, routine, and conventional in the art at the time of the invention.

158. The claim limitation of using a relational database with SQL was well-known in the art and fails to add an inventive step to the abstract idea of calculating object level profitability.

(ii) Claim 3

3[a] wherein the step of calculating at least one marginal value of profit includes the steps of calculating net interest (NI), other revenue (OR) and direct expense (DE)

159. Claim 3 describes the step of calculating a marginal value of profit as calculating “net interest (NI), other revenue (OR) and direct expense (DE),” each of which was well-known in the art both individually and as a combination. Ex. 1005 at 42-45; Ex. 1018 at 10-11. For example, *E&Y* depicts the calculation as:

Figure 5-6—Sample Customer Profitability

	Total	Lines and Commitments	Loans	Fee Services	Deposits
Interest Income	\$50		\$50		
Interest Expense	(10)				\$(10)
Credit/(Charge) for Funds	(10)		(40)		30
Net Interest Income	30		10		20
Provision for Loan Losses	(1)		(1)		
Net Interest Income after Provisions for Loan Losses	29		9		20
Waived Fees	(29)			\$(29)	
Other Income	42	\$10	2	30	
Noninterest Expense	(39)	(2)	(1)	(35)	(1)
Contribution	3	<u>\$ 8</u>	<u>\$10</u>	<u>\$(34)</u>	<u>\$19</u>
Overhead Expense	(4)				
Income before Taxes	<u>\$(1)</u>				

Net Interest

Other Revenue

Direct Expense

Ex. 1005 at 45 (emphasis added). The combination of these terms was so commonplace, that the 1996 Annual Report for Wells Fargo (Ex. 1018) included results, separated by lines of business, combining net interest (“net interest income”), other revenue (“non-interest income”), and direct expense (“noninterest expense”).

TABLE 3 LINE OF BUSINESS RESULTS (ESTIMATED)

(income/expense in millions, average balances in billions)	Retail Distribution Group		Business Banking Group		Investment Group	
	1996	1995	1996	1995	1996	1995
Net interest income (1)	\$ 836	\$463	\$ 612	\$372	\$ 745	\$ 472
Provision for loan losses (2)	10	1	99	55	4	1
Noninterest income (3)	1,046	560	265	144	475	464
Noninterest expense (3)	1,858	961	428	276	626	425
Income before income tax expense (benefit)	14	61	350	185	590	510
Income tax expense (benefit) (4)	6	26	144	79	243	216
Net income (loss)	\$ 8	\$ 35	\$ 206	\$106	\$ 347	\$ 294
Average loans	\$ —	\$ —	\$ 4.3	\$ 2.4	\$ 1.6	\$ 0.5
Average assets	1.9	1.0	6.4	3.6	2.3	0.8
Average core deposits	16.2	9.4	11.2	6.4	32.2	18.0
Return on equity (5)	1%	7%	28%	28%	50%	66%
Risk-adjusted efficiency ratio (6)	109%	103%	73%	75%	62%	54%

Ex. 1018 at 10-11. The calculation of each of these individual terms is also described in additional detail in Claims 3[b]-[e] below.

3[b] wherein net interest (NI) is the summation of interest income, value of funds provided and earnings on equity funds used less the sum of interest expense and costs of funds used

160. The additional claim element 3[b] was well-known in the art and the calculation is commonly referred to as funds transfer pricing. Ex. 1001 at 8:43-47. For example, *Wells* explains that net interest income is calculated as “the difference between actual interest earned on assets (and interest paid on liabilities) owned by a group and a funding charge (and credit) based on a Company’s cost of funds.” Ex. 1018 at 10. *Wells* also describes adjusting net interest for equity funds used, explaining that “[e]quity is allocated to the lines of business based on an assessment of the inherent risk associated with each business so that the returns on allocated equity are on a risk-adjusted basis and comparable across business lines.” Ex. 1018 at 11. *Horngren* also describes transfer pricing and allocating the cost of debt and equity to products, projects, and investments made within an organization, explaining that the “cost of equity capital is the opportunity cost to investors of not investing their capital in another investment that is similar in risk.” Ex. 1013 at 904-916, 937.

161. As described in Sections VII.B.3 and VII.D.3, prior art establishes calculating net interest as routine, describing that “all assets will receive funding charges and all liabilities and equity will receive funding credits.” Ex. 1005 at 178; *see also* Ex. 1007 at 48-50, 62-65.

3[c] other revenue (OR) is a measure of profit contribution from non-interest related sources, and

162. The calculation of OR, as a profit contribution from non-interest related sources, was well-known, routine and conventional at the time of the invention. For example, *Horngren* depicts the calculation of revenue from non-interest related sources and applies those revenues to a product, customer, or organization level. Ex. 1013 at 576-585. *Mabberley* discloses calculating other revenue in the form of fees and commissions. Ex. 1008 at 70-71, 117. *Wells* also depicts calculating non-interest income allocated to each business unit. Ex. 1018 at 10-11.

163. Additionally, as described in Section VII.B.3, *E&Y* depicts calculating non-interest income as other income, noninterest revenues from fees, transactions charges, and commissions. Ex. 1005 at 45, 63. As discussed in Section VII.D.3, *SAP-IS-B* also depicts calculating other revenue in the form of commissions attributed to a single transaction. Ex. 1007 at 33.

164. Thus, calculating the well-known value of other revenue was well-known, routine, and conventional at the time of the invention.

3[d] direct expense (DE) is the profit value reduction due to marginal resource consumption by the object

165. The calculation of DE was well-known in the art at the time of the invention. Ex. 1018 at 10-11; Ex. 1013 at 27-28, 96-102. For example, *Horngren* explains that “[d]irect costs of a cost object are costs that are related to the particular cost object and that can be traced to it.” Ex. 1013 at 27-28, 96-102. Similarly, *Mabberley* explains that “[m]arginal costs are defined as those costs incurred by the production of an additional unit of an activity, product or service.” Ex. 1008 at 74.

166. As discussed in Section VII.B.3, *E&Y* discloses making “marginal pricing decisions” using “costs directly related to the product.” Ex. 1005 at 42-45, 204. As discussed in Section VII.D.3, *SAP-IS-B* discloses calculating “standard unit costs” as “direct and directly attributable costs” for each transaction. Ex. 1007 at 33, 55-60.

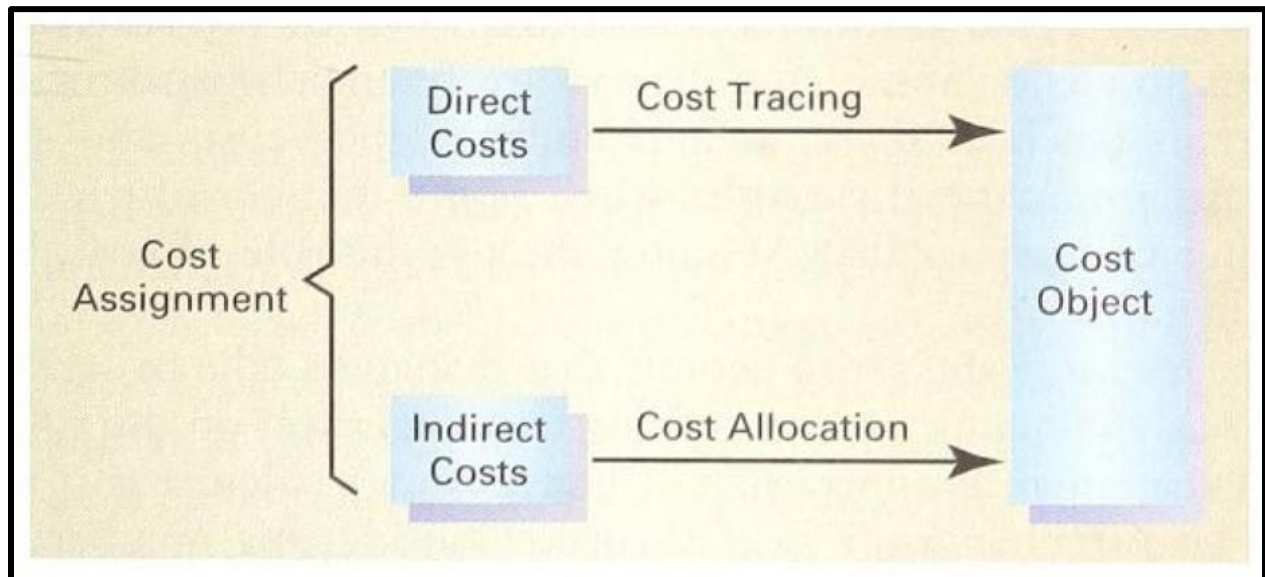
167. The well-known calculations of net interest, other revenue, and direct expense fail to provide an inventive step necessary to make Claim 3 directed to patent-eligible subject matter.

3[e] indirect expense (IE) due to non-object related resource consumption

168. Claim element 3[e] recites the calculation of indirect expense as “non-object related resource consumption.” This concept was well-known in the art at the time of the invention.

169. The ‘316 Patent describes the “Indirect Expense (IE) is an apportioned profit value adjustment for all non-object related resource consumption by the business.” Ex 1001 at 5:12-14, Claim 5.

170. *Horngren* depicts the calculation of indirect expense, allocated to a cost object, as:



Ex. 1014 at 27. *Mabberley* discloses that “[w]here full absorption costing is required, the indirect costs must also be allocated to products.” Ex. 1008 at 134.

171. As described in Section VII.B.3[e], *E&Y* describes the “Fully Absorbed Accounting Approach”: Under this approach, the sum of the profits/losses

of all reported units equals the profits/losses of the entire institution, regardless of whether the reported units are organizational units, products, customers, or any other aspect of an institution's business.” Ex. 1005 at 46. As discussed in Section VII.D.3[e], *SAP-IS-B* also discloses calculating “indirect costs” to “fully absorb the cost involved in a single transaction.” Ex. 1007 at 55-60.

172. Thus, Claim element 3[e] also fails to provide an inventive step that is significantly more than the abstract idea of calculating object level profitability.

(iii) Claim 4

4	The process of Claim 1, wherein the step of calculating at least one marginal value of profit includes the step of provisioning (P) for the selected set of prepared information, provisioning being the expected profit value adjustment for future outcomes related to the object.

173. Claim 4 fails to provide an inventive step in calculating a “marginal value of profit” as “provisioning.” The ‘316 Patent defines “Provision – Adjusting current profit for expected future value changes is known as ‘actuarial’ provisioning. *The technique is well known by the financial industry's accounting practice.*” Ex. 1001 at 9:49-52. The ‘316 Patent admits that step of calculating provisioning was well-known in the financial industry at the time of the invention.

174. Provisioning for expected future outcomes was commonplace in financial institutions and often a requirement for regulatory compliance (*e.g.*,

GAAP, IFRS). See Ex. 1018. *Wells* depicts a breakdown of loan loss provisions per business line as:

(income/expense in millions, average balances in billions)	Retail Distribution Group		Business Banking Group		Investment Group	
	1996	1995	1996	1995	1996	1995
Net interest income (1)	\$ 836	\$463	\$ 612	\$372	\$ 745	\$ 472
Provision for loan losses (2)	10	1	99	55	4	1
Noninterest income (3)	1,046	560	265	144	475	464
Noninterest expense (3)	1,858	961	428	276	626	425
Income before income tax expense (benefit)	14	61	350	185	590	510
Income tax expense (benefit) (4)	6	26	144	79	243	216
Net income (loss)	\$ 8	\$ 35	\$ 206	\$106	\$ 347	\$ 294
Average loans	\$ –	\$ –	\$ 4.3	\$ 2.4	\$ 1.6	\$ 0.5
Average assets	1.9	1.0	6.4	3.6	2.3	0.8
Average core deposits	16.2	9.4	11.2	6.4	32.2	18.0
Return on equity (5)	1%	7%	28%	28%	50%	66%
Risk-adjusted efficiency ratio (6)	109%	103%	73%	75%	62%	54%

Ex. 1018 at 10-11. *Wells* describes the provisioning in a footnote to “Table 3” above, explaining that:

The provision allocated to the line groups for 1996 and 1995 is based on management’s current assessment of the normalized net charge-off ratio for each line of business. In any particular year, the actual net charge-offs can be higher or lower than the normalized provision allocated to the lines of business. The difference between the normalized provision and the Company provision is included in Other.

Ex. 1018 at 10. *Wells* also describes an internally established process for calculating provisions for loan losses, including when to realize loan losses. Ex. 1018 at 24-25. Additionally, *Mabberley* describes calculating “provisions (loan loss, insurance claims, sovereign debt and other loss provisions),” and that “specific provisions are established at the product as well as customer level.” Ex. 1008 at 115, 131. *Horngren* describes calculating income tax provisions, spoilage provisions, and sales return provisions. Ex. 1013 at 42, 577, 662.

175. As discussed in Section 0, *E&Y* describes calculating a loan loss provision as “the total expected loss over the life of the portfolio” that “can be applied against business-unit and product level balances.” Ex. 1005 at 209, 212. As discussed in Section VII.D.3, *SAP-IS-B* depicts calculating provisions including risk costs, minimum reserve costs, and deposit protection costs. Ex. 1007 at 33, 60-66, 88. Thus, Claim 4 fails to provide an inventive concept.

(iv) Claim 5

5	The process of Claim 1, including the step of calculating a profit adjustment value by calculating the value for indirect expense (IE) which is an apportioned profit value adjustment for all non-object related resource consumption.

176. Claim 5 describes the routine task of calculating “indirect expense” which was well-known, routine, and conventional in the art. *Supra* VII.A.2(iv). As discussed in Section VII.A.2(ii), the calculation of IE was well-

known, routine, and conventional at the time of the invention. Claim 5 does not provide any significant limitation beyond what is already present in Claim 1.

177. *Horngren* teaches that “[i]ndirect costs of a cost object are costs that are related to a particular cost object but cannot be traced to it” and “are allocated to the cost object using a cost allocation method.” Ex. 1013 at 27, 110, 458, 510. *Mabberley* discloses that “[w]here full absorption costing is required, the indirect costs must also be allocated to products.” Ex. 1008 at 134.

178. As described in Section VII.B.3[e] and VII.B.5, *E&Y* explains that “[u]nder the full-absorption approach, fixed costs are included in the unit cost, as well as any indirect or overhead costs related to the particular organizational unit,” and that the indirect expense “can be used in reporting from any dimension, including product, branch, organizational, or customer profitability.” Ex. 1005 at 41, 86. As described in Section VII.D.3[e] and VII.D.5, *SAP-IS-B* also discloses calculating “indirect costs” to “fully absorb the cost involved in a single transaction.” Ex. 1007 at 55-60.

179. Calculating indirect expense at various levels of granularity was well-known, routine and conventional in the art at the time of the invention and fails to provide an inventive step.

(v) Claim 6

6	The process of Claim 5, wherein the combining step includes the steps of adding net interest (NI) and other revenues (OR), and subtracting therefrom direct expense (DE), provisioning (P) and indirect expense (IE).

180. Claim 6 recites the simple calculation of adding NI and OR, and subtracting therefrom DE, P, and IE. Since calculating each of the individual values was well-known, the simple combination of these elements in a conventional fashion does not provide an inventive concept.

181. As described in Section VII.B.6, the calculation of Claim 6 is depicted by *E&Y*, where NI (“net interest income”) and OR (“other income”) are added together, and DE (“noninterest income”), P (“provision for loan losses”), and IE (“overhead expense”) are subtracted therefrom. Ex. 1005 at 42-45. As described in Section VII.D.6, this calculation is also depicted in *SAP-IS-B*, in the following figure:

Interest income					
- Opportunity income					
= Interest terms contribution - active					
+ Commission income					
- Commission costs					
= Commission contribution (subtotal)					
= Contribution margin I					
- Standard unit costs					
- Standard cancellation costs					
- Equity capital costs					
= Contribution margin II					
- Indirect costs					
= Contribution margin III = market result					

Interest Income/Expense
± Opportunity Values (COF/VOF)
(± Equity Capital Costs)
Net Interest

+ Other Revenue

- Direct Expenses

- Direct Expenses

- Provisioning

- Indirect Expenses

Ex. 1007 at 63 (emphasis added).

182. A conventional combination of well-known elements fails to add an inventive concept to an abstract idea. Additionally, the calculation of Claim 6 was well-known, routine, and conventional in the art at the time of the invention.

(vi) Claim 7

7 The process of Claim 6, including the step of adjusting the measure for object level profitability for taxes and/or object economic value.

183. Claim 7 recites the well-known tasks of adjusting profitability for “taxes and/or object economic value.” The claim language indicates that

adjusting profitability for either taxes or object economic value are sufficient to meet the limitations of the claim. The ‘316 Patent defines object economic value as:

Equity Allocation - In order for precise net interest revenue or *economic value adjusting calculations the amount of equity funds required at an object level must be determined*. DPM's equity allocation to the object level calculations may use any of the following methods: simple ratios; *regulatory definitions; economic allocations based on econometric modeling (see book on Modern Portfolio Theory) methodologies*; or, as statistically defined allocations.

Ex. 1001 at 8:56-64. The ‘316 Patent admits that object economic value calculation methods were well-known in the art, since they were included in regulatory definitions and included in books on “Modern Portfolio Theory.”

184. Wells depicts adjusting profitability for each business group for taxes. Ex. 1018 at 10-11. Wells also describes adjusting profitability for object economic value, explaining that “[e]quity is allocated to the lines of business based on an assessment of the inherent risk associated with each business so that the returns on allocated equity are on a risk-adjusted basis and comparable across business

lines.” Ex. 1018 at 11. *Hornsgren* describes calculating object economic value by describing the calculation of “economic value added (EVA).” Ex. 1013 at 937.

185. As discussed in Section VII.B.7, *E&Y* discloses the ‘316 Patent’s method of using a “single, average tax rate when taxes are included in profitability reports.” Ex. 1005 at 73. *E&Y* also discloses calculating object economic value by “allocat[ing] shareholder equity strictly by asset percentage” in order to calculate the “ROE for business units, products, or customers.” Ex. 1005 at 14-15.

186. The ‘316 Patent admits that the step of adjusting object level profitability for economic value was well-known, routine, and conventional at the time of the invention. Ex. 1001 at 8:56-64. Further, the art cited above demonstrates that adjusting for either taxes or object economic value was well-known in the art at the time of the invention. Thus, Claim 7 fails to provide an inventive concept.

(vii) Claim 8

8	The process of Claim 1, wherein the opportunity values are based on matched maturity funds transfer pricing theory, where the values are market alternative supplies or uses of funds having matched interest and payment characteristics.

187. Claim 8 recites that “the opportunity values are based on matched maturity funds transfer pricing theory,” and defines matched maturity funds transfer pricing theory as “market alternative supplies or uses of funds having matched interest and payment characteristics.” The ‘316 Patent admits that matched maturity

funds transfer pricing was well-known, routine, and conventional by explaining that the “common name for this approach to valuing is know[n] as ‘Matched Maturity Funds Transfer Pricing.’” Ex. 1001 at 8:43-47.

188. The concept of matched maturity funds transfer pricing was well-known, routine, and conventional in the art at the time of the invention. Ex. 1013 at 906-916. Calculating opportunity values based on matched maturity funds transfer pricing theory was often required by accounting and financial regulations at the time of the invention. Ex. 1013 at 913-916. *Mabberley* describes the matched funding method as matching rates “based on the maturity and pricing structure of the asset or liability to be matched.” Ex. 1008 at 66.

189. As discussed in Sections VII.B.8 and VII.D.7, *E&Y* and *SAP-IS-B* both teach the process of matched maturity funds transfer pricing for various objects. Ex. 1005 at 180, 258; Ex. 1007 at 47-53, 89.

190. The recitation of the well-known and routine calculation, as admitted by the ‘316 Patent and described in the prior art, of matched maturity funds transfer pricing in Claim 8 fails to provide an inventive concept.

(viii) Claims 9, 13, 17, and 21

191. Dependent Claims 9, 13, 17, and 21 all recite substantially similar language and formulas for calculating net interest based on interest income,

interest expense, cost of funds used, and value of funds provided. The primary differences between these claims relate to the factors used to select a treatment rate for the cost of funds and value of funds calculation. *See* Ex. 1001 at Claims 9, 13, 17, and 21. For example, Claim 13 discloses identifying the object's product type/group, and then determining the treatment rate on the product's type/group, given the balance class and tier. Claim 17 identifies the object's product and object attributes, and then determining the treatment rate on the product's type, given the balance class and tier/tenor. Claim 21 identifies the object's product attributes, object attribute, and behavior types, and then determining the treatment rate based on the product type, balance class, and tier/tenor.

9 The process of claim 3, wherein the Net Interest (NI) is calculated as:

Int Inc(o_i)=Interest Income of object o_i
-COF(o_i)=Cost of funds used by object o_i
-Int Exp(o_i)=Interest Expense for object o_i
+VOF(o_i)=Value of funds provided by object o_i

according to:

Int Inc(o_i)=AAB(o_i)*rate_{asset}(o_i), only if object
attribute doesn't exist;

COF(o_i)=AAB(o_i)*Rt

Int Exp(o_i)=ALB(o_i)*rate_{liability}(o_i), only if object
attribute doesn't exist, and

VOF(o_i)=ALB(o_i)*Rt,

wherein:

AAB(o_i)=Average Asset Balance of the object o_i ,

ALB(o_i)=Average Liability Balance of the object o_i ,

rate_{asset}(o_i)=Effective interest rate for object o_i as an asset
balance,

rate_{liability}(o_i)=Effective interest rate for object o_i as a
liability balance, and

Rt=Treatment rate based on the identified treatment for the
object's product attributes.

- 13 The process of Claim 3, wherein Net Interest (NI) is calculated where summations are over the possible balance variables for the object, according to:

$$IntInc(o_i) = \sum_{\forall c,t} AB_{(asset\ c,t)}(o_i) * rate_{(asset\ c,t)}(o_i),$$

calculate only if

object attribute doesn't exist,

$$-COF(o_i) = \sum_{\forall c,t} AB_{(asset\ c,t)}(o_i) * R_{(asset\ c,t)}R_{(c,t)}(pt(o))$$

$$-IntExp(o_i) = \sum_{\forall c,t} AB_{(liability\ c,t)}(o_i) * rate_{(liability\ c,t)}(o_i),$$

only if object

attribute doesn't exist,

$$+VOF(o_i) = \sum_{\forall c,t} AB_{(liability\ c,t)}(o_i) * R_{(liability\ c,t)}R_{(c,t)}(pt(o)),$$

wherein

$AB_{(c,t)}(o_i)$ =Average Balances of the object o_i ,

$rate_{(c,t)}(o_i)$ =Effective interest rate for the corresponding balance asset or liability,

$Rt(o)$ =Object o 's product type/group as needed to identify treatment rate,

$R_{(c,t)}(pt(o))$ =Rate (treatment rate) for objects of this product type/group, given the balance class, and tier,

$Int\ Inc(o_i)$ =Interest Income of object o_i ,

$COF(o_i)$ =Cost of funds used by object o_i ,

$Int\ Exp(o_i)$ =Interest Expense for object o_i , and

$VOF(o_i)$ =Value of funds provided by object o_i .

- 17 The process of Claim 3, wherein Net Interest (NI) is calculated where summations are over the possible balance variables for the object, according to:

$$IntInc(o_i) = \sum_{\forall c,t} AB_{(asset\ c,t)}(o_i) * rate_{(asset\ c,t)}(o_i), \text{ only if object}$$

attribute doesn't exist,

$$-COF(o_i) = \sum_{\forall c,t} AB_{(asset\ c,t)}(o_i) * R_{(asset\ c,t)}(type_{p,a}(o_i)),$$

$$-IntExp(o_i) = \sum_{\forall c,t} AB_{(liability\ c,t)}(o_i) * rate_{(liability\ c,t)}(o_i),$$

only if object

attribute doesn't exist,

$$+VOF(o_i) = \sum_{\forall c,t} AB_{(liability\ c,t)}(o_i) * R_{(c,t)}(type_{p,a}(o_i)),$$

wherein:

$AB_{(c,t)}(o_i)$ =Average Balances of the object o_i ,

$rate_{(c,t)}(o_i)$ =Effective interest rate for the corresponding balance,

$Type_{p,a}(o_i)$ =Object o_i 's product and object attributes as needed to identify treatment,

$R_{(c,t)}(type_{p,a}(o_i))$ =Rate (treatment rate) for this object's product type, given the balance class, and tier/tenor,

$Int\ Inc\ (o_i)$ =Interest Income of object o_i ,

$COF\ (o_i)$ =Cost of funds used by object o_i ,

$Int\ Exp\ (o_i)$ =Interest Expense for object o_i , and

$VOF\ (o_i)$ =Value of funds provided by object o_i .

21 The process of Claim 3, wherein Net Interest (NI) is calculated where summations are over the possible balance variables for the object, according to:

$\text{Int Inc}(o_i) = \sum \text{AB}_{(asset\ c, t)}(o_i) * \text{rate}_{(asset\ c, t)}(o_i)$ only if object attribute doesn't exist,

$-\text{COF}(o_i) = \sum \text{AB}_{(asset\ c, t)}(o_i) * \text{R}_{(asset, t)}(\text{type}_{p, a, b}(o_i)),$

$-\text{Int Exp}(o_i) = \sum \text{AB}_{(liability, t)}(o_i) * \text{rate}_{(liability, t)}(o_i)$ only if object attribute doesn't exist,

$+\text{VOF}(o_i) = \sum \text{AB}_{(liability, t)}(o_i) * \text{R}_{(liability, t)}(\text{type}_{p, a, b}(o_i)),$

wherein:

$\text{AB}_{(c, t)}(o_i)$ = Average Balances of the object,

$\text{rate}_{(c, t)}(o_i)$ = Effective interest rate for the corresponding balance amounts,

$\text{type}_{p, a, b}(o_i)$ = Object o_i 's product, object attribute, and behavior types as needed to identify treatment rate,

$\text{R}_{(c, t)}(\text{type}_{p, a, b}(o_i))$ = Rate (treatment rate) for objects of this product type, balance class, and tier/tenor,

$\text{Int Inc}(o_i)$ = interest Income of object o_i ,

$\text{COF}(o_i)$ = Cost of funds used by object o_i ,

$\text{Int Exp}(o_i)$ = Interest Expense for object o_i , and

$\text{VOF}(o_i)$ = Value of funds provided by object o_i .

192. Wells discloses that net interest income is calculated as “the difference between actual interest earned on assets (and interest paid on liabilities) owned by a group and a funding charge (and credit) based on a Company’s cost of funds.” Ex. 1018 at 10. *Mabberley* describes calculating net interest using the “average debit and credit balances” multiplied by a “rate applied to funds provided (cost of funds) or offered (earnings credit).” Ex. 1008 at 115.

193. As discussed in Sections VII.B.9 and VII.E.1, prior art establishes calculating net interest as well-known in the art, describing that “all

assets will receive funding charges and all liabilities and equity will receive funding credits.” Ex. 1005 at 178; Ex. 1010 at 22; *see* Ex. 1007 at 48-51, 62-67.

194. The calculation of Claim 9 was well-known, routine and conventional at the time of the invention. Furthermore, the use of a generic financial formula is itself an abstract idea. *See Flook*, 437 U.S. 584. Thus, Claims 9 fails to provide an inventive concept.

(ix) Claims 10, 14, 18, and 22

195. Dependent Claims 10, 14, 18 and 22 all recite substantially the same claim language and formulas for calculating earnings on allocated equity based on the average asset balance, equity ratio, and treatment rate for equity. The only difference between these four claims is their dependency on Claims 9, 13, 17, and 21, respectively. *See* Ex. 1001 at Claims 10, 14, 18, and 22. A comparison of the four claims is provided below to demonstrate their similarity:

10. The process of claim 9, including the step of calculating earnings on allocated equity, where the summation is taken over all asset balances, according to: $EOAE(o_i) = R_{equity} * ER * \Sigma AB_{(asset,t)}(o_i),$ wherein: $AB_{(asset,t)}(o_i)$ = Average Asset balances of the object o_i, including any allocated asset balances, ER = Equity Ratio, and R_{equity} = Treatment Rate for equity.	14. The process of claim 13, including the step of calculating earnings on allocated equity, where the summation is taken over all asset balances, according to: $EOAE(o_i) = R_{equity} * ER * \Sigma AB_{(asset,t)}(o_i),$ wherein: $AB_{(asset,t)}(o_i)$ = Average Asset balances of the object o_i, including any allocated asset balances, ER = Equity Ratio, and R_{equity} = Treatment Rate for equity.

18. The process of claim 17, including the step of calculating earnings on allocated equity, where the summation is taken over all asset balances, according to: $EOAE(o_i) = R_{equity} * ER * \Sigma AB_{(asset,t)}(o_i)$, wherein: $AB_{(asset,t)}(o_i)$ = Average Asset balances of the object o_i, including any allocated asset balances, ER = Equity Ratio, and R_{equity} = Treatment Rate for equity.	22. The process of claim 21, including the step of calculating earnings on allocated equity, where the summation is taken over all asset balances, according to: $EOAE(o_i) = R_{equity} * ER * \Sigma AB_{(asset,t)}(o_i)$, wherein: $AB_{(asset,t)}(o_i)$ = Average Asset balances of the object o_i, including any allocated asset balances, ER = Equity Ratio, and R_{equity} = Treatment Rate for equity.

See Ex. 1001 at Claims 10, 14, 18, and 22. The claim language is exactly the same for each of the four claims, except for the claim dependencies.

10 The process of Claim 9, including the step of calculating earnings on allocated equity, where the summation is taken over all asset balances, according to:

$$EOAE(o_i) = R_{equity} * ER * \Sigma AB_{(asset,t)}(o_i), \text{ wherein:}$$

$AB_{(asset,t)}(o_i)$ = Average Asset balances of the object o_i , including any allocated asset balances,

ER = Equity Ratio, and

R_{equity} = Treatment Rate for equity.

14 The process of Claim 13, including the step of calculating earnings on allocated equity, where the summation is taken over all asset balances, according to:

$$EOAE(o_i) = R_{equity} * ER * \Sigma AB_{(asset,t)}(o_i), \text{ wherein:}$$

$AB_{(asset,t)}(o_i)$ = Average Asset balances of the object o_i , including any allocated asset balances,

ER = Equity Ratio, and

R_{equity} = Treatment Rate for equity.

- 18 The process of Claim 17, including the step of calculating earnings on allocated equity, where the summation is taken over all asset balances, according to:**

$$EOAE(o_i) = R_{equity} * ER * \sum AB_{(asset,t)}(o_i), \text{ wherein:}$$

$AB_{(asset,t)}(o_i)$ = Average Asset balances of the object o_i , including any allocated asset balances,
 ER = Equity Ratio, and
 R_{equity} = Treatment Rate for equity.

- 22 The process of Claim 21, including the step of calculating earnings on allocated equity, where the summation is taken over all asset balances, according to:**

$$EOAE(o_i) = R_{equity} * ER * \sum AB_{(asset,t)}(o_i), \text{ wherein:}$$

$AB_{(asset,t)}(o_i)$ = Average Asset balances of the object o_i , including any allocated asset balances,
 ER = Equity Ratio, and
 R_{equity} = Treatment Rate for equity.

196. Claims 10, 14, 18, and 22 recites calculating earnings on allocated equity (EOAE) by multiplying the treatment rate of equity (R_{equity}) by the equity ratio (ER), and multiplying that result by the sum of all average asset balances ($AB_{(asset,t)}$) associated with the object o_i . The '316 Patent specification states that this option for allocating equity to objects is: "Option 2 EOAE calculation based on a simple equity ratio." Ex. 1001 at 14:36,44-51. I would note that the equation of Claims 10, 14, 18, and 22 are strikingly similar to the calculation of unlevered ROE

and DuPont Analysis, both concepts well-known in the art at the time of the invention.

197. It is important to note that values multiplied outside the summation (“ Σ ”) can be moved into the summation argument by the associative and distributive properties of multiplication. Specifically, depending on whether the equity ratio is a common ratio for the entire organization or a specific equity ratio for the object, the equity ratio times the average asset balance is equal to the equity funds used by the object o_i . For example, a loan of \$1,000 with an equity ratio of 20% results in \$200 of equity allocated to the loan ($\$1,000 \times 0.20 = \$200$). Indeed, the equity ratio is just the equity balance over the asset balance. The result of multiplying the equity ratio and the average asset balance of the object equals the equity used by the object. The result of multiplying the equity used by the object by the treatment rate for equity is the cost (or earnings) of equity used. It is important to note that there is no indication within the ‘316 claims or specification as to how to calculate the treatment rate for equity. It should also be noted that while parent Claim 3 references calculating “earnings on equity funds used,” Claims 10, 14, 18, and 22 refer to the “step of calculating earnings on allocated equity.” For the purposes of this analysis, I am treating these two phrases as if they refer to the same concept.

198. *Horngren* discloses calculating the earnings on allocated equity per product unit:

Invested capital	\$96,000,000
Target rate of return on investment	18%
Total target operating income (18% × \$96,000,000)	\$17,280,000
Target operating income per unit of Provalue II (\$17,280,000 ÷ 200,000 units)	\$ 86.40

Ex. 1013 at 442. Above, *Horngren* shows, for a product line, invested capital ($ER \times \Sigma AB$) times the target rate of return on investment (treatment rate of equity or R_{equity}) to calculate the total target operating income. *Horngren* further shows allocating equity from the product line down to each of the 200,000 units.

199. As discussed in Section VII.B.10, *E&Y* discloses calculating the earnings on allocated equity using the equity ratio multiplied by a treatment rate for equity. Ex. 1005 at 14-15, 178, 219. As discussed in Section VII.E.2, *Kimball* also discloses calculating earnings on allocated equity as “assigned equity” times the “transfer rate.” Ex. 1010 at 22; *supra* VII.E.2. Thus, the formula of Claims 10, 14, 18, and 22 was well-known at the time of the invention.

200. The calculations of Claims 10, 14, 18, and 22 were well-known, routine and conventional at the time of the invention. Furthermore, the use of a generic financial formula is itself an abstract idea. See *Flook*, 437 U.S. 584. Thus, Claims 10, 14, 18, and 22 fail to provide an inventive concept.

(x) Claims 11, 15, 19, and 23

201. Dependent Claims 11, 15, 19, and 23 all recite substantially the same claim language and formulas for calculating earnings on allocated equity based on the amount associated with the object, an object weight, a risk-weighted capital ratio, and treatment rate for equity. The only difference between these four claims is their dependency on Claims 9, 13, 17, and 21, respectively. See Ex. 1001 at Claims 11, 15, 19, and 23. A comparison of the four claims is provided below to demonstrate their similarity:

11. The process of claim 9, including the step of calculating earnings on allocated equity according to: $EOAE(o_i) = R_{equity} * \Sigma [Amount(o_i) * W(Wt(o_i)) * Cap Ratio],$ wherein: Amount(o_i)=Amount(s) associated with object ‘a’ This may be the average asset balances of the object ‘o_i’ including any allocated asset balances, or may be an object parameter, Wt(type(o_i))=Code needed to identify the weight for object o balances, at the object-type level, W(Wt(type(o_i)))=determined by the weight code, Cap Ratio=An appropriate risk-weighted capital ratio chosen, and R_{equity}=Treatment Rate for equity.	15. The process of claim 13, including the step of calculating earnings on allocated equity according to: $EOAE(o_i) = R_{equity} * \Sigma [Amount(o_i) * W(Wt(o_i)) * Cap Ratio],$ wherein: Amount(o_i)=Amount(s) associated with object ‘a’ This may be the average asset balances of the object ‘o_i’ including any allocated asset balances, or may be an object parameter, Wt(type(o_i))=Code needed to identify the weight for object o balances, at the object-type level, W(Wt(type(o_i)))=determined by the weight code, Cap Ratio=An appropriate risk-weighted capital ratio chosen, and R_{equity}=Treatment Rate for equity.

19. The process of claim 17, including the step of calculating earnings on allocated equity according to: $EOAE(o_i) = R_{equity} * \Sigma [Amount(o_i) * W(Wt(o_i)) * Cap Ratio], \text{ wherein:}$ Amount(o_i)=Amount(s) associated with object ‘a’ This may be the average asset balances of the object ‘o_i’ including any allocated asset balances, or may be an object parameter, Wt(type(o_i))=Code needed to identify the weight for object o balances, at the object-type level, W(Wt(type(o_i)))=determined by the weight code, Cap Ratio=An appropriate risk-weighted capital ratio chosen, and R_{equity}=Treatment Rate for equity.	23. The process of claim 21, including the step of calculating earnings on allocated equity according to: $EOAE(o_i) = R_{equity} * \Sigma [Amount(o_i) * W(Wt(o_i)) * Cap Ratio], \text{ wherein:}$ Amount(o_i)=Amount(s) associated with object ‘a’ This may be the average asset balances of the object ‘o_i’ including any allocated asset balances, or may be an object parameter, Wt(type(o_i))=Code needed to identify the weight for object o balances, at the object-type level, W(Wt(type(o_i)))=determined by the weight code, Cap Ratio=An appropriate risk-weighted capital ratio chosen, and R_{equity}=Treatment Rate for equity.

See Ex. 1001 at Claims 11, 15, 19, and 23. The claim language is exactly the same for each of the four claims, except for the claim dependencies.

11 The process of Claim 9, including the step of calculating earnings on allocated equity according to:

$$EOAE(o_i) = R_{equity} * \Sigma [Amount(o_i) * W(Wt(o_i)) * Cap Ratio], \text{ wherein:}$$

Amount(o_i)=Amount(s) associated with object ‘a’ This may be the average asset balances of the object ‘o_i’ including any allocated asset balances, or may be an object parameter,
Wt(type(o_i))=Code needed to identify the weight for object o balances, at the object-type level,
W(Wt(type(o_i)))=determined by the weight code,
Cap Ratio=An appropriate risk-weighted capital ratio chosen, and
R_{equity}=Treatment Rate for equity.

- 15 The process of Claim 13, including the step of calculating earnings on allocated equity according to:**

$$EOAE(o_i) = R_{equity} * \Sigma [Amount(o_i) * W(Wt(o_i)) * Cap Ratio], \text{ wherein:}$$

Amount(o_i)=Amount(s) associated with object 'a' This may be the average asset balances of the object ' o_i ' including any allocated asset balances, or may be an object parameter,

Wt(type(o_i))=Code needed to identify the weight for object o balances, at the object-type level,

W(Wt(type(o_i)))=determined by the weight code,

Cap Ratio=An appropriate risk-weighted capital ratio chosen, and

R_{equity} =Treatment Rate for equity.

- 19 The process of Claim 17, including the step of calculating earnings on allocated equity according to:**

$$EOAE(o_i) = R_{equity} * \Sigma [Amount(o_i) * W(Wt(o_i)) * Cap Ratio], \text{ wherein:}$$

Amount(o_i)=Amount(s) associated with object 'a' This may be the average asset balances of the object ' o_i ' including any allocated asset balances, or may be an object parameter,

Wt(type(o_i))=Code needed to identify the weight for object o balances, at the object-type level,

W(Wt(type(o_i)))=determined by the weight code,

Cap Ratio=An appropriate risk-weighted capital ratio chosen, and

R_{equity} =Treatment Rate for equity.

23 The process of Claim 21, including the step of calculating earnings on allocated equity according to:

$$EOAE(o_i) = R_{equity} * \Sigma [Amount(o_i) * W(Wt(o_i)) * Cap Ratio], \text{ wherein:}$$

Amount(o_i)=Amount(s) associated with object ‘a’ This may be the average asset balances of the object ‘o_i’ including any allocated asset balances, or may be an object parameter,

Wt(type(o_i))=Code needed to identify the weight for object o balances, at the object-type level,

W(Wt(type(o_i)))=determined by the weight code,

Cap Ratio=An appropriate risk-weighted capital ratio chosen, and

R_{equity}=Treatment Rate for equity.

202. Claims 11, 15, 19, and 23 recite calculating earnings on allocated equity by multiplying a treatment rate of equity (R_{equity}) by the summation of the object asset balance (Amount), an object weighting (W(Wt)), and a risk-weighted capital ratio (Cap Ratio). Claims 11, 15, 19, and 23, and the ‘316 Patent, fail to specify what the “weight” of an object balance refers to, or how to calculate the weight. The ‘316 Patent also fails to describe what an “appropriate” risk-weighted capital ratio is. When the capital ratio is not “risk-weighted,” the “capital ratio” may refer to the same concept as the “equity ratio,” since both refer to the amount of equity capital allocated to an object. The ‘316 specification describes the equity allocation formula of Claims 11, 15, 19, and 23 as a “regulatory definition.” Ex. 1001 at 8:56-64. Since the equity allocation formula of Claims 11, 15, 19, and 23 was obvious enough to be included in regulations (*e.g.*, the Basel Accords which, in

the United States, are implemented by regulators including the Office of the Comptroller of the Currency and the Federal Reserve), the equity allocation formula was well-known and routine. *See* Ex. 1018 at 26-28.

203. The ‘316 specification also explains that “[f]our exclusive options are provided for allocating equity to objects,” describing the equity allocation formula of Claims 11, 15, 19, and 23 as “Option 3 Equity allocation for all assets ***following industry standards.***” Ex. 1001 at 14:36-38,52-67. The fact that this equity allocation formula follows industry standards means that the formula was well-known within industry. This description from the ‘316 specification demonstrates that the calculation of earnings on allocated equity according to Claims 11, 15, 19, and 23 were well-known, routine and conventional since they are established “industry standards.”

204. *Wells* depicts calculating earnings (Net Income (loss)) for objects (lines of business):

TABLE 3 LINE OF BUSINESS RESULTS (ESTIMATED)						
(income/expense in millions, average balances in billions)	Retail Distribution Group		Business Banking Group		Investment Group	
	1996	1995	1996	1995	1996	1995
Net interest income (1)	\$ 836	\$463	\$ 612	\$372	\$ 745	\$ 472
Provision for loan losses (2)	10	1	99	55	4	1
Noninterest income (3)	1,046	560	265	144	475	464
Noninterest expense (3)	1,858	961	428	276	626	425
Income before income tax expense (benefit)	14	61	350	185	590	510
Income tax expense (benefit) (4)	6	26	144	79	243	216
Net income (loss)	\$ 8	\$ 35	\$ 206	\$106	\$ 347	\$ 294
Average loans	\$ —	\$ —	\$ 4.3	\$ 2.4	\$ 1.6	\$ 0.5
Average assets	1.9	1.0	6.4	3.6	2.3	0.8
Average core deposits	16.2	9.4	11.2	6.4	32.2	18.0
Return on equity (5)	1%	7%	28%	28%	50%	66%
Risk-adjusted efficiency ratio (6)	109%	103%	73%	75%	62%	54%

Ex. 1018 at 10. *Wells* also depicts allocating equity to lines of business on a risk-adjusted basis. Ex. 1018 at 10-11. In a footnote to the figure above, *Wells* describes its method for allocating equity:

Equity is allocated to the lines of business based on an assessment of the *inherent risk* associated with each business so that the *returns on allocated equity are on a risk-adjusted basis and comparable across business lines.*

Ex. 1018 at 11. Allocating equity to lines of business by assessing the inherent risk of each business, as described in *Wells*, demonstrates that the formula of Claims 11, 15, 19, and 23 was well-known at the time of the invention.

205. As discussed in Section VII.B.11, *E&Y* discloses using equity allocations based on regulatory requirements, market comparables, cost of capital

hurdle rates, risk-based methods, and other capital allocation methodologies. Ex. 1005 at 30. *E&Y* specifically discloses using a “risk-adjusted allocation of capital to product lines” in “institutions with advanced performance measurement systems.” Ex. 1005 at 30. *E&Y* also explicitly discloses calculating “equity allocations based on regulatory requirements,” describing the calculations of Claims 11, 15, 19, and 23 as well-known in the art. Ex. 1005 at 30.

206. As discussed in Section VII.E.3, *Kimball* discloses calculating earnings on allocated equity as the transfer rate (*i.e.*, R_{equity}) times the assigned equity, where the assigned equity is calculated as the regulatory capital requirement (*i.e.*, CapRatio) times a weight (*i.e.*, $W(\text{Wt}(o_i))$) times the asset balance (*i.e.*, $\text{Amount}(o_i)$). Ex. 1010 at 22.

207. Based on all the disclosures discussed above, the calculations of Claims 11, 15, 19, and 23 were well-known, routine and conventional at the time of the invention. Furthermore, the use of a generic financial formula is itself an abstract idea. *See Flook*, 437 U.S. 584. Thus, Claims 11, 15, 19, and 23 fail to provide an inventive concept.

(xi) Claims 12, 16, 20, and 24

208. Dependent Claims 12, 16, 20, and 24 all recite substantially the same claim language and formulas for calculating earnings on allocated equity based

on the amount associated with the object, an equity allocation rule for a cohort, and treatment rate for equity. The only difference between these four claims is their dependency on Claims 9, 13, 17, and 21, respectively. See Ex. 1001 at Claims 12, 16, 20, and 24. A comparison of the four claims is provided below to demonstrate their similarity:

12. The process of claim 9, including the step of calculating earnings on allocated equity, according to: $EOAE(o_i) = R_{equity} * E_{cohort}(o)(Amount(o_i)),$ or $\sum R_{equity} * [\alpha + \beta * Amount(o_i)]$, wherein: Amount($o_i$)=An amount or amounts related to the object, such as average balances of the object (denoted $AB_{(c,s,t)}(o_i)$), Cohort(o_i)=The cohort of objects in which object o is a member, $E_{cohort}(o_i)$=The equity allocation rule for the cohort of object o, according to a linear (two-valued) function that operates on Amount(o_i) of the form $\alpha + \beta * Amount(o)$, and R_{equity}=Treatment Rate(s) for equity for the Amount(o_i) value(s).	16. The process of claim 13, including the step of calculating earnings on allocated equity, according to: $EOAE(o_i) = \sum R_{equity} * E_{cohort}(o)(Amount(o_i)),$ or $\sum R_{equity} * [\alpha + \beta * Amount(o_i)]$, wherein: Amount($o_i$)=An amount or amounts related to the object, such as average balances of the object (denoted $AB_{(c,s,t)}(o_i)$), Cohort(o_i)=The cohort of objects in which object o is a member, $E_{cohort}(o_i)$=The equity allocation rule for the cohort of object o, according to a linear (two-valued) function that operates on Amount(o_i) of the form $\alpha + \beta * Amount(o)$, and R_{equity}=Treatment Rate(s) for equity for the Amount(o_i) value(s).
20. The process of claim 17, including the step of calculating earnings on allocated equity, according to: $EOAE(o_i) = \sum R_{equity} * E_{cohort}(o)(Amount(o_i)),$ or $\sum R_{equity} * [\alpha + \beta * Amount(o_i)]$, wherein: Amount($o_i$)=An amount or amounts related to the object such as average balances of the object (denoted $AB_{(c,s,t)}(o_i)$), Cohort(o_i)=The cohort of objects in which object o is a member, $E_{cohort}(o_i)$=The equity allocation rule for the cohort of object o, according to a linear (two-valued) function that operates on Amount(o_i) of the form $\alpha + \beta * Amount(o)$ and R_{equity}=Treatment Rate(s) for equity for the Amount(o_i) value(s).	24. The process of claim 21, including the step of calculating earnings on allocated equity, according to: $EOAE(o_i) = \sum R_{equity} * E_{cohort}(o)(Amount(o_i)),$ or $\sum R_{equity} * [\alpha + \beta * Amount(o_i)]$, wherein: Amount($o_i$)=An amount or amounts related to the object such as average balances of the object (denoted $AB_{(c,s,t)}(o_i)$), Cohort(o_i)=The cohort of objects in which object o is a member, $E_{cohort}(o_i)$=The equity allocation rule for the cohort of object o, according to a linear (two-valued) function that operates on Amount(o_i) of the form $\alpha + \beta * Amount(o)$ and R_{equity}=Treatment Rate(s) for equity for the Amount(o_i) value(s).

See Ex. 1001 at Claims 12, 16, 20, and 24. The claim language is exactly the same for each of the four claims, except for the claim dependencies.

12 The process of Claim 9, including the step of calculating earnings on allocated equity according to:

$$EOAE(o_i) = R_{equity} * E_{cohort}(o)(Amount(o_i)),$$

or $\Sigma R_{equity} * [\alpha + \beta * Amount(o_i)]$, wherein:

$Amount(o_i)$ = An amount or amounts related to the object, such as average balances of the object (denoted $AB_{(c,s,t)}(o_i)$),

$Cohort(o_i)$ = The cohort of objects in which object o is a member,

$E_{cohort}(o_i)$ = The equity allocation rule for the cohort of object o, according to a linear (two-valued) function that operates on $Amount(o_i)$ of the form $\alpha + \beta * Amount(o)$, and

R_{equity} = Treatment Rate(s) for equity for the $Amount(o_i)$ value(s).

16 The process of Claim 13, including the step of calculating earnings on allocated equity according to:

$$\text{EOAE}(o_i) = \sum R_{\text{equity}} * E_{\text{cohort}}(o)(\text{Amount}(o_i)),$$

or $\sum R_{\text{equity}} * [\alpha + \beta * \text{Amount}(o_i)]$, wherein:

$\text{Amount}(o_i)$ = An amount or amounts related to the object, such as average balances of the object (denoted $\text{AB}_{(c,s,t)}(o_i)$,

$\text{Cohort}(o_i)$ = The cohort of objects in which object o is a member,

$E_{\text{cohort}}(o_i)$ = The equity allocation rule for the cohort of object o , according to a linear (two-valued) function that operates on $\text{Amount}(o_i)$ of the form $\alpha + \beta * \text{Amount}(o)$, and

R_{equity} = Treatment Rate(s) for equity for the $\text{Amount}(o_i)$ value(s).

20 The process of Claim 17, including the step of calculating earnings on allocated equity according to:

$$\text{EOAE}(o_i) = \sum R_{\text{equity}} * E_{\text{cohort}}(o)(\text{Amount}(o_i)),$$

or $\sum R_{\text{equity}} * [\alpha + \beta * \text{Amount}(o_i)]$, wherein:

$\text{Amount}(o_i)$ = An amount or amounts related to the object, such as average balances of the object (denoted $\text{AB}_{(c,s,t)}(o_i)$,

$\text{Cohort}(o_i)$ = The cohort of objects in which object o is a member,

$E_{\text{cohort}}(o_i)$ = The equity allocation rule for the cohort of object o , according to a linear (two-valued) function that operates on $\text{Amount}(o_i)$ of the form $\alpha + \beta * \text{Amount}(o)$, and

R_{equity} = Treatment Rate(s) for equity for the $\text{Amount}(o)$ value(s).

24 The process of Claim 21, including the step of calculating earnings on allocated equity according to:

$$\text{EOAE}(o_i) = \sum R_{\text{equity}} * E_{\text{cohort}}(o)(\text{Amount}(o_i)),$$

or $\sum R_{\text{equity}} * [\alpha + \beta * \text{Amount}(o_i)]$, wherein:

$\text{Amount}(o_i)$ = An amount or amounts related to the object, such as average balances of the object (denoted $\text{AB}_{(c,s,t)}(o_i)$,

$\text{Cohort}(o_i)$ = The cohort of objects in which object o is a member,

$E_{\text{cohort}}(o_i)$ = The equity allocation rule for the cohort of object o , according to a linear (two-valued) function that operates on $\text{Amount}(o_i)$ of the form $\alpha + \beta * \text{Amount}(o)$, and

R_{equity} = Treatment Rate(s) for equity for the $\text{Amount}(o_i)$ value(s).

209. Claims 12, 16, 20, and 24 recite calculating earnings on allocated equity by summing all the treatment rates for equity multiplied by the equity allocation rule for the cohort of the object according to a linear function of the amounts (or balances) related to the object. The ‘316 Patent describes this equity allocation as “Option 4 Equity allocation using an economic allocation rule, based on object cohorts and modern portfolio theory’s capital asset pricing model.” Ex. 1001 at 14:39-41, 15:1-19. I note that CAPM was described as a theory more than ten years after MPT. Although CAPM builds on MPT’s concept of diversifiable and non-diversifiable risk, it is distinct. Making MPT possessive of CAPM (“*modern portfolio theory’s capital asset pricing model*”) would strike most financial economists as wrong. However, Modern Portfolio Theory (“MPT”), and the related

Capital Asset Pricing Model (“CAPM”), were well-known, routine, and conventional approaches to finance and accounting at the time of the invention. Ex. 1005 at 224. The ‘316 Patent further explains that “DPM’s equity allocation to the object level calculations may use . . . economic allocations based on econometric modeling (see book on Modern Portfolio Theory) methodologies.” Ex. 1001 at 8:59-64. The ‘316 Patent, in describing Claims 12, 16, 20, and 24 in terms of MPT and CAPM, demonstrate that the equations in Claims 12, 16, 20, and 24 were well-known, routine, and conventional in the art and obvious for a POSITA to use.

210. The ‘316 Patent also conflates the calculations of Claims 12, 16, 20, and 24 with the concept of Shareholder Value Add (“SVA”) of Claim 29, explaining that:

For those companies which use economic profit value calculations, the formula changes to:

$$\text{Profit}(o_i) = \{ [\text{NIR}(o_i) + \text{OR}(o_i) - \text{DE}(o_i) - \text{IE}(o_i) - P(o_i)] * (1 - \text{EffectiveTaxRate}) \} - \text{SVA}(o_i),$$

where

$$\text{SVA}(o_i) = \alpha(o_i) + \beta(o_i) * \text{Amount}(o_{ii}),$$

and $\alpha(o_i)$, $\beta(o_i)$ are functions for a cohort of objects in which o_i is a member, and $\text{Amount}(o_i)$ is given by a rule which maps o_i to a data value (such as balance, or allocated

equity) also defined at the cohort level. (A cohort defined here represents a grouping of objects with similar risk characteristics, consistent with *Modern Portfolio Theory and the Capital Asset Pricing Model*.)

Shareholder Value Add (SVA) is a method financial analysts use to adjust profit measures for risk. The idea is to subtract from the profit measure the cost of the equity required to support whatever object is being measured. Companies use this risk adjustment measure essentially to *burden the profit for risk being taken with the equity funds used by the object.* These institutions will classify *cohorts of risk* and the risk cost equivalent as a *percentage of account balance or allocated equity (i.e., "Hurdles")*.

Ex. 1001 at 22:36-59. Again, the ‘316 Patent explains that the process of allocating equity using cohorts with similar risk characteristics is taken from MPT and CAPM. In the specification, cohorts of risk are defined as a percentage of account balance or a percentage of allocated equity, referred to in the ‘316 Patent as “Hurdles” or a hurdle rate. Ex. 1001 at 22:57-59. In the paragraph above, the ‘316 Patent also explains that SVA is a “*method financial analysts use* to adjust profit measures for risk,” describing the method as one already well-known and routine for financial

analysts. These descriptions in the ‘316 Patent make it clear that the concept of allocating equity using cohorts, as recited by Claims 12, 16, 20, and 24, was well-known, routine and conventional within the art at the time of the invention.

211. In the airline example provided in the ‘316 Patent, the patent describes the process of Claims 12, 16, 20, and 24 as “allocat[ing] equity based on mileage benefit and have it reduce NI by the ***weighted average cost of capital for the airline.***” This demonstrates that the linear combination described in Claims 12, 16, 20, and 24 can also be considered the weighted average cost of capital (“WACC”). The concept of calculating WACC is a well-known, routine and conventional in the area of finance, and adjusting profit measures for WACC was widely practiced at the time of the invention. Ex. 1013 at 937-938.

212. *Horngren* discloses the calculation of “Economic value added (EVA)” to adjust the income for a given object by the weighted-average cost of capital: “Economic value added (EVA®) equals after-tax operating income minus the (after-tax) weighted-average cost of capital multiplied by total assets minus current liabilities”. Ex. 1013 at 937-938. By describing EVA, *Horngren* is also disclosing SVA of the ‘316 Patent.

213. As discussed in Section VII.B.12, *E&Y* discloses the elements of Claims 12, 16, 20, and 24 in its discussion of allocating equity according to market comparables by using regression or factor-analytic techniques to determine market

betas per business line (or cohort). Ex. 1005 at 224-225. As discussed in Section VII.E.4, *Kimball* also discloses allocating equity by calculating assigned equity based on capital allocations of peer businesses (external cohorts), multiplied by a transfer rate. Ex. 1010 at 19-22.

214. The equity allocation calculation of Claims 12, 16, 20, and 24 were well-known, routine, and conventional at the time of the invention. Furthermore, the use of a generic financial formula is itself an abstract idea. *See Flook*, 437 U.S. 584. Thus, Claims 12, 16, 20, and 24 fail to provide an innovative step.

(xii) Claim 25

25 **The process of Claim 5, wherein the value for indirect expense (IE) is calculated as:**

$$\text{before deferral } IE(o_i) = IE_k * \frac{F(IE_k)(o_i)}{\sum_{o_j \in O(IE)} F(IE_k)(o_j)}$$

added over each set IE_k to
which o_i is related,

$$= \sum_k^{o \in O(IE)} \left(IE_k * \frac{F(IE_k)(o_i)}{\sum_j^{o_j \in O(IE)} F(IE_k)(o_j)} \right)$$

and each of these terms is deferred over its amortization period according to any of the amortization rules (cash, straight line, declining balance, or interest amortization calculations), and where $AM_1(L,R)$ is used to denote the amortization rule and its life:

$$IE(o_i) = \sum_k^{o_i \in O(IE)} AM_1(L, R) \left(IE_k * \frac{F(IE_k)(o_i)}{\sum_j^{o_j \in O(IE)} F(IE_k)(o_j)} \right),$$

and
the result increased by the amounts with remaining amortization life for which amortization was begun in earlier periods.

215. Claim 25 recites the formula for calculating indirect expense based on apportioning some of the total indirect expense to an object, and then amortizing that apportioned indirect expense based on the amortization rule and life

of the object. The apportionment is based on any function as defined by $F(IE_k)(o_i)$, which the '316 Patent describes as using the object balance, object count, event count, or revenue-based apportionment, among other methods. Ex. 1001 at 19:64-22:10. The '316 Patent describes the purpose of amortization, explaining that: “Since DPM is designed to ***mirror a financial statement's profit measure*** it must support deferral and accrual accounting principles. ***Amortization methods are included in DPM to reflect these GAAP concepts.***” Ex. 1001 at 9:22-25. The '316 Patent admits that the amortization methods of Claim 25 were well-known and reflected in regulatory accounting practices.

216. *Hornngren* describes calculating indirect expense, apportioning indirect expenses according to expense pools, and adjusting for the amount of the overall indirect expense incurred in this time period. Ex. 1013 at 100-101.

217. As discussed in Section VII.B.13, *E&Y* describes the indirect expense calculation of Claim 25. Ex. 1005 at 74-76. As discussed in Section VII.C.5, *Blain* teaches amortizing indirect costs, and allocating those costs to cost objects for profitability calculations. Ex. 1006 at 255-256.

218. Thus, the formula of Claim 25 was well-known, routine and conventional at the time of the invention. Furthermore, the use of a generic financial formula is itself an abstract idea. *See Flook*, 437 U.S. 584. Thus, Claim 25 fails to provide an inventive concept.

(xiii) Claim 26

26 The process of Claim 4, provisioning (P) of each object is calculated according to:

$$P(o_i) = PG(o_i) * \frac{\text{Balance of } o_i}{\sum_{o_k \in RPG(o_i)} \text{Balance } o_k}, \text{ wherein}$$

$PG(o_i)$ denotes the P group in which o_i is a member.

219. Claim 26 recites “calculating provisioning (P) of each object” by multiplying the provisioning allocated to a provision group (“PG”) by an apportionment based on the balance of the object as a percentage of the balance of the group. The simple apportionment of a provision group based on “balance” does not add substantially more than the abstract idea of calculating object level profitability. Pooling assets into groups, calculating a provision for the group, and allocating the provision to assets according to their “balance” was well-known, routine, and conventional at the time of the invention. Ex. 1018 at 10-11; Ex. 1013 at 577. In fact, that formula was routinely used in banks for calculating loan loss provisions and reserve requirements. Ex. 1018 at 10-11; Ex. 1005 at 75-79, 209.

220. It is important to note that “RPG(o_i)” recited in the claim does not appear anywhere in the ‘316 Patent specification, claims or figures, and has no

explanation as to what it represents. For the purposes of this discussion, I will assume that RPG refers to the provision group. As discussed in Claims 1[e], 4, and 26-27, provisioning for future expected events was well-known, routine, and conventional in the art at the time of the invention.

221. The airline example presented in the '316 Patent presents this formula as:

$$P(\text{seat}) = \text{Flight: Insurance Premium} * \frac{1}{\text{totalSeatsOnPlane}}$$

Ex. 1001 at 26:42-43. This formula, as applied to the airline example, simply divides the insurance premium for a flight by the total seats on the plane to determine the insurance provision per seat.

222. Wells depicts the calculation of Claim 26 in its calculation of a provision for loan losses:

TABLE 3 LINE OF BUSINESS RESULTS (ESTIMATED)						
(income/expense in millions, average balances in billions)	Retail Distribution Group		Business Banking Group		Investment Group	
	1996	1995	1996	1995	1996	1995
Net interest income (1)	\$ 836	\$463	\$ 612	\$372	\$ 745	\$ 472
Provision for loan losses (2)	10	1	99	55	4	1
Noninterest income (3)	1,046	560	265	144	475	464
Noninterest expense (3)	1,858	961	428	276	626	425
Income before income tax expense (benefit)	14	61	350	185	590	510
Income tax expense (benefit) (4)	6	26	144	79	243	216
Net income (loss)	\$ 8	\$ 35	\$ 206	\$106	\$ 347	\$ 294
Average loans	\$ —	\$ —	\$ 4.3	\$ 2.4	\$ 1.6	\$ 0.5
Average assets	1.9	1.0	6.4	3.6	2.3	0.8
Average core deposits	16.2	9.4	11.2	6.4	32.2	18.0
Return on equity (5)	1%	7%	28%	28%	50%	66%
Risk-adjusted efficiency ratio (6)	109%	103%	73%	75%	62%	54%

Ex. 1018 at 10. *Wells* explains, in a footnote to its results per line of business above, that:

The provision allocated to the line groups for 1996 and 1995 is *based on management's current assessment of the normalized net charge-off ratio for each line of business*. In any particular year, the actual net charge-offs can be higher or lower than the normalized provision allocated to the lines of business. The difference between the normalized provision and the Company provision is included in Other.

Ex. 1018 at 10. *Wells* shows the formula of Claim 26 by taking an overall provision for an organization (PG) and allocating the provision to each line of business according to the net charge-off ratio. Ex. 1018 at 10-11. The net charge-off ratio consists of the net charge-off for a particular line of business ($\text{Balance}(o_i)$) over the total charge-off for all lines of business ($\sum \text{Balance}(o_k)$). *Wells*, by its disclosure in its public annual report, demonstrates that the formula of Claim 26 was well-known, routine, and obvious in the art at the time of the invention.

223. *Horngren* describes calculating a return provision applied to a product based on its share of gross revenue:

	WordMaster	SpreadMaster	FinanceMaster	Total
Actual units sold	6,000	9,000	4,000	
Actual selling price	\$ 250	\$ 300	\$ 450	
Gross revenues	\$1,500,000	\$2,700,000	\$1,800,000	\$6,000,000
Deduct sales return provision (3%)	45,000	81,000	54,000	180,000
Net revenues	<u>\$1,455,000</u>	<u>\$2,619,000</u>	<u>\$1,746,000</u>	<u>\$5,820,000</u>

Ex. 1013 at 577. Above, *Horngren* depicts taking a total provision (\$180,000) and apportioning that provision to each product (*e.g.*, WordMaster, SpreadMaster, FinanceMaster) based on the ratio of the product's Gross revenues (\$1,500,000) to total Gross revenues (\$6,000,000). Thus, the formula of Claim 26 was so well-known, that it had been included in a textbook on the topic of Cost Accounting well before the time of the invention.

224. *E&Y* discloses the formula of Claim 26, as discussed in Section VII.B.14. *E&Y* describes calculating a “periodic provision as a percentage of outstanding balances.” Ex. 1005 at 209. *E&Y* also describes calculating “loan loss provisions” for the “appropriate center, product, or customer.” Ex. 1005 at 77.

225. Based on the disclosures above, the formula of Claim 26 was well-known, routine, and conventional at the time of the invention. The generic accounting formula of Claim 26 fails to provide an inventive concept. *See Flook*, 437 U.S. 584. Thus, Claim 26 fails to provide an inventive concept.

(xiv) Claim 27

27 **The process of Claim 4, wherein provisioning (P) is calculated as:**

$$P(o_i) = PG(o_i) * \frac{\text{Balance } (o_i) * RF(o_i)}{\sum_k [\text{Balance } (o_k) * RF(o_k)]},$$

wherein:

PG(o_i) denotes the P group in which o_i is a member, and

RF(o_i) denotes the expected adjustment factor for o_i .

226. Claim 27 recites calculating provisioning by multiplying the provisioning allocated to a provision group (PG(o_i)) by an apportionment based on the balance and adjustment factor of an object as a percentage of the balance and adjustment factor of the group ($\frac{\text{Balance}(o_i) * RF(o_i)}{\sum \text{Balance}(o_k) * RF(o_k)}$).

It is important to note that “RPG(o_i)” recited in the claim does not appear anywhere in the ‘316 Patent specification, claims or figures, and has no explanation as to what it represents. Additionally, as discussed in Claims 1[e], 4, and 26-27, provisioning for future expected events was well-known, routine, and conventional in the art at the time of the invention.

227. Wells depicts the calculation of Claim 27 in its calculation of a provision for loan losses:

TABLE 3

LINE OF BUSINESS RESULTS (ESTIMATED)

(income/expense in millions, average balances in billions)	Retail Distribution Group		Business Banking Group		Investment Group	
	1996	1995	1996	1995	1996	1995
Net interest income (1)	\$ 836	\$463	\$ 612	\$372	\$ 745	\$ 472
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Income tax expense (benefit) (4)	6	26	144	79	243	216
Net income (loss)	\$ 8	\$ 35	\$ 206	\$106	\$ 347	\$ 294
Average loans	\$ —	\$ —	\$ 4.3	\$ 2.4	\$ 1.6	\$ 0.5
Average assets	1.9	1.0	6.4	3.6	2.3	0.8
Average core deposits	16.2	9.4	11.2	6.4	32.2	18.0
Return on equity (5)	1%	7%	28%	28%	50%	66%
Risk-adjusted efficiency ratio (6)	109%	103%	73%	75%	62%	54%

Ex. 1018 at 10. *Wells* explains, in a footnote to its results per line of business above, that:

The provision allocated to the line groups for 1996 and 1995 is based on management's current assessment of the normalized net charge-off ratio for each line of business. In any particular year, the actual net charge-offs can be higher or lower than the normalized provision allocated to the lines of business. The difference between the normalized provision and the Company provision is included in Other.

Ex. 1018 at 10. *Wells* shows the formula of Claim 27 by taking an overall provision for an organization (PG) and allocating the provision to each line of business according to the net charge-off ratio. Ex. 1018 at 10-11. The net charge-off ratio

consists of the net charge-off for a particular line of business ($\text{Balance}(o_i)$) over the total charge-off for all lines of business ($\sum \text{Balance}(o_k)$). The “normalized” nature of the net charge-off ratio teaches that an adjustment factor ($\text{RF}(o_i)$) can be used to adjust the net charge-off ratio. *Wells*, by its disclosure in its public annual earnings report, demonstrates that the formula of Claim 27 was well-known, routine, and obvious in the art at the time of the invention.

228. As discussed in Section VII.B.15, *E&Y* discloses calculating a provision based on an apportionment of a provision group. *E&Y* discloses the need to calculate the provision using an adjustment factor. Ex. 1005 at 77. *E&Y* also discloses using the total expected losses ($\text{PG}(o_i)$) multiplied by the balances and by risk rating or a risk grade ($\frac{\text{Balance}(o_i) * \text{RF}(o_i)}{\sum \text{Balance}(o_k) * \text{RF}(o_k)}$). Ex. 1005 at 211.

229. The formula of Claim 27 was well-known, routine, and conventional in the art at the time of the invention. Furthermore, the application of a generic equation to a profitability calculation fails to transform the patent-ineligible concept into a patent-eligible one. See *Flook*, 437 U.S. 584. Thus, Claim 27 fails to provide an inventive concept.

(xv) Claim 28

28 The process of Claim 4, wherein provisioning (P) is calculated as:

$$P(o_i) = \text{Exposure}(o_i) * \text{Pr}(o_i) * \text{Expected Value Adjustment}(o_i) *$$

$$\frac{1}{L},$$

wherein:

Pr(o_i) is a probability for object o_i, and

L is the expected number of reporting periods during the life of o_i.

230. Claim 28 recites calculating provisioning by multiplying the exposure, probability, and expected value adjustment for an object, and dividing that value by the expected number of reporting periods during the life of the object. It is important to note that Claim 28 and the ‘316 Patent specification fail to describe what “Exposure(o_i)” and “Expected Value Adjustment(o_i)” mean or how they should be calculated. For the purposes of this discussion, I am treating “Exposure(o_i)” as the object balance or the loss possible for the object o_i, and “Expected Value Adjustment(o_i)” as a risk factor.

231. As discussed in Claims 1[e], 4, and 26-27, provisioning for future expected events was well-known, routine, and conventional in the art at the time of the invention.

232. As discussed in VII.B.16, *E&Y* describes various methods of calculating provisioning, including a method using Markov Chains called Loan

Migration analysis to calculate provisions and required reserves as a function of potential losses, probability of those losses, risk factors, and time. Ex. 1005 at 206, 208-210. *E&Y* discloses calculating a loan loss provision of a portfolio (o_i) based on the balance of the portfolio ($\text{Exposure}(o_i)$), expected loss over the life of the portfolio ($\text{Pr}(o_i)$), the current risk rating ($\text{Expected Adjustment Value}(o_i)$), and the period of time in which the loss can be expected to occur ($1/L_i$).

233. Based on the disclosures above, Claim 28 was well-known, routine, and conventional in the art at the time of the invention. Furthermore, the application of a generic equation to the abstract idea of calculating object level profitability fails to transform the abstract idea into patent-eligible subject matter. *See Flook*, 437 U.S. 584. Thus, Claim 28 fails to provide an inventive concept.

(xvi) Claim 29

29 The process of Claim 7, wherein the step of adjusting the measure for object level profitability is calculated as:

$$\text{Profit}(o_i) = \{ [\text{NIR}(o_i) + \text{OR}(o_i) - \text{DE}(o_i) - \text{IE}(o_i) - \text{P}(o_i)] * (1 - \text{EffectiveTaxRate}) \} - \text{SVA}(o_i),$$

where

$$\text{SVA}(o_i) = \alpha(o_i) + \beta(o_i) * \text{Amount}(o_i),$$

and

$\alpha(o_i)$, $\beta(o_i)$ are functions for a cohort of objects in which o_i is a member, and $\text{Amount}(o_i)$ is given by a rule which maps o_i to a data value (such as balance, or allocated equity) also defined at the cohort level.

234. Claim 29 fails to provide an inventive concept beyond the well-known abstract idea of “calculating object level profitability” by calculating the shareholder value added (“SVA”). SVA is defined by the ‘316 patent specification as “a method financial analysts use to adjust profit measures for risk. The idea is to subtract from the profit measure the cost of the equity required to support whatever object is being measured.” Ex. 1001 at 22:51-54. The specification further explains that “institutions will classify cohorts of risk and the risk cost equivalent as a percentage of account balance or allocated equity (i.e., ‘Hurdles’).” Ex. 1001 at 22:57-59. The ‘316 specification explains that “ $\alpha(o_i)$, $\beta(o_i)$ are functions for a cohort of objects in which o_i is a member” and that the “cohort defined here represents a grouping of objects with similar risk characteristics, consistent with Modern

Portfolio Theory and the Capital Asset Pricing Model.” Ex. 1001 at 22:44-50. The ‘316 Patent admits that the calculation of SVA was well-known in the art in its description of SVA being based on “modern portfolio theory’s capital asset pricing model.” Ex. 1001 at 14:30-41.

235. In the ‘316 Patent’s airline example, profit per seat was adjusted for “[e]conomic equity per average seat” times the “[c]ost of capital rate.” Ex. 1001 at 28:28-30.

$$\text{Calculate SHV(seat)=Profit(seat)–(Flight:} \\ \text{risk\_factor*eqrt)}$$

Ex. 1001 at 28:31-32. The example does not provide any value for alpha and the specification does not provide any description of what alpha or beta represent other than their consistency with the Capital Asset Pricing Model (“CAPM”). The claim appears to equate β from the claim language with the Flight:risk_factor in the airline example. Although the airline example does not show an α or β in the airline example, both of these values need to be calculated in order to apply the CAPM model. Additionally, the specification conflates the “cost of capital rate” with the “equity rate” in presenting the airline example.

236. The concept of adjusting profit by a required hurdle rate was a well-known concept in accounting practice. Ex. 1013 at 937-938. For example, *Horngren* explains that the “cost of equity capital is the opportunity cost to investors

of not investing their capital in another investment that is similar in risk” and companies that have adjusted income for the cost of equity were found to “have increased shareholder value.” Ex. 1013 at 937-938. *Horngren* further describes calculating a “required rate of return (RRR), which is the minimum acceptable rate of return . . . that the organization could expect to receive elsewhere for an investment of comparable risk. This rate is also called the discount rate, hurdle rate, or (opportunity) cost of capital.” Ex. 1013 at 783.

237. As discussed in Section VII.B.17, *E&Y* discloses “determin[ing] the proper hurdle rate for each line of business” as “measured by its beta coefficient, based on the capital asset pricing model (CAPM)” for “maximizing shareholder value.” Ex. 1005 at 30, 224. As discussed in Section VII.E.5, *Kimball* discloses calculating shareholder value add based on assigned equity and a transfer rate (*e.g.*, hurdle rate). Ex. 1010 at 19-22.

238. Using Modern Portfolio Theory (“MPT”) and the Capital Asset Pricing Model (“CAPM”) to set the discount rate of equity to calculate shareholder value added was well-known and routine in the art. Furthermore, the application of a generic equation to a profitability calculation fails to transform the patent-ineligible concept into a patent-eligible one. *See Flook*, 437 U.S. 584. Thus, Claim 29 fails to provide an inventive concept.

(xvii) Claim 30

30 The process of Claim 7, wherein the step of adjusting the measure for object level profitability includes the calculation

$$\text{Profit}(o_i) = [\text{NIR}(o_i) + \text{OR}(o_i) - \text{DE}(o_i) - \text{IE}(o_i) - \text{P}(o_i)] * (1 - \text{EffectiveTaxRate}) \text{ where,}$$

for a two tier taxation system, Effective Tax Rate is calculated as:

$$\text{Effective Tax Rate} = (1 - \text{tax rate 2}) * (\text{tax rate 1}) + \text{tax rate 2.}$$

239. Claim 30 fails to provide an inventive concept by simply reciting the formula of Claim 6 and multiplying it by a tax rate. Calculation of taxes using the formula “1-tax_rate” was well-known and routine, and was required by the GAAP and IFRS accounting standards. Ex. 1018 at 10-11. Additionally, the formula for calculating a two-tier taxation system is a simple mathematical derivation of the routine tax calculation (“1-tax_rate”) applied twice.

240. *McKenzie* discloses the two-tiered tax calculation of Claim 30 as:

$$\tau = \theta (1 - u) + u$$

where τ is the total effective tax rate, θ is the first tax rate, and u is the second tax rate. Ex. 1011 at 3. This is the exact formula of Claim 30, and establishes that the formula was well-known in the art.

241. Additionally, the formula of Claim 30 is a simple multiplication of two rates. For example, consider a company that has a net income of \$100 and is charged a 10% state tax rate and a 30% federal tax rate. The company would pay a \$10 state tax, and a \$27 federal tax, for a total of \$37 in taxes and \$63 of after-tax profit. This results in a combined effective tax rate of 37%, as shown below:

$$\$100 * (1 - tax_1) = \$100 * (1 - 0.10) = \$90$$

$$\$90 * (1 - tax_2) = \$90 * (1 - 0.30) = \$63$$

$$EffectiveTaxRate = 1 - \frac{\$63}{\$100} = 0.37 = 37\%$$

This results in the same value as the calculation used in Claim 30, where $tax_1=0.10$ and $tax_2=0.30$:

$$EffectiveTaxRate = (1 - tax_2) * (tax_1) + tax_2$$

$$EffectiveTaxRate = (1 - 0.30) * (0.10) + 0.30 = 0.37 = 37\%$$

242. The calculation of the two-tier tax rate of Claim 30 is a simple mathematical derivation of the conventional practice of multiplying a value by a first tax rate followed by a second tax rate, as derived below:

$$[EBT * (1 - tax_1)] * (1 - tax_2),$$

$$where EBT = NIR(o_i) + OR(o_i) - DE(o_i) - IE(o_i) - P(o_i)$$

$$= EBT * (1 - tax_1) * (1 - tax_2)$$

$$= EBT * (1 - tax_1 - tax_2 + tax_1 tax_2)$$

$$= EBT * [1 - (tax_1 + tax_2 - tax_1 tax_2)]$$

$$= EBT * [1 - ((1 - tax_2) * tax_1 + tax_2)]$$

$$= EBT * [1 - EffectiveTaxRate],$$

$$where EffectiveTaxRate = (1 - tax_2) * tax_1 + tax_2$$

243. As shown above, the idea of calculating a two-tier tax rate was well-known, routine, and conventional, including the formula referenced in Claim 30. Furthermore, the application of a generic equation fails to transform the abstract idea into patent-eligible subject matter. *See Flook*, 437 U.S. 584. Thus, Claim 30 fails to provide an inventive step or significantly more than the abstract idea of “calculating object level profitability.”

B. Claims 1-29 are Anticipated by *E&Y* and Claims 1-30 are Rendered Obvious by *E&Y*

244. It is my opinion that each of Claims 1-29 are anticipated, and Claims 1-30 are rendered obvious, by *E&Y*.

1. Independent Claim 1 is Anticipated and Obvious

245. Independent Claim 1 recites:

1. A process for determining object level profitability in a relational database management system, comprising the computer implemented steps of:

[1a] providing a computerized profit database having profit information;

[1b] providing a relational database management system operable in association with the computerized profit database;

[1c] preparing the profit information to be accessed electronically through the relational database management system, including the step of calculating opportunity values for funds used or supplied by each object being measured;

[1d] establishing, in the relational database, rules for processing the prepared information, including the steps of providing information necessary to select objects and performing a profit calculus;

[1e] using the relational database management system to independently calculate at least one marginal value of profit for each object being measured using the established rules as applied to a selected set of prepared information;

[1f] combining the at least one marginal value of profit to create a measure for object level profitability.

246. *E&Y* discloses all elements of Claim 1 in the following figures by disclosing a method that uses a relational database to combine, for various cost

objects, opportunity values and a marginal value of profit to calculate a measure of object level profit. The cost objects shown in the images below include a product, customer, business unit, and organization:

Figure 16-2—Financial Systems Architecture

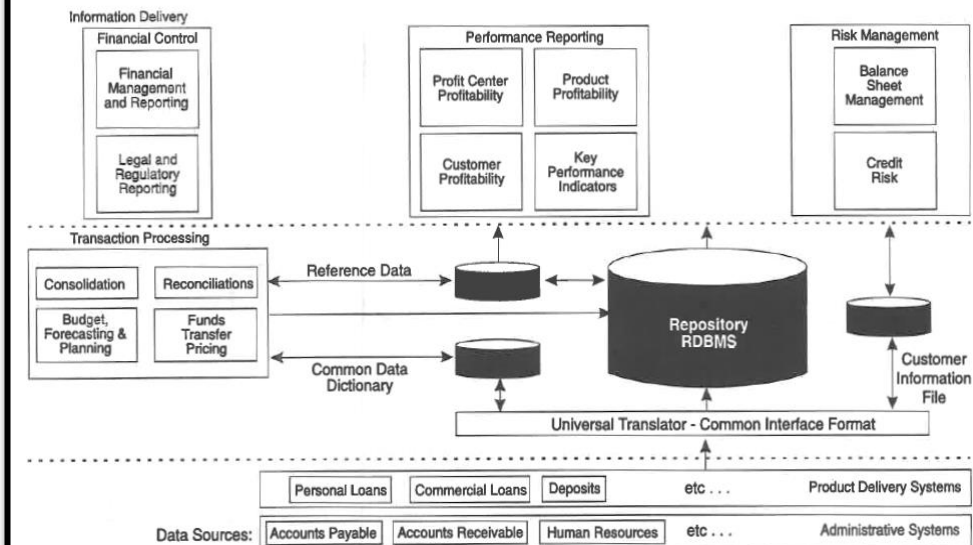
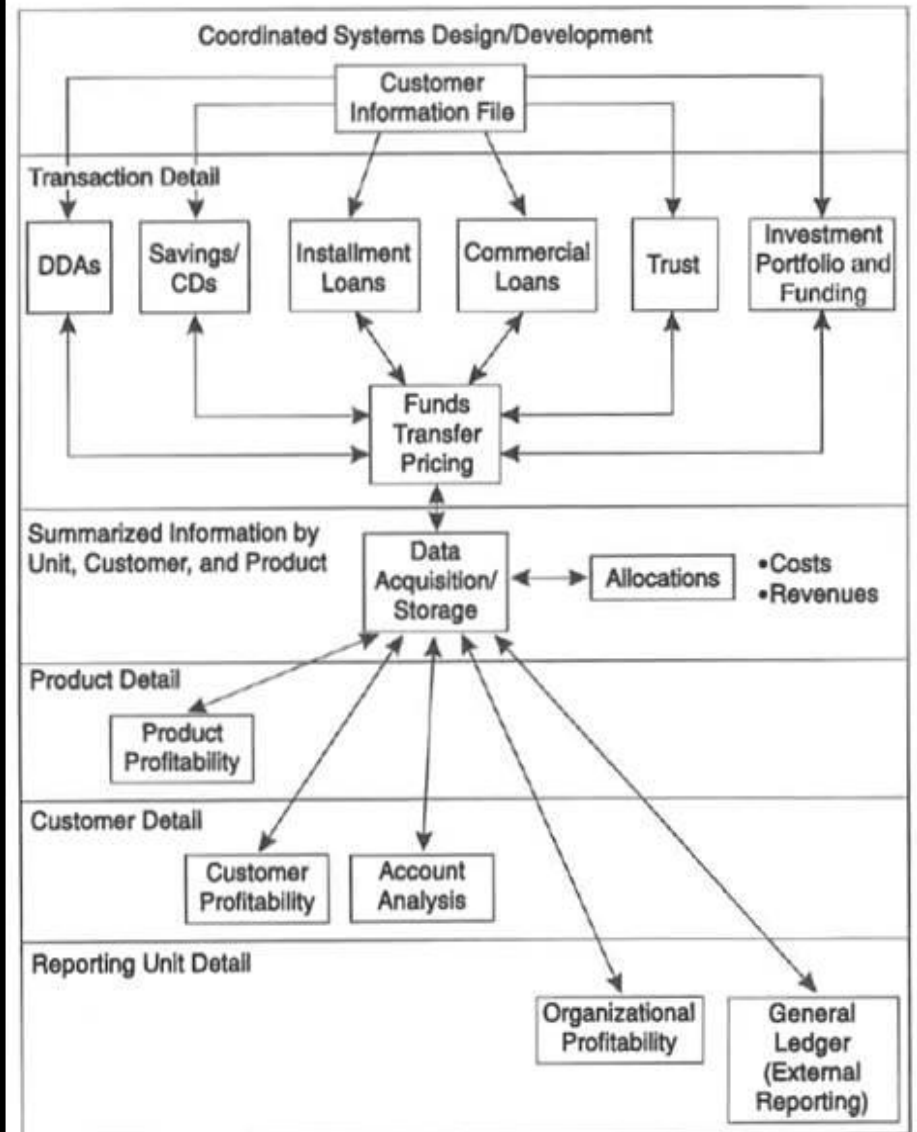


Figure 5-6—Sample Customer Profitability

	Total	Lines and Commitments	Loans	Fee Services	Deposits
Interest Income	\$50		\$50		
Interest Expense	(10)				\$(10)
Credit/(Charge) for Funds	(10)		(40)		30
Net Interest Income	30		10		20
Provision for Loan Losses	(1)		(1)		
Net Interest Income after Provisions for Loan Losses	29		9		20
Waived Fees	(29)			\$(29)	
Other Income	42	\$10	2	30	
Noninterest Expense	(39)	(2)	(1)	(35)	(1)
Contribution	3	\$ 8	\$10	\$(34)	\$19
Overhead Expense	(4)				
Income before Taxes	<u>\$(1)</u>				

Figure 15-4—Integrated View of Systems and Information Flows



1[preamble] A process for determining object level profitability in a relational database management system, comprising the computer implemented steps of:

247. I understand that independent Claim 1 includes a preamble that recites “a process for determining object level profitability in a relational database management system.” *E&Y* teaches a “process” calculating object level profitability using an RDBMS and a plurality of different profit calculation methods. Ex. 1005 at 29, 183, 275-277. *E&Y* teaches using an RDBMS by describing a performance measurement system “as an integrated database storing financial and nonfinancial data on products, customers, segments, delivery channels, and the like.” Ex. 1005 at 29. In addition to teaching gathering data into a profit database, *E&Y* teaches converting “data into useful information, organizing them, and making them accessible to the right people at the right time” by “aggregating data from many vertical, product-account-based databases into a single customer-oriented picture of behavior and profitability.” Ex. 1005 at 288. Accordingly, to the extent that the preamble is considered a limitation it is my opinion that *E&Y* renders the preamble of Claim 1 is anticipated and obvious.

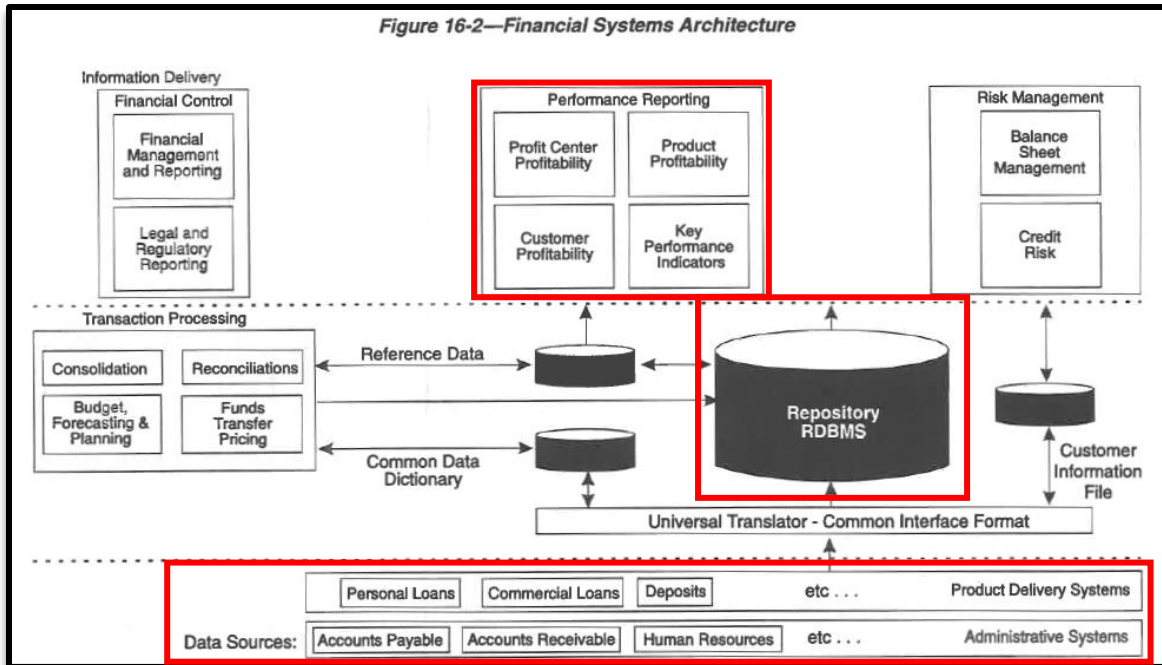
1[a] providing a computerized profit database having profit information

248. It is my opinion that *E&Y* anticipates, and renders obvious, element 1[a]. As explained in Section V.A, the “profit information” stored in the “computerized profit database” is described by the ‘316 Patent as “financial and/or

non-financial data related to calculating profit.” The computerized profit database is simply a database that stores “financial and/or non-financial data related to calculating profit.”

249. *E&Y* teaches storing profit information in a computerized profit database. Ex. 1005 at 29, 183, 275-277. *E&Y* anticipates element 1[a] by its disclosure of “information technology capabilities [such] as relational databases” which “stor[e] financial and nonfinancial data on products” and report “data on each component of total profit.” Ex. 1005 at 29, 183. By disclosing storing financial and non-financial information on products, *E&Y* discloses providing “financial and/or non-financial data related to calculating profit,” or “profit information.” By disclosing storing data related to calculated profit in a database, *E&Y* discloses “providing a profit database having profit information.”

250. *E&Y* discloses a “computerized” database by describing data being “acquired, processed, reported, and stored” on a “desktop” or “larger departmental server[s] or mainframe computers.” Ex. 1005 at 270. *E&Y* also depicts the profit database as including, individually and together, the “Data Sources” or the “Repository RDBMS” in the figure below.



Ex. 1005 at 275 (emphasis added). Since *E&Y* discloses using a “computerized profit database having profit information,” *E&Y* anticipates and renders obvious element 1[a].

251. In the alternative, if element 1[a] is construed to mean storing actual profit calculations (at a point where no profit calculation has yet been made), *E&Y* anticipates and renders that construction as well. For example, *E&Y* discloses storing individual responsibility center profit measurements, explaining that:

For example, as part of ***organizational profitability measurement***, the ***reporting of responsibility center roll-ups should use tables*** to deal with the organizational changes that are bound to occur.

Ex. 1005 at 260. *E&Y* is describing the use of tables to store intermediate profitability information (*e.g.*, responsibility center roll-ups) during the calculation of organizational profitability. *E&Y* also describes storing a component of profit information, the transfer pricing calculations, in the database, explaining that “[t]he **database is used to house the results of transfer pricing calculations**, provide the basis for all allocations, and prepare detailed performance measurement reports.”

Ex. 1005 at 256.

252. To the extent that *E&Y* is found to not expressly disclose element 1[a], as discussed in Section VII.A.1(ii), element 1[a] was well-known in the art. It is my opinion that it would have been routine and conventional for a POSITA to use a computerized database storing business financial information when calculating profit values for an organization. Computerized databases were well known in the art at the time of the invention, and profitability database systems were in wide use by financial organizations. Ex. 1012 at 8 (“At the heart of the bank would be a comprehensive customer database and a product profit database.”). It is my opinion that it would have been obvious for a POSITA to use well-known computerized profit databases in the system of *E&Y*.

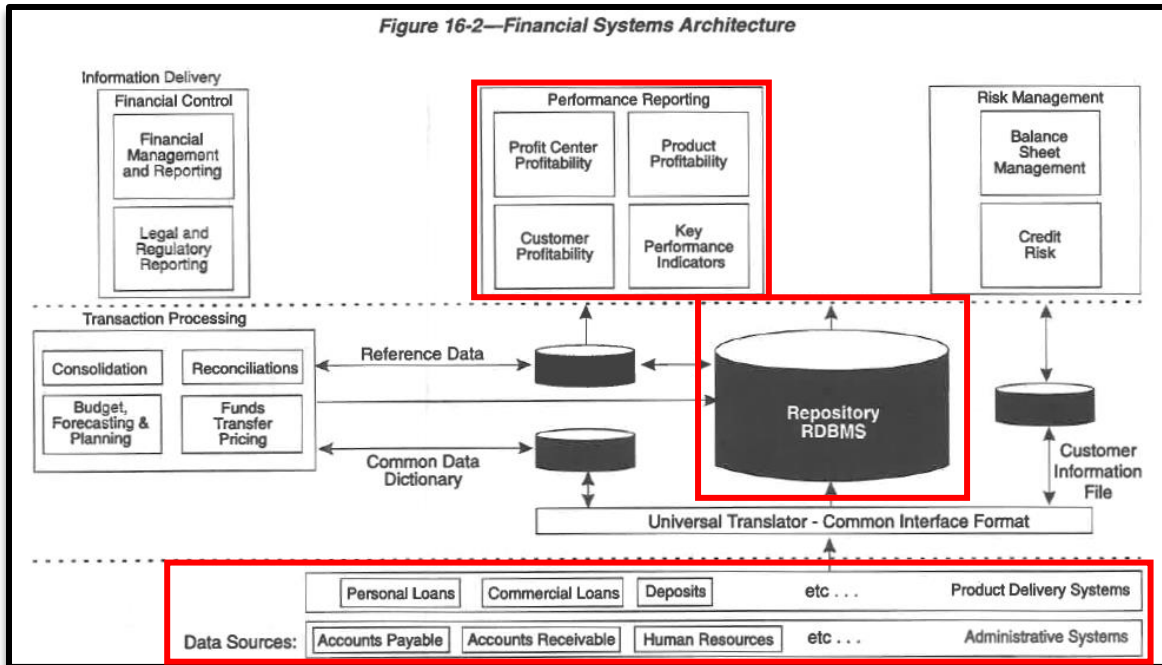
1[b] providing a relational database management system operable in association with the computerized profit database

253. It is my opinion that *E&Y* anticipates, and renders obvious, element 1[b]. Ex. 1005 at 183, 275-277. *E&Y* teaches using a “relational database platform” which can “aggregat[e] data from many vertical, product-account-based databases into a single customer-oriented picture of behavior and profitability.” Ex. 1005 at 277, 288. *E&Y* describes a “relational database platform” as:

Central Data Repository

The most important component of the architecture is the use of a data repository that spans all the applications and houses all the common data elements. This is vital to assure consistency and credibility, and produce operating efficiency. Because flexibility is an essential requirement of the system, this repository is almost always built upon a relational database platform.

Ex. 1005 at 277. *E&Y*’s “relational database platform” includes a “relational database management system.” Both provide the ability to store data, interrogate the database, and retrieve data elements, provide application interoperability, and are built on top of a relational database. *E&Y* further discloses using a relational database management system (“RDBMS”) in the figure below:



Ex. 1005 at 275 (emphasis added). *E&Y* describes the “Repository RDBMS” as a “central data repository” and/or “transaction-level data warehouse.” Ex. 1005 at 275-277. Some information accessed or stored in the “Repository RDBMS” is obtained from the “Data Sources” shown in the figure above. The “Data Sources” are existing systems that store transactional and administrative information. Examples of transactional information include profit information for a particular personal loan, commercial loan, or deposits. Ex. 1005 at 260, 275. Administrative information may include information on accounts payable, accounts receivable, and human resources. Ex. 1005 at 275. *E&Y* describes the “Repository RDBMS” as accessing the financial and non-financial profit information either directly from a repository database or from the “Data Sources”. Ex. 1005 at 275-277. These “Data Sources” hold profit information stored in a computerized profit database (*e.g.*,

personal loan transaction profit). Ex. 1005 at 139-140, 275-277. *E&Y* describes one of the benefits of migrating from legacy systems to a RDBMS as including “[o]pen’ systems standards that enable the transfer of data between applications and hardware platforms.” Ex. 1005 at 274-275. These open standards discussed by *E&Y* make it possible for the “Repository RDBMS” to access and operate the “Data Sources.” Ex. 1005 at 274-277. One example of an open standard from *E&Y* is the “Universal Translator – Common Interface Format” that allows the “Repository RDBMS” to access data from the “Data Sources.” Ex. 1005 at 273-277. It is my opinion that the “Data Sources” of *E&Y* correspond with the “computerized profit database” of the ‘316 Patent. *E&Y* discloses a “Repository RDBMS” that uses a “Universal Translator – Common Interface Format” to operate and associate with the “Data Sources.” Ex. 1005 at 273-277. Accordingly, *E&Y* anticipates and renders obvious claim element 1[b].

254. To the extent that *E&Y* is found to not expressly disclose element 1[b], as referenced in Section VII.A.1(iii), element 1[b] was well-known and conventional in the art. It is my opinion that it would have been obvious to a POSITA to combine the conventional technology of an RDBMS with a profit database. The concept of using an RDBMS to access and manipulate database data to generate useful summaries and other reports based on the data was well known in the art at the time of the invention, as was the concept of a profit database. See Ex.

1012 at 8; *see also* Ex. 1012 at 9:11-40. Providing a well-known RDBMS operable with a profit database was also well known in the art at the time of the invention. Ex. 1012 at 9:17-25, 9:30-40. It would have been obvious for a POSITA to also combine the well-known technologies of an RDBMS and a profit database with the teachings of *E&Y* to render element 1[b] obvious. In my expert opinion, element 1[b] is anticipated and/or rendered obvious by *E&Y*.

1[c] preparing the profit information to be accessed electronically through the relational database management system, including the step of calculating opportunity values for funds used or supplied by each object being measured

255. It is my opinion that *E&Y* anticipates, and renders obvious, element 1[c]. Ex. 1005 at 175-177, 183. Element 1[c] includes the steps of “preparing the profit information to be accessed electronically through the relational database management system,” “calculating opportunity values for funds used or supplied,” and “by each object being measured.”

preparing the profit information to be accessed electronically through the relational database management system

256. As discussed in relation to element 1[b], *E&Y* discloses this portion of the limitation – accessing profit information through the relational database. Ex. 1005 at 183, 275-277, 288. *E&Y* also specifically discloses accessing the profit information electronically, stating that “[e]lectronic delivery through office automation networks [] eliminates most of the cost of printing and transporting paper

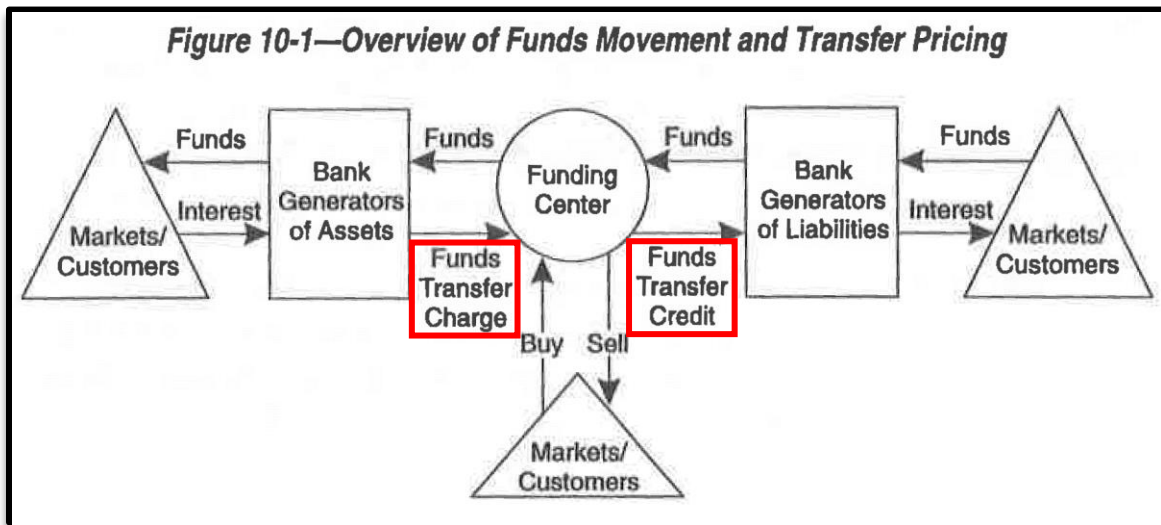
reports.” Ex. 1005 at 274. Thus, *E&Y* teaches “preparing the profit information to be accessed electronically through the relational database management system.”

calculating opportunity values for funds used or supplied

257. *E&Y* also anticipates and renders obvious this portion of element 1[c] – “calculating opportunity values for funds used or supplied.” As discussed in Section VII.A.1(iv), “opportunity values” includes at least “funds transfer pricing” within the scope of the ‘316 Patent. *Supra* VII.A.1(iv). Specifically, as discussed above, claim element 1[c] recites calculating “opportunity values for funds used or supplied.” Further, dependent claim 8 further narrows the calculation of opportunity values to calculating “matched maturity funds transfer pricing.” The only other reference to “opportunity” within the ‘316 Patent is in describing that “DPM’s ***funds transfer pricing method uses maturity opportunity rates*** used in valuing each object’s marginal use or source of internal funds.” Ex. 1001 at 7:61-64. Accordingly, although “opportunity values” are not expressly defined, I understand that “calculating opportunity values,” as described by Claim 1, is satisfied at least by calculating “funds transfer pricing.”

258. *E&Y* discloses that “funds-transfer pricing represents a series of management-accounting mechanisms that measure ***the value of opportunity cost of funds provided and used***” in order to accurately determine “the profitability of business units, products, customers, etc.” Ex. 1005 at 175. *E&Y* describes the

process of calculating opportunity values and funds transfer pricing in great detail, including an entire chapter titled “Chapter 10: Transfer Pricing of Funds.” Ex. 1005 at 175. *E&Y* also discloses the process of funds transfer pricing in the figure below:



Ex. 1005 at 177 (emphasis added). Thus, *E&Y* teaches the calculation of opportunity values for funds used (*e.g.*, Funds Transfer Charge) or supplied (*e.g.*, Funds Transfer Credit).

calculating opportunity values for ... each object being measured

259. *E&Y* anticipates and renders obvious this portion of element 1[c] – “calculating opportunity values for . . . each object being measured.” *E&Y* discloses that all costs and profits can be “attributed to one or more cost objects,” where a “cost object is any product, service, customer, market, distribution channel, project, etc., for which a unique cost measurement is desired.” Ex. 1005 at 125-126,

130. *E&Y* discloses calculating opportunity values for funds used or supplied by objects, such as the product object in the following figure:

Figure 5-4—Sample Product Profitability Statement

Interest Income
Interest Expense
Credit/Charge for Funds
Net Interest Income
Provision for Loan Loss
Net Interest Income after Provision for Loan Loss
Other Income
Net Revenue
Direct Expense
Indirect Expense
Data Processing
Loan Processing
Item Processing
Branch System
Marketing
Other
Total Noninterest Expense
Income before Taxes

Ex. 1005 at 43 (emphasis added). Figure 5-4 depicts “Credit/Charge for Funds” as opportunity values for funds used or supplied for an object, in this case a particular product. *E&Y* further describes the need to calculate transfer prices to properly calculate profitability for different objects, explaining:

Ultimately, the objective of transfer pricing is the proper valuation of the provision or use of funds by the bank's organizations, products, segments, customers, etc., which are the subjects of profitability measurement.

Funds-transfer pricing is a set of management accounting conventions and practices. It is not driven by GAAP or RAP. Given its importance to the institution, numerous objectives may exist:

- ***Identifying the cost or opportunity value of funds*** to the institution.
- Facilitating the ***profitability measurement of various components (branches, products, customer, accounts)*** of the institution by relating appropriate costs to revenues.

Ex. 1005 at 176. Since *E&Y* discloses calculating opportunity values for funds used and supplied for each cost object (*e.g.*, branch, product, customer, account), *E&Y* anticipates and renders obvious element 1[c].

260. To the extent that *E&Y* is found to not expressly disclose element 1[c], as referenced in Section VII.A.1(iv), element 1[c] was well-known and routine in the art and is therefore rendered obvious. The concept of preparing profit information to be accessed electronically through an RDBMS was well-known in

the art at the time of the invention and was widely used. *See* Ex. 1012 at 8; *see also* Ex. 1012 at 9:11-40. The concept of using transfer pricing to calculate opportunity values was well-known in the art and was used by the U.S. Internal Revenue Service to govern taxation of multinational businesses and treatment of transfer pricing for taxation purposes. Ex. 1013 at 913-916. It was also well-known, routine, and conventional to calculate opportunity values for each object being measured (*e.g.*, opportunity cost per barrel). Ex. 1013 at 913-916. It would have been obvious to a POSITA to use the well-known RDBMS to perform the routine and regulatorily required calculation of opportunity values for each object being measured. *E&Y* anticipates and/or renders obvious preparing profit information through a relational database and calculating opportunity values for funds used or supplied by each object.

1[d] establishing, in the relational database, rules for processing the prepared information, including the steps of providing information necessary to select objects and performing a profit calculus

261. It is my opinion that *E&Y* anticipates and renders obvious element 1[d].

establishing, in the relational database, rules for processing the prepared information

262. It is my opinion that *E&Y* anticipates and renders obvious the step of “establishing, in the relational database, rules for processing the prepared

information.” *E&Y* discloses using relational databases and using the database to process information. Ex. 1005 at 29, 183, 256, 275-277. In fact, much of *E&Y* focuses on the types of rules that financial professionals would want to establish in a database to determine product profitability. Ex. 1005 at 29, 183, 256, 275-277. In my opinion, this includes “establishing, in the relational database, rules for processing the prepared information.” The first step in using a relational database is to define the database tables and the relationships between the tables in an entity-relationship model. Ex. 1004 at 9-10. The entity-relationship model is itself defined by establishing rules in the database, commonly defined using the data definition language (“DDL”) associated with SQL. Ex. 1004 at 9-10. For example, the basic creation of a schema and database tables itself establishes rules for processing the prepared information as depicted below:

```

CREATE SCHEMA AUTHORIZATION TED

CREATE TABLE S ( SNO      CHAR(5)    NOT NULL,
                  SNAME    CHAR(20),
                  STATUS    DECIMAL(3),
                  CITY      CHAR(15),
                  PRIMARY KEY ( SNO ) )

CREATE TABLE P ( PNO      CHAR(6)    NOT NULL,
                  PNAME    CHAR(20),
                  COLOR     CHAR(6),
                  WEIGHT    DECIMAL(3),
                  CITY      CHAR(15),
                  PRIMARY KEY ( PNO ) )

CREATE TABLE SP ( SNO      CHAR(5)    NOT NULL,
                   PNO      CHAR(6)    NOT NULL,
                   QTY      DECIMAL(5),
                   PRIMARY KEY ( SNO, PNO ),
                   FOREIGN KEY ( SNO ) REFERENCES S,
                   FOREIGN KEY ( PNO ) REFERENCES P )

```

Fig. 2.3 Schema definition example

Ex. 1004 at 9. Above, the schema definition establishes at least the following rules or restrictions: that “Ted” is authorized to edit the schema; that field SNO in table S must contain a value; that tables S, P, and SP have 4, 5, and 3 columns or fields respectively; that the “SNAME” is composed of characters and has a maximum of twenty characters; that “PNO” must have a value for every row or record in the table; that the table SP is associated with corresponding rows in the S and P tables (through the foreign key definition); and that the “SNO” field must be unique among rows in the S table (through the primary key definition). In just the creation of a relational database, many rules are established within the database to process

information (e.g., accept an entry as a valid record to go into a table and the database). Thus, the idea of establishing rules within a database would have been obvious to POSITA at the time of the invention.

263. Further, *E&Y* discloses “establishing, in the relational database, rules to process the prepared information” when *E&Y* describes the “assignment of cost elements to pools, and then to cost objects” using “the algorithms built into the Activity Based Costing system.” Ex. 1005 at 140. The assignment of cost elements to pools, and then to cost objects, are calculations happening in the relational database. Ex. 1005 at 140. The ‘316 Patent provides several examples of the types of “rules” that should be established in the database for processing information, including a rule for calculating direct expense as shown below:

Calculate DE1(seat)=tcc*(1/(total no. of seats on plane))

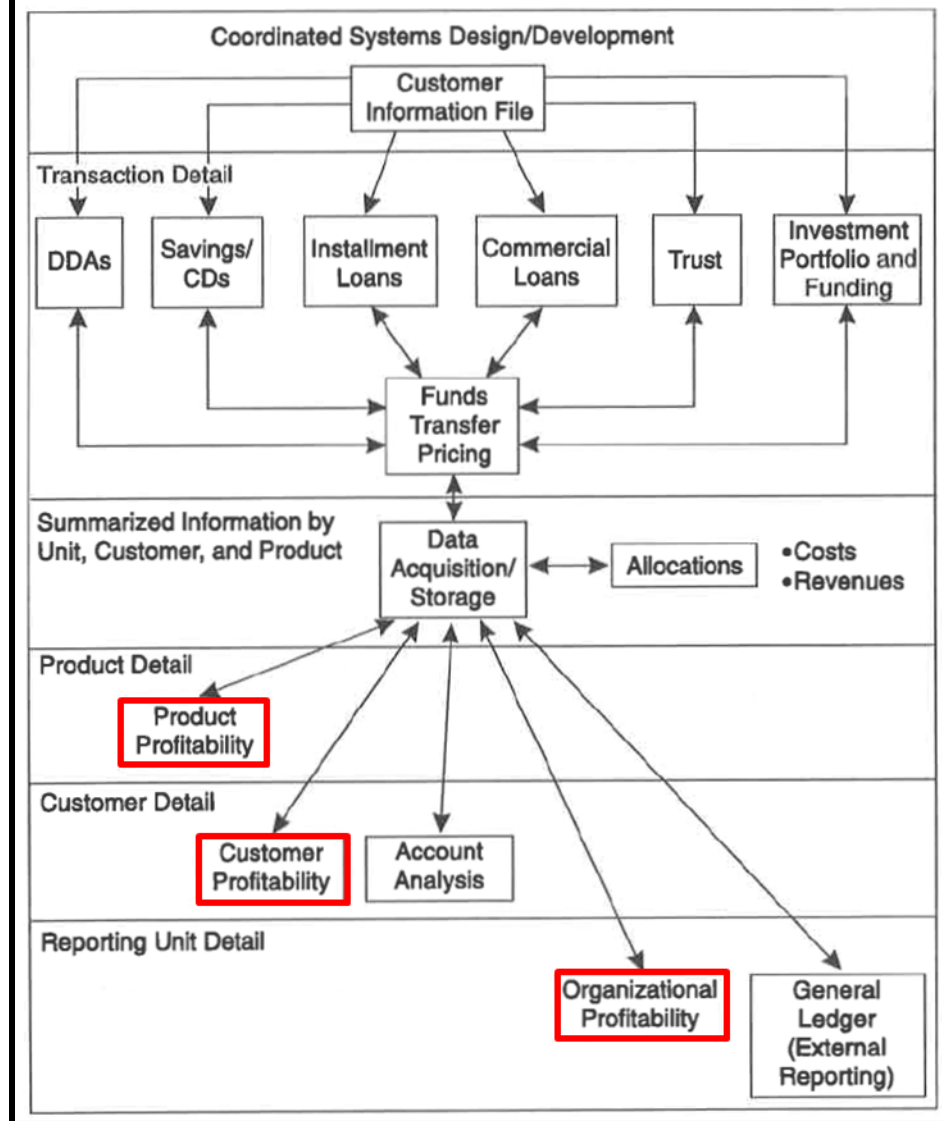
Ex. 1001 at 26:27. In the rule above, the ‘316 Patent describes calculating direct expense of the flight crew per seat by multiplying the total crew cost by one over the total number of seats on the plane. Similarly, *E&Y* describes calculating the direct expense of a payroll unit in the figure below:

Figure 8-6—Example: Payroll Units (Category One)			
Step 1. Expenses Booked to Proper Account and Step 2. Aggregated by Cost Center and by Line Item	Step 3. Costs Mapped to Process Cost Pools	Step 4. Cost Driver Determined and Cost Assigned	Step 5. Costs Driven to Cost Object
Expenses for the Period MM/YY Cost Center 10XX: Payroll Direct Expenses Salaries \$42,000 Travel & Entertainment 6,000 Occupancy 9,000 Telephone 3,000 Supplies 3,000 Printing 1,500 Postage 1,500 Depreciation 2,000 Miscellaneous 4,000 Total Direct Expenses \$72,000 Charges from Category One Units Computer (usage × rate) \$6,000 Cafeteria (usage × rate) 1,080 Etc. (usage × rate) 2,000 Total Support Charges \$9,000 Total Expenses \$81,000	Process Pool A: Payroll Processing Activities determined to consume 80% of center's costs: $\\$81,000 \times .80 = \\$64,800$ Process Pool B: Investigation Activities determined to consume 20% of the center's costs: $\\$81,000 \times .20 = \\$16,200$ Total Expenses \$81,000	Process Pool A Driver: Number of Payroll Checks $\\$64,800 / 10,000 \text{ checks} = \\$6.48/\text{check}$ Process Pool B Driver: Number of Inquiries $(\\$16,200 / 150 \text{ inquiries} = \\$108/\text{inquiry})$ Total Expenses \$81,000	Support unit costs are attributed to other responsibility centers on the basis of the number of checks and inquiries that they generate.

Ex. 1005 at 134. Similar to the ‘316 Patent rule for calculating flight crew cost per seat, *E&Y* above describes how to determine the direct expense of the payroll processing costs per check. *E&Y* applies this rule by calculating the payroll processing cost (\$64,800) divided by the total number of checks provided (10,000) to arrive at the direct expense of payroll processing per check. In describing this calculation, *E&Y* anticipates the equivalent rule disclosed by the ‘316 Patent for direct expense calculation, and anticipates using rules in the database for calculating direct expense.

264. The figure below further depicts the establishment of rules for cost allocations and “performing a profit calculus”:

Figure 15-4—Integrated View of Systems and Information Flows



Ex. 1005 at 257 (emphasis added). The figure above depicts how *E&Y* describes acquiring data in the repository database (*e.g.*, Data Acquisition/Storage), allocating costs and revenues according to established rules, storing those allocations in the repository database, and generating profitability reports for different levels of detail along with the general ledger for external reporting. *E&Y* also teaches “developing

and maintaining necessary algorithms for executing funds transfer pricing” and developing “cost and profitability information . . . for any unit, product, customer or other cost object.” Ex. 1005 at 239, 320. Thus, *E&Y* anticipates “establishing, in the relational database, rules for processing the prepared information.”

providing information necessary to select objects

265. *E&Y* also discloses “providing information necessary to select objects.” *E&Y* discusses at length how to deal with data from different sources and how to attribute costs to different cost objects. Ex. 1005 at 134-137, 239, 255-267, 320. Specifically, *E&Y* discloses:

Many of these data elements are required to perform funds-transfer pricing and may come from a variety of sources, usually spanning several systems. For instance, some transfer pricing systems require balance data directly from the customer application systems, but they rely on general ledger input for noncustomer-related balances. Therefore, *it is important not only to identify the data elements but also to identify their source*, and the integrity of those sources:

...

Product identification for product profitability reporting.
This identification can be either a fixed product code or, for more flexibility, a combination of one or more existing fields used to identify loan or deposit types (e.g., Fed line/call codes for loan systems or type/series codes for deposit systems).

Ex. 1005 at 256. Thus, *E&Y* discloses providing information (product code or product identifier) necessary to select objects (products).

266. *E&Y* describes “providing information necessary to select objects” throughout its discussion of the cost object and the process of identifying drivers that drive costs to those cost objects. For example, *E&Y* discloses “providing information to select objects” in describing:

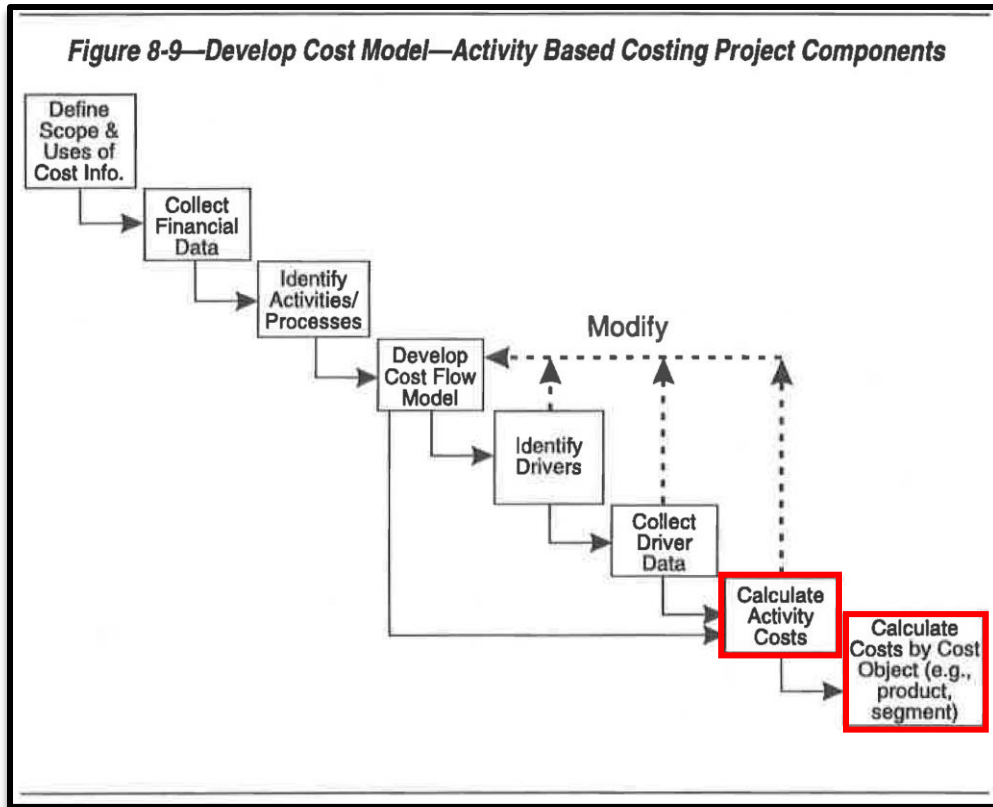
The first phase of Activity Based Costing assigns general ledger resource costs (e.g., salaries, equipment, supplies, and capital) to business processes or major activities aligned to a process activity cost pool. In this first phase, resource cost drivers are used to assign cost to process or activity cost pools. A resource cost driver measures the quantity of resources consumed by a process or an activity. The second phase of cost assignment uses activity cost

drivers to assign activity costs out of these process/activity cost pools to the end cost object (i.e., a product, customer, or delivery channel). An activity cost driver measures the quantity of activities used by the cost object.

Ex. 1005 at 129. *E&Y*, in the paragraph above, describes providing information (determining resource cost drivers) necessary to select objects (assigning cost drivers to cost pools and to the end cost object). In the process of driving costs to the cost object within the database, *E&Y* discloses “providing information necessary to select objects.”

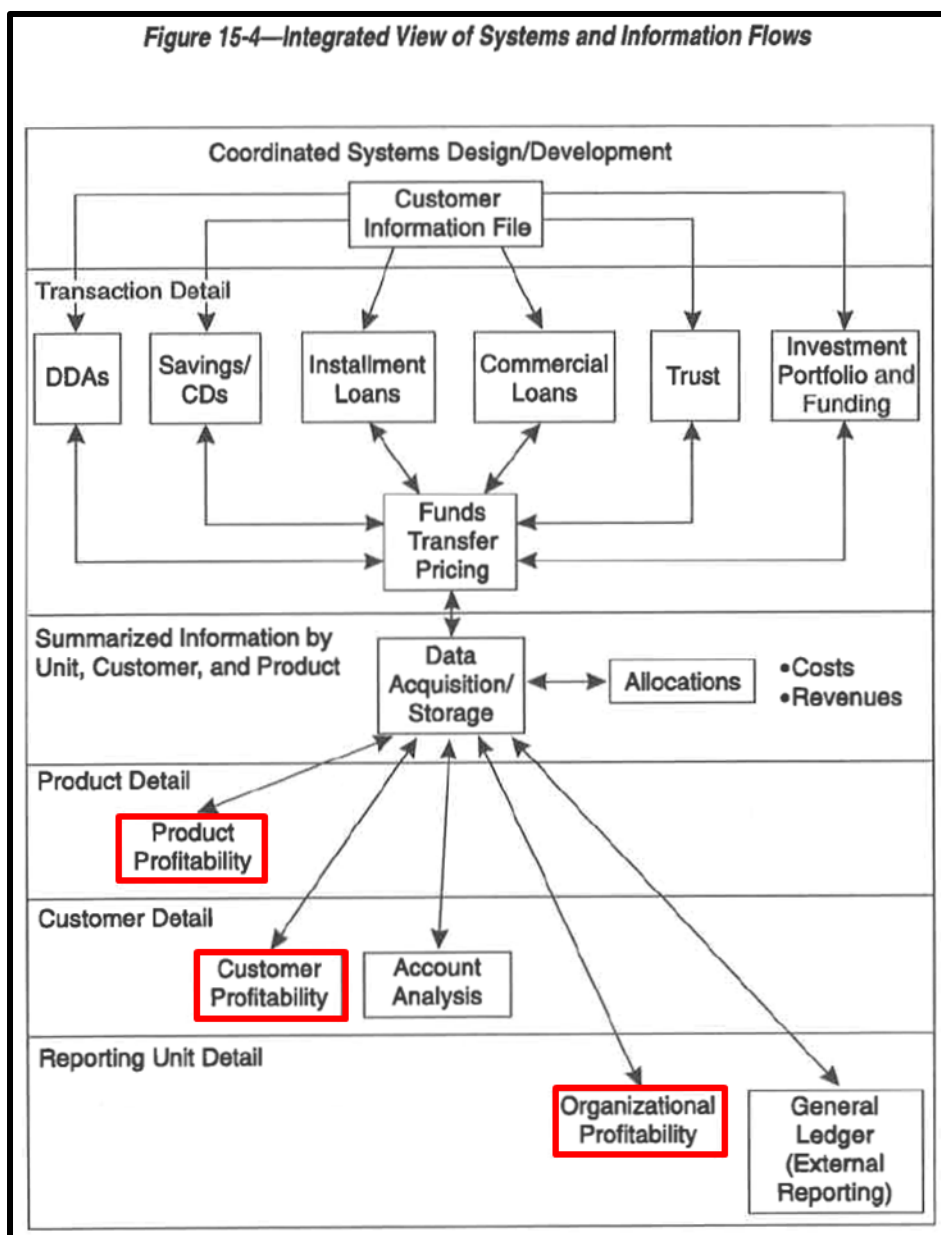
performing a profit calculus

267. *E&Y* discloses “performing a profit calculus” throughout the book. The figure below is one example of *E&Y* performing a profit calculus:



Ex. 1005 at 139. In the figure above, *E&Y* discloses a profit model using cost drivers to allocate activity costs to cost objects. The figure below also depicts how *E&Y* discloses “performing a profit calculus” in generating profitability reports by product, customer and organization:

Figure 15-4—Integrated View of Systems and Information Flows



Ex. 1005 at 257 (emphasis added).

268. As referenced in Section VII.A.1(v), element 1[d] was well-known in the art. In my opinion, the idea of establishing rules to create, maintain, and analyze values stored in a relational database was the purpose for creating and using a database. Even the act of creating a database establishes rules for processing

information within the database. Using rules in a database to select information and calculate values would have been obvious to a POSITA at the time of the invention. It is my opinion that it would have been obvious for a POSITA to combine well-known elements in the art with *E&Y* to produce element 1[d]. Thus, *E&Y* anticipates and/or renders obvious element 1[d].

1[e]	using the relational database management system to independently calculate at least one marginal value of profit for each object being measured using the established rules as applied to a selected set of prepared information

269. *E&Y* anticipates and renders obvious element 1[e]. Ex. 1005 at 56, 104, 184, 204. Element 1[e] includes the steps of “using the relational database management system,” “to independently calculate,” “at least one marginal value of profit for each object being measured,” “using the established rules as applied to a selected set of prepared information.”

270. *E&Y*, as discussed in relation to element 1[b], discloses using a relational database management system to perform profit calculations. Ex. 1005 at 183, 275-277, 288. *E&Y* teaches one to “independently calculate” profit values by describing that the “direct allocation approach consists of **concurrent, independent allocations** and distributes all expenses directly to the final beneficiaries. In other words, the expenses of each center are allocated to profit centers, products, or customers directly; no expenses are allocated initially to intermediate users.” Ex.

1005 at 104. *E&Y*, above, describes that the direct allocation approach to distribute all expense (*e.g.*, direct expenses) to profit centers, products or customers uses “concurrent, independent allocations,” teaching “independently calculating at least one marginal value of profit for each element being measured” of element 1[e].

271. *E&Y* also discloses calculating “at least one marginal value of profit for each object being measured.” As described in Section VII.A.1(vi), the ‘316 Patent describes the marginal value of profit in many ways. The ‘316 Patent recites that “marginal profit measures associated with use of the business’ balance sheet resources, [are] also referred to as funds transfer pricing.” Ex. 1001 at 6:21-13. Dependent claims of the ‘316 Patent also describe calculating the marginal value of profit as including the step of “provisioning (P)” and/or “calculating net interest (NI), other revenue (OR), and direct expense (DE).” Ex. 1001 at Claims 3, 4.

272. *E&Y* discloses calculating “at least one marginal value of profit for each object being measured” by describing that “[m]arginal costs consist of expense items incurred as a result of adding one incremental item” and “management can use marginal cost components to develop internal marginal cost analyses and ‘what if’ volume/cost pricing analyses.” Ex. 1005 at 56. *E&Y* also discloses calculating each of NI, OR, DE and P at various levels of granularity, as depicted in the figures below:

Figure 5-2—Typical Organizational Profitability Statement

Interest Income	
Interest Expense	
Credit/Charge for Funds	
Net Interest Income	
Provision for Loan Loss	
Net Interest Income after Provision for Loan Loss	
Other Income	
Net Revenue	
Direct Expense	
Salaries and Benefits	
Furniture and Equipment	
Occupancy	
Telephone	
Professional Fees	
Travel and Entertainment	
Other Direct Expenses	
Total Direct Expense	
Indirect Expense	
Total Noninterest Expense	
Income before Taxes	

Figure 5-4—Sample Product Profitability Statement

Interest Income	
Interest Expense	
Credit/Charge for Funds	
Net Interest Income	
Provision for Loan Loss	
Net Interest Income after Provision for Loan Loss	
Other Income	
Net Revenue	
Direct Expense	
Indirect Expense	
Data Processing	
Loan Processing	
Item Processing	
Branch System	
Marketing	
Other	
Total Noninterest Expense	
Income before Taxes	

Ex. 1005 at 42-43. The figures above disclose calculating net interest (“Net Interest Income”), other revenue (“Other Income”), direct expense (“Direct Expense”), and provisioning (“Provision for Loan Losses”) at an organization or product level, each of which comprises “at least one marginal value of profit” for an object. As depicted in Figures 5-2 and 5-4, “Total Noninterest Expense” consists of both direct and indirect expenses, where “Direct Expenses” (or “Total Direct Expenses” in Figure 5-2) plus “Indirect Expenses” equals the “Total Noninterest Expense.” Ex. 1005 at

42-45. A POSITA would understand that, as is standard in the accounting practice, the “Total Noninterest Expense” is calculated as the sum of the “Direct Expenses” and “Indirect Expenses” based on “Noninterest Expense” being depicted under a line indicating a calculation. A POSITA would similarly understand that “Income before taxes” would be calculated by subtracting the “Total Noninterest Expense” from “Net Revenue,” or that the “Total Noninterest Expense” would be depicted as a negative number and would be added to “Net Revenue” resulting in “Income before taxes.”

273. *E&Y* provides a sample profitability report for the customer object, based on the figures above, as depicted below:

Figure 5-6—Sample Customer Profitability

	Total	Lines and Commitments	Loans	Fee Services	Deposits
Interest Income	\$50		\$50		
Interest Expense	(10)				\$(10)
Credit/(Charge) for Funds	(10)		(40)		30
Net Interest Income	30		10		20
Provision for Loan Losses	(1)		(1)		
Net Interest Income after Provisions for Loan Losses	29		9		20
Waived Fees	(29)			\$(29)	
Other Income	42	\$10	2	30	
Noninterest Expense	(39)	(2)	(1)	(35)	(1)
Contribution	3	<u>\$ 8</u>	<u>\$10</u>	<u>\$(34)</u>	<u>\$19</u>
Overhead Expense	(4)				
Income before Taxes	<u>\$ (1)</u>				

Net Interest

Provision

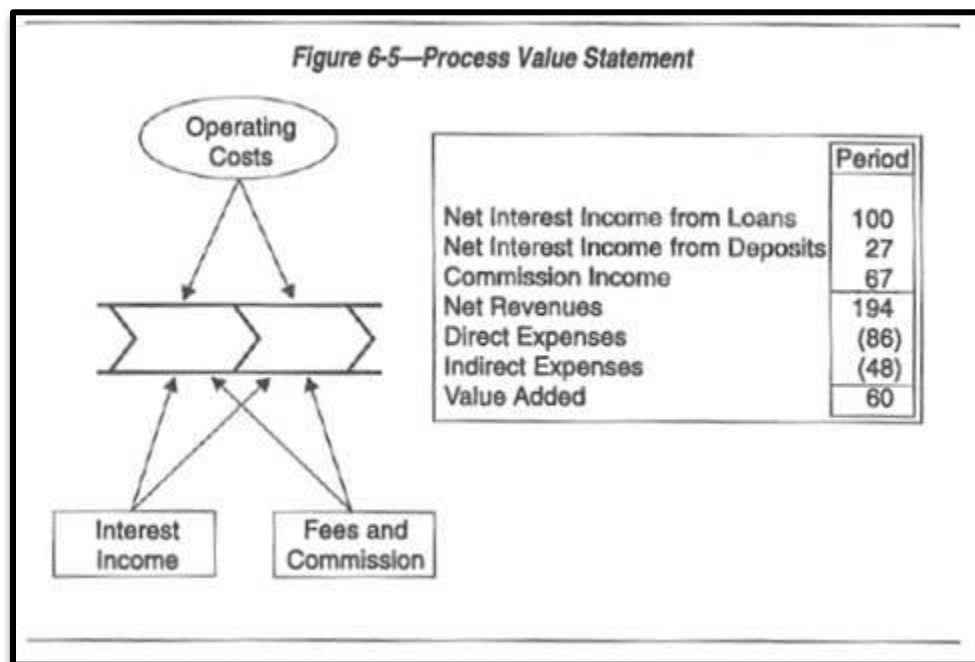
Other Revenue

Direct Expense

Ex. 1005 at 45. Figure 5-6 discloses calculating net interest (“Net Interest Income”), other revenue (“Other Income”), direct expense (a portion of “Noninterest Expense”), and provisioning (“Provision for Loan Losses”) for the customer object. Each of these calculations comprises “at least one marginal value of profit” for an object. As depicted in Figures 5-2 and 5-4 and discussed in the previous paragraph, “Total Noninterest Expense” consists of both direct and indirect expenses. Ex. 1005 at 42-45. Each of the columns to the right of “Total” in Figure 5-6 depict lines of business for the particular customer. The “Total” column refers to the total profit per customer, where the “profit object” is defined as the customer object. Each of the values (*i.e.*, net interest, other revenue, direct expense, and provisioning) is

calculated for “each object being measured,” where the object is the customer object. Ex. 1005 at 41-45, 253-258. In *E&Y*, the object being measured is often referred to as the cost object. Ex. 1005 at 125-135, 137-140, 320-321.

274. The following figure also depicts calculating various measures of the marginal value of profit:



Ex. 1005 at 72. *E&Y*, in the figure above, discloses calculating net interest (“Net Interest Income from Loans” and “Net Interest Income from Deposits”), other revenue (“Commission Income”) and direct expenses (“Direct Expenses”). In my opinion, *E&Y* discloses calculating “at least one marginal value of profit” as that term is used in the ‘316 Patent.

275. *E&Y* also discloses “using the established rules as applied to a selected set of prepared information” to make these calculations. Ex. 1005 at 129,

140, 255-257. As discussed in Section VII.B.1[d] with respect to element 1[d], the *E&Y* discloses establishing rules to calculate profit values using prepared information stored in the database. Ex. 1005 at 129, 239, 255-257, 320. For example, *E&Y* describes the process of calculating direct expenses as including the “assignment of cost elements to pools, and then to cost objects” using “the algorithms built into the Activity Based Costing system.” Ex. 1005 at 140. The “assignment” and “the algorithms” represent rules for calculating profit. The “cost objects” and “pools” demonstrate that the profit calculation uses a selected set of prepared information. In my opinion, *E&Y* anticipates using established rules to calculate at least one marginal value of profit for each object.

276. As referenced in Section VII.A.1[e], element 1[e] was well-known and routine in the art. *E&Y* anticipates element 1[e], and it also would have been obvious for a POSITA to combine well-known elements in the art with *E&Y* to produce element 1[e].

1[f] combining the at least one marginal value of profit to create a measure for object level profitability.

277. *E&Y* anticipates and renders obvious element 1[f]. 1[f] includes the steps of “combining at least one marginal value of profit to create a measure for object level profitability.”

278. In the figures below, *E&Y* teaches combining net interest (“Net Interest Income”), provision (“Provision for Loan Losses”), other revenue (“Other Income”) and/or direct expense (“Direct Expense”) with indirect expense (“Indirect Expense”):

Figure 5-2—Typical Organizational Profitability Statement	
Interest Income	
Interest Expense	
Credit/Charge for Funds	
Net Interest Income	
Provision for Loan Loss	
Net Interest Income after Provision for Loan Loss	
Other Income	
Net Revenue	
Direct Expense	
Salaries and Benefits	
Furniture and Equipment	
Occupancy	
Telephone	
Professional Fees	
Travel and Entertainment	
Other Direct Expenses	
Total Direct Expense	
Indirect Expense	
Total Noninterest Expense	
Income before Taxes	

Figure 5-4—Sample Product Profitability Statement	
Interest Income	
Interest Expense	
Credit/Charge for Funds	
Net Interest Income	
Provision for Loan Loss	
Net Interest Income after Provision for Loan Loss	
Other Income	
Net Revenue	
Direct Expense	
Indirect Expense	
Data Processing	
Loan Processing	
Item Processing	
Branch System	
Marketing	
Other	
Total Noninterest Expense	
Income before Taxes	

Ex. 1005 at 42-43. The ‘316 claims and specification define “marginal value of profit” as including net interest, other revenue, direct expense, and/or provisioning.

Ex. 1001 at 4:67-5:4, 5:12-14, 7:4-11. The figures above disclose combining net

interest (“Net Interest Income”), other revenue (“Other Income”), direct expense (“Direct Expense”), and provisioning (“Provision for Loan Losses”) (i.e. at least one marginal value of profit) with indirect expense (“Indirect Expense”) to create a measure of object level profitability (“Income before Taxes”). The “object” in Figure 5-4 above is a product, while the “object” in Figure 5-2 is the organization. It is my opinion that the product level profitability report that is generated by *E&Y* is a “measure for object level profitability.” Thus, *E&Y* teaches “combining at least one marginal value of profit to create a measure for object level profitability.” As depicted in Figures 5-2 and 5-4, “Total Noninterest Expense” consists of both direct and indirect expenses, where “Direct Expenses” (or “Total Direct Expenses” in Figure 5-2) plus “Indirect Expenses” equals the “Total Noninterest Expense.” Ex. 1005 at 42-45. A POSITA would understand that, as is standard in the accounting practice, the “Total Noninterest Expense” is calculated as the sum of the “Direct Expenses” and “Indirect Expenses” based on “Noninterest Expense” being depicted under a line indicating a calculation. A POSITA would similarly understand that “Income before taxes” would be calculated by subtracting the “Total Noninterest Expense” from “Net Revenue,” or that the “Total Noninterest Expense” would be depicted as a negative number and would be added to “Net Revenue” resulting in “Income before taxes.”

279. E&Y provides a sample profitability report based on the rules or frameworks in Figures 5-2 and 5-4 above for the customer object:

Figure 5-6—Sample Customer Profitability

	Total	Lines and Commitments	Loans	Fee Services	Deposits
Interest Income	\$50		\$50		
Interest Expense	(10)				\$(10)
Credit/(Charge) for Funds	(10)		(40)		30
Net Interest Income	30		10		20
Provision for Loan Losses	(1)		(1)		
Net Interest Income after Provisions for Loan Losses	29		9		20
Waived Fees	(29)			\$(29)	
Other Income	42	\$10	2	30	
Noninterest Expense	(39)	(2)	(1)	(35)	(1)
Contribution	3	<u>\$ 8</u>	<u>\$10</u>	<u>\$(34)</u>	<u>\$19</u>
Overhead Expense	(4)				
Income before Taxes	<u><u>\$(1)</u></u>				

Net Interest
 Provisioning

 Other Revenue
 Direct &
 Indirect Expense
 Indirect Expense

Ex. 1005 at 45. The figure above discloses combining net interest (“Net Interest Income”), other revenue (“Other Income”), direct expense (a portion of “Noninterest Expense”), and provisioning (“Provision for Loan Losses”) (i.e. at least one marginal value of profit) with indirect expense (a portion of “Noninterest Expense” and “Overhead Expense”) to create a measure of object level profitability (“Income before Taxes”). The “object” in Figure 5-6 above is a customer object. As depicted in Figures 5-2 and 5-4 and explained in the previous paragraph, “Total Noninterest Expense” consists of both direct and indirect expenses. Ex. 1005 at 42-45. Each of

the columns to the right of “Total” in Figure 5-6 depict lines of business for the particular customer. The “Total” column refers to the total profit per customer, where the “profit object” is defined as the customer object. Each of the values (*i.e.*, net interest, other revenue, direct expense, provisioning, and indirect expense) is calculated for “each object being measured,” where the object is the customer object. Ex. 1005 at 41-45, 253-258. In *E&Y*, the object being measured is often referred to as the cost object. Ex. 1005 at 125-135, 137-140, 320-321.

280. While Figure 5-6 depicts some expenses (*e.g.*, overhead expenses) allocated to the customer object, and not to each of the individual products or lines of business, *E&Y* discloses the option of distributing these costs on the page following Figure 5-6, explaining:

Fully Absorbed Accounting Approach

Under this approach, the sum of the ***profits/losses of all reported units equals the profits/losses of the entire institution***, regardless of whether the reported units are ***organizational units, products, customers, or any other aspect of an institution's business***. All income statement items are assigned or allocated and are "fully absorbed" in the individual income statements. For example, if reported units are products, then the sum of the reported profits of

the products would equal the institution's overall profits.

The fully absorbed approach requires that all expenses ultimately be distributed among the reported units of the institution and that no expenses be left undistributed at any level.

Ex. 1005 at 46.

281. Further, *E&Y* teaches that all costs and profit calculations can be measured at the cost object. *E&Y* describes the cost object as “any product, service, customer, market, distribution channel, project, etc., for which a unique cost measurement is desired.” Ex. 1005 at 125-129, 130-132, 134-140, 320-321. *E&Y* describes the purpose of using these cost objects as:

Once cost and profitability information have been developed for any unit, product, customer or other cost object, the most immediate opportunity for using the results of this information centers on implementing both near-term actions and long-term strategic improvements for those cost objects that are the most unprofitable or out of line with their intended goals and performance requirements.

Ex. 1005 at 320.

282. As described in Section VII.A.1[f], element 1[f] was well-known in the art. *E&Y* anticipates element 1[f], and a POSITA would have known to combine existing techniques with *E&Y* to render element 1[f] obvious.

283. Since *E&Y* discloses all elements of Claim 1, it is my opinion that *E&Y* anticipates and renders obvious Claim 1 of the ‘316 Patent.

2. Dependent Claim 2 is Anticipated and Obvious

2 The process of Claim 1, wherein the relational database comprises a structured query language (SQL).

284. I understand that Claim 2 depends from Claim 1, and that in order to disclose or render obvious this claim, each limitation of any base claim and any intervening claim must be met in addition to the instant claim limitation. It is my opinion that *E&Y* renders this claim obvious and teaches this limitation.

285. *E&Y* anticipates and renders obvious Claim 2 by describing the use of relational databases in conjunction with “query functions.” Ex. 1005 at 29-32, 96, 183, 256, 277-279 (discloses using “ad hoc query functions to verify the data on reports and screens”). Structured Query Language (“SQL”) was developed in the 1970s and had become an official standard by 1986. Ex. 1004 at 3. By the early 1990s, SQL was used widely as a standard language associated with most relational databases. Ex. 1004 at 4. While *E&Y* does not explicitly mention SQL, *E&Y* discloses using relational databases and query functions. Ex. 1005 at 29-32, 96, 183, 256, 277-279. A POSITA would understand *E&Y*’s discussion of query functions,

together with its discussion of structured database schemas to be describing a structured query language. Additionally, it would be obvious to use a structured query language to access and manipulate data from the database of *E&Y*, as structured query language was a well-known and predictably successful way of accessing and manipulating database data as of the date of the '316 Patent. Ex. 1004 at 3-6. Therefore *E&Y* anticipates and renders obvious Claim 2.

286. *E&Y* also describes using technologies for the storage and management of data including:

"Open" systems standards that enable the transfer of data between applications and hardware platforms, which has allowed the interoperability of competing vendors and driven down prices.

Ex. 1005 at 274. A POSITA would understand *E&Y*'s discussion of open system standards that enable the transfer of data in the context of databases as referring to standards, including a structured query language. *E&Y* further explains that:

Database gateway technology that makes data from existing mainframe-based "legacy" systems available to the desktop, in many cases without the need for extensive custom programming and maintenance.

Ex. 1005 at 274. A POSITA would understand *E&Y*'s discussion of database gateway technologies that make data in legacy systems available to the desktop as including at least a structured query language to store and access that data. Therefore *E&Y* anticipates and renders obvious Claim 2.

287. As discussed in Section VII.A.2(i), SQL was a well-known, routine and conventional technology used with relational databases. Simply using SQL with the teachings of *E&Y* would have been obvious to a POSITA. Therefore, *E&Y* anticipates and renders obvious Claim 2.

3. Dependent Claim 3 is Anticipated and Obvious

3 The process of claim 1, wherein the step of calculating at least one marginal value of profit includes the steps of calculating net interest (NI), other revenue (OR) and direct expense (DE), wherein net interest (NI) is the summation of interest income, value of funds provided and earnings on equity funds used less the sum of interest expense and costs of funds used, other revenue (OR) is a measure of profit contribution from non-interest related sources, and direct expense (DE) is the profit value reduction due to marginal resource consumption by the object and indirect expense (IE) due to non-object related resource consumption.

288. I understand that Claim 3 depends from Claim 1, and that in order to disclose or render obvious this claim, each limitation of any base claim and any intervening claim must be met in addition to the instant claim limitation. It is my opinion that *E&Y* renders this claim obvious and teaches this limitation.

289. Claim 3 recites “the step of calculating at least one marginal value of profit includes the steps of calculating net interest (NI), other revenue (OR) and direct expense (DE)” followed by specific definitions of NI, OR, and DE. It is my opinion that *E&Y* anticipates and renders obvious all elements of Claim 3, as explained below.

3[a] wherein the step of calculating at least one marginal value of profit includes the steps of calculating net interest (NI), other revenue (OR) and direct expense (DE)

290. Element 3[a] recites calculating “at least one marginal value of profit” which includes calculating “net interest (NI), other revenue (OR) and direct expense (DE).” Thus, I understand that Claim 3 requires the calculation of all three of NI, OR, and DE. However, each of NI, OR, and DE are marginal values of profit, and do not require the others in order to calculate “at least one marginal value of profit.” Regardless of the claim construction, *E&Y* anticipates and renders obvious element 3[a].

291. *E&Y* discloses that “[m]arginal costs consist of expense items incurred as a result of adding one incremental item” and “management can use marginal cost components to develop internal marginal cost analyses and ‘what if’ volume/cost pricing analyses.” Ex. 1005 at 56. *E&Y* also discloses calculating each of NI, OR, and DE at various levels of granularity, as depicted in the figures below:

Figure 5-2—Typical Organizational Profitability Statement

Interest Income
Interest Expense
Credit/Charge for Funds

Net Interest Income
Provision for Loan Loss

Net Interest Income after Provision for Loan Loss
Other Income

Net Revenue
Direct Expense
Salaries and Benefits
Furniture and Equipment
Occupancy
Telephone
Professional Fees
Travel and Entertainment
Other Direct Expenses

Total Direct Expense
Indirect Expense

Total Noninterest Expense

Income before Taxes

Figure 5-4—Sample Product Profitability Statement

Interest Income
Interest Expense
Credit/Charge for Funds

Net Interest Income
Provision for Loan Loss

Net Interest Income after Provision for Loan Loss
Other Income

Net Revenue
Direct Expense
Indirect Expense
Data Processing
Loan Processing
Item Processing
Branch System
Marketing
Other

Total Noninterest Expense

Income before Taxes

Ex. 1005 at 42-43. The figures above disclose calculating net interest (“Net Interest Income”), other revenue (“Other Income”), direct expense (“Direct Expense”), and provisioning (“Provision for Loan Losses”) at an organization or product level, each of which comprises “at least one marginal value of profit” for an object. As depicted in Figures 5-2 and 5-4, “Total Noninterest Expense” consists of both direct and indirect expenses, where “Direct Expenses” (or “Total Direct Expenses” in Figure 5-2) plus “Indirect Expenses” equals the “Total Noninterest Expense.” Ex. 1005 at

42-45. A POSITA would understand that, as is standard in the accounting practice, the “Total Noninterest Expense” is calculated as the sum of the “Direct Expenses” and “Indirect Expenses” based on “Noninterest Expense” being depicted under a line indicating a calculation. A POSITA would similarly understand that “Income before taxes” would be calculated by subtracting the “Total Noninterest Expense” from “Net Revenue,” or that the “Total Noninterest Expense” would be depicted as a negative number and would be added to “Net Revenue” resulting in “Income before taxes.”

292. E&Y provides a sample profitability report for the customer object, based on the figures above, as depicted below:

Figure 5-6—Sample Customer Profitability

	Total	Lines and Commitments	Loans	Fee Services	Deposits
Interest Income	\$50		\$50		
Interest Expense	(10)				\$(10)
Credit/(Charge) for Funds	(10)		(40)		30
Net Interest Income	30		10		20
Provision for Loan Losses	<u>(1)</u>		<u>(1)</u>		
Net Interest Income after Provisions for Loan Losses	29		9		20
Waived Fees	(29)			\$(29)	
Other Income	42	\$10	2	30	
Noninterest Expense	<u>(39)</u>	<u>(2)</u>	<u>(1)</u>	<u>(35)</u>	<u>(1)</u>
Contribution	3	<u>\$ 8</u>	<u>\$10</u>	<u>\$(34)</u>	<u>\$19</u>
Overhead Expense	<u>(4)</u>				
Income before Taxes	<u><u>\$(1)</u></u>				

Net Interest

Other Revenue

Direct Expense

Ex. 1005 at 45. This figure discloses calculating net interest (“Net Interest Income”), other revenue (“Other Income”), direct expense (a portion of “Noninterest Expense”), and provisioning (“Provision for Loan Losses”) for the customer object. Each of these calculations comprises “at least one marginal value of profit” for an object. As depicted in Figures 5-2 and 5-4 and discussed in the previous paragraph, “Total Noninterest Expense” consists of both direct and indirect expenses. Ex. 1005 at 42-45. Each of the columns to the right of “Total” in Figure 5-6 depict lines of business for the particular customer. The “Total” column refers to the total profit per customer, where the “profit object” is defined as the customer object. Each of the values (*i.e.*, net interest, other revenue, direct expense, and provisioning) is calculated for “each object being measured,” where the object is the customer object. Ex. 1005 at 41-45, 253-258. In *E&Y*, the object being measured is often referred to as the cost object. Ex. 1005 at 125-135, 137-140, 320-321. *E&Y* also teaches several ways to calculate each of these marginal profit values, as described in elements 3[b]-3[d] below.

293. As discussed in Section VII.A.2(ii), calculating a marginal value of profit, including calculating net interest, other revenue, and direct expense was well-known, routine, and conventional in the art at the time of the invention. Calculating net interest, other revenue, and direct expense was commonplace in accounting and was taught in accounting and finance textbooks at the time of the

invention. Ex. 1013 at 27-28, 96-102, 396, 591-592. Calculating net interest, other revenue, and direct expense was often required by accounting regulations. Ex. 1018 at 12, 14-15, 37. Therefore, it is my opinion that *E&Y* anticipates and renders obvious element 3[a]. Further, it would have been obvious for a POSITA to combine the teachings of *E&Y* with well-known and routine elements in the art to render element 3[a] obvious.

3[b] wherein net interest (NI) is the summation of interest income, value of funds provided and earnings on equity funds used less the sum of interest expense and costs of funds used

294. Element 3[b] recites a calculation for net interest as “the summation of interest income, value of funds provided and earnings on equity funds used less the sum of interest expense and costs of funds used.” This equation can be written as:

$$NI = \sum IntInc + VOF + EarningsOnEquityFunds - IntExp - COF$$

where “NI” is net interest, “IntInc” is interest income, “VOF” is value of funds provided, “EarningsOnEquityFunds” is the earnings on equity funds used, “IntExp” is interest expense, and “COF” is cost of funds used. This formula is similar to the funds transfer pricing model, in that it calculates a cost of funds used and value of funds provided for every product. Ex. 1005 at 175-179. It is important to note that, while Element 3[b] recites adding “earnings on equity funds used” to calculate NI,

the ‘316 Patent recites **reducing** NI by the cost of capital. For example, for the NI Option 4 calculation, the ‘316 Patent recites:

NI EOAE Option 4: Allocate equity based on mileage benefit and **have it reduce NI** by the **weighted average cost of capital** for the airline.

Ex. 1001 at 24:51-53. This is also consistent with the SVA equity allocation of Claim 29, where SVA reduces the overall profit for an object. It is my opinion that this calculation of net interest is anticipated and rendered obvious by *E&Y*.

295. In order to understand the transfer pricing calculation of Element 3[b], it is instructive to see an example of the transfer pricing calculations for a hypothetical bank. Assume that ExampleBank was just established. ExampleBank receives \$125,000 in equity funding from a shareholder, and the shareholder expects a 24% return on their investment per year. ExampleBank also accepts \$500,000 in deposits from a first customer, who is paid 2% in interest per year. At this point, ExampleBank has \$625,000 in assets (cash), \$500,000 in liabilities (deposit account), and \$125,000 in equity (shareholder equity). Suppose now, ExampleBank wants to make a loan from their \$625,000 in cash to a second customer, and will charge 8% on the loan per year. Now, ExampleBank has \$625,000 in assets (loan), \$500,000 in liabilities (deposit account), and \$125,000 in equity (shareholder equity). Looking to the calculation of element 3[b], we see that the deposit account asset will have an

interest expense of **\$10,000** ($\$500,000 * 2\% = \$10,000$) and a value of funds provided of **\$30,000**, which is \$500,000 times the transfer rate of the alternative use of funds, which in this case is determined to be 6% ($\$500,000 * 6\% = \$30,000$) or what the deposited funds could have earned if not lent to ExampleBank's customer. Thus, the Net Interest for the deposit account would be:

$$NI = \$0 + \$30,000 + \$0 - \$10,000 - \$0 = \$20,000$$

$$NI = IntInc + VOF + EarningsOnEquity - IntExp - COF$$

For the deposit account, the Interest Income, Cost of Funds, and Earnings on Equity Funds are all zero. For the loan product, the NI calculation will have to take into consideration both the equity and debt portions of the funding used to provide the loan. In this case, 20% of the loan comes from equity (shareholders) and 80% comes from debt (deposit accounts). The loan would receive **\$50,000** in interest income ($\$625,000 * 8\% = \$50,000$). The loan would have a debt cost of funds of **\$10,000** ($\$500,000 * 2\% = \$10,000$) and a cost of allocated equity of **\$30,000** ($\$125,000 * 24\% = \$30,000$). The total charge for funds is therefore **\$40,000** ($\$10,000 + \$30,000$). Thus, the Net Interest calculation of 3[b] for the loan account would be:

$$NI = \$50,000 + \$0 + (-\$30,000) - \$0 - \$10,000 = \$10,000$$

$$NI = IntInc + VOF + EarningsOnEquity - IntExp - COF$$

For the loan product, the Interest Expense is zero, and the Value of Funds Provided is zero. In the example above, it would not make sense to add the cost of equity

funds to the net interest calculation, since the shareholders require a return on the equity allocated to the loan. The final calculation shows that ExampleBank will receive **\$10,000**, or 1.6% of the \$625,000 loan, in profit since the interest on the loan is greater than the cost of debt and equity funds. This ExampleBank scenario maps to the values in Figure 5-6 below.

296. E&Y discloses calculating net interest including adding interest income, value of funds provided, and earnings on equity funds, and subtracting therefrom interest expense and cost of funds used in the following figure:

<i>Figure 5-6—Sample Customer Profitability</i>					
	Total	Lines and Commitments	Loans	Fee Services	Deposits
Interest Income	\$50		\$50		
Interest Expense	(10)				\$(10)
Credit/(Charge) for Funds	(10)		(40)		30
Net Interest Income	30		10		20
Provision for Loan Losses	(1)		(1)		
Net Interest Income after Provisions for Loan Losses	29		9		20
Waived Fees	(29)			\$(29)	
Other Income	42	\$10	2	30	
Noninterest Expense	(39)	(2)	(1)	(35)	(1)
Contribution	3	<u>\$ 8</u>	<u>\$10</u>	<u>\$(34)</u>	<u>\$19</u>
Overhead Expense	(4)				
Income before Taxes	<u>\$(1)</u>				

+ Interest Income

- Interest Expense

- Cost of Funds

+ Value of Funds

+ Earnings on Equity

Net Interest

Ex. 1005 at 45. The figure above discloses calculating the net interest (“Net Interest Income”) by taking the interest income (“Interest Income”), subtracting therefrom

the interest expense (“Interest Expense”), and adding (or subtracting) the value of funds/cost of funds/earnings on equity funds (“Credit/(Charge) for Funds”). The “Credit/(Charge) for Funds” is described by *E&Y* as “all balance-sheet items will be transfer priced,” meaning that “all assets will receive funding charges and all liabilities and equity will receive funding credits.” Ex. 1005 at 178. In the figure above, that means that the loans (“Loans”) receive a funding charge for the cost of debt and earnings on equity funds used in providing the loan, and a funding credit is provided for the value of the deposits (“Deposits”). In terms of the formula of element 3[b], the figure above discloses calculating

Net Interest Income

$$\begin{aligned}
 &= \text{Interest Income} + \text{Credit for (Debt) Funds} \\
 &+ \text{Credit for (Equity) Funds} - \text{Interest Expense} \\
 &- \text{Charge for Funds}
 \end{aligned}$$

297. *E&Y* discloses using “[t]ransfer pricing systems [to] calculate charges for funds used and credits for funds provided by organizational units, products, and customers” and that “these charges and credits determine the net interest spread of assets and liabilities.” Ex. 1005 at 260. *E&Y* teaches that:

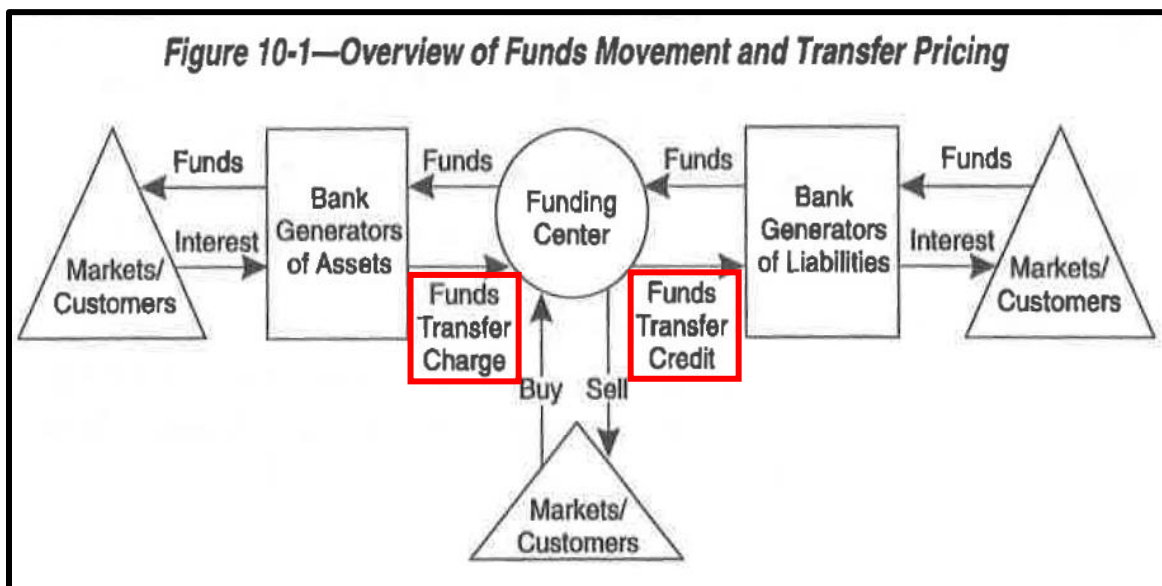
Ultimately, the objective of transfer pricing is the proper valuation of the provision or use of funds by the bank's organizations, products, segments, customers, etc., which

are the subjects of profitability measurement. Funds-transfer pricing is a set of management accounting conventions and practices. It is not driven by GAAP or RAP. Given its importance to the institution, numerous objectives may exist:

- Identifying the cost or opportunity value of funds to the institution.
- Facilitating the profitability measurement of various components (branches, products, customer, accounts) of the institution by relating appropriate costs to revenues.
- Isolating interest-rate risk from the business units and capturing it in a separate reporting unit.
- Enhancing asset and liability pricing decisions.
- Supporting asset/liability management and separating credit risk from interest-rate risk.
- Quantifying the net interest income impact of gap funding.
- Evaluating each component of the institution in a manner consistent with its economic impact on total earnings.

- Using funds-transfer pricing to set a course of action for employees whose activities are measured by financial reports.

Ex. 1005 at 176-177. Transfer pricing (or the process of determining the cost of funds, value of funds, and earnings on equity funds used) is depicted by *E&Y* in the figure below:



Ex. 1005 at 177. *E&Y* describes this figure as:

Figure 10-1 is an overview of the funds-transfer pricing process. Essentially, a central funding center “buys” funds from the parts of the bank that generate liabilities, and “sells” them to asset-generating parts of the bank, which require funding. It buys and sells at rates commensurate with the repricing characteristics of the asset funded or

liability “bought,” thereby match funding each transaction. Excesses or shortages of funds are handled through funding center transactions with the market. In this manner, the impact of interest-rate gap risk is theoretically centralized within the funding center, and credit risk is held within the business units. The asset generators' net interest margin reflects the difference between the interest rates they charge to their customers on balances (less credit loss provision) and the funds-transfer price they pay to the funding center. The liability generators' net interest margin is, conversely, the difference between the interest rates they pay to their customers on balances, and the funds-transfer credit they receive from the funding center.

Ex. 1005 at 177-178. *E&Y* discloses that “allocating equity to products or business lines on a risk-adjusted basis has become important in developing strategy and measuring financial performance.” Ex. 1005 at 218. *E&Y* further discusses using “funds value of capital” and teaches that “equity allocated to a business should, however, receive a funds transfer pricing credit.” Ex. 1005 at 179. It is my opinion

that the discussion of net interest calculation and funds transfer pricing in *E&Y* anticipates and renders obvious element 3[b].

298. As discussed in Section VII.A.2(ii), calculating net interest at both an organizational level and product level was well-known, routine, and conventional in the art at the time of the invention. Calculating net interest using transfer pricing was taught in accounting textbooks at the time of the invention, and was often required by accounting regulations and banking capital reserve requirements. Ex. 1013 at 913-916. Therefore, it is my opinion that *E&Y* anticipates and renders obvious element 3[b]. Further, it would have been obvious for a POSITA to combine the teachings of *E&Y* with well-known and routine elements in the art to render element 3[b] obvious.

3[c] other revenue (OR) is a measure of profit contribution from non-interest related sources

299. Element 3[c] recites calculating other revenue (OR) as “a measure of profit contribution from non-interest related sources.” A common form of other revenue in banks comes from commissions, fees, and charges. For example, *E&Y* discloses that the “classic example is the charge for insufficient funds (NSF),” which became a “fertile source of *noninterest revenue*.” Ex. 1005 at 290.

300. *E&Y* depicts the calculation of OR in determining profitability for the customer object in the figure below:

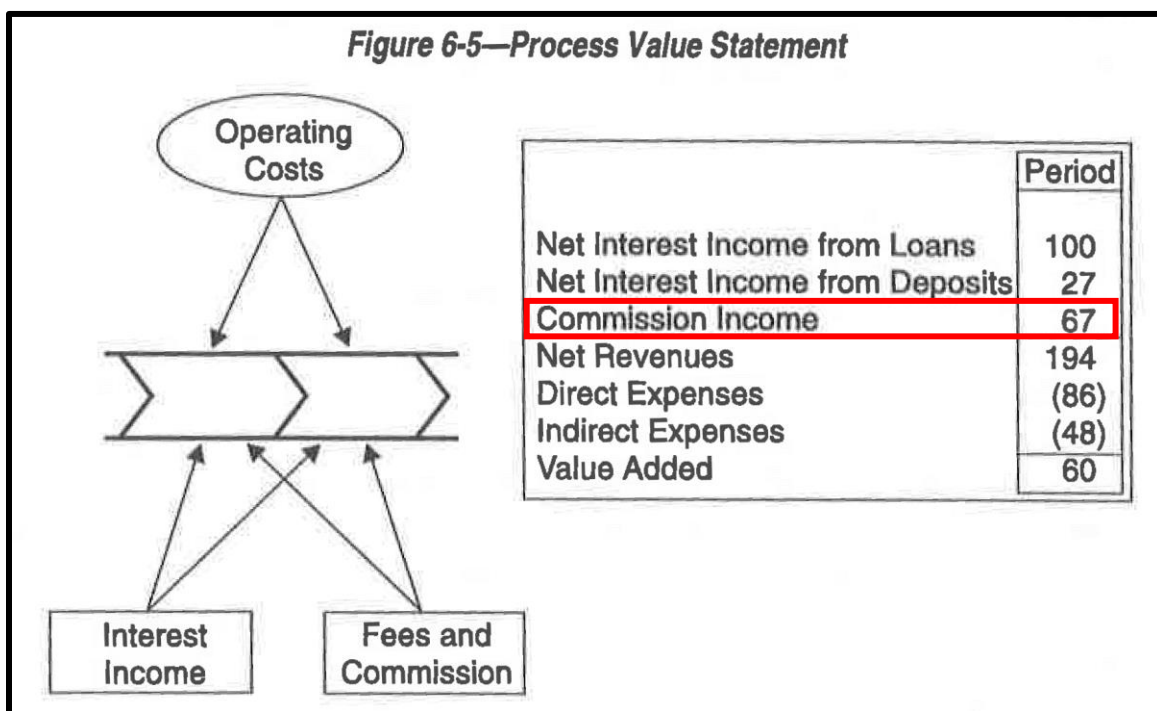
Figure 5-6—Sample Customer Profitability

	Total	Lines and Commitments	Loans	Fee Services	Deposits
Interest Income	\$50		\$50		
Interest Expense	(10)				\$(10)
Credit/(Charge) for Funds	(10)		(40)		30
Net Interest Income	30		10		20
Provision for Loan Losses	(1)		(1)		
Net Interest Income after Provisions for Loan Losses	29		9		20
Waived Fees	(29)			\$(29)	
Other Income	42	\$10	2	30	
Noninterest Expense	(39)	(2)	(1)	(35)	(1)
Contribution	3	<u>\$ 8</u>	<u>\$10</u>	<u>\$(34)</u>	<u>\$19</u>
Overhead Expense	(4)				
Income before Taxes	<u>\$(1)</u>				

Other Revenue

Ex. 1005 at 45. Other revenue is depicted in the figure above as “Other Income” and includes all income not related to “Interest Income.” Therefore, *E&Y* anticipates and renders obvious calculating other revenue as “a measure of profit contribution from non-interest related sources.”

301. *E&Y* provides additional examples of other revenue, including “noninterest revenue from fees,” “transaction charges, and commissions.” Ex. 1005 at 63. The figure below depicts the calculation of other revenue as “Commission Income”, which is a profit contribution from a non-interest related source:



Ex. 1005 at 72. Therefore, *E&Y* anticipates and renders obvious calculating other revenue as “a measure of profit contribution from non-interest related sources.”

302. As discussed in Section VII.A.2(ii), calculating other revenue at an organizational level and product level was well-known, routine, and conventional in the art at the time of the invention. Therefore, it is my opinion that *E&Y* anticipates and renders obvious element 3[c]. Further, it would have been obvious for a POSITA to combine the teachings of *E&Y* with well-known and routine elements in the art to render element 3[c] obvious.

3[d] and direct expense (DE) is the profit value reduction due to marginal resource consumption by the object.

303. Element 3[d] recites that the “direct expense (DE) is the profit value reduction due to marginal resource consumption by the object.” *E&Y* discloses that “marginal pricing decisions” use “costs directly related to the product.” Ex. 1005 at 204. *E&Y* discloses using direct expenses constituting the profit value reduction due to marginal resource consumption of the object under evaluation in profit calculation as:

Direct and Indirect Expenses

A responsibility center incurs direct expenses by carrying out its activities and tasks. Generally, these expenses are highly controllable. They include the expenses budgeted by a center and listed on its general ledger responsibility report. Salaries are a good example of this type of expense.

Direct expenses also include expenses that a center requires to operate, but that, for control purposes, may be budgeted and monitored elsewhere. Another center reports these expenses because it may have the expertise needed to manage the expense, or because it can achieve better

economies of scale. Examples of expense items often handled this way are benefits, occupancy, and telecommunication expenses.

Ex. 1005 at 53. In the paragraph above, *E&Y* discloses calculating direct expenses as expenses that a center requires to operate, disclosing “marginal resource consumption.”

304. *E&Y* teaches calculating direct expense for the customer object as depicted in the figure below:

Figure 5-6—Sample Customer Profitability

	Total	Lines and Commitments	Loans	Fee Services	Deposits
Interest Income	\$50		\$50		
Interest Expense	(10)				\$(10)
Credit/(Charge) for Funds	(10)		(40)		30
Net Interest Income	30		10		20
Provision for Loan Losses	(1)		(1)		
Net Interest Income after Provisions for Loan Losses	29		9		20
Waived Fees	(29)			\$(29)	
Other Income	42	\$10	2	30	
Noninterest Expense	(39)	(2)	(1)	(35)	(1)
Contribution	3	<u>\$ 8</u>	<u>\$10</u>	<u>\$(34)</u>	<u>\$19</u>
Overhead Expense	(4)				
Income before Taxes	<u>\$(1)</u>				

Direct Expense

Ex. 1005 at 45. In the figure above, direct expense is calculated as a portion of “Noninterest expense” for each product for a given customer. As depicted in Figures

5-2, “Total Noninterest Expense” consists of both direct and indirect expenses, where “Direct Expenses” (or “Total Direct Expenses” in Figure 5-2) plus “Indirect Expenses” equals the “Total Noninterest Expense.” Ex. 1005 at 42-45. A POSITA would understand that, as is standard in the accounting practice, the “Total Noninterest Expense” is calculated as the sum of the “Direct Expenses” and “Indirect Expenses” based on “Noninterest Expense” being depicted under a line indicating a calculation. A POSITA would similarly understand that “Income before taxes” would be calculated by subtracting the “Total Noninterest Expense” from “Net Revenue,” or that the “Total Noninterest Expense” would be depicted as a negative number and would be added to “Net Revenue” resulting in “Income before taxes.” The “Total” column, depicts all revenue and expenses being allocated to the object (*e.g.*, the customer object).

305. Additional examples of direct expenses disclosed in *E&Y* are depicted in the figure below:

Figure 5-2—Typical Organizational Profitability Statement

Interest Income
Interest Expense
Credit/Charge for Funds

Net Interest Income
Provision for Loan Loss

Net Interest Income after Provision for Loan Loss
Other Income

Net Revenue
Direct Expense
Salaries and Benefits
Furniture and Equipment
Occupancy
Telephone
Professional Fees
Travel and Entertainment
Other Direct Expenses

Total Direct Expense
Indirect Expense

Total Noninterest Expense

Income before Taxes

Ex. 1005 at 43. In the figure above, *E&Y* discloses examples of direct expenses including salaries and benefits, furniture and equipment, occupancy, telephone, professional fees, travel and entertainment, and other direct expenses.

306. It is my opinion, based on the information provided, that *E&Y* anticipates and renders obvious element 3[d]. Further, as discussed in Section

VII.A.2(ii), calculating direct expense at an organizational, customer and product level was well-known, routine, and conventional in the art at the time of the invention. Ex. 1013 at 27-28, 96-102. It would have been obvious for a POSITA to combine the teachings of *E&Y* with the routine calculation of direct expenses to render element 3[d] obvious.

307. Since *E&Y* discloses calculating a marginal value of profit, including calculating each of NI, OR, and DE as prescribed in Claim 3, *E&Y* anticipates and renders obvious Claim 3. Additionally, it would have been obvious to a POSITA to combine the teachings of *E&Y* with well-known aspects of cost accounting and activity-based costing to render Claim 3 obvious.

3[e] indirect expense (IE) due to non-object related resource consumption

308. *E&Y* anticipates and renders obvious element 3[e]. Element 3[e] includes the step of calculating indirect expense as “non-object related resource consumption.”

309. *E&Y* discloses calculating indirect expense for each object being measured. The ‘316 Patent describes IE as “an apportioned profit value adjustment for all non-object related resource consumption by the business.” Ex. 1001 at 5:12-14.

310. *E&Y* anticipates and renders obvious calculating indirect expense for each object being measured. *E&Y* discloses that:

A reporting issue even more fundamental than the presentation of detailed expense information is whether reports should include all or only some expenses. Three basic methods of reporting profitability address this issue: the ***fully absorbed accounting approach***, the contribution approach, and the ‘above the line/below the line approach.’

Ex. 1005 at 46. *E&Y* explains the fully absorbed accounting approach in greater detail as:

Fully Absorbed Accounting Approach

Under this approach, the sum of the profits/losses of all reported units equals the profits/losses of the entire institution, regardless of whether the reported units are ***organizational units, products, customers, or any other aspect of an institution's business. All income statement items are assigned or allocated and are "fully absorbed"*** in the individual income statements. For example, if reported units are products, then the sum of the reported

profits of the products would equal the institution's overall profits.

The fully absorbed approach requires that all expenses ultimately be distributed among the reported units of the institution and that no expenses be left undistributed at any level.

The advantages of this approach are:

- All expenses are included when profitability is reported and analyzed. This reduces the possibility that certain expense items will be ignored and remain unmanaged or not factored into such decision-making issues as establishing product prices.
- Managers become aware of all expenses in an institution, which facilitates expense management.
- Having fully accounted for all income statement items, individual business line, branch, product, or customer 'hurdle rates' can be established that are congruent with the overall organization's goals. Every measure is in line with the corporate goal as it all contributes to the total.

Ex. 1005 at 46. *E&Y*, in the paragraph above, discloses calculating IE at different object levels (*e.g.*, product profitability, customer profitability). *E&Y* also discloses a benefit of using the fully absorbed approach to calculating IE as:

Full-absorption costing creates the additional advantage of assuring that the entire institution's profitability equals the sum of the profitability of its components. No residual expenses need to be factored in to derive total institution profitability. This consideration becomes especially important when all components of the institution are analyzed. ***The sum of the parts equals the sum of the whole.***

Ex. 1005 at 87. *E&Y* also discloses implementing a fully absorbed profit adjustment in an automated fashion:

Using the full absorption technique, this process normally would be completed by a cost accounting system that automatically allocates the period's expenses to the pools and then divides the pools by the resource unit usage.

Ex. 1005 at 156. It is my opinion that *E&Y* anticipates and renders obvious calculating indirect expense for each object being measured using a relational database.

311. In addition to disclosing calculating indirect expense for each object being measured, *E&Y* teaches that indirect costs are to be assigned or allocated, and therefore fully absorbed, so that:

the sum of the profits/losses of all reported units equals the profits/losses of the entire institution, regardless of whether the reported units are organizational units, products, customers, or any other aspect of an institution's business. All income statement items are assigned or allocated and are “fully absorbed” in the individual income statements. For example, if reported units are products, then the sum of the reported profits of the products would equal the institution's overall profits.

Ex. 1005 at 46.

312. *E&Y* also discloses calculating indirect expenses in the following figure:

Figure 5-2—Typical Organizational Profitability Statement

Interest Income
Interest Expense
Credit/Charge for Funds
Net Interest Income
Provision for Loan Loss
Net Interest Income after Provision for Loan Loss
Other Income
Net Revenue
Direct Expense
Salaries and Benefits
Furniture and Equipment
Occupancy
Telephone
Professional Fees
Travel and Entertainment
Other Direct Expenses
Total Direct Expense
Indirect Expense
Total Noninterest Expense
Income before Taxes

Figure 5-4—Sample Product Profitability Statement

Interest Income
Interest Expense
Credit/Charge for Funds
Net Interest Income
Provision for Loan Loss
Net Interest Income after Provision for Loan Loss
Other Income
Net Revenue
Direct Expense
Indirect Expense
Data Processing
Loan Processing
Item Processing
Branch System
Marketing
Other
Total Noninterest Expense
Income before Taxes

Ex. 1005 at 42-43. *E&Y* discloses calculating indirect expense (“Indirect Expense”) for each organization or product object as depicted in the figures above. As depicted in Figures 5-2 and 5-4, “Total Noninterest Expense” consists of both direct and indirect expenses, where “Direct Expenses” (or “Total Direct Expenses” in Figure 5-2) plus “Indirect Expenses” equals the “Total Noninterest Expense.” Ex. 1005 at 42-45. A POSITA would understand that, as is standard in the accounting practice, the “Total Noninterest Expense” is calculated as the sum of the “Direct Expenses”

and “Indirect Expenses” based on “Noninterest Expense” being depicted under a line indicating a calculation. A POSITA would similarly understand that “Income before taxes” would be calculated by subtracting the “Total Noninterest Expense” from “Net Revenue,” or that the “Total Noninterest Expense” would be depicted as a negative number and would be added to “Net Revenue” resulting in “Income before taxes.”

313. E&Y provides a sample profitability report for the customer object, based on the rules or framework above, as depicted below:

Figure 5-6—Sample Customer Profitability

	Total	Lines and Commitments	Loans	Fee Services	Deposits
Interest Income	\$50		\$50		
Interest Expense	(10)				\$(10)
Credit/(Charge) for Funds	(10)		(40)		30
Net Interest Income	30		10		20
Provision for Loan Losses	(1)		(1)		
Net Interest Income after Provisions for Loan Losses	29		9		20
Waived Fees	(29)			\$(29)	
Other Income	42	\$10	2	30	
Noninterest Expense	(39)	(2)	(1)	(35)	(1)
Contribution	3	\$ 8	\$10	\$(34)	\$19
Overhead Expense	(4)				
Income before Taxes	<u>\$ (1)</u>				

Indirect Expense

Indirect Expense

Ex. 1005 at 45. The figure above discloses calculating indirect expenses (a portion of “Noninterest Expense” and “Overhead Expense”) which, in this illustration, has

been allocated to a customer object. Therefore, Figure 5-6 depicts, for a customer object, calculating IE as non-object related resource consumption. As depicted in Figures 5-2 and 5-4 and discussed in the previous paragraph, “Total Noninterest Expense” consists of both direct and indirect expenses. Ex. 1005 at 42-45. Each of the columns to the right of “Total” in Figure 5-6 depict lines of business for the particular customer. The “Total” column refers to the total profit per customer, where the “profit object” is defined as the customer object. The indirect expense is calculated for “each object being measured,” where the object is the customer object. Ex. 1005 at 41-45, 253-258. In *E&Y*, the object being measured is often referred to as the cost object. Ex. 1005 at 125-135, 137-140, 320-321. Thus, *E&Y* anticipates and renders obvious Claim element 3[e].

314. While Figure 5-6 depicts some expenses (*e.g.*, overhead expenses) allocated to the customer object and not to each of the individual products or lines of business, *E&Y* discloses distributing these costs on the page following Figure 5-6, explaining:

Fully Absorbed Accounting Approach

Under this approach, the sum of the ***profits/losses of all reported units equals the profits/losses of the entire institution***, regardless of whether the reported units are ***organizational units, products, customers, or any other***

aspect of an institution's business. All income statement items are assigned or allocated and are "fully absorbed" in the individual income statements. For example, if reported units are products, then the sum of the reported profits of the products would equal the institution's overall profits. *The fully absorbed approach requires that all expenses ultimately be distributed among the reported units of the institution* and that *no expenses be left undistributed at any level.*

Ex. 1005 at 46.

315. Section VII.A.2(ii) explains that element 3[e] was well known in the art. It is my opinion that calculating indirect expenses was well-known, routine and conventional in the art. *E&Y* anticipates element 3[e], and a POSITA would have known to combine conventional techniques with *E&Y* to render element 3[e] obvious.

4. Dependent Claim 4 is Anticipated and Obvious

4	The process of Claim 1, wherein the step of calculating at least one marginal value of profit includes the step of provisioning (P) for the selected set of prepared information, provisioning being the expected profit value adjustment for future outcomes related to the object.

316. I understand that Claim 4 depends from Claim 1, and that in order to disclose or render obvious this claim, each limitation of any base claim and any intervening claim must be met in addition to the instant claim limitation. It is my opinion that *E&Y* renders this claim obvious and teaches this limitation.

317. Claim 4 recites the steps of calculating at least one marginal value of profit including the step of “provisioning (P) for the selected set of prepared information,” where “provisioning being the expected profit value adjustment for future outcomes related to the object.” Provisioning for expected loan losses is a well-known, routine, and conventional practice in the finance and banking sectors. The ‘316 Patent explicitly states that the practice of provisioning is well-known in the financial industry, stating:

Provision — Adjusting current profit for expected future value changes is known as 'actuarial' provisioning. ***The technique is well known by the financial industry's accounting practice.*** DPM applies actuarial based methods in its object level profit calculations where the

Provision pre-adjusts profit for contingent or known exposures to future profit.

Ex. 1001 at 9:49-55. The ‘316 Patent provides additional examples of what may be used to calculate provisioning, “such as: expected loss rates, reserve percentages, exposure factors, recovery rates, default probabilities and collection costs.”

318. *E&Y* discloses the step of provisioning for loan losses in the figure below:

Figure 5-6—Sample Customer Profitability

	Total	Lines and Commitments	Loans	Fee Services	Deposits
Interest Income	\$50		\$50		
Interest Expense	(10)				\$(10)
Credit/(Charge) for Funds	(10)		(40)		30
Net Interest Income	30	—	10	—	20
Provision for Loan Losses	<u>(1)</u>	—	<u>(1)</u>	—	—
Net Interest Income after Provisions for Loan Losses	29		9		20
Waived Fees	(29)			\$(29)	
Other Income	42	\$10	2	30	
Noninterest Expense	<u>(39)</u>	<u>(2)</u>	<u>(1)</u>	<u>(35)</u>	<u>(1)</u>
Contribution	3	<u>\$ 8</u>	<u>\$10</u>	<u>\$(34)</u>	<u>\$19</u>
Overhead Expense	<u>(4)</u>				
Income before Taxes	<u><u>\$(1)</u></u>				

Provision

Ex. 1005 at 45. In the figure above, *E&Y* discloses calculating provisioning as the “Provision for Loan Losses,” and allocates a loan loss provision or “profit value

adjustment” (of 10% of Net Interest Income) to the risky loan product (*i.e.*, “Loans”).

E&Y describes several methods for calculating loan loss provisions, including:

Loan Loss Provision

An important component of a financial institution's profit and loss statement, at least for lending institutions, is the loan loss provision. Several methods can be used to handle the provision. The simplest is to not allocate it, an approach often used in smaller institutions. However, this is misleading because the loan loss provision is a major component of product and customer profitability.

Another way to deal with the loan loss provision is to allocate net charge-offs (gross charge-offs less recoveries) to the appropriate center, product, or customer as an element of the profit and loss statement. This technique is relatively simple to implement because the gross charge-offs and recoveries are known and can easily be charged to the appropriate organizational centers, products, and customers.

Ex. 1005 at 76-77. *E&Y* above describes a simple method for allocating (or not allocating) a provision for loan losses. The charge-offs represent a current allocation for expected future outcomes.

319. A more complex calculation of a loan loss provision is disclosed by *E&Y* as:

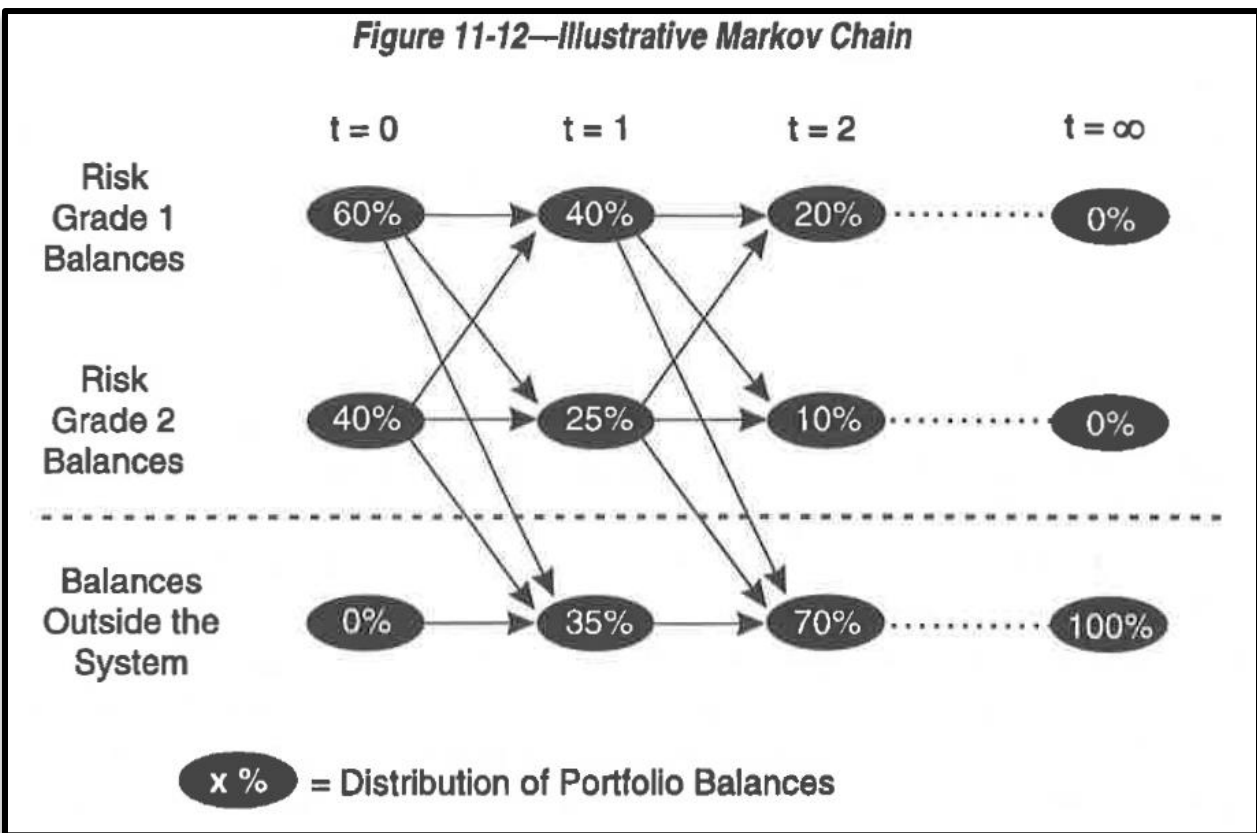
Step 4 - Calculate the Required Provision

The required ***loan loss provision*** can be compared to an insurance premium that ***amortizes the cost of a loss over the period of time in which the loss can be expected to occur***. The analysis provides the total expected loss over the life of the portfolio. In order to determine the pro rata periodic risk charge, it is necessary to know how long the current balances by risk grade will remain on the books.

Markov chain mathematics provides the answer. It is not the number of transitions until all balances are either charged off or paid off (which is infinite), but rather the balance-weighted average number of transitions that counts. Taking this number by risk rating, which comes out of the matrix algebra, and dividing it into the total expected losses by risk rating, provides the needed

periodic provision as a percentage of outstanding balances.

Ex. 1005 at 209. In the paragraph above, *E&Y* discloses calculating the provision for loan losses using the future expected cost of a loss over the period of time. The process of using Markovian chains provides a mechanism to modify the expected future losses as time progresses, providing a more detailed and accurate picture of the future losses expected. An illustration of a Markov Chain is provided below:



Ex. 1005 at 209. In the image above, *E&Y* depicts the riskiness of a portfolio as time progresses, describing a process for adjusting loan loss provisions for expected future outcomes continuously as time progresses. It is my opinion that *E&Y*

anticipates, and renders obvious, the step of including a provision as “the expected profit value adjustment for future outcomes related to the object.”

320. *E&Y* discloses other forms of provisioning, including reserve requirements for bank soundness and capital adequacy regulations for equity capital. Ex. 1005 at 205-212, 214. These forms of provisioning also adjust the profit calculation according to expected future events.

321. It is my opinion, based on the information provided, that *E&Y* anticipates and renders obvious Claim 4. As discussed in Section VII.A.2(iii), and as disclosed by the ‘316 Patent itself, the step of provisioning at an organizational, customer and product level was “well known by the financial industry’s accounting practice” at the time of the invention. Ex. 1001 at 9:49-55. It would have been obvious for a POSITA to combine the teachings of *E&Y* with well-known and routine elements of the financial industry’s accounting practices to render Claim 4 obvious.

5. Dependent Claim 5 is Anticipated and Obvious

5	The process of Claim 1, including the step of calculating a profit adjustment value by calculating the value for (IE) which is an apportioned profit value adjustment for all non-object related resource consumption.

322. I understand that Claim 5 depends from Claim 4, and that in order to disclose or render obvious this claim, each limitation of any base claim and any

intervening claim must be met in addition to the instant claim limitation. It is my opinion that *E&Y* renders this claim obvious and teaches this limitation.

323. Claim 5 specifies that the “profit adjustment value” includes “calculating the value for indirect expense (IE), which is an apportioned profit value adjustment for all non-object related resource consumption.” The ‘316 patent describes calculating indirect expenses as follows: “pool indirect costs and revenues and then apportion them.” Ex. 1001 at 9:8-10. The ‘316 Patent further explains that:

Indirect expense, by its nature is not related directly to an Object, therefore apportionment techniques are used to allocate indirect expense to an Object. Any apportionment function is allowed as long as it is derivable at the object level using ratios of attributes available at the object level to the summation of this available attribute across all objects receiving the apportioned expense.

Ex. 1001 at 19:50-56.

324. *E&Y* discloses calculating indirect expenses as an apportioned profit value adjustment for all non-object related resource consumption. *E&Y* discloses calculating indirect expense in the figures below:

Figure 5-2—Typical Organizational Profitability Statement

Interest Income	
Interest Expense	
Credit/Charge for Funds	
Net Interest Income	
Provision for Loan Loss	
Net Interest Income after Provision for Loan Loss	
Other Income	
Net Revenue	
Direct Expense	
Salaries and Benefits	
Furniture and Equipment	
Occupancy	
Telephone	
Professional Fees	
Travel and Entertainment	
Other Direct Expenses	
Total Direct Expense	
Indirect Expense	
Total Noninterest Expense	
Income before Taxes	

Figure 5-4—Sample Product Profitability Statement

Interest Income	
Interest Expense	
Credit/Charge for Funds	
Net Interest Income	
Provision for Loan Loss	
Net Interest Income after Provision for Loan Loss	
Other Income	
Net Revenue	
Direct Expense	
Indirect Expense	
Data Processing	
Loan Processing	
Item Processing	
Branch System	
Marketing	
Other	
Total Noninterest Expense	
Income before Taxes	

Ex. 1005 at 42-43. In addition to calculating indirect expense for each product or organization as depicted in the figures above, *E&Y* describes that:

Under the full-absorption approach, fixed costs are included in the unit cost, as well as any indirect or overhead costs related to the particular organizational unit. However, unit costs could be developed to represent direct unit costs and indirect unit costs. Under full-absorption

costing, these unit costs are assigned to users based on transactions processed, multiplied by unit cost. Full-absorption costing therefore results in the allocation of a base expense that equals the unit's total expense.

Ex. 1005 at 86. *E&Y* discloses, in the paragraph above, how the allocation of indirect costs results in the allocation of a unit's total expense, which includes non-object related resource consumption. *E&Y* further describes the process of calculating and allocating indirect expenses as:

Indirect expenses are expenses that support the activities of a responsibility center but are incurred elsewhere in the institution and allocated to the users of such activities or services. Every indirect expense is a direct expense of some other center. Indirect expenses can support activities that assist a center in performing its tasks. One example is the recruiting expense incurred by a personnel center to provide other centers with staff to perform their functions. Another is the purchasing expense grouped in one center for economies of scale but incurred to service other centers. The support expense also can be for activities that complement a center's efforts in providing products and

services to customers. An example is the expense that proof and encoding incurs to service the checking account customers of the branch network. This activity could be handled in each branch, but is centralized for control and economy of scale.

Ex. 1005 at 53. *E&Y* discloses that indirect expenses are expenses that support the activities of a business unit, but are incurred by other business units. Thus *E&Y* describes the ‘316 Patents recitation of calculating indirect expenses as “non-object related resource consumption.”

325. *E&Y*, in the figure below, provides a list of example expenses that may be included in the indirect expense report:

Figure 5-3—Indirect Expense Statement	
Human Resources	
Loan Processing	
Deposit Processing	
Computer Operations	
Item Processing	
Security	
Building	
Office Services	
Other	
Total Indirect Expense	

Ex. 1005 at 42. *E&Y* further describes the figure above, explaining that:

Figure 5-3 offers an example of a detailed indirect expense report. In this example, the report shows how much expense has been allocated or assigned from computer operations, loan processing, and other units. The amounts allocated to a particular organizational unit would be determined using one of the cost allocation techniques to be explained in Chapter 7.

A similar reporting concept can be used in reporting from any dimension, including product, branch, organizational, or customer profitability.

Ex. 1005 at 41. *E&Y* describes in detail various methods for calculating indirect expenses, with amounts “allocated to a particular organizational unit” based on the units apportioned “non-object related resource consumption” (‘316), such as computer operations, loan processing, and other overhead expenses. It is my opinion that *E&Y* anticipates and renders obvious Claim 5 by describing various methods of calculating indirect expense as prescribed in Claim 5.

326. It is my opinion, based on the information provided, that *E&Y* anticipates and renders obvious Claim 5. As discussed in Section VII.A.2(iv), calculating indirect expenses at an organizational, customer and product level was well-known in the art at the time of the invention. It would have been obvious for a

POSITA to combine the teachings of *E&Y* with well-known and routine elements in the art to render Claim 5 obvious.

6. Dependent Claim 6 is Anticipated and Obvious

6 The process of Claim 5, wherein the combining step includes the steps of adding net interest (NI) and other revenues (OR), and subtracting therefrom direct expense (DE), provisioning (P) and indirect expense (IE).

327. I understand that Claim 6 depends from Claim 5, and that in order to disclose or render obvious this claim, each limitation of any base claim and any intervening claim must be met in addition to the instant claim limitation. It is my opinion that *E&Y* renders this claim obvious and teaches this limitation.

328. Claim 6 recites “adding net interest (NI) and other revenues (OR), and subtracting therefrom direct expense (DE), provisioning (P) and indirect expense (IE).” It is my opinion that *E&Y* anticipates and renders obvious Claim 6.

329. *E&Y* also discloses calculating and combining NI, OR, DE, P and IE at various levels of granularity, as depicted in the figures below:

Figure 5-2—Typical Organizational Profitability Statement

Interest Income
Interest Expense
Credit/Charge for Funds

Net Interest Income
Provision for Loan Loss

Net Interest Income after Provision for Loan Loss
Other Income

Net Revenue
Direct Expense
Salaries and Benefits
Furniture and Equipment
Occupancy
Telephone
Professional Fees
Travel and Entertainment
Other Direct Expenses

Total Direct Expense
Indirect Expense

Total Noninterest Expense

Income before Taxes

Figure 5-4—Sample Product Profitability Statement

Interest Income
Interest Expense
Credit/Charge for Funds

Net Interest Income
Provision for Loan Loss

Net Interest Income after Provision for Loan Loss
Other Income

Net Revenue
Direct Expense
Indirect Expense
Data Processing
Loan Processing
Item Processing
Branch System
Marketing
Other

Total Noninterest Expense

Income before Taxes

Ex. 1005 at 42-43. The figures above disclose calculating net interest (“Net Interest Income”), other revenue (“Other Income”), direct expense (“Direct Expense”), provisioning (“Provision for Loan Losses”), and indirect expense (“Indirect Expense”) at an organization or product level. *E&Y* specifically discloses adding net interest (“Net Interest Income”) and other revenue (“Other Income”), and subtracting therefrom direct expense (“Direct Expenses”), provisioning (“Provision for Loan Losses”), and indirect expense (“Indirect Expense”) in the figure above.

E&Y also discloses combining each of these measures according to organization, customer, product, or any other cost object.

330. An example of *E&Y* performing the same calculation for the customer object is provided below:

Figure 5-6—Sample Customer Profitability

	Total	Lines and Commitments	Loans	Fee Services	Deposits	
Interest Income	\$50		\$50			
Interest Expense	(10)				\$(10)	
Credit/(Charge) for Funds	(10)		(40)		30	
Net Interest Income	30		10		20	+ Net Interest
Provision for Loan Losses	(1)		(1)			- Provisioning
Net Interest Income after Provisions for Loan Losses	29		9		20	
Waived Fees	(29)			\$(29)		
Other Income	42	\$10	2	30		+ Other Revenue
Noninterest Expense	(39)	(2)	(1)	(35)	(1)	- Direct & - Indirect Expense
Contribution	3	<u>\$ 8</u>	<u>\$10</u>	<u>\$(34)</u>	<u>\$19</u>	
Overhead Expense	(4)					- Indirect Expense
Income before Taxes	<u><u>\$(1)</u></u>					

Ex. 1005 at 45. In the figure above, *E&Y* discloses adding net interest (“Net Interest Income”) and other revenue (“Other Income”), and subtracting therefrom direct expense (part of “Noninterest Expense”), provisioning (“Provision for Loan Losses”), and indirect expense (part of “Noninterest Expense” and “Overhead”).

331. *E&Y* also performs the same calculations for the organization object:

Figure 15-1—Sample Organization Profitability

Interest Income	\$3,000
Interest Expense	(6,000)
Credit/(Charge) for Funds	5,000
Net Interest Income	2,000
Provision for Loan Losses	200
Interest Income after Provision for Loan Losses	1,800
Other Income	300
Net Revenues	2,100
Operating Expense	850
Operating Income	\$1,250
Overhead	90
Income before Taxes	\$1,160

Ex. 1005 at 253. In the figure above, *E&Y* discloses adding net interest (“Net Interest Income”) and other revenue (“Other Income”), and subtracting therefrom direct expense (part of “Operating Expense”), provisioning (“Provision for Loan Losses”), and indirect expense (part of “Operating Expense” and “Overhead”). As demonstrated by the figures above, *E&Y* anticipates and renders obvious Claim 6.

332. As discussed in Section VII.A.2(v), calculating and combining net interest, other revenue, direct expense, provisioning, and indirect expense was well-known, routine, and conventional in the art at the time of the invention. Calculating net interest, other revenue, direct expense, and provisioning was often required by accounting regulations. Ex. 1018 at 10-11. Combining these elements

according to standard accounting rules was well-known, routine and conventional at the time of the invention. Ex. 1018 at 10-11, 37, 45. Therefore, it is my opinion that *E&Y* anticipates and renders obvious Claim 6. Further, it would have been obvious for a POSITA to combine the teachings of *E&Y* with well-known and routine elements in the art to render Claim 6 obvious.

7. Dependent Claim 7 is Anticipated and Obvious

7 The process of Claim 6, including the step of adjusting the measure for object level profitability for taxes and/or object economic value.

333. I understand that Claim 7 depends from Claim 6, and that in order to disclose or render obvious this claim, each limitation of any base claim and any intervening claim must be met in addition to the instant claim limitation. It is my opinion that *E&Y* renders this claim obvious and teaches this limitation.

334. Claim 7 recites the steps of adjusting the measure for object level profitability for “taxes and/or object economic value.” The use of “and/or” in Claim 7 indicates that adjusting the measure for object level profitability for either taxes or object economic value is sufficient to anticipate or render obvious the claim. The simple calculation of taxes is well-known, routine, and conventional in the art. Additionally, I note that the concepts of “object economic value”, the calculation of “earnings on equity funds used”, and the “earnings on allocated equity” appear substantially overlapping. The ‘316 Patent defines object economic value as:

Equity Allocation - In order for precise net interest revenue or economic value adjusting calculations the amount of equity funds required at an object level must be determined. DPM's equity allocation to the object level calculations may use any of the following methods: simple ratios; regulatory definitions; economic allocations based on econometric modeling (see book on Modern Portfolio Theory) methodologies; or, as statistically defined allocations.

Ex. 1001 at 8:56-64. The '316 Patent above explains that object economic value (or equity allocation) calculation methods were well-known in the art, since they were included in regulatory definitions and included in books on Modern Portfolio Theory. It is my opinion that *E&Y* anticipates and renders obvious Claim 7.

335. *E&Y* anticipates and renders obvious “adjusting the measure for object level profitability for taxes.” *E&Y* discusses the difficulty with calculating taxes on an object level, since taxes on individual products are often dependent on the other operations of the business. *E&Y* discloses:

Taxes

The issue involves the wide variety of tax structures and rates with which financial institutions operate. Because tax

rates vary by country, state, and city, calculation of a tax effect should reflect the differences. The difficulty in implementing a differential tax rate system, however, has led many institutions to use a single, average tax rate when taxes are included in profitability reports.

Ex. 1005 at 73. *E&Y* above discloses adjusting for differential tax rates in their profitability reports, which discloses adjusting object level profitability for taxes. The ‘316 Patent does not even provide this level of detail when determining which tax rate to use for profitability calculations, disclosing that:

Tax Rates – Tax rates are required for after-tax profit calculation. DPM is designed to calculate pre-tax income on a taxable equivalent basis (***where an single effective tax rate is all that is required to transform pre-tax income into after tax earnings.***)

Ex. 1001 at 8:21-25. The ‘316 Patent describes using a single effective tax rate for tax calculations in the same fashion described by *E&Y*. Thus, *E&Y* anticipates and renders obvious Claim 7.

336. *E&Y* also discloses adjusting tax-advantaged investments for their particular tax treatment:

For example, the use of multiple day-basis calculations in the application of FTP rates or the application of adjustments for tax-advantaged investments can create subtle distortions in the results, unless enough time is allowed for thorough development and testing.

Ex. 1005 at 267. *E&Y* also discusses implications of international tax regimes when calculating funds transfer pricing for object level profitability:

However, where international funding transactions occur, which involve different tax jurisdictions, regulatory considerations may exist. Cross-border transfer pricing regulations could color the specific approaches used for these transactions.

Ex. 1005 at 176. Based on the different mechanisms disclosed by *E&Y* for adjusting the object level profitability for taxes, it is my opinion that *E&Y* anticipates and renders obvious the tax portion of Claim 7.

337. *E&Y* anticipates and renders obvious “adjusting the measure for object level profitability” for “object economic value.” As discussed above, “object economic value” is defined by the ‘316 Patent as an “equity allocation to the object level” that can be calculated using “simple ratios; regulatory definitions; economic allocations based on econometric modeling (see book on Modern Portfolio Theory)

methodologies; or, as statistically defined allocations.” *E&Y* discloses multiple ways of incorporating equity allocations into the cost object, and addressing the issue that traditional measures such as return on assets (ROA) are not universally valid measures across all businesses, including using the simple ratio of ROE:

A logical step in addressing this issue is to calculate the ROE for business units, products, or customers (more likely customer groups). In taking this step, however, management must ***devise an approach of allocating equity*** so that a return may be computed. (See the ***discussion of techniques for capital allocation*** In Chapter 12, Capital Issues.)

Once the allocation is made, stakeholders can compare ROE to returns gained from other investments and weigh the institution’s risks. A financial institution's risk is essentially the risk of loss associated with its businesses, products, and customers. In a sense, the institution needs equity to offset the possibility of losses. If an institution ***allocates equity by asset percentage***, it ignores its components of that risk, unless, coincidentally, there is equal risk with all assets.

This idea can be demonstrated by the use of ROE to evaluate product performance. For example, if we assume that losses are greater for credit card loans than for other types of consumer loans, then the ***allocation of shareholder equity needed to protect against that risk*** should be greater for the credit card loans as well. But if management allocates shareholder equity strictly by asset percentage, it overstates the ROE for credit card loans and understates the other types of consumer loans. Similar examples could be drawn for business units and customer relationships.

Ex. 1005 at 14-15. In the paragraph above, *E&Y* describes the drawbacks of using a simple asset percentage ratio in allocating equity to business units, customers, and products.

338. In order to address these shortcomings, *E&Y* describes creating a value-based management information system (“MIS”) which can use a cost of capital (*e.g.*, a hurdle rate from econometric modelling based on CAPM), regulatory definitions, or risk-adjusted calculation (statistically defined models) as disclosed below:

Phase 10—Value-Based MIS

The shift toward a stakeholder-value orientation in many financial institutions has led executives to demand information measuring the performance of centers, products/product lines, and customers in terms of ***return on equity hurdle rates and market comparable ROEs.***

When business lines or products are viewed as stand-alone entities and ROE data for each (adjusted for business-specific risk) is ***measured against a cost of capital "hurdle rate,"*** actionable information is generated. This can then be used to guide strategic or tactical ***steps toward maximizing stakeholder value.*** As a limited and inexpensive source of funding, capital should be diverted from unprofitable businesses and products and toward areas that enhance the value of capital contributions.

Obviously, ***selection of a capital-allocation methodology*** is a critical aspect of a value-based information system. Many institutions with advanced performance measurement systems already in place use a ***risk-adjusted allocation of capital to product lines as the***

foundation for their ROE performance benchmarks.

Risk-adjusted allocations recognize that capital exists primarily to cover unexpected losses arising from the risk inherent in the banking business. ***Equity allocations based on regulatory requirements or market comparables*** are considered viable alternatives to the risk-based method, but do not take into account the institution's specific credit and interest rate exposure characteristics.

Ex. 1005 at 30. Above, *E&Y* describes various methods of allocating equity to organizational units, customers and products. *E&Y* discloses using regulatory requirements, market comparables, and cost of capital hurdle rates to measure object economic value. Since *E&Y* discloses adjusting object level profitability for taxes and object economic value, *E&Y* anticipates and renders obvious Claim 7.

339. As discussed in Section VII.A.2(vi), adjusting object level profitability for taxes and/or object economic value was well-known, routine, and conventional in the art at the time of the invention. Calculating taxes and object economic value (or equity allocations) was often required by accounting regulations and was widely taught in economic and accounting textbooks. Ex. 1013 61, 70, 822-833; *see also* Ex. 1018 at 27, 37, 43, 65-66. Therefore, it is my opinion that *E&Y*

anticipates and renders obvious Claim 7. Additionally, it would have been obvious for a POSITA to combine the teachings of *E&Y* with well-known and routine elements in the art to render Claim 7 obvious.

8. Dependent Claim 8 is Anticipated and Obvious

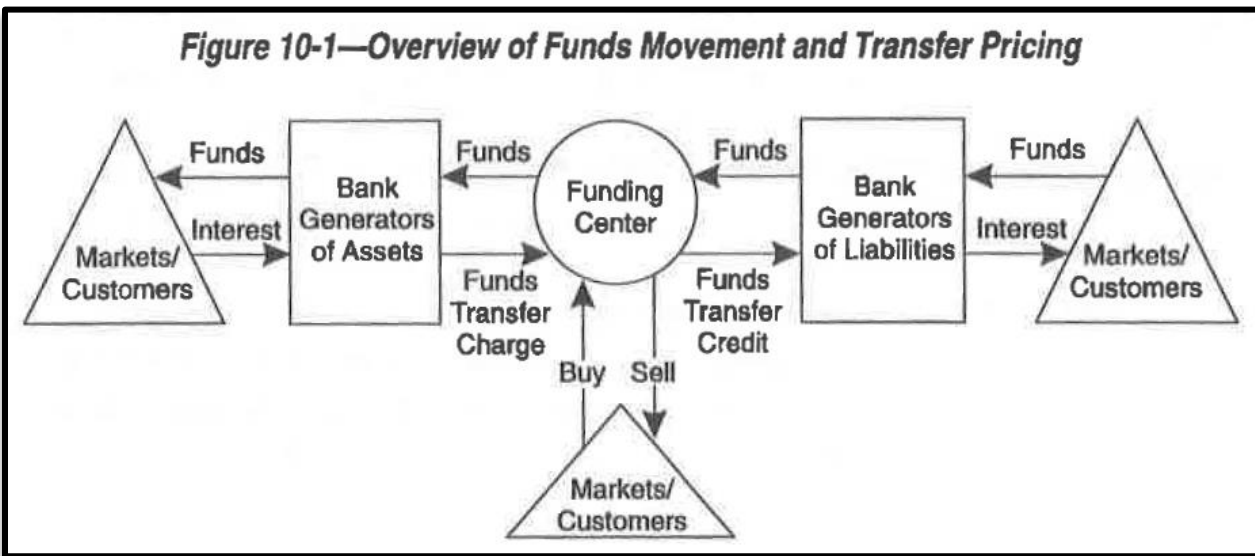
8 The process of Claim 1, wherein the opportunity values are based on matched maturity funds transfer pricing theory, where the values are market alternative supplies or uses of funds having matched interest and payment characteristics.

340. I understand that Claim 8 depends from Claim 1, and that in order to disclose or render obvious this claim, each limitation of any base claim and any intervening claim must be met in addition to the instant claim limitation. It is my opinion that *E&Y* renders this claim obvious and teaches this limitation.

341. Claim 8 recites the step where “the opportunity values are based on matched maturity funds transfer pricing theory,” and defines matched maturity funds transfer pricing theory as “market alternative supplies or uses of funds having matched interest and payment characteristics.” The concept of matched maturity funds transfer pricing theory was well-known, routine, and conventional in the art at the time of the invention. Additionally, *E&Y* anticipates and renders obvious using matched maturity funds transfer pricing theory to calculate profitability.

342. *E&Y* discloses calculating opportunity values using funds transfer pricing, describing that “[a] fundamental proposition is that the transfer

pricing system should reflect the true opportunity costs associated with funds provision and usage.” Ex. 1005 at 177. *E&Y* describes the process of funds transfer pricing using the figure below:



Ex. 1005 at 177. In addition to disclosing calculating opportunity values using funds transfer pricing, *E&Y* specifically discloses using matched maturity funds transfer pricing, describing:

- ***Matched rate/cost of funds information for match-funded loans and deposits.*** This data element can be used either to ***match-fund every loan or deposit*** or to supplement a funds-transfer pricing rate table for use in match-funding specific large dollar loans or deposits.

Ex. 1005 at 258. *E&Y* explains in detail the process of matched funding as:

Matched Funding

Advances in information technology have made it possible to *identify and "match fund" individual assets and liabilities* as they are booked. That is, *each individual account receives a specific transfer rate based on the account type and such specific characteristics as duration and repricing points*. However, for performance measurement purposes, it may be necessary in the case of certain classes of assets or liabilities to transfer price entire balances, such as cash or receivables.

Further, some assets and liabilities may reprice in maturity bands for which little interest rate distinction exists. As a simple example, a three-week rate may differ very little from a four-week rate. Trying to maintain a true "matched funded" system may not be worth the expense. As a result, many banks group assets and liabilities into separate "pools" with similar repricing characteristics. The pools usually are for specific time periods (e.g., overnight, up to one month, one to three months, three months to a year, one to two years, two to five years, and

over five years). ***Transfer charges and credits are driven by the pool with which the asset or liability is associated.***

Ex. 1005 at 180. *E&Y* above describes the process of matched maturity funds transfer pricing as matching assets and liabilities based on characteristics like duration and repricing points. Since *E&Y* describes calculating opportunity values based on matched maturity funds transfer pricing theory, where funds are matched based on interest and payment characteristics, *E&Y* anticipates and renders obvious Claim 8.

343. As discussed in Section VII.A.2(vii), calculating opportunity values based on matched maturity funds transfer pricing theory was well-known, routine, and conventional in the art at the time of the invention. Ex. 1013 at 913-916. Calculating opportunity values based on matched maturity funds transfer pricing theory was often required by accounting and financial regulations. Ex. 1013 at 913-916. Therefore, it is my opinion that *E&Y* anticipates and renders obvious Claim 8. Further, it would have been obvious for a POSITA to combine the teachings of *E&Y* with well-known and routine elements in the art to render Claim 8 obvious.

9. Dependent Claims 9, 13, 17, and 21 are Anticipated and Obvious

344. Dependent Claims 9, 13, 17, and 21 all recite substantially similar language and formulas for calculating net interest based on interest income, interest expense, cost of funds used, and value of funds provided. The primary differences between these claims relate to the factors used to select a treatment rate for the cost of funds and value of funds calculation. *See* Ex. 1001 at Claims 9, 13, 17, and 21. For example, Claim 13 discloses identifying the object's product type/group, and then determining the treatment rate on the product's type/group, given the balance class and tier. Claim 17 identifies the object's product and object attributes, and then determining the treatment rate on the product's type, given the balance class and tier/tenor. Claim 21 identifies the object's product attributes, object attribute, and behavior types, and then determining the treatment rate based on the product type, balance class, and tier/tenor.

9 The process of claim 3, wherein the Net Interest (NI) is calculated as:

Int Inc(o_i)=Interest Income of object o_i
-COF(o_i)=Cost of funds used by object o_i
-Int Exp(o_i)=Interest Expense for object o_i
+VOF(o_i)=Value of funds provided by object o_i

according to:

Int Inc(o_i)=AAB(o_i)*rate_{asset}(o_i), only if object
attribute doesn't exist;

COF(o_i)=AAB(o_i)*Rt

Int Exp(o_i)=ALB(o_i)*rate_{liability}(o_i), only if object
attribute doesn't exist, and

VOF(o_i)=ALB(o_i)*Rt,

wherein:

AAB(o_i)=Average Asset Balance of the object o_i ,

ALB(o_i)=Average Liability Balance of the object o_i ,

rate_{asset}(o_i)=Effective interest rate for object o_i as an asset
balance,

rate_{liability}(o_i)=Effective interest rate for object o_i as a
liability balance, and

Rt=Treatment rate based on the identified treatment for the
object's product attributes.

- 13 The process of Claim 3, wherein Net Interest (NI) is calculated where summations are over the possible balance variables for the object, according to:

$$IntInc(o_i) = \sum_{\forall c,t} AB_{(asset\ c,t)}(o_i) * rate_{(asset\ c,t)}(o_i),$$

calculate only if

object attribute doesn't exist,

$$-COF(o_i) = \sum_{\forall c,t} AB_{(asset\ c,t)}(o_i) * R_{(asset\ c,t)}R_{(c,t)}(pt(o))$$

$$-IntExp(o_i) = \sum_{\forall c,t} AB_{(liability\ c,t)}(o_i) * rate_{(liability\ c,t)}(o_i),$$

only if object

attribute doesn't exist,

$$+VOF(o_i) = \sum_{\forall c,t} AB_{(liability\ c,t)}(o_i) * R_{(liability\ c,t)}R_{(c,t)}(pt(o)),$$

wherein

$AB_{(c,t)}(o_i)$ =Average Balances of the object o_i ,

$rate_{(c,t)}(o_i)$ =Effective interest rate for the corresponding balance asset or liability,

$Rt(o)$ =Object o 's product type/group as needed to identify treatment rate,

$R_{(c,t)}(pt(o))$ =Rate (treatment rate) for objects of this product type/group, given the balance class, and tier,

$Int\ Inc(o_i)$ =Interest Income of object o_i ,

$COF(o_i)$ =Cost of funds used by object o_i ,

$Int\ Exp(o_i)$ =Interest Expense for object o_i , and

$VOF(o_i)$ =Value of funds provided by object o_i .

- 17 The process of Claim 3, wherein Net Interest (NI) is calculated where summations are over the possible balance variables for the object, according to:

$$IntInc(o_i) = \sum_{\forall c,t} AB_{(asset\ c,t)}(o_i) * rate_{(asset\ c,t)}(o_i), \text{ only if object}$$

attribute doesn't exist,

$$-COF(o_i) = \sum_{\forall c,t} AB_{(asset\ c,t)}(o_i) * R_{(asset\ c,t)}(type_{p,a}(o_i)),$$

$$-IntExp(o_i) = \sum_{\forall c,t} AB_{(liability\ c,t)}(o_i) * rate_{(liability\ c,t)}(o_i),$$

only if object

attribute doesn't exist,

$$+VOF(o_i) = \sum_{\forall c,t} AB_{(liability\ c,t)}(o_i) * R_{(c,t)}(type_{p,a}(o_i)),$$

wherein:

$AB_{(c,t)}(o_i)$ =Average Balances of the object o_i ,

$rate_{(c,t)}(o_i)$ =Effective interest rate for the corresponding balance,

$Type_{p,a}(o_i)$ =Object o_i 's product and object attributes as needed to identify treatment,

$R_{(c,t)}(type_{p,a}(o_i))$ =Rate (treatment rate) for this object's product type, given the balance class, and tier/tenor,

$Int\ Inc\ (o_i)$ =Interest Income of object o_i ,

$COF\ (o_i)$ =Cost of funds used by object o_i ,

$Int\ Exp\ (o_i)$ =Interest Expense for object o_i , and

$VOF\ (o_i)$ =Value of funds provided by object o_i .

21 The process of Claim 3, wherein Net Interest (NI) is calculated where summations are over the possible balance variables for the object, according to:

$\text{Int Inc}(o_i) = \sum \text{AB}_{(asset\ c, t)}(o_i) * \text{rate}_{(asset\ c, t)}(o_i)$ only if object attribute doesn't exist,

$-\text{COF}(o_i) = \sum \text{AB}_{(asset\ c, t)}(o_i) * \text{R}_{(asset, t)}(\text{type}_{p, a, b}(o_i)),$

$-\text{Int Exp}(o_i) = \sum \text{AB}_{(liability, t)}(o_i) * \text{rate}_{(liability, t)}(o_i)$ only if object attribute doesn't exist,

$+\text{VOF}(o_i) = \sum \text{AB}_{(liability, t)}(o_i) * \text{R}_{(liability, t)}(\text{type}_{p, a, b}(o_i)),$

wherein:

$\text{AB}_{(c, t)}(o_i)$ = Average Balances of the object,

$\text{rate}_{(c, t)}(o_i)$ = Effective interest rate for the corresponding balance amounts,

$\text{type}_{p, a, b}(o_i)$ = Object o_i 's product, object attribute, and behavior types as needed to identify treatment rate,

$\text{R}_{(c, t)}(\text{type}_{p, a, b}(o_i))$ = Rate (treatment rate) for objects of this product type, balance class, and tier/tenor,

$\text{Int Inc}(o_i)$ = interest Income of object o_i ,

$\text{COF}(o_i)$ = Cost of funds used by object o_i ,

$\text{Int Exp}(o_i)$ = Interest Expense for object o_i , and

$\text{VOF}(o_i)$ = Value of funds provided by object o_i .

345. I understand that Claims 9, 13, 17, and 21 depend from Claim 3, and that in order to disclose or render obvious these claims, each limitation of any base claim and any intervening claim must be met in addition to the instant claim limitation. It is my opinion that *E&Y* renders these claims obvious and teaches these limitations.

346. Claims 9, 13, 17, and 21 recite calculating Net Interest (NI) by adding interest income and value of funds provided, and subtracting therefrom interest expense and cost of funds used. Each of these calculations are based on the

average asset (or liability) balance of the object being measured, multiplied by an interest rate (or treatment rate) based on the object's product attributes, object attributes, and behavior types. The '316 Patent discloses that the method of valuing an object's use or source of funds (i.e., cost of funds used and value of funds provided) was commonly known in the art as Matched Maturity Funds Transfer Pricing theory. Ex. 1001 at 8:43-47. The '316 Patent states that:

Funds Treatment – Every object with cash flows affecting a financial statement's balance sheet requires a ***method of valuing an object's use or source of funds. The common name for this approach to valuing is know [sic] as “Matched Maturity Funds Transfer Pricing.”***

Ex. 1001 at 8:43-47. It is my opinion that *E&Y* anticipates and renders obvious Claims 9, 13, 17, and 21.

347. *E&Y* discloses calculating net interest using interest income, interest expense, and cost (or value) of funds. Ex. 1005 at 195, 254, Chapter 10. For example, *E&Y* discloses calculating net interest for the customer object:

Figure 5-6—Sample Customer Profitability

	Total	Lines and Commitments	Loans	Fee Services	Deposits
Interest Income	\$50		\$50		
Interest Expense	(10)				\$(10)
Credit/(Charge) for Funds	(10)		(40)		30
Net Interest Income	30		10		20
Provision for Loan Losses	(1)		(1)		
Net Interest Income after Provisions for Loan Losses	29		9		20
Waived Fees	(29)			\$(29)	
Other Income	42	\$10	2	30	
Noninterest Expense	(39)	(2)	(1)	(35)	(1)
Contribution	3	<u>\$ 8</u>	<u>\$10</u>	<u>\$(34)</u>	<u>\$19</u>
Overhead Expense	(4)				
Income before Taxes	<u>\$ (1)</u>				

+ Interest Income

- Interest Expense

- Cost of Funds

+ Value of Funds

Net Interest

Ex. 1005 at 45. Above, *E&Y* demonstrates how to use interest income, interest expense, cost of funds used, and value of funds provided to calculate net interest income. For example, for Loans, *E&Y* shows the organization receiving interest income of \$50 and allocating a charge for the funds used (*i.e.*, cost of funds used) of \$40 resulting in a net interest income of \$10 for the product. Similarly, for Deposits, *E&Y* shows the organization paying interest expense of \$10 but receiving a credit for funds provided (*i.e.*, value of funds provided) of \$30, resulting in a net interest income of \$20.

$$E\&Y: \quad NI = IntInc - ChargeForFunds - IntExp + CreditForFunds$$

$$E\&Y: \quad \$30 = \$50 - \$40 - \$10 + \$30$$

'137 Patent: $NI = IntInc - CostOfFunds - IntExp + ValueOfFunds$

While not explicitly depicted in the image above, calculating interest income and interest expense is based on the asset/liability balance and the applicable interest rates. For example, for the Deposits account, if the rate of interest was 1%, then the interest expense is calculated by multiplying the total liability balance of \$1,000 by the interest rate of 1% to arrive at the interest expense of \$10. Similarly, the credit/charge for funds is calculated based on the asset/liability balance multiplied by a funds transfer rate. In the example where the deposit balance is \$1,000, a treatment rate of 3% would result in a credit (*i.e.*, value of funds provided) of \$30 for the Deposit account. Similarly, for the Loan account, an asset balance of \$1000 and an interest rate of 5% results in interest income of \$50. An asset balance of \$1000 times the transfer rate of debt funds of 4% results in a cost of funds of \$40. Combining the Loans and Deposit accounts, the total net interest income for the organization is calculated based on the total interest income, interest expense, and credit/charge for funds, as shown below:

$$\$30 = (\$1000 * 5\%) - (\$1000 * 4\%) - (\$1000 * 1\%) + (\$1000 * 3\%)$$

$$NI = (AB_{asset} * rate_{asset}) - (AB_{asset} * R_{asset}) - (AB_{liability} * rate_{liability}) \\ + (AB_{liability} * R_{liability})$$

348. E&Y further breaks down the Net Interest calculation for a particular product – loans – depicting the calculation of net interest based on interest income and cost of funds used as follows:

Figure 11-4—Comparative Loan Profitability Calculations (for a \$100,000 Loan)		
	With Compensating Balance	Without Compensating Balance
Interest Income @ 10%	\$10,000	\$10,000
Average Loan Balance	\$100,000	\$100,000
Compensating Balance @ 10% of Average Loan Balance	<u>(10,000)</u>	<u>—</u>
Amount Funded	<u>\$ 90,000</u>	<u>\$100,000</u>
Cost of Funds @ 8%	7,200	8,000
Net Interest Income	<u>\$ 2,800</u>	<u>\$ 2,000</u>
Yield—Interest Income + Amount Funded	11.1%	10%
Spread—Net Interest Income + Amount Funded	3.1%	2%

Ex. 1005 at 195. Above, E&Y depicts a method of calculating net interest income for a single account by combining interest income and cost of funds. The figure above depicts calculating interest income using an average loan balance (ALB) of \$100,000 multiplied by the interest rate for the product ($\text{rate}_{\text{liability}}$) of 10%, resulting in interest income (IntInc) of \$10,000. In performing this calculation, E&Y discloses the interest income formula of Claim 9. The cost of funds provided is calculated (in the loan without compensating balance shown above) using the average asset

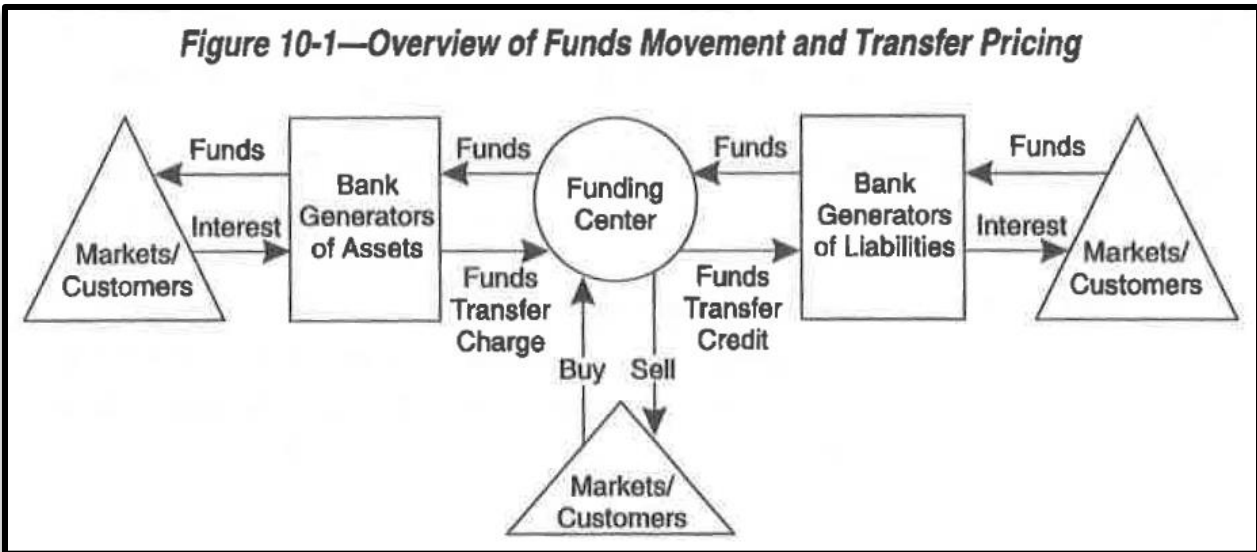
balance (AAB) of \$100,000 multiplied by the cost of funds (Rt) of 8%, resulting in a cost of funds (COF) of \$8,000. This calculation of cost of funds discloses the cost of funds formula depicted in Claim 9.

$$\$2,000 = (\$100,000 * 10\%) - (\$100,000 * 8\%) - 0 + 0$$

$$NI = (AB_{asset} * rate_{asset}) - (AB_{asset} * R_{asset}) - (AB_{liability} * rate_{liability}) \\ + (AB_{liability} * R_{liability})$$

Since the account being measured is an asset product (a loan), the calculation only uses interest income and cost of funds used, while a liability product (*e.g.*, a deposit account) would use average liability balance, interest expense and value of funds provided. Thus, *E&Y* anticipates and renders obvious Claim 9.

349. In addition to the disclosures above, *E&Y* further discloses calculating net interest by combining interest income, interest expense, cost of funds, and value of funds according to Funds Transfer Pricing theory. Ex. 1005 at 175-179, 256-258. *E&Y* discloses that “***all assets will receive funding charges and all liabilities and equity will receive funding credits***” using the “[a]verage daily ***balance*** for [a] reporting period ***for funds-transfer pricing calculations of yields***, and reporting of profitability information.” Ex. 1005 at 178, 256-258. *E&Y* depicts the calculation of funds transfer pricing as:



Ex. 1005 at 177. *E&Y* explains the process of funds transfer pricing in the figure above as:

Figure 10-1 is an overview of the funds-transfer pricing process. Essentially, a central funding center ***"buys" funds from the parts of the bank that generate liabilities, and "sells" them to asset-generating parts*** of the bank, which require funding. ***It buys and sells at rates commensurate with the repricing characteristics of the asset funded or liability "bought,"*** thereby match funding each transaction. Excesses or shortages of funds are handled through funding center transactions with the market.

Ex. 1005 at 177. In the paragraph above, *E&Y* discloses calculating cost of funds (“buys funds from the parts of the bank that generate liabilities”) and value of funds (“sells them to asset-generating parts of the bank, which require funding”). Above, *E&Y* also discloses determining a treatment rate using an object’s “product, object attribute, and behavior types” by teaching using “rates commensurate with the repricing characteristics of the asset funded or liability bought”. Ex. 1005 at 177. *E&Y* also discloses combining interest income, interest expense, cost of funds, and value of funds:

The *asset generators' net interest margin* reflects the difference between the *interest rates they charge to their customers on balances* (less credit loss provision) *and the funds transfer price they pay* to the funding center. The *liability generators' net interest margin* is, conversely, the *difference between the interest rates they pay to their customers on balances, and the funds-transfer credit they receive* from the funding center.

Ex. 1005 at 177-178. Above, *E&Y* discloses calculating interest income minus cost of funds, plus value of funds minus interest expense.

350. *E&Y* also describes various methods of determining treatment rates for funds based on a variety of characteristics and across various dimensions.

Ex. 1005 at 180, 259-260. For example, *E&Y* discloses that “each individual account receives a ***specific transfer rate based on the account type and such specific characteristics as duration and repricing points.***” Ex. 1005 at 180. *E&Y* describes the type of information that must be gathered in order to calculate net interest as described in the claims:

It is especially important in management reporting because of the many data input systems and organizations involved in preparing the information. Management reports, for example, often include ***yields, cost of funds, and other rate information.*** Depending on the complexity of the system being developed, the underlying information may consist of ***several different rate calculation methodologies.***

Commercial loans may use a "month/year" convention such as 30/360, actual/360, or actual/365 to annualize interest rates. Installment loans may use a similarly wide variety of methodologies, depending on the loan types. But when totals are aggregated and combined yields/rates are calculated, which annualization method should be used? For this reason and others, institutions

must be careful when making decisions and designing system logic such as rate annualization. The effect on reported yields and margins could significantly affect individual line managers' reported profitability.

Processing logic in a funds-transfer pricing (FTP) system should receive special scrutiny during design and development, especially when precise methodologies such as *duration adjustments and match-funding* are employed. *Transfer pricing systems calculate charges for funds used and credits for funds provided by organizational units, products, and customers.* As discussed in Chapter 10, these charges and credits determine the net interest spread of assets and liabilities.

Over the last several years, *many software vendors have introduced sophisticated FTP systems* with the flexibility to be tailored to most performance measurement system designs. Given the overall significance that FTP plays in profitability and in the time to implement, *many institutions are turning to these commercially available programs for their FTP solutions.*

Ex. 1005 at 259-260. *E&Y*, above, discloses using multiple rates to calculate the components of net interest for an organizational unit, product, and customer, with the rate being based on duration, annualization, loan type, and other rate information. *E&Y* thus discloses the claim elements of determining a rate based on the product type (*e.g.*, loan type), balance class (*e.g.*, asset, liability, repricing points), and tier/tenor (*e.g.*, duration, annualization). Thus, *E&Y* anticipates and renders obvious Claims 9, 13, 17, and 21.

351. As disclosed by the '316 Patent, and as discussed in Section VII.A.2(viii), calculating net interest according to funds transfer pricing was well-known, routine, and conventional in the art at the time of the invention. In describing how to calculate net interest using funds transfer pricing, *E&Y* anticipates and renders obvious Claims 9, 13, 17, and 21. Further, it would have been obvious for a POSITA to combine the well-known accounting practice of funds transfer pricing with a database at the time of the invention. *Supra* VII.A.2(viii). Similarly, it would have been obvious to combine the elements of *E&Y* with the well-known elements of funds transfer pricing to render obvious Claims 9, 13, 17, and 21.

10. Dependent Claims 10, 14, 18, and 22 are Anticipated and Obvious

352. Dependent Claims 10, 14, 18 and 22 all recite substantially the same claim language and formulas for calculating earnings on allocated equity based

on the average asset balance, equity ratio, and treatment rate for equity. The only difference between these four claims is their dependency on Claims 9, 13, 17, and 21, respectively. See Ex. 1001 at Claims 10, 14, 18, and 22. A comparison of the four claims is provided below to demonstrate their similarity:

10. The process of claim 9, including the step of calculating earnings on allocated equity, where the summation is taken over all asset balances, according to: $EOAE(o_i) = R_{equity} * ER * \Sigma AB_{(asset, t)}(o_i),$ wherein: $AB_{(asset, t)}(o_i)$ = Average Asset balances of the object o_i, including any allocated asset balances, ER = Equity Ratio, and R_{equity} = Treatment Rate for equity.	14. The process of claim 13, including the step of calculating earnings on allocated equity, where the summation is taken over all asset balances, according to: $EOAE(o_i) = R_{equity} * ER * \Sigma AB_{(asset, t)}(o_i),$ wherein: $AB_{(asset, t)}(o_i)$ = Average Asset balances of the object o_i, including any allocated asset balances, ER = Equity Ratio, and R_{equity} = Treatment Rate for equity.
18. The process of claim 17, including the step of calculating earnings on allocated equity, where the summation is taken over all asset balances, according to: $EOAE(o_i) = R_{equity} * ER * \Sigma AB_{(asset, t)}(o_i),$ wherein: $AB_{(asset, t)}(o_i)$ = Average Asset balances of the object o_i, including any allocated asset balances, ER = Equity Ratio, and R_{equity} = Treatment Rate for equity.	22. The process of claim 21, including the step of calculating earnings on allocated equity, where the summation is taken over all asset balances, according to: $EOAE(o_i) = R_{equity} * ER * \Sigma AB_{(asset, t)}(o_i),$ wherein: $AB_{(asset, t)}(o_i)$ = Average Asset balances of the object o_i, including any allocated asset balances, ER = Equity Ratio, and R_{equity} = Treatment Rate for equity.

See Ex. 1001 at Claims 10, 14, 18, and 22. The claim language is exactly the same for each of the four claims, except for the claim dependencies.

- 10** The process of Claim 9, including the step of calculating earnings on allocated equity, where the summation is taken over all asset balances, according to:

$$EOAE(o_i) = R_{equity} * ER * \Sigma AB_{(asset,t)}(o_i), \text{ wherein:}$$

$AB_{(asset,t)}(o_i)$ = Average Asset balances of the object o_i , including any allocated asset balances,
 ER = Equity Ratio, and
 R_{equity} = Treatment Rate for equity.

- 14** The process of Claim 13, including the step of calculating earnings on allocated equity, where the summation is taken over all asset balances, according to:

$$EOAE(o_i) = R_{equity} * ER * \Sigma AB_{(asset,t)}(o_i), \text{ wherein:}$$

$AB_{(asset,t)}(o_i)$ = Average Asset balances of the object o_i , including any allocated asset balances,
 ER = Equity Ratio, and
 R_{equity} = Treatment Rate for equity.

- 18** The process of Claim 17, including the step of calculating earnings on allocated equity, where the summation is taken over all asset balances, according to:

$$EOAE(o_i) = R_{equity} * ER * \Sigma AB_{(asset,t)}(o_i), \text{ wherein:}$$

$AB_{(asset,t)}(o_i)$ = Average Asset balances of the object o_i , including any allocated asset balances,
 ER = Equity Ratio, and
 R_{equity} = Treatment Rate for equity.

22 The process of Claim 21, including the step of calculating earnings on allocated equity, where the summation is taken over all asset balances, according to:

$$\text{EOAE}(o_i) = R_{\text{equity}} * \text{ER} * \Sigma \text{AB}_{(\text{asset}, t)}(o_i), \text{ wherein:}$$

$\text{AB}_{(\text{asset}, t)}(o_i)$ = Average Asset balances of the object o_i , including any allocated asset balances,
ER = Equity Ratio, and
 R_{equity} = Treatment Rate for equity.

353. I understand that Claim 10 depends from Claim 9, Claim 14 depends from Claim 13, Claim 18 depends from Claim 17, Claim 22 depends from Claim 21, and that in order to disclose or render obvious these claims, each limitation of any base claim and any intervening claim must be met in addition to the instant claim limitation. It is my opinion that *E&Y* renders these claims obvious and teaches this limitation.

354. Claims 10, 14, 18, and 22 recites calculating earnings on allocated equity (EOAE) by multiplying the treatment rate of equity (R_{equity}) by the equity ratio (ER), and multiplying that result by the sum of all average asset balances ($\text{AB}_{(\text{asset}, t)}$) associated with the object o_i . The '316 Patent specification states that this option for allocating equity to objects is: "Option 2 EOAE calculation based on a simple equity ratio." Ex. 1001 at 14:36,44-51. I would note that the equation of Claims 10, 14, 18, and 22 are strikingly similar to the calculation of unlevered ROE

and DuPont Analysis, both concepts well-known in the art at the time of the invention.

355. It is important to note that values multiplied outside the summation (“ Σ ”) can be moved into the summation argument by the associative and distributive properties of multiplication. Specifically, depending on whether the equity ratio is a common ratio for the entire organization or a specific equity ratio for the object, the equity ratio times the average asset balance is equal to the equity funds used by the object o_i . For example, a loan of \$1,000 with an equity ratio of 20% results in \$200 of equity allocated to the loan ($\$1,000 \times 0.20 = \$200$). Indeed, the equity ratio is just the equity balance over the asset balance. The result of multiplying the equity ratio and the average asset balance of the object equals the equity used by the object. The result of multiplying the equity used by the object by the treatment rate for equity is the cost (or earnings) of equity used. It is important to note that there is no indication within the ‘316 claims or specification as to how to calculate the treatment rate for equity. It should also be noted that while parent Claim 3 references calculating “earnings on equity funds used,” Claims 10, 14, 18, and 22 refer to the “step of calculating earnings on allocated equity.” For the purposes of this analysis, I am treating these two phrases as if they refer to the same concept.

356. *E&Y* discloses calculating the earnings on allocated equity by describing that “all assets will receive funding charges and all liabilities and equity will receive funding credits.” Ex. 1005 at 178. *E&Y* depicts using the equity ratio (or capital ratio) to calculate the earnings on allocated equity in the following figure:

Figure 3-5—Effect of Capital Ratio on Performance Measurement		
	Bank A	Bank B
Key Financial Data		
Average Assets	\$150,000	\$900,000
Average Equity	\$ 9,000	\$ 36,000
Net Income	\$ 1,200	\$ 7,200
Key Financial Ratios		
ROA	0.8%	0.8%
Capital Ratio	6.0%	4.0%
ROE	13.3%	20.0%
(ROA × 1/Capital Ratio)		

Ex. 1005 at 14. The figure above depicts the equation of Claims 10, 14, 18, and 22 by 1) summing the average asset balances of each product (“ $AB_{(asset,t)}(O_i)$ ”) to arrive at an average asset balance, 2) multiplying by the capital ratio (“ER” or the “equity ratio”), and 3) multiplying by the rate of equity (“Treatment Rate for equity”) to arrive at net income (“EOAE”). The capital ratio is equity capital divided by assets. *E&Y*, in the figure above, determines net income (EOAE) by taking the average asset

balance (AB) multiplied by the capital ratio (ER) times the rate of equity (treatment rate).

357. While the figure above looks at equity on an organization level, *E&Y* explains the shortcomings of using an institution-wide equity ratio as:

A financial institution's risk is essentially the risk of loss associated with its businesses, products, and customers. In a sense, the institution needs equity to offset the possibility of losses. If an ***institution allocates equity by asset percentage***, it ignores its components of that risk, unless, coincidentally, there is equal risk with all assets.

This idea can be demonstrated by the use of ROE to evaluate product performance. For example, if we assume that losses are greater for credit card loans than for other types of consumer loans, then the ***allocation of shareholder equity needed to protect against that risk should be greater*** for the credit card loans as well. But if management allocates shareholder equity strictly by asset percentage, it overstates the ROE for credit card loans and understates the other types of consumer loans. Similar

examples could be drawn for business units and customer relationships.

Ex. 1005 at 14-15. In the paragraph above, *E&Y* describes calculating allocation of “equity by asset percentage,” which discloses multiplying the equity ratio by the average asset balance of an object. *E&Y* also discloses above using the risk of different assets to allocate equity, and the ROE of the institution as the treatment rate. Based on the disclosures above, *E&Y* anticipates and renders obvious Claims 10, 14, 18 and 22.

358. *E&Y* addresses the shortcomings of allocating equity across the institution by disclosing:

The shift toward a stakeholder-value orientation in many financial institutions has led executives to demand information measuring the ***performance of centers, products/product lines, and customers in terms of return on equity hurdle rates and market comparable ROEs.***

Ex. 1005 at 30. *E&Y* above discloses using equity hurdle rates at the level of products, product lines, customers, and centers. *E&Y* further discloses:

Equity allocations based on regulatory requirements or market comparables are considered viable alternatives to the risk-based method.

Ex. 1005 at 30.

359. Finally, in Chapter 12 entitled “Capital Issues,” *E&Y* describes another approach to economic assignment of equity based on a particular business line. *E&Y* discloses:

The regulatory risk-based capital adequacy standards provoke institutions' management to consider how various businesses consume equity. The regulatory concept of segmenting assets and off-balance sheet activities by their underlying risk profiles neatly parallels an emerging shareholder-value method for analyzing and developing the institution's strategy. This method ***separates the institution into business lines and calculates their individual profitability, required rate of return, and contribution to the institution's total value.***

A key problem is determining the equity that should underlie each business line. ***Institutions must determine the appropriate equity-to-assets ratio—or leverage—for each business line.***

Ex. 1005 at 219. *E&Y* discloses using an equity-to-assets ratio (equity ratio) per business line with the individual object's balance combined with the required rate of

return (treatment rate of equity) to determine the contribution to the institution's total value. Furthermore, *E&Y* describes statutory capital requirements established by regulators that need to be considered in determining the appropriate ER (equity ratio) by business unit/object. Thus, *E&Y* anticipates and renders obvious Claims 10, 14, 18, and 22.

360. As discussed in Section VII.A.2(ix), calculating earnings on allocated equity using simple ratios was well-known, routine, and conventional in the art at the time of the invention. Ex. 1018 at 17, 26-27, 69. In describing how to calculate earnings on equity allocation, *E&Y* anticipates and renders obvious Claims 10, 14, 18, and 22. Further, it would have been obvious for a POSITA to combine the teachings of *E&Y* with the well-known and routine calculations of allocated equity using simple ratios to render Claims 10, 14, 18, and 22 obvious.

11. Dependent Claims 11, 15, 19, and 23 are Anticipated and Obvious

361. Dependent Claims 11, 15, 19, and 23 all recite substantially the same claim language and formulas for calculating earnings on allocated equity based on the amount associated with the object, an object weight, a risk-weighted capital ratio, and treatment rate for equity. The only difference between these four claims is their dependency on Claims 9, 13, 17, and 21, respectively. See Ex. 1001 at

Claims 11, 15, 19, and 23. A comparison of the four claims is provided below to demonstrate their similarity:

11. The process of claim 9, including the step of calculating earnings on allocated equity according to: $EOAE(o_i) = R_{equity} * \Sigma [Amount(o_i) * Wt(o_i)] * Cap Ratio], \text{ wherein:}$ Amount(o_i)=Amount(s) associated with object 'a' This may be the average asset balances of the object 'o_i' including any allocated asset balances, or may be an object parameter, Wt(type(o_i))=Code needed to identify the weight for object o balances, at the object-type level, W(Wt(type(o_i)))=determined by the weight code, Cap Ratio=An appropriate risk-weighted capital ratio chosen, and R_{equity}=Treatment Rate for equity.	15. The process of claim 13, including the step of calculating earnings on allocated equity according to: $EOAE(o_i) = R_{equity} * \Sigma [Amount(o_i) * W(Wt(o_i))] * Cap Ratio], \text{ wherein:}$ Amount(o_i)=Amount(s) associated with object 'a' This may be the average asset balances of the object 'o_i' including any allocated asset balances, or may be an object parameter, Wt(type(o_i))=Code needed to identify the weight for object o balances, at the object-type level, W(Wt(type(o_i)))=determined by the weight code, Cap Ratio=An appropriate risk-weighted capital ratio chosen, and R_{equity}=Treatment Rate for equity.
19. The process of claim 17, including the step of calculating earnings on allocated equity according to: $EOAE(o_i) = R_{equity} * \Sigma [Amount(o_i) * W(Wt(o_i))] * Cap Ratio], \text{ wherein:}$ Amount(o_i)=Amount(s) associated with object 'a' This may be the average asset balances of the object 'o_i' including any allocated asset balances, or may be an object parameter, Wt(type(o_i))=Code needed to identify the weight for object o balances, at the object-type level, W(Wt(type(o_i)))=determined by the weight code, Cap Ratio=An appropriate risk-weighted capital ratio chosen, and R_{equity}=Treatment Rate for equity.	23. The process of claim 21, including the step of calculating earnings on allocated equity according to: $EOAE(o_i) = R_{equity} * \Sigma [Amount(o_i) * W(Wt(o_i))] * Cap Ratio], \text{ wherein:}$ Amount(o_i)=Amount(s) associated with object 'a' This may be the average asset balances of the object 'o_i' including any allocated asset balances, or may be an object parameter, Wt(type(o_i))=Code needed to identify the weight for object o balances, at the object-type level, W(Wt(type(o_i)))=determined by the weight code, Cap Ratio=An appropriate risk-weighted capital ratio chosen, and R_{equity}=Treatment Rate for equity.

See Ex. 1001 at Claims 11, 15, 19, and 23. The claim language is exactly the same for each of the four claims, except for the claim dependencies.

11 The process of Claim 9, including the step of calculating earnings on allocated equity according to:

$$EOAE(o_i) = R_{equity} * \Sigma [Amount(o_i) * W(Wt(o_i)) * Cap Ratio], \text{ wherein:}$$

Amount(o_i)=Amount(s) associated with object 'a' This may be the average asset balances of the object 'o_i' including any allocated asset balances, or may be an object parameter,

Wt(type(o_i))=Code needed to identify the weight for object o balances, at the object-type level,

W(Wt(type(o_i)))=determined by the weight code,

Cap Ratio=An appropriate risk-weighted capital ratio chosen, and

R_{equity}=Treatment Rate for equity.

15 The process of Claim 13, including the step of calculating earnings on allocated equity according to:

$$EOAE(o_i) = R_{equity} * \Sigma [Amount(o_i) * W(Wt(o_i)) * Cap Ratio], \text{ wherein:}$$

Amount(o_i)=Amount(s) associated with object 'a' This may be the average asset balances of the object 'o_i' including any allocated asset balances, or may be an object parameter,

Wt(type(o_i))=Code needed to identify the weight for object o balances, at the object-type level,

W(Wt(type(o_i)))=determined by the weight code,

Cap Ratio=An appropriate risk-weighted capital ratio chosen, and

R_{equity}=Treatment Rate for equity.

19 The process of Claim 17, including the step of calculating earnings on allocated equity according to:

$$EOAE(o_i) = R_{equity} * \Sigma [Amount(o_i) * W(Wt(o_i)) * Cap Ratio], \text{ wherein:}$$

Amount(o_i)=Amount(s) associated with object 'a' This may be the average asset balances of the object ' o_i ' including any allocated asset balances, or may be an object parameter,

Wt(type(o_i))=Code needed to identify the weight for object o balances, at the object-type level,

W(Wt(type(o_i)))=determined by the weight code,

Cap Ratio=An appropriate risk-weighted capital ratio chosen, and

R_{equity} =Treatment Rate for equity.

23 The process of Claim 21, including the step of calculating earnings on allocated equity according to:

$$EOAE(o_i) = R_{equity} * \Sigma [Amount(o_i) * W(Wt(o_i)) * Cap Ratio], \text{ wherein:}$$

Amount(o_i)=Amount(s) associated with object 'a' This may be the average asset balances of the object ' o_i ' including any allocated asset balances, or may be an object parameter,

Wt(type(o_i))=Code needed to identify the weight for object o balances, at the object-type level,

W(Wt(type(o_i)))=determined by the weight code,

Cap Ratio=An appropriate risk-weighted capital ratio chosen, and

R_{equity} =Treatment Rate for equity.

362. I understand that Claim 11 depends from Claim 9, Claim 15 depends from Claim 13, Claim 19 depends from Claim 17, Claim 23 depends from

Claim 21, and that in order to disclose or render obvious this claim, each limitation of any base claim and any intervening claim must be met in addition to the instant claim limitation. It is my opinion that *E&Y* renders this claim obvious and teaches this limitation.

363. Claims 11, 15, 19, and 23 recite calculating earnings on allocated equity by multiplying a treatment rate of equity (R_{equity}) by the summation of the object asset balance (Amount), an object weighting ($W(Wt)$), and a risk-weighted capital ratio (Cap Ratio). Claims 11, 15, 19, and 23, and the ‘316 Patent, fail to specify what the “weight” of an object balance refers to, or how to calculate the weight. Furthermore, the ‘316 Patent fails to describe what an “appropriate” risk-weighted capital ratio is. In spite of the omission, *E&Y* still discloses all elements of Claims 11, 15, 19, and 23, thus anticipating and rendering obvious Claims 11, 15, 19, and 23. The ‘316 specification describes the equity allocation formula of Claims 11, 15, 19, and 23 as a “regulatory definition.” Ex. 1001 at 8:59-64. Since the equity allocation formula of Claims 11, 15, 19, and 23 was obvious enough to be included in regulations (e.g., the Basel Accords which, in the United States, are implemented by regulators including the Office of the Comptroller of the Currency and the Federal Reserve), the equity allocation formula would have been obvious to a POSITA.

364. Additionally, the ‘316 specification also explains that “[f]our exclusive options are provided for allocating equity to objects,” describing the equity

allocation formula of Claims 11, 15, 19, and 23 as “Option 3 Equity allocation for all assets ***following industry standards.***” Ex. 1001 at 14:36-38,52-60. The fact that this equity allocation formula follows industry standards means that the formula was known within industry and would have been obvious for a POSITA to use. This description from the ‘316 specification demonstrate that the calculation of earnings on allocated equity according to Claims 11, 15, 19, and 23 were well-known, routine and conventional since they are established “industry standards.” Thus, the calculations of Claims 11, 15, 19, and 23 are rendered obvious as stated by the ‘316 Patent specification.

365. E&Y discloses calculating earnings on allocated equity using regulatory guidelines, explaining that

[R]egulatory risk-adjusted capital guidelines reinforce the notion that different activities have ***different capital requirements.*** Therefore, ***allocating equity to products or business lines on a risk-adjusted basis*** has become important in developing strategy and measuring financial performance.

Ex. 1005 at 218. Here, E&Y anticipates Claims 11, 15, 19, and 23 by disclosing using regulatory definitions of risk-adjusted capital guidelines to calculate allocations of equity to products or business lines. Regulations dating to the 1980s

for example establish that cash and government bonds have risk weightings that are lower than other types of assets such as unsecured loans to customers that may have the highest risk weighting of 100%.

366. *E&Y* describes using a capital ratio for calculating earnings on allocated equity in the following figure:

Figure 3-5—Effect of Capital Ratio on Performance Measurement		
	Bank A	Bank B
Key Financial Data		
Average Assets	\$150,000	\$900,000
Average Equity	\$ 9,000	\$ 36,000
Net Income	\$ 1,200	\$ 7,200
Key Financial Ratios		
ROA	0.8%	0.8%
Capital Ratio	6.0%	4.0%
ROE	13.3%	20.0%
(ROA × 1/Capital Ratio)		

Ex. 1005 at 13. In the figure above, *E&Y* describes taking the average asset balance (Amount) times a bank specific capital ratio (Cap Ratio) times the return on equity (R_{equity}). The weight can be considered to be 1, or can be considered to be already factored into the capital ratio as depicted in the figures above, where the two Capital Ratios are weighted differently. The calculation above, in terms of the calculation of Claims 11, 15, 19, and 23, can be shown as:

$$E\&Y: \quad \$1,200 = 13.3\% * [\$150,000 * 1 * 6\%]$$

$$'137 \text{ Patent: } EOAE = R_{equity} * \sum [Amount * W(Wt) * CapRatio]$$

E&Y also describes the figure above as:

Effect of Capital Ratios on Performance Measurement

Leverage (assets to shareholder equity) was a commercial bank's least controllable profit component under regulation, and it is the one component whose controllability has been further reduced under deregulation. As ***commercial bank capital ratios*** varied, institutions that focused on return on equity tended to "lever up" or increase the level of assets supported by shareholder equity. That practice recognized the significant influence that leverage has on ROE.

Ex. 1005 at 13-14. In the figure and paragraph above, *E&Y* describes how capital ratios can be used when evaluating a business line or institution. *E&Y* above discloses using bank capital ratios, often provided by regulators, to set equity allocations. *E&Y* also discloses how the capital ratio can affect the return on equity and change the institutions risk/return profile.

367. More specifically, *E&Y* discloses calculating earnings on allocated equity using the capital ratio, disclosing:

The shift toward a stakeholder-value orientation in many financial institutions has led executives to demand information measuring the performance of centers, products/product lines, and customers in terms of ***return on equity hurdle rates and market comparable ROEs.***

When business lines or products are viewed as stand-alone entities and ROE data for each (adjusted for business-specific risk) is measured against a ***cost of capital "hurdle rate,"*** actionable information is generated. This can then be used to guide strategic or tactical steps toward maximizing stakeholder value. As a limited and inexpensive source of funding, capital should be diverted from unprofitable businesses and products and toward areas that enhance the value of capital contributions.

Obviously, selection of a capital-allocation methodology is a critical aspect of a value-based information system. ***Many institutions with advanced performance measurement systems already in place use a risk-adjusted allocation of capital to product lines*** as the foundation for their ROE performance benchmarks.

Risk adjusted allocations recognize that capital exists primarily to cover unexpected losses arising from the risk inherent in the banking business. ***Equity allocations based on regulatory requirements or market comparables*** are considered viable alternatives to the risk-based method, but do not take into account the institution's specific credit and interest rate exposure characteristics.

Ex. 1005 at 30. *E&Y* above discusses using equity allocations based on regulatory requirements, market comparables, cost of capital hurdle rates, risk-based methods, and other capital allocation methodologies. *E&Y* specifically discloses using a “risk-adjusted allocation of capital to product lines” in “institutions with advanced performance measurement systems.” Ex. 1005 at 30. *E&Y* also explicitly discloses calculating “equity allocations based on regulatory requirements,” which discloses the ‘316 Patent’s description of “DPM’s equity allocation to the object level calculations” using “regulatory definitions.” Ex. 1001 at 8:56-64. In describing these equity allocation methods, *E&Y* anticipates and renders obvious Claims 11, 15, 19, and 23.

368. As disclosed in the ‘316 Patent, and as discussed in Section VII.A.2(x), calculating earnings on allocated equity using a treatment rate for equity, object asset balance, an object weight, and a risk-weighted capital ratio was well-

known, routine, and conventional in the art at the time of the invention. Ex. 1001 at 8:59-64. In describing how to calculate earnings on allocated equity using a risk-adjusted capital ratio, using regulatory requirements, and/or using industry standards, *E&Y* anticipates and renders obvious Claims 11, 15, 19, and 23. Further, it would have been obvious for a POSITA to combine the teachings of *E&Y* with well-known and routine elements calculating earnings on allocated equity using an object weight, a risk-weighted capital ratio, and a treatment rate for equity to render Claims 11, 15, 19, and 23 obvious.

12. Dependent Claims 12, 16, 20, and 24 are Anticipated and Obvious

369. Dependent Claims 12, 16, 20, and 24 all recite substantially the same claim language and formulas for calculating earnings on allocated equity based on the amount associated with the object, an equity allocation rule for a cohort, and treatment rate for equity. The only difference between these four claims is their dependency on Claims 9, 13, 17, and 21, respectively. See Ex. 1001 at Claims 12, 16, 20, and 24. A comparison of the four claims is provided below to demonstrate their similarity:

12. The process of claim 9, including the step of calculating earnings on allocated equity, according to: $\text{EOAE}(o_i) = R_{\text{equity}} * E_{\text{cohort}}(o)(\text{Amount}(o_i)),$ or $\Sigma R_{\text{equity}} * [\alpha + \beta * \text{Amount}(o_i)]$, wherein: Amount($o_i$)=An amount or amounts related to the object, such as average balances of the object (denoted $\text{AB}_{(c,s,t)}(o_i)$), Cohort(o_i)=The cohort of objects in which object o is a member, $E_{\text{cohort}}(o_i)$=The equity allocation rule for the cohort of object o, according to a linear (two-valued) function that operates on Amount(o_i) of the form $\alpha + \beta * \text{Amount}(o)$, and R_{equity}=Treatment Rate(s) for equity for the Amount(o_i) value(s).	16. The process of claim 13, including the step of calculating earnings on allocated equity, according to: $\text{EOAE}(o_i) = \Sigma R_{\text{equity}} * E_{\text{cohort}}(o)(\text{Amount}(o_i)),$ or $\Sigma R_{\text{equity}} * [\alpha + \beta * \text{Amount}(o_i)]$, wherein: Amount($o_i$)=An amount or amounts related to the object, such as average balances of the object (denoted $\text{AB}_{(c,s,t)}(o_i)$), Cohort(o_i)=The cohort of objects in which object o is a member, $E_{\text{cohort}}(o_i)$=The equity allocation rule for the cohort of object o, according to a linear (two-valued) function that operates on Amount(o_i) of the form $\alpha + \beta * \text{Amount}(o)$, and R_{equity}=Treatment Rate(s) for equity for the Amount(o_i) value(s).
20. The process of claim 17, including the step of calculating earnings on allocated equity, according to: $\text{EOAE}(o_i) = \Sigma R_{\text{equity}} * E_{\text{cohort}}(o)(\text{Amount}(o_i)),$ or $\Sigma R_{\text{equity}} * [\alpha + \beta * \text{Amount}(o_i)]$, wherein: Amount($o_i$)=An amount or amounts related to the object such as average balances of the object (denoted $\text{AB}_{(c,s,t)}(o_i)$), Cohort(o_i)=The cohort of objects in which object o is a member, $E_{\text{cohort}}(o_i)$=The equity allocation rule for the cohort of object o, according to a linear (two-valued) function that operates on Amount(o_i) of the form $\alpha + \beta * \text{Amount}(o)$, and R_{equity}=Treatment Rate(s) for equity for the Amount(o_i) value(s).	24. The process of claim 21, including the step of calculating earnings on allocated equity, according to: $\text{EOAE}(o_i) = \Sigma R_{\text{equity}} * E_{\text{cohort}}(o)(\text{Amount}(o_i)),$ or $\Sigma R_{\text{equity}} * [\alpha + \beta * \text{Amount}(o_i)]$, wherein: Amount($o_i$)=An amount or amounts related to the object such as average balances of the object (denoted $\text{AB}_{(c,s,t)}(o_i)$), Cohort(o_i)=The cohort of objects in which object o is a member, $E_{\text{cohort}}(o_i)$=The equity allocation rule for the cohort of object o, according to a linear (two-valued) function that operates on Amount(o_i) of the form $\alpha + \beta * \text{Amount}(o)$, and R_{equity}=Treatment Rate(s) for equity for the Amount(o_i) value(s).

See Ex. 1001 at Claims 12, 16, 20, and 24. The claim language is exactly the same for each of the four claims, except for the claim dependencies.

- 12 The process of Claim 9, including the step of calculating earnings on allocated equity according to:**

$$\text{EOAE}(o_i) = R_{\text{equity}} * E_{\text{cohort}}(o)(\text{Amount}(o_i)),$$

or $\Sigma R_{\text{equity}} * [\alpha + \beta * \text{Amount}(o_i)]$, wherein:

$\text{Amount}(o_i)$ = An amount or amounts related to the object, such as average balances of the object (denoted $\text{AB}_{(c,s,t)}(o_i)$,

$\text{Cohort}(o_i)$ = The cohort of objects in which object o is a member,

$E_{\text{cohort}}(o_i)$ = The equity allocation rule for the cohort of object o, according to a linear (two-valued) function that operates on $\text{Amount}(o_i)$ of the form $\alpha + \beta * \text{Amount}(o)$, and

R_{equity} = Treatment Rate(s) for equity for the $\text{Amount}(o_i)$ value(s).

- 16 The process of Claim 13, including the step of calculating earnings on allocated equity according to:**

$$\text{EOAE}(o_i) = \Sigma R_{\text{equity}} * E_{\text{cohort}}(o)(\text{Amount}(o_i)),$$

or $\Sigma R_{\text{equity}} * [\alpha + \beta * \text{Amount}(o_i)]$, wherein:

$\text{Amount}(o_i)$ = An amount or amounts related to the object, such as average balances of the object (denoted $\text{AB}_{(c,s,t)}(o_i)$,

$\text{Cohort}(o_i)$ = The cohort of objects in which object o is a member,

$E_{\text{cohort}}(o_i)$ = The equity allocation rule for the cohort of object o, according to a linear (two-valued) function that operates on $\text{Amount}(o_i)$ of the form $\alpha + \beta * \text{Amount}(o)$, and

R_{equity} = Treatment Rate(s) for equity for the $\text{Amount}(o_i)$ value(s).

20 The process of Claim 17, including the step of calculating earnings on allocated equity according to:

$$\text{EOAE}(o_i) = \Sigma R_{\text{equity}} * E_{\text{cohort}}(o)(\text{Amount}(o_i)),$$

or $\Sigma R_{\text{equity}} * [\alpha + \beta * \text{Amount}(o_i)]$, wherein:

$\text{Amount}(o_i)$ = An amount or amounts related to the object, such as average balances of the object (denoted $\text{AB}_{(c,s,t)}(o_i)$,

$\text{Cohort}(o_i)$ = The cohort of objects in which object o is a member,

$E_{\text{cohort}}(o_i)$ = The equity allocation rule for the cohort of object o, according to a linear (two-valued) function that operates on $\text{Amount}(o_i)$ of the form $\alpha + \beta * \text{Amount}(o)$, and

R_{equity} = Treatment Rate(s) for equity for the $\text{Amount}(o)$ value(s).

24 The process of Claim 21, including the step of calculating earnings on allocated equity according to:

$$\text{EOAE}(o_i) = \Sigma R_{\text{equity}} * E_{\text{cohort}}(o)(\text{Amount}(o_i)),$$

or $\Sigma R_{\text{equity}} * [\alpha + \beta * \text{Amount}(o_i)]$, wherein:

$\text{Amount}(o_i)$ = An amount or amounts related to the object, such as average balances of the object (denoted $\text{AB}_{(c,s,t)}(o_i)$,

$\text{Cohort}(o_i)$ = The cohort of objects in which object o is a member,

$E_{\text{cohort}}(o_i)$ = The equity allocation rule for the cohort of object o, according to a linear (two-valued) function that operates on $\text{Amount}(o_i)$ of the form $\alpha + \beta * \text{Amount}(o)$, and

R_{equity} = Treatment Rate(s) for equity for the $\text{Amount}(o_i)$ value(s).

370. I understand that Claim 12 depends from Claim 9, Claim 16 depends from Claim 13, Claim 20 depends from Claim 17, Claim 24 depends from Claim 21, and that in order to disclose or render obvious this claim, each limitation of any base claim and any intervening claim must be met in addition to the instant claim limitations. It is my opinion that *E&Y* renders this claim obvious and teaches these limitations.

371. Claims 12, 16, 20, and 24 recite calculating earnings on allocated equity by summing all the treatment rates for equity multiplied by the equity allocation rule for the cohort of the object according to a linear function of the amounts (or balances) related to the object. The ‘316 Patent describes this equity allocation as “Option 4 Equity allocation using an economic allocation rule, based on object cohorts and modern portfolio theory’s capital asset pricing model.” Ex. 1001 at 14:39-41, 15:1-19. Modern Portfolio Theory (“MPT”), and the related Capital Asset Pricing Model (“CAPM”) were well-known, routine, and conventional approaches to finance and accounting at the time of the invention. Ex. 1005 at 224. The ‘316 Patent further explains that “DPM’s equity allocation to the object level calculations may use . . . economic allocations based on econometric modeling (see book on Modern Portfolio Theory) methodologies.” Ex. 1001 at 8:59-64. The ‘316 Patent, in describing Claims 12, 16, 20, and 24 in terms of MPT and CAPM,

demonstrate that the equations in Claims 12, 16, 20, and 24 were well-known, routine, and conventional in the art and obvious for a POSITA to use.

372. The '316 Patent also conflates the calculations of Claims 12, 16, 20, and 24 with the concept of Shareholder Value Add ("SVA") of Claim 29, explaining that:

For those companies which use economic profit value calculations, the formula changes to:

$$\text{Profit}(o_i) = \{ [\text{NIR}(o_i) + \text{OR}(o_i) - \text{DE}(o_i) - \text{IE}(o_i) - P(o_i)] * (1 - \text{EffectiveTaxRate}) \} - \text{SVA}(o_i),$$

where

$$\text{SVA}(o_i) = \alpha(o_i) + \beta(o_i) * \text{Amount}(o_{ii}),$$

and $\alpha(o_i)$, $\beta(o_i)$ are functions for a cohort of objects in which o_i is a member, and $\text{Amount}(o_i)$ is given by a rule which maps o_i to a data value (such as balance, or allocated equity) also defined at the cohort level. (A cohort defined here represents a grouping of objects with similar risk characteristics, consistent with *Modern Portfolio Theory and the Capital Asset Pricing Model*.)

Shareholder Value Add (SVA) is a method financial analysts use to adjust profit measures for risk. The idea is to subtract from the profit measure the cost of the equity required to support whatever object is being measured. Companies use this risk adjustment measure essentially to ***burden the profit for risk being taken with the equity funds used by the object.*** These institutions will classify ***cohorts of risk*** and the risk cost equivalent as a ***percentage of account balance or allocated equity (i.e., "Hurdles")***.

Ex. 1001 at 22:36-59. Again, the ‘316 Patent explains that the process of allocating equity using cohorts with similar risk characteristics is taken from MPT and CAPM. In the specification, cohorts of risk are defined as a percentage of account balance or a percentage of allocated equity, referred to in the ‘316 Patent as “Hurdles” or a hurdle rate. In the paragraph above, the ‘316 Patent also explains that SVA is a “method financial analysts use to adjust profit measures for risk,” describing the method as one already well-known and routine for financial analysts. These descriptions in the ‘316 Patent make it clear that the concept of allocating equity using cohorts, as recited by Claims 12, 16, 20, and 24, was well-known, routine and conventional within the art at the time of the invention.

373. In the airline example provided in the ‘316 Patent, the patent describes:

NI EOAE—Option 4: Allocate equity based on mileage benefit and have it reduce NI by the weighted average cost of capital for the airline.

Rule

Populated in Step 2 are:

The Amount(seat) parameter is Customer:bene_miles

The equity rate is 9.75%

Calculate EOAE(seat)=Amount(seat)*equity
rate*cohort_wt

The cohort is based groups of each instance of loyalty_rtng and class of seat paired. Cohort_wt is “beta” and no “alpha.”

All other attributes and EOAE calculations results are null.

Ex. 1001 at 24:51-63. Above, the ‘316 Patent describes the process of Claims 12, 16, 20, and 24 as “allocat[ing] equity based on mileage benefit and have it reduce NI by the ***weighted average cost of capital for the airline.***” This demonstrates that the linear combination described in Claims 12, 16, 20, and 24 can also be considered the weighted average cost of capital (“WACC”). The concept of calculating WACC is a well-known, routine and conventional in the area of finance, and adjusting profit measures for WACC was widely practiced at the time of the invention. Ex. 1013 at 937-938. It would have been obvious to a POSITA to combine WACC with the equity balance to calculate earnings on allocated equity.

374. E&Y discloses calculating earnings on allocated equity using market betas, business unit betas, cost of capital hurdle rates, market comparables, and CAPM. Ex. 1005 at 30, 224-226. For example, E&Y discloses that:

In fact, another dimension beyond stand-alone volatility is needed to determine the *proper hurdle rate for each business line*: the systemic risk embedded in that business line, for example, as *measured by its beta coefficient, based on the capital asset pricing model (CAPM)*. Beta is *a measure of the risk of the business relative to overall market risk*, based on patterns of business-line and market return covariance. (Risk-return measures other than beta also exist, for instance, those based on arbitrage pricing theory (APT).

Ex. 1005 at 224. Here, E&Y discloses calculating a hurdle rate for each business line by measuring its beta coefficient based on CAPM. Thus, E&Y discloses the elements of calculating a “linear (two-valued) function. . . of the form $\alpha + \beta * \text{Amount}(o)$ ” of Claims 12, 16, 20, and 24.

375. E&Y also discloses the elements of Claims 12, 16, 20, and 24 in its discussion of allocating equity according to market comparables by using

regression or factor-analytic techniques to determine market betas per business line (or cohort):

MARKET COMPARABLES

A number of publicly traded companies, funds, or trusts concentrate the bulk of their activities in a small set of identifiable business lines, so it usually is possible to find ***observable market betas for banking businesses.***

Ex. 1005 at 225. E&Y continues to describe the use of regression or factor analytic techniques for determining betas, explaining:

Meanwhile, institutions can use ***regression or factor-analytic techniques to estimate the imputed return-on-equity requirements by major business segments.*** By including a large enough sample of financial institutions and categorizing the range and scale of their activities, ***business line (as opposed to institution-wide) equity costs*** can be developed.

Ex. 1005 at 225. Above, E&Y discloses determining a business line's (cohort's) beta and required rate of return using regression (linear function) or factor-analytic techniques. This disclosure anticipates the claims' recitation of an "equity allocation rule for the cohort of object o, according to a linear (two-valued) function" and the

“treatment rate(s) for equity.” It is my opinion that *E&Y* anticipates and renders obvious Claims 12, 16, 20, and 24.

376. As discussed in Section VII.A.2(xi) and as disclosed by the ‘316 Patent, calculating equity allocations based on cohorts, using MPT and CAPM, was well-known, routine, and conventional in the art at the time of the invention. Ex. 1001 at 8:59-64, 14:39-41. In describing how to calculate equity allocations using market betas and CAPM, *E&Y* anticipates and renders obvious Claims 12, 16, 20, and 24. Further, it would have been obvious for a POSITA to combine the teachings of *E&Y* with the well-known financial concepts of MPT and CAPM to render Claims 12, 16, 20, and 24 obvious.

13. Dependent Claim 25 is Anticipated and Obvious

25 **The process of Claim 5, wherein the value for indirect expense (IE) is calculated** **as:**

$$\text{before deferral } IE(o_i) = IE_k * \frac{F(IE_k)(o_i)}{\sum_{o_j \in O(IE)} F(IE_k)(o_j)}$$

added over each set IE_k to
which o_i is related,

$$= \sum_k^{o \in O(IE)} \left(IE_k * \frac{F(IE_k)(o_i)}{\sum_j^{o_j \in O(IE)} F(IE_k)(o_j)} \right)$$

and each of these terms is deferred over its amortization period according to any of the amortization rules (cash, straight line, declining balance, or interest amortization calculations), and where $AM_1(L,R)$ is used to denote the amortization rule and its life:

$$IE(o_i) = \sum_k^{o_i \in O(IE)} AM_1(L, R) \left(IE_k * \frac{F(IE_k)(o_i)}{\sum_j^{o_j \in O(IE)} F(IE_k)(o_j)} \right),$$

and
the result increased by the amounts with remaining amortization life for which amortization was begun in earlier periods.

377. I understand that Claim 25 depends from Claim 5, and that in order to disclose or render obvious this claim, each limitation of any base claim and

any intervening claim must be met in addition to the instant claim limitation. It is my opinion that *E&Y* renders this claim obvious and teaches this limitation.

378. Claim 25 recites calculating indirect expense based on apportioning some of the total indirect expense to an object, and then amortizing that apportioned indirect expense based on the amortization rule and life of the object. The apportionment is based on any function as defined by $F(IE_k)(o_i)$, which the ‘316 Patent describes as using the object balance, object count, event count, or revenue-based apportionment, among other methods. Ex. 1001 at 19:64-22:10.

379. *E&Y* discloses amortizing indirect expenses apportioned to objects. For example, *E&Y* discloses amortizing development costs of a new product based on the cost of development of that product, explaining that “[i]n management accounting, a new product's profitability may be projected by ***capturing the cost of development separately and amortizing it over the product's life expectancy.***” Ex. 1005 at 326. Here, *E&Y* discloses separating the cost of a particular product's development $(F(IE_k)(o_i) / \sum F(IE_k)(o_j))$ from the overall product development costs (IE_k) and amortizing that value over the product's life expectancy ($AM_1(L,R)$). Therefore, *E&Y* anticipates and renders obvious Claim 25. *E&Y* continues with an example of splitting research and development expenses based on an expenditure per item amortized over the expected life of the product:

Figure 6-7—Unit Costs for Multiyear System		
Expenditure	Expected Life	Cost per Item
\$1 Million	+25 Million Item-Years = (5 Million Items per Year for 5 Years)	\$0.04

Ex. 1005 at 74. Again, *E&Y* discloses overall research and development expenditures of \$1 million (IE_k), splitting these expenditures based on the number of items $(F(IE_k)(o_i) / \sum F(IE_k)(o_j))$, and using a straight-line amortization over 5 years ($AM_1(L,R)$) to determine the indirect expense per item. It is my opinion that *E&Y*'s disclosures of amortizing indirect expenses, as demonstrated above, anticipate and render obvious Claim 25.

380. *E&Y* discloses apportioning and amortizing expenses related to advertising activity. Ex. 1005 at 75-76. Advertising is a standard example of an indirect or overhead expense. *E&Y* discloses that:

The third way to handle advertising expense is to use a simple allocation basis (such as the number of certificates of deposit) and to develop an ***average advertising expense per product unit***. In essence, this method treats the expense as an overhead to a customer account. Because the account is automatically associated with a customer, a

product, and an organization, this technique allows more effective allocation of the expense than do the other two methods. Like the second method, it also could ***allocate the average amount per account*** in the period during which the advertising expense occurs, but this action usually produces expense fluctuations in profitability statements. A more widely accepted practice is to ***amortize the advertising expense as follows***:

$\text{Advertising expense per account per month} = \frac{\text{Annual budgeted advertising}}{\text{Number of accounts} \times 12 \text{ months}}$

Ex. 1005 at 76. Here, *E&Y* discloses calculating the advertising expense (IE_k) per account ($F(IE_k)(o_i) / \sum F(IE_k)(o_j)$) per month ($AM_1(L,R)$). More specifically, the formula in *E&Y* above can be rewritten to match the calculation of Claim 25:

$$AdExpPerAcctPerMonth = \sum \frac{1 \text{ month}}{12 \text{ months}} * \left[AnnualAdExp * \frac{1}{NumOfAccts} \right]$$

Or more generally summing over all indirect costs:

$$IndirecExpPerAcctPerMonth$$

$$= \sum \frac{1 \text{ month}}{12 \text{ months}} * \left[AnnualIndirectExp * \frac{1}{NumOfAccts} \right]$$

which is equivalent to:

$$IE(o_i) = \sum AM_1(L, R) * \left[IE_k * \frac{F(IE_k)(o_i)}{F(IE_k)(o_j)} \right]$$

For the reasons above, *E&Y* anticipates and renders obvious Claim 25.

381. As discussed in Section VII.A.2(xii), calculating indirect costs by apportionment and amortization was well-known, routine, and conventional in the art at the time of the invention. In describing how to calculate indirect expenses for particular objects using amortization, *E&Y* anticipates and renders obvious Claim 25. Further, it would have been obvious for a POSITA to combine the teachings of *E&Y* with well-known and routine elements of amortization and apportioned indirect costs to render Claim 25 obvious.

14. Dependent Claim 26 is Anticipated and Obvious

26 The process of Claim 4, provisioning (P) of each object is calculated according to:

$$P(o_i) = PG(o_i) * \frac{\text{Balance of } o_i}{\sum_{o_k \in R PG(o_i)} \text{Balance } o_k}, \text{ wherein}$$

$PG(o_i)$ denotes the P group in which o_i is a member.

382. I understand that Claim 26 depends from Claim 4, and that in order to disclose or render obvious this claim, each limitation of any base claim and

any intervening claim must be met in addition to the instant claim limitation. It is my opinion that *E&Y* renders this claim obvious and teaches this limitation.

383. Claim 26 recites “calculating provisioning (P) of each object” by multiplying the provisioning allocated to a provision group (“PG”) by an apportionment based on the balance of the object as a percentage of the balance of the group. It is important to note that “RPG(o_i)” recited in the claim does not appear anywhere in the ‘316 Patent specification, claims or figures, and has no explanation as to what it represents. Thus, for the purposes of this discussion, I have treated RPG as PG. The airline example presented in the ‘316 Patent presents this formula as:

$$P(\text{seat}) = \text{Flight: InsurancePremium} * \frac{1}{\text{totalSeatsOnPlane}}$$

Ex. 1001 at 26:42-43. This formula, as applied to the airline example, divides the insurance premium for a flight by the total seats on the plane to determine the insurance provision per seat. It is important to note that in the example above, the airline “self-insures,” which is not clearly explained in the ‘316 Patent, but it would usually mean the airline itself would hold reserves (a provision) and then draw on them for losses, damages, and other insurance claims.

384. *E&Y* discloses calculating provisioning for an object based on an apportionment of a provisioning group. *E&Y* discloses:

Another way to deal with the *loan loss provision* is to
allocate net charge-offs (gross charge-offs less

recoveries) to the appropriate center, product, or customer as an element of the profit and loss statement. This technique is relatively simple to implement because the gross charge-offs and recoveries are known and can easily be *charged to the appropriate organizational centers, products, and customers*.

Ex. 1005 at 77. *E&Y* discloses having a loan loss provision ($P(o_i)$). Subsequently, *E&Y* describes the steps of taking the net charge-offs ($PG(o_i)$) and allocating them to the appropriate organizational center, product, or customer ($Balance(o_i) / \sum Balance(o_k)$). Since *E&Y* discloses all the elements of Claim 26, *E&Y* anticipates and renders obvious Claim 26.

385. *E&Y* also discloses using outstanding balances in calculating provisions, explaining that:

Taking this number by risk rating, which comes out of the matrix algebra, and *dividing it into the total expected losses by risk rating*, provides the needed *periodic provision as a percentage of outstanding balances*.

Ex. 1005 at 209. Above, *E&Y* discloses taking the total expected losses for a portfolio ($PG(o_i)$) and multiplying that by the percentage of outstanding balance

associated with a specific risk rating ($\frac{Balance(o_i)}{\sum Balance(o_k)}$). In disclosing how to calculate provisioning for an object based on an apportionment of a provision group, *E&Y* anticipates and renders obvious Claim 26.

386. As discussed in Section VII.A.2(xiii), calculating provisioning based on an apportionment of a provisioning group was well-known, routine, and conventional in the art at the time of the invention. In describing provisioning for an object based on an apportionment of a provision group, *E&Y* anticipates and renders obvious Claim 22. Further, it would have been obvious for a POSITA to combine the teachings of *E&Y* with well-known and routine elements in the art to render Claim 22 obvious.

15. Dependent Claim 27 is Anticipated and Obvious

27 The process of Claim 4, wherein provisioning (P) is calculated as:

$$P(o_i) = PG(o_i) * \frac{Balance(o_i) * RF(o_i)}{\sum_k [Balance(o_k) * RF(o_k)]},$$

wherein:

PG(o_i) denotes the P group in which o_i is a member, and
RF(o_i) denotes the expected adjustment factor for o_i .

387. I understand that Claim 27 depends from Claim 4, and that in order to disclose or render obvious this claim, each limitation of any base claim and

any intervening claim must be met in addition to the instant claim limitation. It is my opinion that *E&Y* renders this claim obvious and teaches this limitation.

388. Claim 27 recites calculating provisioning by multiplying the provisioning allocated to a provision group ($PG(o_i)$) by an apportionment based on the balance and adjustment factor of an object as a percentage of the balance and adjustment factor of the group $(\frac{Balance(o_i) * RF(o_i)}{\sum Balance(o_k) * RF(o_k)})$.

It is important to note that “RPG(o_i)” recited in the claim does not appear anywhere in the ‘316 Patent specification, claims or figures, and has no explanation as to what it represents. Thus, for the purposes of this discussion, I have treated RPG as PG. As discussed in relation to Claim 26, *E&Y* discloses calculating a provision based on an apportionment of a provision group. *E&Y* discloses the need to calculate the provision using an adjustment factor, explaining that:

These methods for handling the loan loss provision do not account for changes in credit risk in the reported profitability. That presents a problem, because if there is an increase in credit risk, there should be an ***increased loan loss reserve with a corresponding provision to account for that increased risk***. One allocation method that deals with this change in risk involves the computation of a calculated loan loss reserve.

Ex. 1005 at 77. *E&Y* discloses the need to modify the apportioned provision for an increase or decrease in risk associated with that particular object. *E&Y* also describes adjusting an apportioned provision group by individual risk ratings. Therefore, *E&Y* anticipates and renders obvious Claim 27.

389. *E&Y* also describes a more complex method for adjusting the risk associated with a particular object when determining an object's apportioned provisioning by explaining that:

The credit analysis software creates a transition probability matrix. Using this matrix, an absorbing Markov chain calculation is performed to derive ***total expected losses and weighted average number of transitions by risk rating. Needed provision by risk grade is determined by dividing total expected losses by weighted average transitions. Needed reserve by risk grade is determined by multiplying total expected losses by the bank's appropriate loss pattern.*** All of these factors are ***multiplied by current balances by risk rating to achieve a first-cut provision and reserve.*** Management, using a top-down perspective, reviews the calculations and

makes adjustments for specific large problem credits, LDC loans, and other exception items.

Various standard reports can be created to show expected losses, chargeoffs, ***needed provision***, and needed reserve, based on the current quarter versus a weighted average range of prior quarters. ***Reports also can be created for the entire portfolio or subsets selected by industry, geography, organizational unit, or other parameter.***

Ex. 1005 at 211. *E&Y* discloses using the total expected losses ($PG(o_i)$) multiplied by the balances, and by risk rating or a risk grade $(Balance(o_i) * RF(o_i) / \sum Balance(o_k) * RF(o_k))$. It is my opinion that the description of *E&Y* above anticipates and renders obvious Claim 27.

390. As discussed in Section VII.A.2(xiv), calculating provisioning for an object based on an apportionment of a provision group, based on balance and an expected adjustment factor, was well-known, routine, and conventional in the art at the time of the invention. In describing how to calculate provisioning using provision groups, balances, and risk factors, *E&Y* anticipates and renders obvious Claim 27. Further, it would have been obvious for a POSITA to combine the

teachings of *E&Y* with the well-known concept of provisioning based on groups to render Claim 27 obvious.

16. Dependent Claim 28 is Anticipated and Obvious

28 The process of Claim 4, wherein provisioning (P) is calculated as:

$$P(o_i) = \frac{\text{Exposure}(o_i) * \text{Pr}(o_i) * \text{Expected Value Adjustment}(o_i)}{L}$$

$$\frac{1}{L}$$

wherein:

$\text{Pr}(o_i)$ is a probability for object o_i , and

L is the expected number of reporting periods during the life of o_i .

391. I understand that Claim 28 depends from Claim 4, and that in order to disclose or render obvious this claim, each limitation of any base claim and any intervening claim must be met in addition to the instant claim limitation. It is my opinion that *E&Y* renders this claim obvious and teaches this limitation.

392. Claim 28 recites calculating provisioning by multiplying the exposure, probability, and expected value adjustment for an object, and dividing that value by the expected number of reporting periods during the life of the object. It is important to note that Claim 28 and the ‘316 Patent specification fail to describe what “ $\text{Exposure}(o_i)$ ” and “ $\text{Expected Value Adjustment}(o_i)$ ” mean or how they should be calculated. For the purposes of this discussion, I am treating “ $\text{Exposure}(o_i)$ ” as

the object balance or the loss possible for the object o_i and “Expected Value Adjustment(o_i)” as a risk factor.

393. *E&Y* describes in detail various methods of calculating provisioning, including a method using Markov Chains called Loan Migration to calculate provisions and required reserves as a function of potential losses, probability of those losses, risk factors, and time. *E&Y* describes loan migration as:

Loan migration analysis is the examination of ***groups of similarly classified loans to determine the level of credit losses***. The first step in quantifying these ***expected credit losses is to disaggregate the loan portfolio by risk rating and understand how balances change from one period to the next***.

Ex. 1005 at 206. For example, *E&Y* provides the following figures followed by an explanation of how to calculate the loan loss provision, disclosing:

Figure 11-10—Probability Vectors

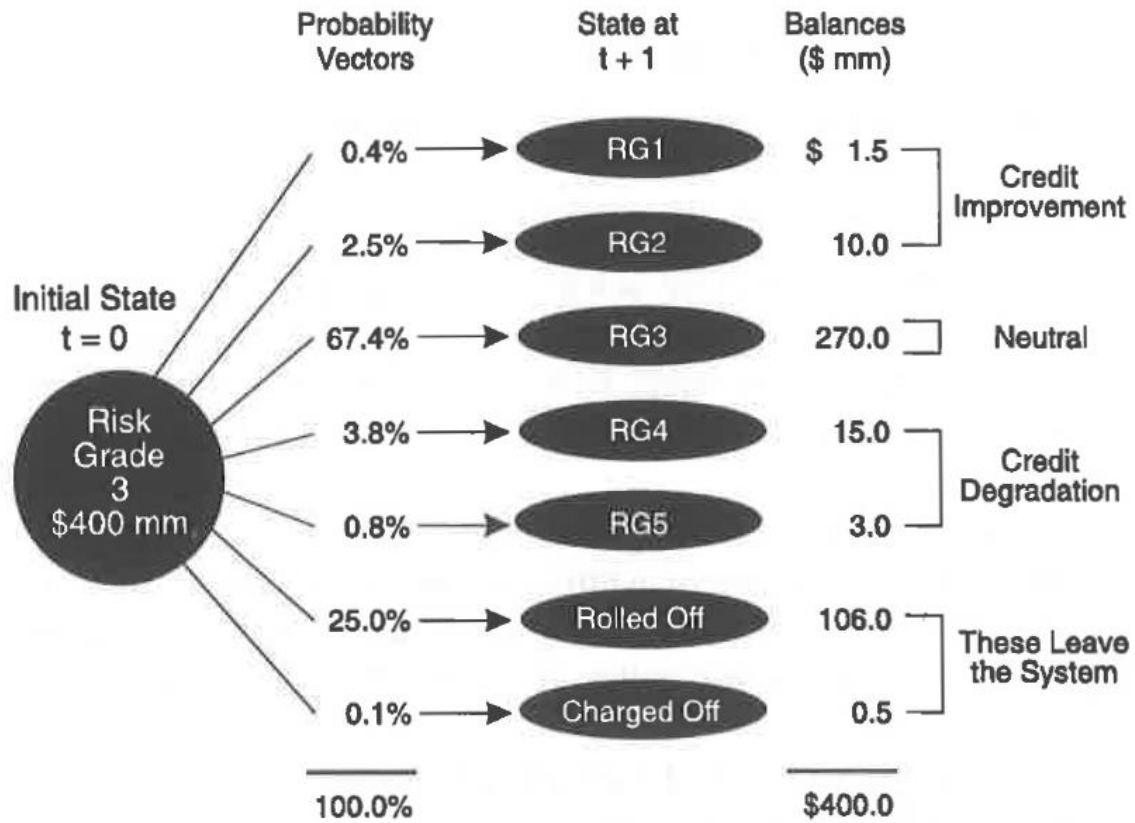
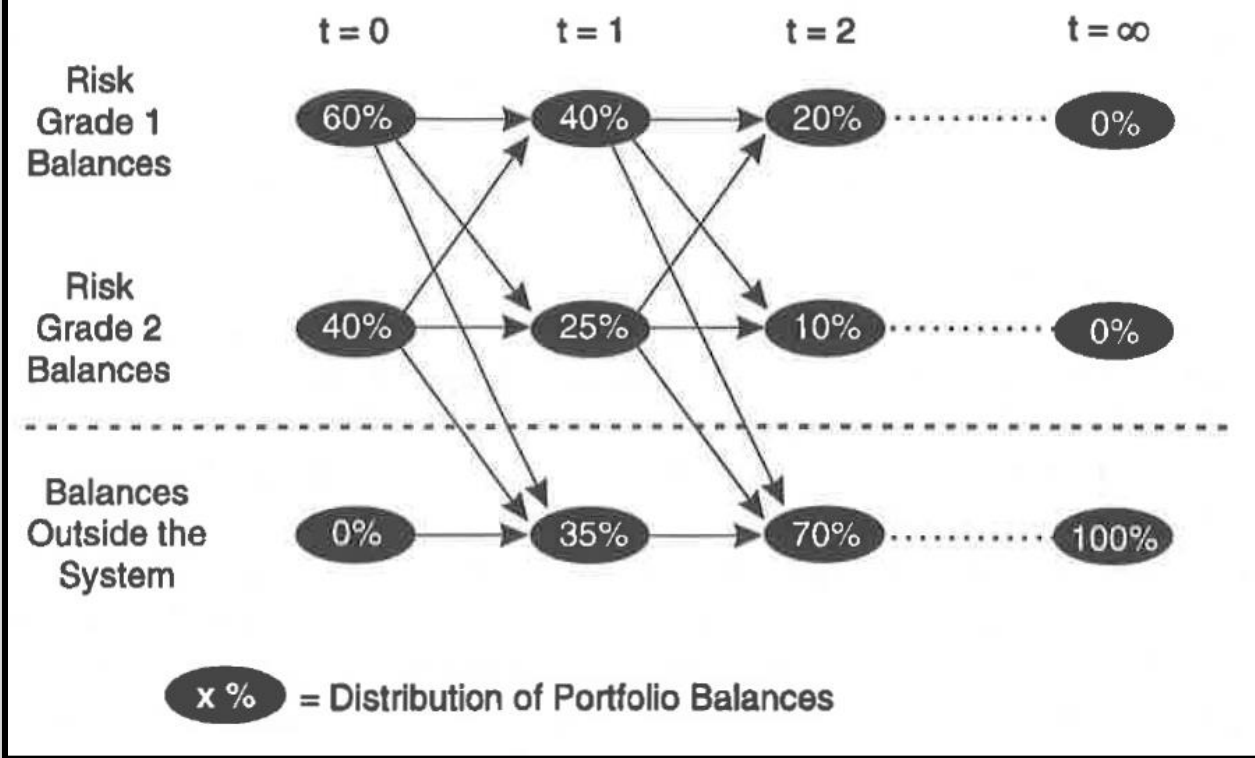


Figure 11-11—Loan Transition Probability Matrix (%)

		Risk Grade This Quarter					Rolled Off	Charged Off
		1	2	3	4	5		
Risk Grade Last Quarter	1	65.0	8.8	0.3	0.0	0.0	25.8	0.0
	2	1.7	66.7	4.5	1.1	0.0	26.1	0.0
	3	0.4	2.5	67.5	3.8	0.8	25.0	0.1
	4	0.0	0.1	3.0	69.0	9.4	17.9	0.6
	5	0.0	0.0	0.3	2.3	89.5	4.3	3.8

Figure 11-12—Illustrative Markov Chain



Step 4 – Calculate the Required Provision

The required **loan loss provision** can be compared to an insurance premium that **amortizes the cost of a loss over the period of time in which the loss can be expected to occur**. The analysis provides the **total expected loss over the life of the portfolio**. In order to **determine the pro rata periodic risk charge**, it is necessary to know **how long the current balances by risk grade will remain on the books**.

Markov chain mathematics provides the answer. It is not the number of transitions until all balances are either charged off or paid off (which is infinite), but rather the balance-weighted average number of transitions that counts. ***Taking this number by risk rating***, which comes out of the matrix algebra, and ***dividing it into the total expected losses by risk rating, provides the needed periodic provision as a percentage of outstanding balances.***

Ex. 1005 at 208-210. *E&Y* discloses calculating a loan loss provision of a portfolio (o_i) based on the balance of the portfolio ($\text{Exposure}(o_i)$), expected loss over the life of the portfolio ($\text{Pr}(o_i)$), the current risk rating ($\text{Expected Adjustment Value}(o_i)$), and the period of time in which the loss can be expected to occur ($1/L_i$). The Figure 11-11 illustrates the risk grade changing from one period of time (a quarter of a year) to the next quarter. Figure 11-12 uses arbitrary time periods, $t=0$, $t=1$, $t=2$, ... $t=\infty$. *E&Y* discloses all the aspects of Claim 28 in calculating the “needed periodic provision as a percentage of outstanding balances,” thus anticipating and rendering obvious Claim 28.

394. *E&Y* further details the Markov Chain process, explaining that:

If actual losses (chargeoffs) occurred evenly over the life of the portfolio, there would be no need for a reserve. However, real losses are unpredictable. Losses tend to occur later rather than sooner in the life of a loan portfolio. As the portfolio ages, certain credits degrade to the point where they are written off. Each period, the reserve balance is increased by the proportionate share of the total expected losses, and decreased by actual chargeoffs.

For example, consider a loan portfolio with a life of four years. ***Each year, 25 percent of the total expected losses will be provided for and added to the reserve.*** Suppose that in the first year no actual losses are charged off. At the end of the period, the reserve balance will be 25 percent of the total expected losses.

In the second year, an additional 25 percent of total expected losses will be provided for. If chargeoffs of 6 percent are taken, a net 19 percent will be added to the reserve, increasing its balance at the end of Year Two to 44 percent. In Year Three, another 25 percent of total expected losses is taken. Given chargeoffs of 26 percent

of total losses, a net 1 percent will be subtracted from the reserve, leaving the balance at the end of Year Three at 43 percent of total expected losses. In the final year, 25 percent of total expected losses is provided for, and the remaining 68 percent of total expected losses is charged off. The net subtraction from reserves is 43 percent, leaving zero balance in the reserve at the end of the fourth year.

Ex. 1005 at 210. *E&Y* provides additional detail on the Markov Chain process, detailing how the exposure, probability of losses, risk factor, and remaining time change each period. *E&Y* further describes above how these factors are used to calculate the required provision (or reserves) for each period. *E&Y* further explains that the results of the Markov Chain method can be applied to any object or cross-section of the organization, disclosing:

*Various standard reports can be created to show expected losses, chargeoffs, **needed provision**, and needed reserve, **based on the current quarter versus a weighted average range of prior quarters**. Reports also can be created for the entire portfolio or subsets selected by*

industry, geography, organizational unit, or other parameter.

Ex. 1005 at 211. The disclosures of *E&Y* anticipate and render obvious the calculation Claim 28.

395. As discussed in Section VII.A.2(xv), calculating provisioning using exposure, probability of loss, expected adjustment factor, and remaining time was well-known, routine, and conventional in the art at the time of the invention. In describing how to calculate provisions using Markov Chains and loan migration, *E&Y* anticipates and renders obvious Claim 28. Further, it would have been obvious for a POSITA to combine the teachings of *E&Y* with the well-known elements of provisioning for future losses using probabilities to render Claim 28 obvious.

17. Dependent Claim 29 is Anticipated and Obvious

29 **The process of Claim 7, wherein the step of adjusting the measure for object level profitability is calculated as:**

$$\text{Profit}(o_i) = \{ [\text{NIR}(o_i) + \text{OR}(o_i) - \text{DE}(o_i) - \text{IE}(o_i) - \text{P}(o_i)] * (1 - \text{EffectiveTaxRate}) \} - \text{SVA}(o_i),$$

where

$$\text{SVA}(o_i) = \alpha(o_i) + \beta(o_i) * \text{Amount}(o_i),$$

and

$\alpha(o_i)$, $\beta(o_i)$ are functions for a cohort of objects in which o_i is a member, and $\text{Amount}(o_i)$ is given by a rule which maps o_i to a data value (such as balance, or allocated equity) also defined at the cohort level.

396. I understand that Claim 29 depends from Claim 7, and that in order to disclose or render obvious this claim, each limitation of any base claim and any intervening claim must be met in addition to the instant claim limitation. It is my opinion that *E&Y* renders this claim obvious and teaches this limitation.

397. Claim 29 recites “adjusting the measure for object level profitability” calculated as the formula of parent Claim 6 multiplied by the effective tax rate, with shareholder value add (“SVA”) subtracted therefrom. SVA is defined as a function of $\alpha(o_i)$, $\beta(o_i)$, and $\text{Amount}(o_i)$ classified by a cohort of objects. The ‘316 Patent states that “[a] cohort defined here represents a grouping of objects with similar risk characteristics, ***consistent with Modern Portfolio Theory and the Capital Asset Pricing Model.***” Both Modern Portfolio Theory (“MPT”) and the

Capital Asset Pricing Model (“CAPM”) were ubiquitously known and used in the areas of finance and accounting. The ‘316 Patent further describes SVA as:

Shareholder Value Add (SVA) is a method financial analysts use to adjust profit measures for risk. The idea is to subtract from the profit measure the cost of the equity required to support whatever object is being measured. ***Companies use this risk adjustment measure essentially to burden the profit for risk being taken with the equity funds used by the object.*** These institutions will classify ***cohorts of risk*** and the risk cost equivalent as a ***percentage of account balance or allocated equity (i.e., "Hurdles")***.

Ex. 1001 at 22:36-59. In the paragraph above, the ‘316 Patent explains that SVA is a “method financial analysts use to adjust profit measures for risk,” and that “companies use this risk adjustment measure,” describing the method as one already well-known, routine and conventional for financial analysts and companies to use. These descriptions in the ‘316 Patent make it clear that the concept of SVA using cohorts, as recited by Claim 29, was well-known, routine and conventional within the art at the time of the invention.

398. E&Y discloses adjusting profit for SVA using groupings to calculate beta according to CAPM. For example, E&Y discloses that:

In fact, another dimension beyond stand-alone volatility is needed to ***determine the proper hurdle rate for each business line***: the systemic risk embedded in that business line, for example, as ***measured by its beta coefficient, based on the capital asset pricing model (CAPM)***. Beta is ***a measure of the risk of the business relative to overall market risk***, based on patterns of business-line and market return covariance. (Risk-return measures other than beta also exist, for instance, those based on arbitrage pricing theory (APT).

Ex. 1005 at 224. Here, E&Y discloses the elements of calculating beta per business line according to CAPM. E&Y also discloses using market betas and equity costs to business lines to maximize shareholder value by describing:

The shift toward a ***stakeholder-value orientation*** in many financial institutions has led executives to demand information measuring the ***performance of centers, products/product lines, and customers in terms of return on equity hurdle rates and market comparable ROEs***.

When business lines or products are viewed as stand-alone entities and ***ROE data for each (adjusted for***

business-specific risk) is measured against a cost of capital "hurdle rate," actionable information is generated. This can then be used to guide strategic or tactical steps toward *maximizing stakeholder value*. As a limited and inexpensive source of funding, capital should be diverted from unprofitable businesses and products and toward areas that enhance the value of capital contributions.

Obviously, selection of a capital-allocation methodology is a critical aspect of a value-based information system. *Many institutions with advanced performance measurement systems already in place use a risk-adjusted allocation of capital to product lines* as the foundation for their ROE performance benchmarks. Risk adjusted allocations recognize that capital exists primarily to cover unexpected losses arising from the risk inherent in the banking business. *Equity allocations based on regulatory requirements or market comparables* are considered viable alternatives to the risk-based method,

but do not take into account the institution's specific credit and interest rate exposure characteristics.

Ex. 1005 at 30. In addition to anticipating Claim 29, in the paragraph above, *E&Y* explains that Claim 29 was already widely used by “many institutions.” *E&Y* further explains that:

With a ***regulatory capital adequacy ratio, financial institutions must maintain a certain level of equity financing.*** The degree to which a product uses shareholder equity may be useful in measuring its success at financing its own growth.

Ex. 1005 at 17. Again, *E&Y* makes it clear that the evaluation of SVA as allocating equity to a product (or other object) was not only well-known, but was related to a regulatory requirement for financial institutions. It is my opinion that this description in *E&Y*, along with the discussion of beta and CAPM, anticipates and renders obvious Claim 29.

399. *E&Y* also discloses the elements of Claim 29 in its explanation of techniques to determine market betas per business line (or cohort):

MARKET COMPARABLES

A number of publicly traded companies, funds, or trusts concentrate the bulk of their activities in a small set of

identifiable business lines, so it usually is possible to find ***observable market betas for banking businesses.***

...

Meanwhile, institutions can use ***regression or factor-analytic techniques to estimate the imputed return-on-equity requirements by major business segments.*** By including a large enough sample of financial institutions and categorizing the range and scale of their activities, ***business line (as opposed to institution-wide) equity costs*** can be developed.

Ex. 1005 at 225. This disclosure anticipates Claim 29's use of market comparable betas to assess an object's profit and to allocate equity costs. It is my opinion that *E&Y* anticipates and renders obvious Claim 29. Additionally, *E&Y* discloses the simple tax calculation of Claim 29 of multiplying profit by (1-tax_rate) by teaching using "a single, average tax rate when taxes are included in profitability reports."

Ex. 1005 at 73. The use of a "single, average tax rate" teaches multiplying by (1-tax_rate), since the calculation of taxes using (1-tax_rate) is a simple mathematical rule of multiplication and was widely used at the time of the invention. See Ex. 1018.

400. As discussed in Section VII.A.2(xvi), calculating shareholder value add was well-known, routine, and conventional in the art at the time of the invention. In describing how to calculate SVA and allocated equity using CAPM, *E&Y* anticipates and renders obvious Claim 29. Further, it would have been obvious for a POSITA to combine the teachings of *E&Y* with the well-known financial concept of calculating SVA using CAPM to render Claim 29 obvious.

18. Dependent Claim 30 is Obvious

30 The process of Claim 7, wherein the step of adjusting the measure for object level profitability includes the calculation

$$\text{Profit}(o_i) = [\text{NIR}(o_i) + \text{OR}(o_i) - \text{DE}(o_i) - \text{IE}(o_i) - \text{P}(o_i)] * (1 - \text{EffectiveTaxRate}) \text{ where,}$$

for a two tier taxation system, Effective Tax Rate is calculated as:

$$\text{Effective Tax Rate} = (1 - \text{tax rate 2}) * (\text{tax rate 1}) + \text{tax rate 2.}$$

401. I understand that Claim 30 depends from Claim 7, and that in order to disclose or render obvious this claim, each limitation of any base claim and any intervening claim must be met in addition to the instant claim limitation. It is my opinion that *E&Y* renders this claim obvious and teaches this limitation.

402. Claim 30's calculation of a two-tier tax is a basic mathematical derivation and would have been obvious to a POSITA. The derivation, based on

multiplying earnings before taxes (“EBT”) by a first tax and a second tax, is shown below:

$$[EBT * (1 - tax_1)] * (1 - tax_2),$$

$$\text{where } EBT = NIR(o_i) + OR(o_i) - DE(o_i) - IE(o_i) - P(o_i)$$

$$= EBT * (1 - tax_1) * (1 - tax_2)$$

$$= EBT * (1 - tax_1 - tax_2 + tax_1 tax_2)$$

$$= EBT * [1 - (tax_1 + tax_2 - tax_1 tax_2)]$$

$$= EBT * [1 - ((1 - tax_2) * tax_1 + tax_2)]$$

$$= EBT * [1 - EffectiveTaxRate],$$

$$\text{where } EffectiveTaxRate = (1 - tax_2) * tax_1 + tax_2$$

403. While *E&Y* does not explicitly derive the two-tier effective tax rate of Claim 30, *E&Y* teaches calculating taxes using a “wide variety of tax structures with which financial institutions operate. Because tax rates vary by country, state, and city, the calculation of a tax effect should reflect the differences.” Due to the difficulty in implementing a differential tax rate system, many institutions have decided to use “a single, average tax rate when taxes are included in profitability reports.” Ex. 1005 at 73. Thus, *E&Y* teaches, and renders obvious, calculating multiple taxes and applying those taxes (either individually or as an average tax rate) to determine object level profitability.

404. As discussed in Section VII.A.2(xvii), calculating two-tiered taxes was well-known, routine, and conventional in the art at the time of the invention. In describing how to calculate taxes for various tax jurisdictions, *E&Y* renders obvious Claim 30. Further, it would have been obvious for a POSITA to combine the teachings of *E&Y* with the well-known accounting practice of calculating taxes to render Claim 30 obvious.

405. *****

406. *E&Y* teaches all of the elements in the challenged claims. To the extent that any element is alleged missing from *E&Y*, it would have been obvious to a POSITA to use the well-known teachings in the prior art, discussed above (VII.A), to meet those elements in implementing the system of *E&Y*. Moreover, a POSITA reading the various teachings and examples of *E&Y* would at once envisage the claimed arrangements of the challenged claims. I understand that “a reference can anticipate a claim even if it does not expressly spell out all the limitations arranged or combined as in the claim, if a person of skill in the art, reading the reference, would at once envisage the claimed arrangement or combination.” *Blue Calypso LLC v. Groupon, Inc.*, 815 F.3d 1331, 1334 (Fed. Cir. 2016) (internal citations omitted). I also understand that “reference need not always include an express discussion of the actual combination to anticipate” and “a reference may still anticipate if that reference teaches that the disclosed components or functionalities

may be combined and one of skill in the art would be able to implement the combination.” *Id.* Here, it would also be obvious to combine the various teachings and examples of *E&Y* set forth above, as they are all discussed in the single reference and described as desirable approaches. A POSITA would be motivated to implement the teachings therein in accordance with the examples discussed in *E&Y*, and would expect success in carrying out that implementation in view of *E&Y*’s express teachings, suggestions and motivations set forth above. It would be common sense when implementing *E&Y*’s teachings to try utilizing the approaches set forth in *E&Y*’s example implementations.

C. Claims 1-2, 4-5, and 25 are Anticipated by *Blain* and Rendered Obvious by *Blain*

1. Independent Claim 1 is Anticipated and Obvious

1. A process for determining object level profitability in a relational database management system, comprising the computer implemented steps of:

providing a computerized profit database having profit information;

providing a relational database management system operable in association with the computerized profit database;

preparing the profit information to be accessed electronically through the relational database management system, including the step of calculating opportunity values for funds used or supplied by each object being measured;

establishing, in the relational database, rules for processing the prepared information, including the steps of providing information necessary to select objects and performing a profit calculus;

using the relational database management system to independently calculate at least one marginal value of profit for each object being measured using the established rules as applied to a selected set of prepared information;

combining the at least one marginal value of profit to create a measure for object level profitability.

407. I understand that independent Claim 1 includes a preamble that recites “a process for determining object level profitability in a relational database management system.” I note that *Blain* teaches a “process” for calculating object level profitability using a plurality of different profit calculation methods. Ex. 1006 at 29, 36-39, 74-78, 311-320. *Blain* discloses using the SAP R/3 system on a computerized profit database with various modules for profit gathering, “reporting,

planning, and ledger processing.” Ex. 1006 at 29. In addition to teaching gathering data into a relational database, *Blain* teaches transforming that data to provide a “continuous measurement of the profitability of everything” within the system. Ex. 1006 at 193. Accordingly, it is my opinion that *Blain* anticipates and renders obvious the preamble of Claim 1.

408. Claim 1 of the ‘316 patent simply takes pre-existing data (*e.g.*, general ledger) and calculates new values based on that data. Whether the calculated values are stored in the profit database, stored in another database, or not stored at all is not specified in Claim 1. It is my opinion that the preamble of Claim 1 does not provide a meaningful limitation to the claim.

409. *Blain* anticipates and renders obvious all elements of Claim 1. *Blain*, entitled “Using SAP R/3,” is a technical handbook for implementing the SAP R/3 platform. SAP R/3 is a software system, built on a relational database, that was widely used by companies large and small to execute a full range of business system functions. SAP R/3 delivers solutions for a wide range of business functions, including financial accounting, inventory management, project planning, forecasting, tax calculations, payroll, personnel management, and profitability analysis. Ex. 1006 at 74-78. Some specific modules provided by SAP R/3 perform the elements of Claim 1 include the FI-GL General Ledger, CO-PC Product Cost Accounting, CO-ABC Activity-Based Costing, and CO-PA Sales and Profitability

Analysis. Specifically, *Blain* discloses using “business data stored in relational databases” with cost data “allocated according to rules” to “carry out marginal and absorption costing in parallel.” Ex. 1006 at 36, 275, 306. SAP R/3 also provides analysis of profitability driven to the “appropriate cost or profit object,” which can be a product, project, team, material number, maintenance order, customer, business unit, or any other method of organizing cost and profit information defined by a customer. Ex. 1006 at 278, 302-305. Thus, *Blain* anticipates and renders obvious Claim 1.

1[a] providing a computerized profit database having profit information

410. It is my opinion that *Blain* anticipates and renders obvious element 1[a]. As explained in Section V.A, the “profit information” stored in the “computerized profit database” is described by the ‘316 Patent as “financial and/or non-financial data related to calculating profit.” The computerized profit database is simply a database that stores “financial and/or non-financial data related to calculating profit.”

411. *Blain* teaches storing profit information in a computerized profit database. Ex. 1006 at 41, 196-198, 209-217, 234, 329. *Blain* discloses that the SAP R/3 system provides the three essential services of “Database Management, Application Processing, and Presentation Services,” either on different processing systems or in “a central system by itself.” Ex. 1006 at 41. *Blain* discloses using the

FI-GL General Ledger and FI-GLX Extended General Ledger modules to store transaction data in a database. Ex. 1006 at 209-217. For example, *Blain* explains that the “general ledger is the source from which are built the external accounting documents, the balance sheet, and the profit and loss statement.” Ex. 1006 at 196. *Blain* further explains the financial data collection by the FI-GL General Ledger as:

The copious and comprehensive data arising from the **SAP standard procedure of capturing all transaction information** in the form of SAP Documents can be subsequently analyzed. For example, there can be valuable additions to primary results in the form of interpretations of the data that picture the company from various points of view. **A look at profit and loss for each activity** over each operating period might be illuminating, for example.

Ex. 1006 at 197. *Blain* explains that the GL-General Ledger stores the data needed to conduct profitability analysis, explaining:

Clearly **the data should be held centrally if you are seeking widespread analyses**; and if you want the information to be up-to-date, then records of every transaction must be available to contribute to the analysis if required. **The General Ledger and its Sub-ledgers in**

the SAP online accounting system provide this central source.

Ex. 1006 at 197. In addition to centrally holding transaction data in the General Ledger, *Blain* discloses that:

If, however, the ***necessary primary data are in the system***, then ***automatic profit and loss information can be computed***. Overheads can be monitored and attributed to such headings as cost center and order settlement. ***Product cost accounting can shed light on the costs of ongoing jobs***. Technical and commercial projects can be monitored, controlled, and brought into the plans. ***Profitability analysis will be possible on the basis of cost of sales and period accounting***.

Ex. 1006 at 198. Since *Blain* discloses storing financial and transaction data in databases within the SAP system, *Blain* anticipates and renders obvious a computerized profit database having profit information.

412. *Blain* also discloses maintaining profit data, explaining that:

The Generally Accepted Accounting Principles (GAAP) require that the values recorded in the accounts of a company shall be in a permanent state of reconciliation. In

order to comply with this requirement, ***an online accounting system has to maintain a journal, a set of account balances and all the documents to support them. The SAP R/3 system meets these conditions and, in some respects, exceeds them.***

Ex. 1006 at 329. *Blain* explains that this cost and profit data is stored in databases:

Transaction data are stored centrally in the document database, and the corresponding line items and details are stored in the sub-ledgers as appropriate. ***The system automatically updates a subtotal of a balance sheet account for every business transaction***, and reconciles the account subtotals and the line items to ***ensure that the financial information is always correct and current.***

Ex. 1006 at 234. In describing storing transaction data for calculating profit in a database, *Blain* anticipates and renders obvious element 1[a].

413. As discussed in Section VII.A.1(ii), element 1[a] was well-known in the art. It is my opinion that it would have been routine and conventional for a POSITA to use a computerized profit database when calculating profit values for an organization. Further, it is my opinion that it would have been obvious for a

POSITA to combine the teachings of *Blain* with well-known computerized profit database concepts to render element 1[a] obvious.

1[b] providing a relational database management system operable in association with the computerized profit database

414. It is my opinion that *Blain* anticipates and renders obvious element 1[b]. Ex. 1006 at 36-38, 41, 54-55, 71. For example, *Blain* describes using SQL “for open data access to R/3 ***business data stored in relational databases.***” Ex. 1006 at 36. *Blain* further describes electronic access to the database, disclosing that the “central database can be serviced in a single processor, a multi-processor, or a cluster of processors.” Ex. 1006 at 38. *Blain* discloses that the SAP system provides the three essential services of “Database Management, Application Processing, and Presentation Services,” either on different processing systems or in “a central system by itself.” Ex. 1006 at 41. *Blain* describes SAP R/3 as performing database management tasks on one or more databases:

Database A database is a collection of files shared by multiple applications. ***A SAP system can operate on more than one database.*** The collection of files can be managed by a database system on another computer. ***The Database system refers to the management of any elements of online or batch transactions that entail making changes***

to the database. This can include directing the database management system to conduct a search and report its findings. Certainly, such applications as MM-Materials Management, PP-Production Planning, and FI-Financial Accounting will demand changes to the database.

Ex. 1006 at 71. *Blain*, above, discloses using a database to store transactions, and using a database management system to search the database and generate reports. Thus, *Blain* anticipates and renders obvious claim element 1[b].

415. *Blain* also discloses the ability for SAP R/3 to interact with various relational database management systems and profit databases, describing:

Portability Across Databases

The R/3 system is compatible with the database systems marketed by a variety of companies including:

- Informix
- Oracle
- Software AG
- Sybase

Ex. 1006 at 37. These database systems (*e.g.*, Oracle, Sybase) were well-known relational database management systems at the time of the invention. Ex. 1014 at 23. In addition to disclosing using an RDBMS in association with a computerized

profit database, *Blain* describes a solution to one of the difficulties in making a profit database operable and implementing this interconnection in a distributed system as:

To meet this need for controlling access from many users and applications to a complex data object, the parts of which may be ***distributed among any number of relational tables***, the ***R/3 system uses an internal central lock manager installed on one of the database servers*** or on one of the application servers.

Ex. 1006 at 54. *Database Systems* describes the ability to handle concurrent data access as a capability typically provided by database management systems:

The term concurrency refers to the fact that DBMSs typically allow many transactions to access the same data at the same time—and in such a system, as is well known, some kind of concurrency control mechanism is needed to ensure that concurrent transactions do not interfere with each other's operation.

Ex. 1014 at 391. A standard method of addressing the concurrency issue is locking.

Ex. 1014 at 391, 395-396. By disclosing SAP R/3 using an internal lock manager for controlling user access, *Blain* is disclosing that SAP R/3 acts as a database management system for the relational tables. By disclosing SAP R/3 using an

internal lock manager for controlling user access, *Blain* is disclosing that SAP R/3 acts as a database management system for relational tables. Thus, It is my opinion that *Blain* anticipates and renders obvious element 1[b].

416. As referenced in Section VII.A.1[b], element 1[b] was well-known and conventional in the art. It is my opinion that it would have been obvious to a POSITA to combine the conventional technology of an RDBMS with a profit database. It would have been obvious for a POSITA to also combine the well-known technology of an RDBMS with the teachings of *Blain* to render element 1[b] obvious. In my opinion, element 1[b] is anticipated and rendered obvious by *Blain*.

1[c] preparing the profit information to be accessed electronically through the relational database management system, including the step of calculating opportunity values for funds used or supplied by each object being measured

417. It is my opinion that *Blain* anticipates, and renders obvious, element 1[c].

preparing the profit information to be accessed electronically through the relational database management system

418. As discussed in relation to element 1[b], *Blain* discloses the step of accessing profit information through the relational database. Ex. 1006 at 36-37, 54, 643. For example, *Blain* describes using SQL “for open data access to R/3 *business data stored in relational databases.*” Ex. 1006 at 36. *Blain* further

describes electronic access to the database, disclosing that the “central database can be serviced in a single processor, a multi-processor, or a cluster of processors.” Ex. 1006 at 38. Thus, *Blain* anticipates and renders obvious the step of element 1[c] of “preparing the profit information to be accessed electronically through the relational database management system.”

calculating opportunity values for funds used or supplied

419. *Blain* also anticipates and renders obvious the second step of element 1[c] of “calculating opportunity values for funds used or supplied.” As discussed in Section VII.A.1(iv), “opportunity values” includes at least “funds transfer pricing” within the scope of the ‘316 Patent. Claim element 1[c] recites calculating “opportunity values for funds used or supplied” and Claim 8 defines calculating opportunity values as calculating “matched maturity funds transfer pricing.” The only other reference to “opportunity” within the ‘316 Patent is in describing that “DPM’s ***funds transfer pricing method uses maturity opportunity rates*** used in valuing each object’s marginal use or source of internal funds.” Ex. 1001 at 7:61-64. Accordingly, although the words “opportunity values” are not used in the specification, and “opportunity values” are not expressly defined in a formula or other explicit way, I understand that “calculating opportunity values,” as described by Claim 1, is satisfied at least by calculating “transfer pricing.”

420. *Blain* describes calculating transfer prices for any cost objects or goods according to rules created by the user, disclosing that:

Goods that are issued, received or manufactured give rise to the information that goes, for example, into the *calculation of*:

- Manufacturing costs
- Standard costs
- Moving average price
- *Transfer prices*

Ex. 1006 at 311. Above, *Blain* is describing the implementation of the CO-PA Profitability Analysis module, which uses “[b]illing documents, [s]ales quantities, [r]evenues, and [s]ales deductions” as data used to calculate transfer prices for goods issued, received, or manufactured. In describing calculating opportunity costs for resources used and supplied, as well as disclosing using transfer pricing, *Blain* anticipates and renders obvious the second step of element 1[c] of “calculating opportunity values for funds used or supplied.”

calculating opportunity values for ... each object being measured

421. *Blain* anticipates and renders obvious the final step of element 1[c] of “calculating opportunity values for . . . each object being measured.” *Blain* discloses using the CO-PA Profitability Analysis module to calculate “[t]ransfer prices” for “[g]oods that are issued, received or manufactured” using information

like “[b]illing documents, [s]ales quantities, [r]evenues, and [s]ales deductions.” Ex. 1006 at 311. *Blain* describes using the CO-Controlling module set (of which CO-PA Profitability Analysis is a module) to drive profitability calculations (including transfer prices) to the object level, explaining that:

You can display a ***business-oriented profit and loss analysis, because all the data objects*** that have a bearing on the computation of value added are represented in the analysis and can therefore be ***scrutinized down to the details of the individual transactions*** from which the data are drawn. ***The cost data are allocated according to rules which are under your control***—there need be no obscurity in how to interpret the analysis reports.

Ex. 1006 at 311. *Blain* discloses that “[c]riteria may be combined across dimensions and levels to make a business segment specification that will give you the profitability analysis for exactly what it is that you want to take a look at,” describing a business segment as “a portion of your business that you have defined in terms of products, customers, activities and organization, combined in any way you want.”

Ex. 1006 at 314.

422. *Blain* discloses attributing all costs and revenues to cost/profit objects, disclosing that “each of these flows via the FI-GL General Ledger account

to the appropriate cost or profit object.” Ex. 1006 at 278. *Blain* further describes a “cost or profit object” as “a convenient conceptual destination that can appear in the accounts with accrued costs or revenues,” and as a method that “enables an accurate system of accounting that will help you control the value-adding business processes of your company.” Ex. 1006 at 275, 278. Based on these disclosures, it is my opinion that *Blain* anticipates and renders obvious element 1[c].

423. As referenced in Section VII.A.1(iv), element 1[c] was well-known and routine in the art and is therefore rendered obvious. Ex. 1013 at 904-912. *Blain* anticipates and renders obvious preparing profit information using a relational database and calculating opportunity values for resources used or supplied by any profit object.

1[d] establishing, in the relational database, rules for processing the prepared information, including the steps of providing information necessary to select objects and performing a profit calculus

424. It is my opinion that *Blain* anticipates and renders obvious element 1[d].

establishing, in the relational database, rules for processing the prepared information

425. *Blain* is a book on how to implement business rules to operate on a relational database system to calculate profit. Ex. 1006 at 323. *Blain* discloses that “***cost data are allocated according to rules*** which are under your control—there

need be no obscurity in how to interpret the analysis reports.” Ex. 1006 at 311. *Blain* describes implementing the CO-ABC Activity-Based Cost Accounting module as including a step to “[a]llocate, or set up rules to allocate, activity costs for both planned and actual data.” Ex. 1006 at 284. *Blain* also describes establishing rules to process information, describing:

Because all costs are based on unified posting and settlement rules in the SAP R/3 system, you can allocate costs from orders and projects to the various target objects using the same rules or rules that you have specified separately.

Ex. 1006 at 323.

426. Additionally, *Blain* discloses using standard rules or custom rules for distributing costs within the CO-Controlling module set, explaining that:

The CO-Controlling system distributes the planned values for the variable primary cost elements for the year. You can see the effects on costs of any fluctuations in planned activity levels. ***You can call for the fixed costs to be distributed using standard rules or your own rules.***

Ex. 1006 at 286. *Blain* continues to explain that:

Because all costs are based on unified posting and settlement rules in the SAP R/3 system, you can allocate costs from orders and projects to the various target objects using the same rules or rules you have specified separately.

Ex. 1006 at 299.

427. *Blain* also discloses using rules, for example, to convert currencies: “[t]he payment expressed in the system document currency will have been converted from the local currency at an exchange rate adopted by the system **according to the rules laid down for assigning the daily exchange rate.**” Ex. 1006 at 164. For the reasons above, *Blain* anticipates and renders obvious the step of “establishing, in the relational database, rules to process the prepared information” as recited in element 1[d].

providing information necessary to select objects

428. *Blain* also anticipates and renders obvious the step of “providing information necessary to select objects.” As described in the previous paragraph, SAP R/3’s use of SQL anticipates “providing information necessary to select objects” since SQL provides a mechanism to define the database tables and relationships, and methods for at least selecting objects.

429. In addition to using SQL, *Blain* discloses various methods of identifying data within the system, including several identification codes:

Complex Organizations and the Chart of Accounts

The chart of accounts has to include all the general ledger accounts in an accounting system. ***You can specify what transaction data goes where***, so that each account will contain all the required details for closing. Internal accounting will usually require that certain types of data be sent to each of the accounts that are used in the controlling functions.

There are two possibilities for using a common chart of accounts in a complex organization:

- You may have a centralized organization in which there is the maximum number of accounts at group level in a ***uniform chart of accounts that will apply to all company codes in the group***.
- You may be a decentralized organization in which ***each company code*** has its own chart of accounts.

In either case it is possible to use sample accounts taken from the ***reference system with transfer rules for***

individual company codes. This allows each company to have some flexibility while operating to a common chart of accounts.

Ex. 1006 at 203. In addition to the company codes used with established rules as referenced above, *Blain* discloses additional codes used for identifying cost allocation elements:

Variances are posted under the ***CO-ABC Activity-Based Cost Accounting system using the rules and procedures of direct cost allocation.*** The system specifies the ***allocation cost element by its identification code*** and by whether the value is fixed or variable on either sender or receiver object.

Ex. 1006 at 289. *Blain* describes the SAP R/3 data object structure as:

The Data Object Structure of the R/3 System

R/3 is object-oriented. The units which the SAP standard business functions are designed to handle are ***data objects which can be of any complexity.*** For example, ***a data object may comprise only an identification code number for the object and one field which contains the information of interest, a part number, for instance.***

Ex. 1006 at 89. *Blain* above explains that any data object may have identification codes and fields associated with the data object. *Blain* describes additional types of identifiers, disclosing that:

At the level of ***the client or the company code***, maintain general data valid for the whole organization, for example, ***material code numbers, multilingual text concerning each material code and classification rules applicable to material.***

Ex. 1006 at 356. Based on the various methods presented in *Blain* for “providing information necessary to select objects,” *Blain* anticipates and renders obvious the second step of element 1[d].

performing a profit calculus

430. *Blain* discloses methods for “performing a profit calculus” throughout the book. Ex. 1006 at 269-291, 308-318, 326-332. For example, *Blain* describes calculating profit based on established rules, explaining:

You can display a ***business-oriented profit and loss analysis***, because all the data objects that have a bearing on the computation of value added are represented in the analysis and can therefore be ***scrutinized down to the details of the individual transactions*** from which the data

are drawn. ***The cost data are allocated according to rules which are under your control***—there need be no obscurity in how to interpret the analysis reports.

Ex. 1006 at 311. *Blain* further describes the SAP R/3 CO-PA Profitability Analysis system as:

The R/3 CO-PA Profitability Analysis system uses the concept of key figures to ***define the lowest level at which it is possible to display the quantities, revenue, sales deductions and costs when you are carrying out a contribution margin calculation for a business segment.***

Ex. 1006 at 315. *Blain* describes performing a profit calculus by explaining that ***“[p]rofitability accounting requires that profit and loss be calculated on the basis of both full costs and marginal costs*** using contribution margin accounting.” Ex. 1006 at 309. Since *Blain* discloses each of the steps of element 1[d], *Blain* anticipates and renders obvious element 1[d].

431. As referenced in Section VII.A.1(v), element 1[d] was well-known in the art. In my opinion, the idea of using a relational database management system to establish rules to create, maintain, and analyze values stored in a relational database was the precise purpose for such a system. Using rules in a database to select information and calculate values would have been obvious to a POSITA at the

time of the invention. It is my opinion that it would have been obvious for a POSITA to combine the well-known elements of relational databases using rules to calculate profit with *Blain* to produce element 1[d]. Thus, *Blain* anticipates and renders obvious element 1[d].

1[e] using the relational database management system to independently calculate at least one marginal value of profit for each object being measured using the established rules as applied to a selected set of prepared information

432. *Blain* anticipates and renders obvious element 1[e]. Element 1[e] includes the steps of “using the relational database management system,” “to independently calculate,” “at least one marginal value of profit for each object being measured,” “using the established rules as applied to a selected set of prepared information.” *Blain*, as discussed in relation to element 1[b], discloses using a relational database management system to perform profit calculations. Ex. 1006 at 36-38, 54-55. *Blain* also discloses “using the established rules as applied to a selected set of prepared information” as discussed with respect to element 1[d]. Ex. 1006 at 57, 89, 283-299, 356.

433. *Blain* discloses to “independently calculate” profit values by describing that the “cost object could be an entity which is quite independent of any particular SAP application.” Ex. 1006 at 304. *Blain* further explains that the system

can process cost and profit information independently and automatically, explaining that:

The *system automatically updates a subtotal of a balance sheet account for every business transaction*, and reconciles the account subtotals and the line items to ensure that the financial information is always correct and always current.

Ex. 1006 at 221. *Blain* also describes a method for calculating profit values by distributing costs to a cost center using the:

Dynamic method—The amount to be distributed is automatically calculated by the system on the basis of the subtotals already recorded in the Extended General Ledger.

Ex. 1006 at 217. Based on the descriptions above, *Blain* anticipates and renders obvious “independently calculating” profit values.

434. *Blain* discloses calculating “at least one marginal value of profit for each object being measured.” As described in Section VII.A.1(vi), the ‘316 Patent describes calculating the marginal value of profit in many ways. The claims of the ‘316 Patent describe calculating the marginal value of profit as including the steps of “provisioning (P)” and/or “calculating net interest (NI), other revenue (OR),

and direct expense (DE).” Ex. 1001 at Claims 3, 4. That is to say, calculating at “least one marginal value of profit” is taught by disclosing any of

- 1) (P) provisioning
- 2) (NI) Net interest
- 3) (OR) Other revenue; or
- 4) (DE) Direct expense.

435. *Blain* discloses calculating “at least one marginal value of profit for each object being measured” by describing that:

In the service sector it is possible to have the system split the costs into fixed and variable components, which allows you to ***carry out marginal and absorption costing in parallel. Any point of view of output may be taken*** for the purpose of evaluating services rendered.

Ex. 1006 at 306. *Blain* above discloses that marginal costs and absorption costs can be calculated in parallel for any object. *Blain* further discloses that “procedures can be carried out as ***full or marginal costs*** and can direct a split into fixed and variable (*i.e.*, direct expense) components. The system provides formulas, formal specifications, texts and report characteristics.” Ex. 1006 at 286. *Blain* also explains that “[p]rofitability accounting requires that ***profit and loss be calculated on the basis of both full costs and marginal costs*** using contribution margin accounting.”

Ex. 1006 at 309. *Blain* further discloses the process of calculating contribution margin of a sales order, describing:

The sales order will be documented with a continuous comparison between planned and actual costs for the whole of its life. ***From this data a simultaneous calculation of contribution margin can be carried out and the results recorded*** on the sales order document.

Ex. 1006 at 302. In addition to calculating marginal profit values, *Blain* also describes the use of marginal profit calculations applied to any object in the SAP R/3 CO-PA Profitability Analysis module, explaining:

The R/3 CO-PA Profitability Analysis system uses the concept of key figures to define ***the lowest level at which it is possible to display the quantities, revenue, sales deductions and costs*** when you are carrying out a ***contribution margin calculation for a business segment***.

The system will offer lists of commonly used key figures as proposals for you to adopt or supplement by key figures of your own specification. ***These key figures can be set at any level of detail***.

Ex. 1006 at 315. Based on the disclosures above, *Blain* anticipates and renders obvious the step of calculating “at least one marginal value of profit for each object being measured,” and anticipates and renders obvious element 1[e].

436. In addition to disclosing calculating marginal values of profit generally, *Blain* discloses calculating at least provisioning (P) and direct expense (DE). Ex. 1006 at 207, 311-313, 1047-1053. For example, *Blain* discloses calculating provisioning including reserves for cost of complaints and sales deductions, reserves for imminent loss, and reserves for unrealized costs. *Blain* discloses calculating “sales deductions,” explaining that “the CO-PA Profitability Analysis system will then adjust the calculation for ***future estimates***.” Ex. 1006 at 313. *Blain* further explains reserves for sales deductions as:

Reserves for Costs of Complaints and Sales Deductions

Inventory cannot be created for certain costs, for example, costs arising under warranties or because of sales deductions. For such costs, ***results analysis creates reserves equal to the planned costs***. These reserves are then used when (and if) actual costs are incurred.

Ex. 1006 at 1058. *Blain* also discloses calculating “[s]pecific reserves set aside for doubtful accounts,” which describes a profit value adjustment for possible future outcomes. Ex. 1006 at 207. *Blain* also describes various provisions for future

outcomes, including “reserves for unrealized costs,” “reserves for the cost of complaints and commissions,” and “reserves for imminent loss.” Ex. 1006 at 1053.

437. *Blain* also discloses calculating direct expense (“DE”), which is considered by the ‘316 Patent to be at least one marginal value of profit. *Blain* discloses that direct costs are “[c]osts that are directly and fully identifiable with a reference object.” Ex. 1006 at 1047. *Blain* allocates direct costs to the objects that incur those costs, explaining that the “system uses additional postings to assign the **direct costs to other cost objects**, such as orders, processes, other cost objects and business segments.” Ex. 1006 at 311. *Blain*, in describing allocating direct costs to cost objects, anticipates and renders obvious calculating “at least one marginal value of profit for each object being measured,” and anticipates and renders obvious element 1[e].

438. As referenced in Section VII.A.1(vi), element 1[e] was well-known and routine in the art. *Blain* anticipates and renders obvious element 1[e], and it also would have been obvious for a POSITA to combine the well-known element of calculating marginal values of profit with *Blain* to produce element 1[e].

1[f]	combining the at least one marginal value of profit to create a measure for object level profitability.

439. *Blain* anticipates and renders obvious element 1[f]. The ‘316 Patent claims and specification define “marginal value of profit” as including at least one of net interest, other revenue, direct expense, provisioning, and/or indirect expense.

440. *Blain* discloses combining a marginal value of profit (*e.g.*, direct expenses):

Overhead Costing

Most common method in product cost accounting. Method as follows:

- ***Assign the direct costs to the cost object.***
- ***Apply the indirect (overhead) costs to the cost object in proportion to the direct costs, expressed as a percentage rate.***

Ex. 1006 at 1054. *Blain* above describes assigning direct costs and indirect costs to a cost object, anticipating and rendering obvious element 1[f]. *Blain* also describes combining marginal and absorption costing:

In the service sector it is possible to have the system split the costs into fixed and variable components, which allows you to ***carry out marginal and absorption costing in parallel. Any point of view of output may be taken*** for the purpose of evaluating services rendered.

Ex. 1006 at 306. *Blain* discloses another method for combining fully allocated costs and marginal costs in a concept called fixed cost absorption accounting, explaining:

Fixed Cost Absorption Accounting

Profitability accounting requires that profit and loss be calculated on the basis of both full costs and marginal costs using contribution margin accounting.

The ***actual costs can be assigned to the business segments*** en bloc or in proportion to sales. Therefore the fixed costs can be ***absorbed across several levels of the organization*** for each period.

When costs are assigned to user-defined business segments, they have usually been gathered from one or more cost centers. However, costs may have been assigned to orders so that they can be collected from the customers; these costs can also be taken into account. ***Direct costs can be assigned to any level of a business segment.***

Ex. 1006 at 309-310. Thus, *Blain* teaches “combining at least one marginal value of profit to create a measure for object level profitability.”

441. Further, *Blain* teaches that all costs and profit calculations can be measured at the cost/profit object. Ex.1006 at 278. *Blain* discloses that all revenues

and expenses “flows via the FI-GL General Ledger account to the appropriate cost or ***profit object***.” Ex. 1006 at 278.

442. As described in Section VII.A.1(vii), element 1[f] was well-known in the art. Ex. 1013 at 298-308. *Blain* anticipates and renders obvious element 1[f], and it would have been obvious to a POSITA to combine the calculation a marginal value of profit with *Blain* to render element 1[f] obvious.

443. Since *Blain* discloses all elements of Claim 1, it is my opinion that *Blain* anticipates and renders obvious Claim 1 of the ‘316 Patent.

2. Dependent Claim 2 is Anticipated and Obvious

2 **The process of Claim 1, wherein the relational database comprises a structured query language (SQL).**

444. I understand that Claim 2 depends from Claim 1, and that in order to disclose or render obvious this claim, each limitation of any base claim and any intervening claim must be met in addition to the instant claim limitation. It is my opinion that *Blain* renders this claim obvious and teaches this limitation.

445. *Blain* anticipates and renders obvious using relational databases with SQL. Ex. 1006 at 36, 57-58, 181, 1060. *Blain* discloses that “international standards have been embodied in the R/3 system” including “**SQL, Structured Query Language**, and ODBC, Open Data Base Connectivity, [that] are the **standards used for open data access to R/3 business data stored in relational**

databases.” Ex. 1006 at 36. *Blain* also describes integrating into SAP R/3 various relational databases that use SQL, including “Informix, Oracle, Software AG, [and] Sybase.” Ex. 1006 at 37; *see also* Ex. 1014 at 23. *Blain* explains that SAP R/3 uses an open system concept to interface with various databases using SQL, describing:

The standard adopted language for the definition of data and for its manipulation ***is the SQL, Structured Query Language. Any database that can interface according to this standard can be utilized by the R/3 system*** without the user needing to be aware of the detailed mechanisms of the database server.

Ex. 1006 at 57. Based on these disclosures, *Blain* anticipates and renders obvious Claim 2.

446. As discussed in Section VII.A.2(i), SQL was a well-known, routine and conventional technology used with relational databases. Ex. 1004 at 2-5. Simply using SQL with the teachings of *Blain* would have been obvious to a POSITA. Therefore, *Blain* anticipates and renders obvious Claim 2.

3. Dependent Claim 4 is Anticipated and Obvious

4	The process of Claim 1, wherein the step of calculating at least one marginal value of profit includes the step of provisioning (P) for the selected set of prepared information, provisioning being the expected profit value adjustment for future outcomes related to the object.

447. I understand that Claim 4 depends from Claim 1, and that in order to disclose or render obvious this claim, each limitation of any base claim and any intervening claim must be met in addition to the instant claim limitation. It is my opinion that *Blain* renders this claim obvious and teaches this limitation.

448. Claim 4 recites the steps of calculating at least one marginal value of profit including the step of “provisioning (P) for the selected set of prepared information,” where “provisioning being the expected profit value adjustment for future outcomes related to the object.” The ‘316 Patent also provides additional examples of what may be used to calculate provisioning, “such as: expected loss rates, reserve percentages, exposure factors, recovery rates, default probabilities and collection costs.”

449. Provisioning for future outcomes was an obvious technique that was a well-known, routine, and conventional practice in the finance and banking sectors. Ex. 1018 at 6-8, 10-11. The ‘316 Patent admits that the practice of provisioning is well-known in the financial industry, stating:

Provision — Adjusting current profit for expected future value changes is known as 'actuarial' provisioning. ***The***

technique is well known by the financial industry's accounting practice. DPM applies actuarial based methods in its object level profit calculations where the Provision pre-adjusts profit for contingent or known exposures to future profit.

Ex. 1001 at 9:49-55. Above, the '316 Patent discloses that the technique of provisioning was “well-known by the financial industry’s accounting practice,” meaning that it would have been obvious to a POSITA to calculate profitability using provisioning.

450. *Blain* discloses calculating provisioning including “sales deductions,” explaining that “the CO-PA Profitability Analysis system will then adjust the calculation for future estimates.” Ex. 1006 at 313. *Blain* also discloses calculating “[s]pecific reserves set aside for doubtful accounts,” which describes a profit value adjustment for possible future outcomes. Ex. 1006 at 207. *Blain* also describes various reserves for future outcomes, including “reserves for unrealized costs,” “reserves for the cost of complaints and commissions,” and “reserves for imminent loss.” Ex. 1006 at 1053. Based on these disclosures, *Blain* anticipates and renders obvious “provisioning (P) for the selected set of prepared information.”

451. It is my opinion, based on the information provided, that *Blain* anticipates and renders obvious Claim 4. As discussed in Section VII.A.2(iii), and

as disclosed by the ‘316 Patent itself, calculating a provision at an organizational, customer and product level was “well known by the financial industry's accounting practice” at the time of the invention. Ex. 1001 at 9:49-55; *see also* Ex. 1018 at 6-8, 10-11. It would have been obvious for a POSITA to combine the teachings of *Blain* with the well-known element of provisioning for future events to render Claim 4 obvious.

4. Dependent Claim 5 is Anticipated and Obvious

5 The process of Claim 1, including the step of calculating a profit adjustment value by calculating the value for indirect expense (IE) which is an apportioned profit value adjustment for all non-object related resource consumption.

452. I understand that Claim 5 depends from Claim 4, and that in order to disclose or render obvious this claim, each limitation of any base claim and any intervening claim must be met in addition to the instant claim limitation. It is my opinion that *Blain* renders this claim obvious and anticipates this limitation.

453. Claim 5 specifies that the “profit adjustment value” includes “calculating the value for indirect expense (IE), which is an apportioned profit value adjustment for all non-object related resource consumption.” The ‘316 patent describes calculating indirect expenses as “DPM's approach is to pool indirect costs and revenues and then apportion them,” and that “[a]ccountants refer to this profit measurement technique as ‘full allocation of profit.’” Ex. 1001 at 9:7-10. ‘316

Patent indicates that full allocation of profit using pooled indirect expenses were well-known, routine, and conventional for accountants at the time of the invention and therefore rendered obvious.

454. *Blain* discloses calculating indirect expenses as an apportioned profit value adjustment for all non-object related resource consumption. *Blain* describes indirect expenses as:

Indirect Costs

Costs for which one single receiving object cannot be directly and fully identified according to the cost-by-cause-principle; for example:

- ***Indirect expenses, such as building insurance***
- Indirect labor cost, such as supervisor wages
- Indirect materials cost, such as coolant cleaning materials

Ex. 1006 at 1050. In addition to disclosing calculating indirect costs, *Blain* discloses applying those costs to cost objects, describing:

Indirect Allocation of Costs to Non-Measurable Activities

The system has indirect cost allocation functions that you can use to ***allocate costs accurately to the objects which caused them***. You may be able to apply standard methods if you can derive an index of activity that can serve as a

quantity to which you can apply a rate. ***But the indirect allocation functions are available for when the most reasonable method is to assess costs and allocate them to their causes.***

Ex. 1006 at 287. *Blain* describes a method for allocating overhead indirect expenses as:

Overhead

Total cost of indirect expenses, indirect labor, indirect materials (indirect costs) ***allocated to cost objects*** by means of overhead rates.

Ex. 1006 at 1054. In describing methods of calculating indirect expenses as apportioned profit adjustments for non-object related costs, *Blain* anticipates and renders obvious Claim 5.

455. It is my opinion, based on the information provided, that *Blain* anticipates and renders obvious Claim 5. As discussed in Section VII.A.2(iv), calculating indirect expenses at an organizational, customer and product level was well-known in the art at the time of the invention, as indicated by the ‘316 Patent specification. Ex. 1001 at 9:7-10. It would have been obvious for a POSITA to combine the teachings of *Blain* with the well-known calculation of indirect expenses to render Claim 5 obvious.

5. Dependent Claim 25 is Anticipated and Obvious

25 The process of Claim 5, wherein the value for indirect expense (IE) is calculated as:

$$\text{before deferral } IE(o_i) = IE_k * \frac{F(IE_k)(o_i)}{\sum_{o_i \in O(IE)} F(IE_k)(o_i)}$$

added over each set IE_k to which o_i is related,

$$= \sum_k^{o \in O(IE)} \left(IE_k * \frac{F(IE_k)(o_i)}{\sum_{o_i \in O(IE)} F(IE_k)(o_j)} \right)$$

and each of these terms is deferred over its amortization period according to any of the amortization rules (cash, straight line, declining balance, or interest amortization calculations), and where $AM_1(L, R)$ is used to denote the amortization rule and its life:

$$IE(o_i) = \sum_k^{o_i \in O(IE)} AM_1(L, R) \left(IE_k * \frac{F(IE_k)(o_i)}{\sum_{o_i \in O(IE)} F(IE_k)(o_j)} \right),$$

and

the result increased by the amounts with remaining amortization life for which amortization was begun in earlier periods.

456. I understand that Claim 25 depends from Claim 5, and that in order to disclose or render obvious this claim, each limitation of any base claim and any intervening claim must be met in addition to the instant claim limitation. It is my opinion that *Blain* renders this claim obvious and teaches this limitation.

457. Claim 25 recites calculating the indirect expense as a summation of an amortization rule multiplied by the total indirect expense for a group of objects, apportioned for a particular object. The amortization rule can take many forms, including “cash, straight line, declining balance, or interest amortization calculations.”

458. The ‘316 Patent specification indicates the formula of Claim 25 was well-known, routine, and conventional in the art by stating that amortization:

is common to accrual accounting methods used in financial statement presentation and give rise to timing differences between cash flows and their related *profit as presented in a financial statement in any accounting period*. Since *DPM is designed to mirror a financial statement's profit* measure it must support deferral and accrual accounting principles. *Amortization methods are included in DPM to reflect these GAAP concepts.*

Ex. 1001 at 9:25-33. The ‘316 Patent above describes amortizing indirect expenses as obvious, well-known in accounting and finance as common to accrual accounting, and reflected by GAAP.

459. *Blain* discloses amortizing indirect expenses apportioned to objects. For example, *Blain* discloses a standard method within the SAP R/3 system, available to all cost objects, to amortize indirect expenses:

Planning Interest and the Amortization of Principal

Standard conditions of interest and amortization are made available by the system. You can call on them to be ***applied to a particular loan or group of loans*** for which you have established the amounts and the payment regime.

...

The plan of interest and amortization of principal will set out the following amounts and other features in a legal format acceptable in the country to which it will apply:

- Fixed or variable interest rate
- Prepayment or additional payment
- Term of loan
- ***Calculation of effective date of interest*** based on the payments according to the loan pricing regulations, or other procedures in cases of international securities trading

- Calculation of annuities or principal amounts
- ***Commission due for origination of the transaction***
- Currency arrangements

When ***a plan of interest and amortization of principal*** has been approved and the details are ***established in the SAP system***, there are several possibilities. The loan administrator can set up commands for automatic execution, or initiate online any of the following activities which can add value to the loan investment:

- ***Accrue interest to particular periods*** or other accounting subheading.
- Post interest automatically.
- Plan amounts by posting them to the appropriate control accounts in the Extended General Ledger.
- Revalue loans in one or more foreign currencies.
- Report balances using a flexible formatting system.
- ***Update the cash flow plan for interest and amortization of principal.***
- Print account statements.

Ex. 1006 at 255-256. Above, *Blain* discloses that amortization as a function is provided in SAP R/3, can be applied to any type of object including a loan. *Blain* later explains that this amortization function can also be applied to other types of securities and purchase orders. Ex. 1006 at 256. It is my opinion that *Blain's*

disclosures of amortizing indirect expenses, as demonstrated above, anticipate and render obvious Claim 25.

460. As discussed in Section VII.A.2(xii) and disclosed by the ‘316 Patent, calculating indirect costs by apportionment and amortization was well-known, routine, and conventional in the art at the time of the invention. Ex. 1001 at 9:25-33; *see also* Ex. 1013 at 27-29. In describing how to calculate indirect expenses for particular objects using amortization, *Blain* anticipates and renders obvious Claim 25. Further, it would have been obvious for a POSITA to combine the teachings of *Blain* with well-known calculation of indirect expenses to render Claim 25 obvious.

461. *Blain* teaches all of the elements in the claims above. To the extent that any element is alleged missing from *Blain*, it would have been obvious to a POSITA to use the well-known teachings in the prior art, discussed above (VII.A), to meet those elements in implementing the system of *Blain*. Moreover, a POSITA reading the various teachings and examples of *Blain* would at once envisage the claimed arrangements of the challenged claims. I understand that “a reference can anticipate a claim even if it ‘d[oes] not expressly spell out’ all the limitations arranged or combined as in the claim, if a person of skill in the art, reading the reference, would ‘at once envisage’ the claimed arrangement or

combination." *Blue Calypso LLC v. Groupon, Inc.*, 815 F.3d 1331, 1334 (Fed. Cir. 2016) (internal references omitted). I also understand that “reference need not always include an express discussion of the actual combination to anticipate” and “a reference may still anticipate if that reference teaches that the disclosed components or functionalities may be combined and one of skill in the art would be able to implement the combination.” *Id.* Here, it would also be obvious to combine the various teachings and examples of *Blain* set forth above, as they are all discussed in the single reference and described as desirable approaches. A POSITA would be motivated to implement the teachings therein in accordance with the examples discussed in *Blain*, and would expect success in carrying out that implementation in view of *Blain*’s express teachings, suggestions and motivations set forth above. It would be common sense when implementing *Blain*’s teachings to try utilizing the approaches set forth in *Blain*’s example implementations.

D. Claims 1-6 and 8 are Anticipated and Rendered Obvious by SAP-IS-B

1. Independent Claim 1 is Anticipated and Obvious

Independent claim 1 recites:

1. A process for determining object level profitability in a relational database management system, comprising the computer implemented steps of:

providing a computerized profit database having profit information;

providing a relational database management system operable in association with the computerized profit database;

preparing the profit information to be accessed electronically through the relational database management system, including the step of calculating opportunity values for funds used or supplied by each object being measured;

establishing, in the relational database, rules for processing the prepared information, including the steps of providing information necessary to select objects and performing a profit calculus;

using the relational database management system to independently calculate at least one marginal value of profit for each object being measured using the established rules as applied to a selected set of prepared information; and

combining the at least one marginal value of to create a measure for object level profitability.

462. I understand that independent Claim 1 includes a preamble that recites “a process for determining object level profitability in a relational database management system.” I note that *SAP-IS-B* teaches a “process” for calculating object level profitability using an RDBMS and a plurality of different profit calculation methods. Ex. 1007 at 6-13, 57-66. *SAP-IS-B* discloses using the IS-B module with a computerized profit database with various methods for gathering and processing the profit information. Ex. 1007 at 31-32. In addition to teaching gathering data into a profit database, *SAP-IS-B* teaches transforming that data to provide a “Bank Profitability analysis separately per cost element or cost center” within the system. Ex. 1007 at 13. Accordingly, it is my opinion that *SAP-IS-B* anticipates and renders obvious the preamble of Claim 1.

463. *SAP-IS-B* anticipates and renders obvious all elements of Claim 1. *SAP-IS-B* is a reference created by SAP AG to provide functional details on integration and implementation of the new Industry Solution for Banks (IS-B) with SAP R/3. The IS-B is fully integrated with the general SAP R/3 product, and allows a user to integrate “IS-B with both existing banking systems and already implemented SAP R/2 and R/3 applications.” Ex. 1007 at 6. The IS-B module focuses on regulatory reporting, financial transactions, single transaction costing for bank profitability analysis, and risk management. The IS-B module integrates with

a database (*i.e.*, data pool) to access cost, revenue, profit, and other information to perform bank profitability analysis. Ex. 1007 at 7-8.

464. *SAP-IS-B* discloses that the IS-B module, and the overall SAP R/3 solution, is “based on relational database technology.” Ex. 1007 at 21. *SAP-IS-B* discloses storing, in the database, cost and revenue information for each transaction, information needed to identify the bank’s organizational structure, product catalog, costing rules, regulatory reporting rules, financial term types, interim profit calculations, and other information. Ex. 1007 at 27-33. *SAP-IS-B* discloses calculating opportunity values for each transaction, and allocating those transaction costs to products, customers, organizational unit (profit center), and/or other objects of measurement. Ex. 1007 at 42. *SAP-IS-B* discloses calculating marginal values of profit, including net interest income, other revenue (*e.g.*, commission income), direct costs, and provisioning (*e.g.*, minimum reserve costs, risk costs, deposit protection costs). Ex. 1007 at 55-64. *SAP-IS-B* also discloses calculating indirect costs. Ex. 1007 at 63. Finally, *SAP-IS-B* discloses combining the marginal values of profit in the following figure:

Interest income					
- Opportunity income					
= Interest terms contribution - active					
+ Commission income					
- Commission costs					
= Commission contribution (subtotal)					
= Contribution margin I					
- Standard unit costs					
- Standard cancellation costs					
- Equity capital costs					
= Contribution margin II					
- Indirect costs					
= Contribution margin III = market result					

Interest Income/Expense
± Opportunity Values (COF/VOF)
(± Equity Capital Costs)
Net Interest

+ Other Revenue

- Direct Expenses

- Direct Expenses

- Provisioning

- Indirect Expenses

Ex. 1007 at 63(emphasis added). The figure above depicts calculating multiple marginal values of profit by calculating:

- net interest (*i.e.*, Interest Income, Opportunity Income, Equity Capital Costs),
- other revenue (*i.e.*, Commission Income),
- direct expense (*i.e.*, Commission costs, Standard unit costs), and
- provisioning (*i.e.*, Standard Cancellation Costs).

with

- a profit adjustment value, which are the indirect expenses (*i.e.*, Indirect Costs),

to create

- a measure of object level profitability (*i.e.*, “market result”).

Net interest, in the figure above, is calculated by taking interest income and adjusting for the opportunity income and equity capital costs. Thus, *SAP-IS-B* anticipates and renders obvious Claim 1.

1[a] providing a computerized profit database having profit information

465. It is my opinion that *SAP-IS-B* anticipates and renders obvious element 1[a]. As explained in Section V.A, the “profit information” stored in the “computerized profit database” is described by the ‘316 Patent as “financial and/or non-financial data related to calculating profit.” Ex. 1001 at 6:50. The computerized profit database is simply a database that stores “financial and/or non-financial data related to calculating profit.”

466. *SAP-IS-B* teaches storing financial and non-financial data in a computerized profit database. Ex. 1007 at 7, 13, 16, 19, 21, 57-60, 88. *SAP-IS-B* explains that “[t]he standard R/3 System architecture consists of a three-tier hierarchy” including “a host (database server) for carrying out all functions requiring access to the database.” Ex. 1007 at 19. *SAP-IS-B* further explains the use of databases:

IS-B is an R/3 solution for client/server architectures based on relational database technology. The system is ideally implemented in conjunction with other SAP

applications, but can also be implemented as a stand-alone system. IS-B has been created as a decentralized bolt-on system and ***has its own databases in the form of a data pool, which is supplied with the necessary information from central R/2 or R/3 systems or from other systems implemented by the bank.***

Ex. 1007 at 21. Above, *SAP-IS-B* describes its use of relational database technology, in the form of a data pool, which gathers information from the central R/3 system or other bank data systems. *SAP-IS-B* further describes the types of information stored in the data pool, explaining that “[t]he database for IS-B is a data pool used by all components, which are fed with transaction data via an interface to the bank’s operational systems.” Ex. 1007 at 7. This transaction data that is stored in the IS-B data pool constitutes financial information that is used for profitability analysis. Ex. 1007 at 32-37.

467. In addition to storing the transaction data in the database, *SAP-IS-B* explains that “***the data pool contains master and transaction data*** which is needed for costing, regulatory reporting and risk management.” Ex. 1007 at 35. Master data includes information on banking transaction master records, business partners, stock classes, business partner accounts, and financial terms. Ex. 1007 at 35. Transaction data “consists of single items of information which refer to specific

transactions” including account items, commercial transactions, individual purchases and sales, and cash flows. Ex. 1007 at 35. *SAP-IS-B*’s storage and use of master data and transaction data constitutes providing financial and non-financial data used for calculating profitability. *SAP-IS-B* also discloses the computerized nature of the system, explaining that “the R/3 System has an open architecture which means that IS-B can be implemented in a large number of different hardware and software environments.” Ex. 1007 at 20. Thus, *SAP-IS-B* anticipates and renders obvious element 1[a].

468. *SAP-IS-B* doesn’t just store financial and non-financial information used for profitability calculations in a database; *SAP-IS-B* also discloses storing calculated profit values themselves in the database. For example, *SAP-IS-B* discloses storing accumulated totals records:

Profitability segments are the smallest reporting units and therefore form the basis for Bank Profitability Analysis.
You assign each profitability segment a certain combination of characteristics (or criteria) for reporting (e.g. customer group, product, risk class, branch). A totals record containing the accumulated period values is kept for each profitability segment.

Ex. 1007 at 60. *SAP-IS-B* further describes storing profitability calculations, in relation to calculating backdated transactions, explaining that “profitability analysis results for the affected period are available in the data pool (as line items per single transaction/single position).” Ex. 1007 at 44. Thus, *SAP-IS-B* anticipates and renders obvious element 1[a].

469. As discussed in Section VII.A.1(ii), element 1[a] was well-known in the art. It is my opinion that it would have been routine and conventional for a POSITA to use a computerized profit database when calculating profit values for an organization. Further, it is my opinion that it would have been obvious for a POSITA to combine the teachings of *SAP-IS-B* with the well-known concept of a computerized profit database to render element 1[a] obvious.

1[b] providing a relational database management system operable in association with the computerized profit database

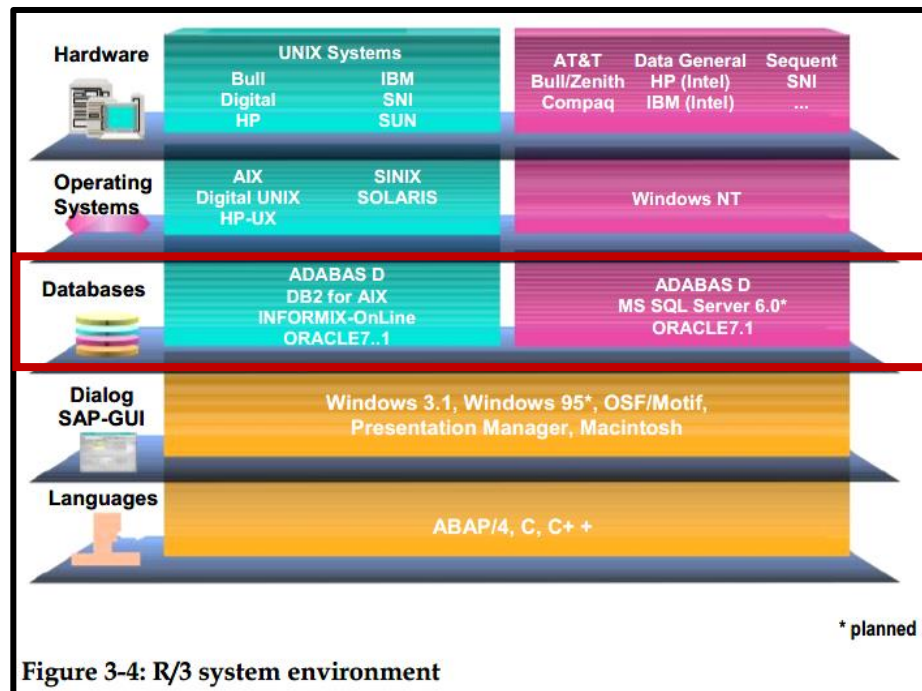
470. It is my opinion that *SAP-IS-B* anticipates and renders obvious element 1[b]. Ex. 1007 at 19-24. For example, *SAP-IS-B* explains that “R/3 is characterized by its client/server architecture, *relational databases* and graphical user interface.” Ex. 1007 at 6. *SAP-IS-B* further explains that:

IS-B is an R/3 solution for client/server architectures based on relational database technology. The system is ideally implemented in conjunction with other SAP

applications, but can also be implemented as a stand-alone system. IS-B has been created as a decentralized bolt-on system and *has its own databases in the form of a data pool, which is supplied with the necessary information from central R/2 or R/3 systems or from other systems implemented by the bank.*

Ex. 1007 at 21. Above, *SAP-IS-B* describes its use of relational database technology, in the form of a data pool, that uses information from (*i.e.*, is operable in association with) the central R/3 system or other bank data systems. *SAP-IS-B* also discloses an RDBMS by explaining that the SAP R/3 system comprises “a host (database server) for carrying out all functions requiring access to the database.” Ex. 1007 at 19. *SAP-IS-B* is describing an RDBMS when it describes a database server, hosting a relational database instance, to carry out the functions of accessing the database.

471. Additionally, *SAP-IS-B* depicts the integration of several well-known relational database management systems into their overall solution in the following figure:



Ex. 1007 at 23. Figure 3-4 above discloses the use of DB2, Oracle, and MS SQL Server as databases that may be used with SAP R/3. Each of DB2, Oracle, and MS SQL Server were well-known RDBMSs at the time of the Invention. Ex. 1014 at 24. For these reasons, *SAP-IS-B* anticipates and renders obvious element 1[b].

472. As referenced in Section VII.A.1[b], element 1[b] was well-known and conventional in the art. It is my opinion that it would have been obvious to a POSITA to combine the conventional technology of an RDBMS with a profit database. It would have been obvious for a POSITA to also combine the well-known technology of an RDBMS with the teachings of *SAP-IS-B* to render element 1[b] obvious. In my opinion, element 1[b] is anticipated and rendered obvious by *SAP-IS-B*.

1[c] preparing the profit information to be accessed electronically through the relational database management system, including the step of calculating opportunity values for funds used or supplied by each object being measured

473. It is my opinion that *SAP-IS-B* anticipates, and renders obvious, element 1[c].

preparing the profit information to be accessed electronically through the relational database management system

474. As discussed in relation to element 1[b], *SAP-IS-B* discloses the step of accessing profit information through the relational database. VII.A.1(iii). *SAP-IS-B* further describes the initial process of preparing data to be processed for profitability analysis, explaining:

When IS-B is implemented, the system is customized using general control parameters. *This process of adapting the system to the requirements of the user (named ‘customizing’ by SAP) primarily consists of setting up basic data.* This basic data includes the following:

- bank’s organizational structure
- *characteristics and value fields of operating concern*
- product catalog

- *costing rules*
- regulatory reporting rules
- risk management rules
- money and capital market table and
- financial terms types.

Ex. 1007 at 27. In addition to describing the setup of basic data for processing information, *SAP-IS-B* describes transferring data from external sources using mapping rules to process information as:

User-defined data structures in the operational banking systems (sender structures) are entered in the SAP Repository as part of the configuration process. The individual fields in these sender structures are then mapped to the SAP receiver structures.

Data transfer involves two stages:

- First stage

You maintain the mapping rules for transferring data from the sender to the receiver system within customizing. The corresponding transfer programs are generated based on your entries.

- Second stage

The actual physical transfer of data is carried out by the system at regular, user-defined, intervals. To do this, the system:

- selects data from the source system
- transfers the selected data to the IS-B system
- *converts data from the sender structure into the receiver structure*
- *processes the records in IS-B*
- *saving checked data*
- logging
- error handling
- *subsequent processing*

Ex. 1007 at 38. Above, *SAP-IS-B* describes the process of preparing financial and non-financial information for profitability calculations to be accessed electronically through the SAP Repository (*i.e.*, an RDBMS). Thus, *SAP-IS-B* anticipates and renders obvious the step of element 1[c] of “preparing the profit information to be accessed electronically through the relational database management system.”

calculating opportunity values for funds used or supplied

475. *SAP-IS-B* also anticipates and renders obvious the second step of element 1[c] of “calculating opportunity values for funds used or supplied.” As

discussed in Section VII.A.1(iv), “opportunity values” includes at least “funds transfer pricing” within the scope of the ‘316 Patent. Claim element 1[c] recites calculating “opportunity values for funds used or supplied” and Claim 8 defines calculating opportunity values as calculating “matched maturity funds transfer pricing.” The only other reference to “opportunity” within the ‘316 Patent is in describing that “DPM's *funds transfer pricing method uses maturity opportunity rates* used in valuing each object's marginal use or source of internal funds.” Ex. 1001 at 7:61-64. Accordingly, although “opportunity values” are not expressly defined, I understand that “calculating opportunity values,” as described by Claim 1, is satisfied at least by calculating “funds transfer pricing.”

476. SAP-IS-B discloses calculating opportunity values using funds transfer pricing using the concept of opportunity interest, which SAP-IS-B defines as:

Opportunity interest

The effective interest rate of the alternative transaction on the money and capital market. *A market rate approach to transfer pricing compares the opportunity interest rate with the rate of the customer transaction.*

Ex. 1007 at 89. SAP-IS-B further explains methods of calculating opportunity interest as:

Opportunity Interest

In case of transactions with the cash flow, ***the determination of the opportunity interest rate is congruent with the structure*** (see the example below of the interest conditions contribution).

In case of transactions without the cash flow, ***the user can select one of the six different procedures:***

- a fixed money and capital market rate is assigned to the single transaction for the entire term
- a fixed money and capital market rate is assigned ***in each case to the single transaction for the period of interest calculation***
- a money and capital market term is allocated to the individual transaction, and the interest rate is adjusted on a daily basis
- ***a money and capital market term is allocated to the individual transaction, and the amount of the opportunity interest rate from the averaging process over a historical period***

- an alternative interest rate is assigned to a single transaction, which consists of the weighted total of several money and capital market rates as at the costing key date
- an alternative interest rate is assigned to a single transaction, which is based on the weighted fixed volume shares with an average interest rate of a money and capital market term.

The money and capital market table contains the interest rates which are used to determine the opportunity interest rate.

Ex. 1007 at 48. *SAP-IS-B* discloses calculating opportunity interest using various methods, including using matched maturity funds transfer pricing and a market rate approach to transfer pricing.

477. *SAP-IS-B* further describes the market rate approach to transfer pricing as:

Market rate approach to transfer pricing

Used in *IS-B* to calculate the interest margin for interest-related business. Each single transaction is set against an alternative transaction on the money and capital market.

The difference between the customer interest rate and the market interest rate (opportunity rate) based on volume, represents the interest terms contribution to transaction cost or value.

Ex. 1007 at 88. SAP-IS-B further describes the market rate approach to transfer pricing, as used in interest margin calculations, as:

The interest margin displayed as the interest terms contribution based on a market rate approach to transfer pricing, only takes into account the net interest income resulting from the terms agreed with the customer. The transformation result reflects the portion of the net interest income which can be traced back to the differing fixed-interest periods and interest rate levels of the transactions.

Ex. 1007 at 91. SAP-IS-B further describes the transformation result in the paragraph above as including all items on the asset and liability side, describing the maturity transformation result:

Maturity transformation result

Calculated by ***offsetting the weighted opportunity interest for all items on the asset side*** (according to the yield curve

on the money and capital market for the local currency)
with the weighted opportunity interest for all items on the liability side. A prerequisite for the calculation is that ***opportunity interest is calculated for all balance sheet items*** including interest-free items such as buildings, land, ***equity capital***, provisions etc.

Ex. 1007 at 89. By describing using weighted opportunity interest values for all asset and liability items, *SAP-IS-B* anticipates and renders obvious “calculating opportunity values for funds used or supplied.”

calculating opportunity values for ... each object being measured

478. *SAP-IS-B* anticipates and renders obvious the final step of element 1[c] of “calculating opportunity values for . . . each object being measured.” Specifically, *SAP-IS-B* discloses calculating opportunity values for all asset and liability items on the balance sheet, explaining:

Maturity transformation result

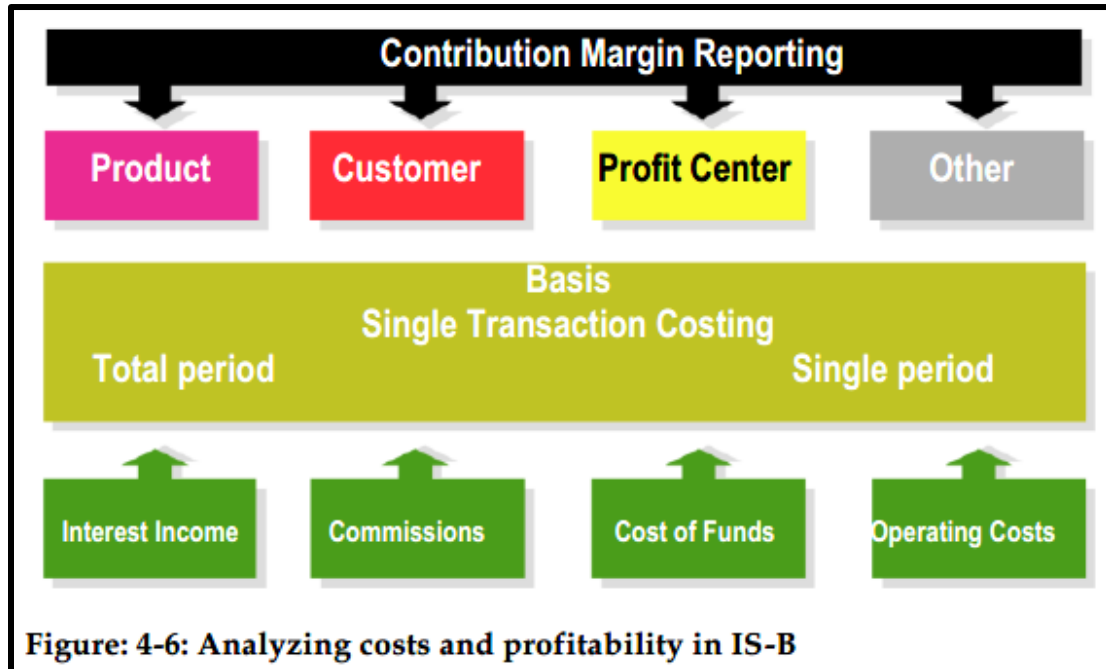
Calculated by ***offsetting the weighted opportunity interest for all items on the asset side*** (according to the yield curve on the money and capital market for the local currency) ***with the weighted opportunity interest for all items on the liability side.*** A prerequisite for the calculation is that

opportunity interest is calculated for all balance sheet

items including interest-free items such as buildings, land,

equity capital, provisions etc.

Ex. 1007 at 89. Additionally, *SAP-IS-B* discloses assigning all costs and revenue (including opportunity interest rates) to “various criteria within profitability analysis” including “product, customer, [and] organization unit (profit center).” Ex. 1007 at 42. This concept is depicted by *SAP-IS-B* in the figure below:



Ex. 1007 at 42. Figure 4-6 depicts calculating opportunity values (*e.g.*, cost of funds) for each transaction and presenting the reporting of profitability for the aggregated transactions by object (*i.e.*, Product, Customer, Profit Center, Other). Since the ‘316 Patent explains that opportunity values include at least funds transfer pricing, and

since calculating cost of funds is a transfer pricing calculation, *SAP-IS-B* discloses calculating opportunity values per transaction.

479. As referenced in Section VII.A.1(iv), element 1[c] was well-known and routine in the art and is therefore rendered obvious. Ex. 1013 at 904-912. *SAP-IS-B* anticipates and renders obvious preparing profit information using a relational database and calculating opportunity values for resources used or supplied by any profit object.

1[d] establishing, in the relational database, rules for processing the prepared information, including the steps of providing information necessary to select objects and performing a profit calculus

480. It is my opinion that *SAP-IS-B* anticipates and renders obvious element 1[d].

establishing, in the relational database, rules for processing the prepared information

481. *SAP-IS-B* is a reference on how to implement banking business rules to operate on a relational database system to provide bank profitability analysis. Ex. 1007 at 6-12, 17-23. *SAP-IS-B* describes the types of rules established within the system for processing information and calculating profitability as:

When IS-B is implemented, the system is customized using general control parameters. This process of adapting the system to the requirements of the user (named

‘customizing’ by SAP) primarily consists of setting up basic data. This basic data includes the following:

- bank’s organizational structure
- characteristics and value fields of operating concern
- product catalog
- *costing rules*
- *regulatory reporting rules*
- *risk management rules*
- money and capital market table and
- financial terms types

Ex. 1007 at 27. *SAP-IS-B*, above, describes setting up costing rules, regulatory reporting rules, and risk management rules during the initial system setup. *SAP-IS-B* depicts the use of these rules in the following figure:

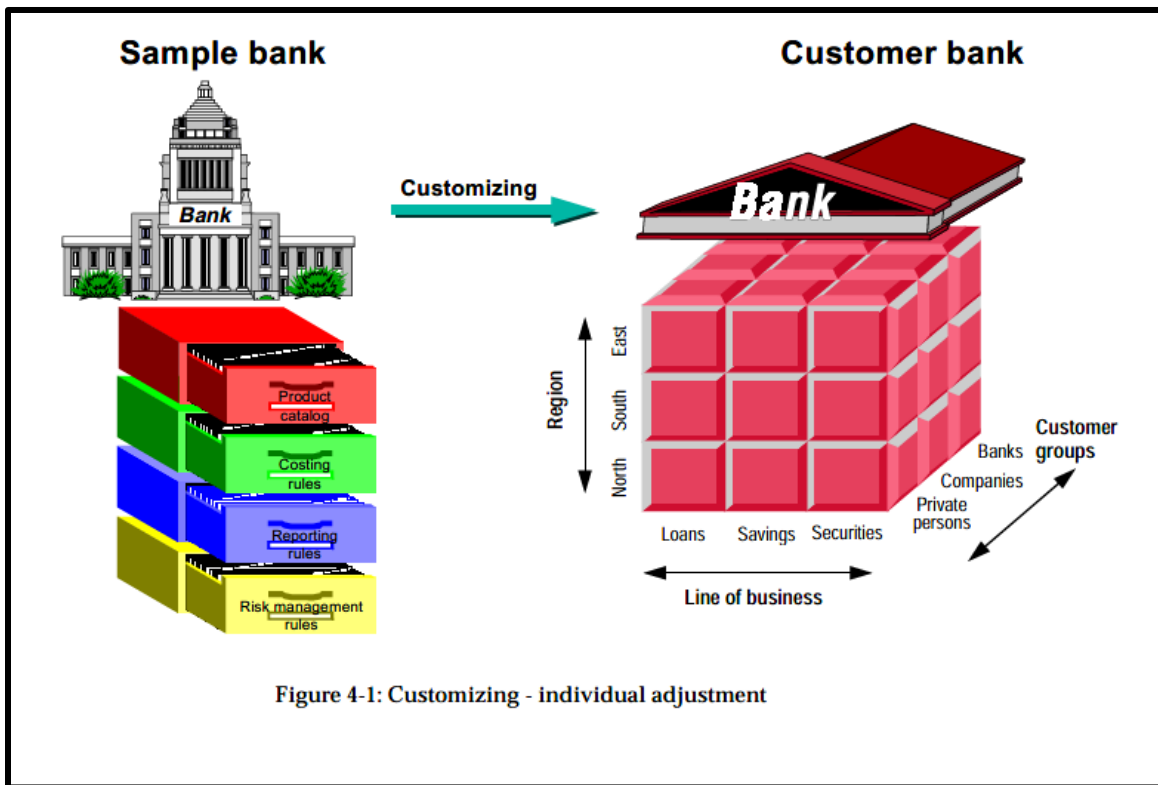


Figure 4-1: Customizing - individual adjustment

Ex. 1007 at 27. *SAP-IS-B* further describes how to use, for example, the costing rules as:

Costing Rule

User-defined costing rules and costing methods defined within customizing form the basis for costing. The customizing involved includes specifying the costing components (risk costs, interest terms contribution) for a single transaction, as well as the costing methods which are to be used. A costing rule is then assigned to each user-defined bank product. The product category of a

single transaction thus determines which costing components will be calculated by which method.

Ex. 1007 at 32.

482. Additionally, *SAP-IS-B* describes establishing rules in the database for data imported for processing or exported for reporting. Ex. 1007 at 57-66. For example, *SAP-IS-B* describes mapping rules for data transferred to or from external regulatory reporting systems as:

Conversion Rule

The conversion rules for mapping sender to receiver structures are ***maintained by the user within customizing.***

The ***rules support the conversion of data structures*** from the external (operational) systems to the IS-B data structures.

Ex. 1007 at 87. *SAP-IS-B* also teaches that:

Customizing

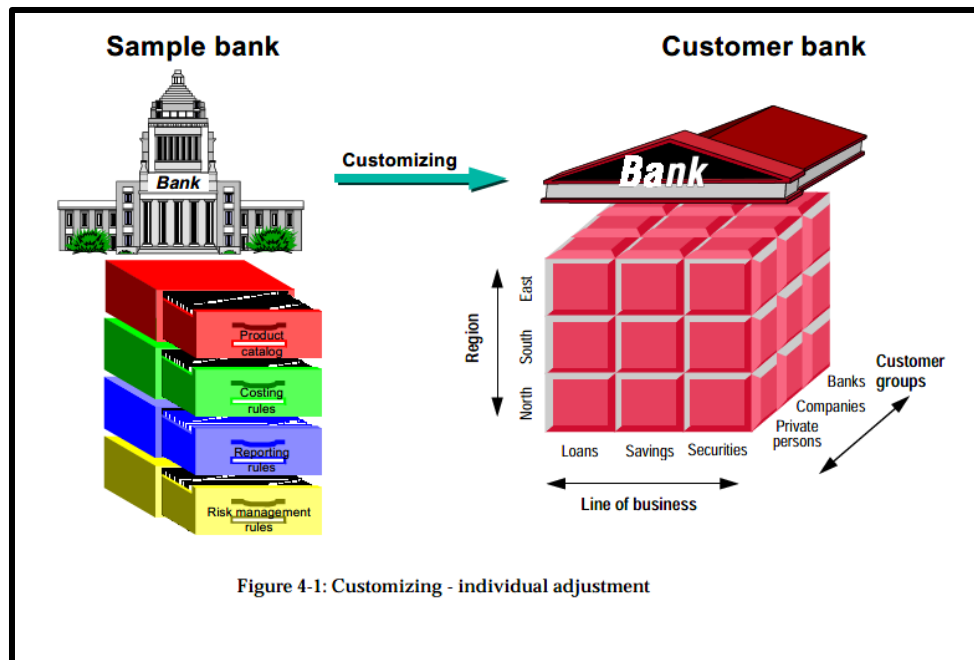
Within IS-B, customizing (or configuration) involves the adjustment (***parametrization***) of the standard sample ***bank model*** provided as part of the IS-B System. The ***system is customized per installation so that it meets the individual requirements of the respective bank.*** The aim

is to align the internal business processes of the bank and the pre-defined structures of the R/3 System.

Ex. 1007 at 87. For the reasons above, *SAP-IS-B* anticipates and renders obvious the step of “establishing, in the relational database, rules to process the prepared information” as recited in element 1[d].

providing information necessary to select objects

483. *SAP-IS-B* also anticipates and renders obvious the step of “providing information necessary to select objects.” *SAP-IS-B*’s use of a relational database management system anticipates “providing information necessary to select objects” since the system provides a mechanism to define the database tables and relationships, and methods for at least selecting objects. In order to display profitability of an object, *SAP-IS-B* must have information necessary (*e.g.*, number assignments, matchcodes) to select the object. Ex. 1007 at 75-78. *SAP-IS-B* also depicts the use of rules (*e.g.*, costing rules, reporting rules, risk management rules) to drive calculations for various objects (*e.g.*, region, line of business, customer group) in the following figure:



Ex. 1007 at 27. In the figure above, *SAP-IS-B* depicts using rules (e.g., costing rules, reporting rules, risk management rules) to identify and measure/track elements in the organizational structure as objects (e.g., Region, Line of business, Customer groups).

484. *SAP-IS-B* also describes the ability of the system to calculate profitability based on different objects, and allowing the user to customize the evaluation of data per object and to view reporting for different objects as:

Evaluations for controlling are defined and carried out by the Bank Profit-ability Analysis system. The values for a single transaction (line item), which are *the result of applying a costing method within Single Transaction Costing* or which you have entered directly into the

system, are collated per reporting period, ***summarized and issued in user-defined reporting structures***. IS-B provides a dialog-based flexible reporting system (interactive reporting) for evaluating the data within Bank Profitability Analysis.

Profitability segments are the smallest reporting units and therefore form the basis for Bank Profitability Analysis. You assign each profitability segment a certain ***combination of characteristics (or criteria) for reporting (e.g. customer group, product, risk class, branch)***. A totals record containing the accumulated period values is kept for each profitability segment.

...

This means that you can ***directly assign those revenues and costs which cannot be assigned to single transactions to profitability segments***. You can carry out the assignment itself on a step-by-step basis progressing through your ***profitability segment hierarchy***.

Ex. 1007 at 60. In addition to the profitability reporting selection and customization described above, *SAP-IS-B* explains that the “data pool contains master and

transaction data,” where master data includes information on “banking transaction master records, business partners, stock classes, business partner accounts, [and] financial terms,” and transaction data includes “account items, commercial transactions, individual purchases and sales, [and] cash flows.” Ex. 1007 at 35. This data allows the system to select objects and allocate profitability calculations to objects (*e.g.*, customer group, product group). Ex. 1007 at 36. Based on the various methods presented in *SAP-IS-B* for “providing information necessary to select objects,” *SAP-IS-B* anticipates and renders obvious the second step of element 1[d].

performing a profit calculus

485. *SAP-IS-B* discloses methods for “performing a profit calculus” throughout the reference. Ex. 1007 at 14, 31-33, 40-44, 58-65. *SAP-IS-B* explains that the “Bank Profitability Analysis” is performed for any “customer group, product, risk class, branch” based on user-assigned rules. Ex.1007 at 57-60. For example, SAP R/3 describes the ability of the system to calculate profitability for different objects using customized rules as:

Evaluations for controlling are defined and carried out by the Bank Profitability Analysis system. The values for a single transaction (line item), which are ***the result of applying a costing method within Single Transaction Costing*** or which you have entered directly into the

system, are collated per reporting period, ***summarized and issued in user-defined reporting structures***. IS-B provides a dialog-based flexible reporting system (interactive reporting) for evaluating the data within Bank Profitability Analysis.

Profitability segments are the smallest reporting units and therefore form the basis for Bank Profitability Analysis. ***You assign each profitability segment a certain combination of characteristics (or criteria) for reporting (e.g. customer group, product, risk class, branch)***. A totals record containing the accumulated period values is kept for each profitability segment.

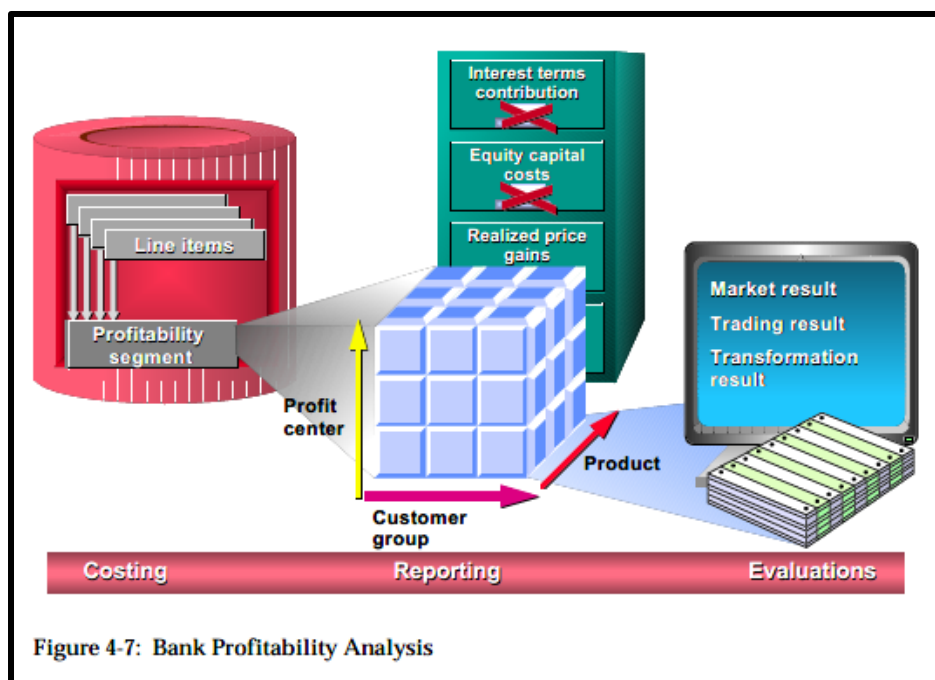
...

This means that you can directly assign those revenues and costs which cannot be assigned to single transactions to profitability segments. You can carry out the assignment itself on a step-by-step basis progressing through your profitability segment hierarchy.

Ex. 1007 at 60. *SAP-IS-B* further describes the evaluation of profitability reports as:

The summarized reporting values of an evaluation can be traced back to profitability segments or line items, provided these still exist (“drill-down”). Via interactive analysis, you can freely navigate within a selected ‘data matrix’ (e.g. breakdown data, change the data hierarchy etc.). The system also supports search strategies which you can change to suit your requirements and which allow you to access all available key values and ratios. You define the analysis path when you define the report. You can, however, also change the analysis path within the selected “data matrix”; e.g. move from an analysis of the result of branch X according to customer groups and the product group “loans”, to an analysis of the customer group “private customers” for product groups across all branches. It is also possible to limit the analysis to one product group, such as “advances on current accounts”.

Ex. 1007 at 61. The concept of calculating profitability per object is also depicted by SAP-IS-B in the figure below:



Ex. 1007 at 60. Figure 4-7 depicts calculating and reporting the profitability of the aggregated transactions per object (*e.g.*, product, customer group, profit center). Since *SAP-IS-B* discloses each of the steps of element 1[d], *SAP-IS-B* anticipates and renders obvious element 1[d].

486. As referenced in Section VII.A.1(v), element 1[d] was well-known in the art. In my opinion, the idea of using a relational database management system to establish rules to create, maintain, and analyze values stored in a relational database was the precise purpose for such a system. Using rules in a database to select information and calculate values would have been obvious to a POSITA at the time of the invention. It is my opinion that it would have been obvious for a POSITA to combine the well-known elements of relational databases using rules to calculate

profit with *SAP-IS-B* to produce element 1[d]. Thus, *SAP-IS-B* anticipates and renders obvious element 1[d].

1[e] using the relational database management system to independently calculate at least one marginal value of profit for each object being measured using the established rules as applied to a selected set of prepared information

487. *SAP-IS-B* anticipates and renders obvious element 1[e]. Element 1[e] includes the steps of “using the relational database management system,” “to independently calculate,” “at least one marginal value of profit for each object being measured,” “using the established rules as applied to a selected set of prepared information.” *SAP-IS-B*, as discussed in relation to element 1[b], discloses using a relational database management system to perform profit calculations. Ex. 1007 at 6-15, 19-24. *SAP-IS-B* also discloses “using the established rules as applied to a selected set of prepared information” as discussed with respect to element 1[d]. Ex. 1007 at 6-15, 27-32.

488. *SAP-IS-B* discloses to “independently calculate” marginal values of profit “for each object being measured” by describing that the “all selected costing methods are analyzed simultaneously; IS-B then issues a list of relevant fields, sorted according to tables.” Ex. 1007 at 36. *SAP-IS-B* further describes the benefits of separating costs and allocating cost elements independently as:

You can *transfer costs to Bank Profitability Analysis separately per cost element or cost center*. The advantage of *dividing costs into cost elements is that you can then display costs such as personnel and energy costs separately within Profitability Analysis*. Similarly, by *dividing costs into cost centers* you can *display distribution and administration costs separately*.

Ex. 1007 at 13. Additionally, in reference to SAP R/3's Cost Accounting module, *SAP-IS-B* discloses that “[w]ithin the Cost Accounting module, various cost accounting systems can run in parallel.” Ex. 1007 at 10. Based on the descriptions above, *SAP-IS-B* anticipates and renders obvious “independently calculating” profit values.

489. *SAP-IS-B* discloses calculating “at least one marginal value of profit for each object being measured.” As described in Section VII.A.1(vi), the ‘316 Patent describes calculating the marginal value of profit in many ways. The claims of the ‘316 Patent describe calculating the marginal value of profit as including the steps of “provisioning (P)” and/or “calculating net interest (NI), other revenue (OR), and direct expense (DE).” Ex. 1001 at Claims 3, 4. That is to say, calculating at “least one marginal value of profit” is taught by disclosing **any of**

1) (P) provisioning

- 2) (NI) Net interest
- 3) (OR) Other revenue; or
- 4) (DE) Direct expense.

490. *SAP-IS-B* discloses calculating “at least one marginal value of profit for each object being measured” by describing that “[t]he reports are based on the values from single transaction costing and on the revenues and costs which are directly assigned to profitability segments.” Ex. 1007 at 59-62. *SAP-IS-B* depicts this calculation as:

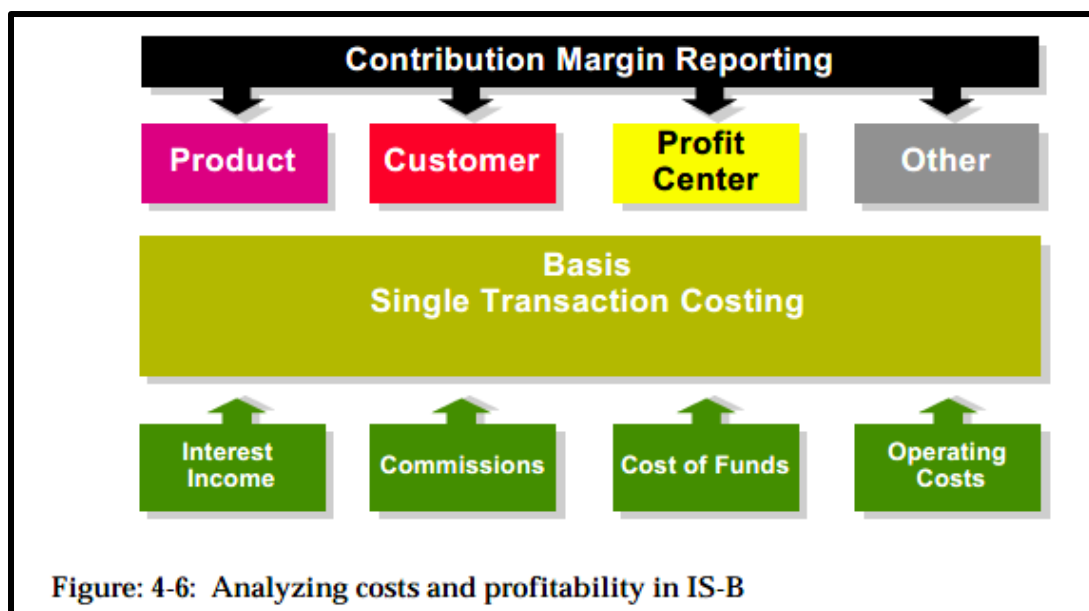
Interest income		Interest Income/Expense
- Opportunity income		± Opportunity Values (COF/VOF)
= Interest terms contribution - active		(± Equity Capital Costs)
		Net Interest
+ Commission income		+ Other Revenue
- Commission costs		- Direct Expenses
= Commission contribution (subtotal)		
= Contribution margin I		
- Standard unit costs		- Direct Expenses
- Standard cancellation costs		- Provisioning
- Equity capital costs		
= Contribution margin II		
- Indirect costs		
= Contribution margin III = market result		

Ex. 1007 at 63 (emphasis added). The figure above depicts calculating multiple marginal values of profit by calculating:

- net interest (*i.e.*, Interest Income, Opportunity Income, Equity Capital Costs),
- other revenue (*i.e.*, Commission Income),
- direct expense (*i.e.*, Commission costs, Standard unit costs), and
- provisioning (*i.e.*, Standard Cancellation Costs).

Net interest, in the figure above, is calculated by taking interest income and adjusting for the opportunity income and equity capital costs. Since each of these calculations comprise “at least one marginal value of profit,” *SAP-IS-B* anticipates and renders obvious element 1[e].

491. *SAP-IS-B* additionally shows the calculation of “at least one marginal value of profit for each object being measured” in the following figure:



Ex. 1007 at 42. Figure 4-6 depicts the calculation of net interest (*i.e.*, Interest Income less Cost of Funds), other revenue (*i.e.*, Commissions), and direct expenses (*i.e.*, Operating Costs). And it does so on a per-object basis (*i.e.*, Product, Customer, Profit Center, Other). Since each of these calculations constitutes at “at least one marginal value of profit for each object being measured,” *SAP-IS-B* anticipates and renders obvious element 1[e].

492. As referenced in Section VII.A.1(vi), element 1[e] was well-known and routine in the art. *SAP-IS-B* anticipates and renders obvious element 1[e], and it also would have been obvious for a POSITA to combine the well-known element of calculating marginal values of profit with *SAP-IS-B* to produce element 1[e].

1[f] combining the at least one marginal value of profit to create a measure for object level profitability.

493. *SAP-IS-B* anticipates and renders obvious element 1[f]. The ‘316 Patent claims and specification define “marginal value of profit” as including at least one of net interest, other revenue, direct expense, provisioning and/or indirect expense.

494. *SAP-IS-B* discloses combining a marginal value of profit (*e.g.*, direct expenses, indirect expenses):

The *calculation of the operating costs is user-specific and is characterized by flexible calculation components* in a costing sheet. You may, for example, opt to display the operating costs on three allocation levels:

- *standard unit costs (direct and directly attributable costs)*
- *cost center overhead rates (indirect costs of cost centers close to the market)*
- overhead surcharges.

This means that you have the flexibility to either *fully absorb the cost involved in a single transaction* or carry out partial, multi-level costing.

Ex. 1007 at 54-58. Above, *SAP-IS-B* discloses combining and allocating direct and indirect costs (*i.e.*, costing components) to any transaction (*i.e.*, object) by choosing to either fully absorb the cost or perform partial, multi-level costing. Since direct costs (*i.e.*, direct expenses) is a marginal value of profit and indirect costs (*i.e.*, indirect expenses) represent a profit adjustment value, *SAP-IS-B* anticipates and renders obvious element 1[f].

495. *SAP-IS-B* also discloses combining a marginal value of profit and a profit adjustment value:

Interest income					
- Opportunity income					
= Interest terms contribution - active					
+ Commission income					
- Commission costs					
= Commission contribution (subtotal)					
= Contribution margin I					
- Standard unit costs					
- Standard cancellation costs					
- Equity capital costs					
= Contribution margin II					
- Indirect costs					
= Contribution margin III = market result					

Interest Income/Expense
± Opportunity Values (COF/VOF)
(± Equity Capital Costs)
Net Interest

+ Other Revenue

- Direct Expenses

- Direct Expenses

- Provisioning

- Indirect Expenses

Ex. 1007 at 63 (emphasis added). The figure above depicts calculating multiple marginal values of profit by calculating:

- net interest (*i.e.*, Interest Income, Opportunity Income, Equity Capital Costs),
- other revenue (*i.e.*, Commission Income),
- direct expense (*i.e.*, Commission costs, Standard unit costs), and
- provisioning (*i.e.*, Standard Cancellation Costs).

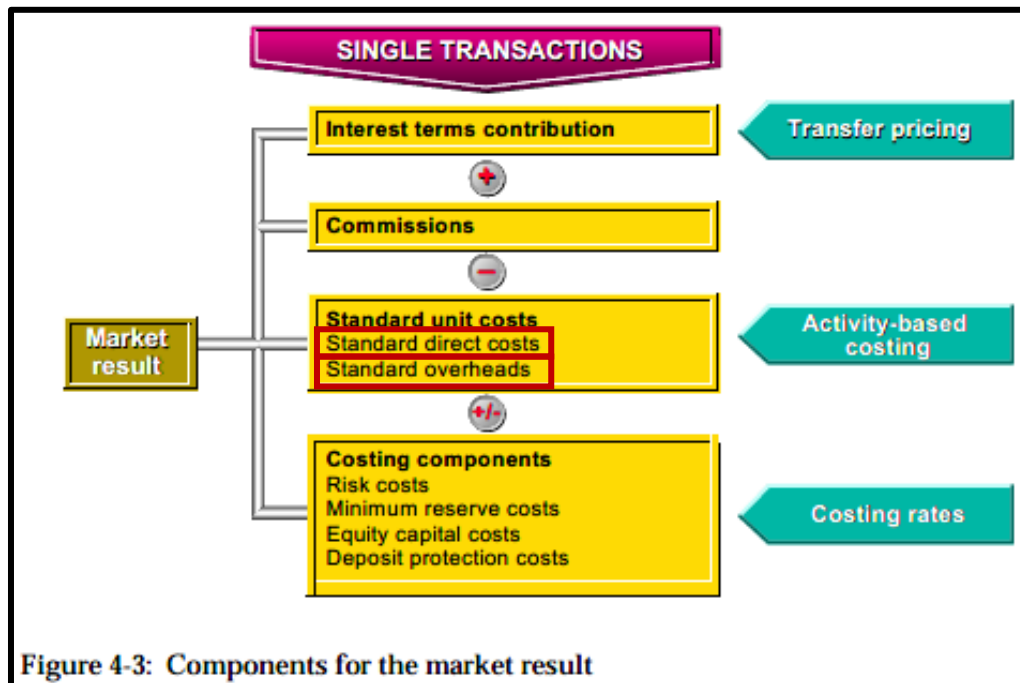
with

- a profit adjustment value, which are the indirect expenses (*i.e.*, Indirect Costs),

to create

- a measure of object level profitability (i.e., market result).

SAP-IS-B also depicts the calculations of the previous figure, including at least direct expense and indirect expense (as an overhead cost), in the following figure:



Ex. 1007 at 33. Since the figures above depict combining at least one marginal value of profit (e.g., “Standard direct costs”) and indirect expense (e.g., “Standard overheads”), SAP-IS-B anticipates and renders obvious element 1[f].

496. Additionally, SAP-IS-B discloses performing profitability analysis for different objects, explaining that:

Profitability segments are the smallest reporting units and therefore form the basis for Bank Profitability Analysis. You *assign each profitability segment* a certain combination of characteristics (or criteria) for *reporting*

(e.g. customer group, product, risk class, branch). A totals record containing the accumulated period values is kept for each profitability segment.

Ex. 1007 at 57-60. *SAP-IS-B*, above, describes reporting profitability for each profitability segment (*e.g.*, customer group, product, risk class, branch) which anticipates and renders obvious creating a “measure for object level profitability.”

497. As described in Section VII.A.1(vii), element 1[f] was well-known in the art. Ex. 1013 at 298-308. *SAP-IS-B* anticipates and renders obvious element 1[f], and it would have been obvious to a POSITA to combine the calculation a marginal value of profit with *SAP-IS-B* to render element 1[f] obvious.

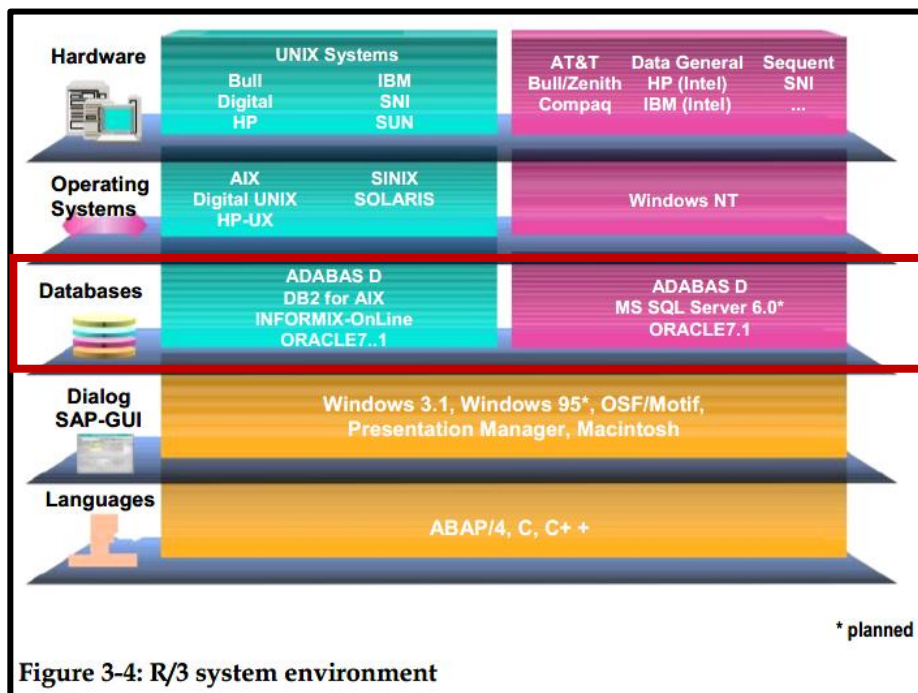
498. Since *SAP-IS-B* discloses all elements of Claim 1, it is my opinion that *SAP-IS-B* anticipates and renders obvious Claim 1 of the ‘316 Patent.

2. Dependent Claim 2 is Anticipated and Obvious

2 The process of Claim 1, wherein the relational database comprises a structured query language (SQL).

499. I understand that Claim 2 depends from Claim 1, and that in order to disclose or render obvious this claim, each limitation of any base claim and any intervening claim must be met in addition to the instant claim limitation. It is my opinion that *SAP-IS-B* renders this claim obvious and teaches this limitation.

500. *SAP-IS-B* anticipates and renders obvious using relational databases with SQL. Ex. 1007 at 23, 58-61. *SAP-IS-B* depicts the SAP R/3 environment as:



Ex. 1007 at 23 (emphasis added). Figure 3-4 above discloses the use of DB2, Oracle, and MS SQL Server as databases that may be used with SAP R/3. Each of DB2, Oracle, and MS SQL Server were well-known RDBMSes that used SQL at the time of the invention. Ex. 1014 at 24. *SAP-IS-B* also discloses the use of database queries, explaining that:

The saved data and the reporting values derived from formulas are then available for evaluations. The reporting

system within Bank Profitability Analysis supports two reporting types:

- *the ad hoc report: you define this at the time of query*, and
- the one- or two-dimensional report: you define the column and line structures for these reports within customizing.

Ex. 1007 at 61. Structured Query Language (“SQL”) was developed in the 1970s and had become an official standard by 1986. Ex. 1004 at 3. By the early 1990s, SQL was used widely as a standard language associated with most relational databases. Ex. 1004 at 4. A POSITA would understand *SAP-IS-B*’s discussion of queries, together with its discussion of relational databases, to be describing the use of a structured query language. Additionally, it would be obvious to use a structured query language to access and manipulate data from the database of *SAP-IS-B*, as structured query language was a well-known and predictably successful way of accessing and manipulating database data as of the date of the ‘316 Patent. Ex. 1004 at 3-6. Therefore, *SAP-IS-B* anticipates and renders obvious Claim 2.

501. As discussed in Section VII.A.2(i), SQL was a well-known, routine and conventional technology used with relational databases. Ex. 1004 at 2-

5. Simply using SQL with the teachings of *SAP-IS-B* would have been obvious to a POSITA. Therefore, *SAP-IS-B* anticipates and renders obvious Claim 2.

3. Dependent Claim 3 is Anticipated and Obvious

3	The process of claim 1, wherein the step of calculating at least one marginal value of profit includes the steps of calculating net interest (NI), other revenue (OR) and direct expense (DE), wherein net interest (NI) is the summation of interest income, value of funds provided and earnings on equity funds used less the sum of interest expense and costs of funds used, other revenue (OR) is a measure of profit contribution from non-interest related sources, and direct expense (DE) is the profit value reduction due to marginal resource consumption by the object.

502. I understand that Claim 3 depends from Claim 1, and that in order to disclose or render obvious this claim, each limitation of any base claim and any intervening claim must be met in addition to the instant claim limitation. It is my opinion that *SAP-IS-B* renders this claim obvious and teaches this limitation.

503. Claim 3 recites “the step of calculating at least one marginal value of profit includes the steps of calculating net interest (NI), other revenue (OR) and direct expense (DE)” followed by specific definitions of NI, OR, and DE. It is my opinion that *SAP-IS-B* anticipates and renders obvious all elements of Claim 3, as explained below.

3[a]	wherein the step of calculating at least one marginal value of profit includes the steps of calculating net interest (NI), other revenue (OR) and direct expense (DE)

504. Element 3[a] recites calculating “at least one marginal value of profit” which includes calculating “net interest (NI), other revenue (OR) and direct expense (DE).” Thus, I understand that Claim 3 requires the calculation of all three of NI, OR, and DE. However, each of NI, OR, and DE are marginal values of profit, and do not require the others in order to calculate “at least one marginal value of profit.” Regardless, *SAP-IS-B* anticipates and renders obvious element 3[a].

505. *SAP-IS-B* discloses calculating each of NI, OR, and DE in the following figure:

Interest income					
- Opportunity income					
= Interest terms contribution - active					
+ Commission income					
- Commission costs					
= Commission contribution (subtotal)					
= Contribution margin I					
- Standard unit costs					
- Standard cancellation costs					
- Equity capital costs					
= Contribution margin II					
- Indirect costs					
= Contribution margin III = market result					

Interest Income/Expense
± Opportunity Values (COF/VOF)
(± Equity Capital Costs)
Net Interest

+ Other Revenue

- Direct Expenses

- Direct Expenses

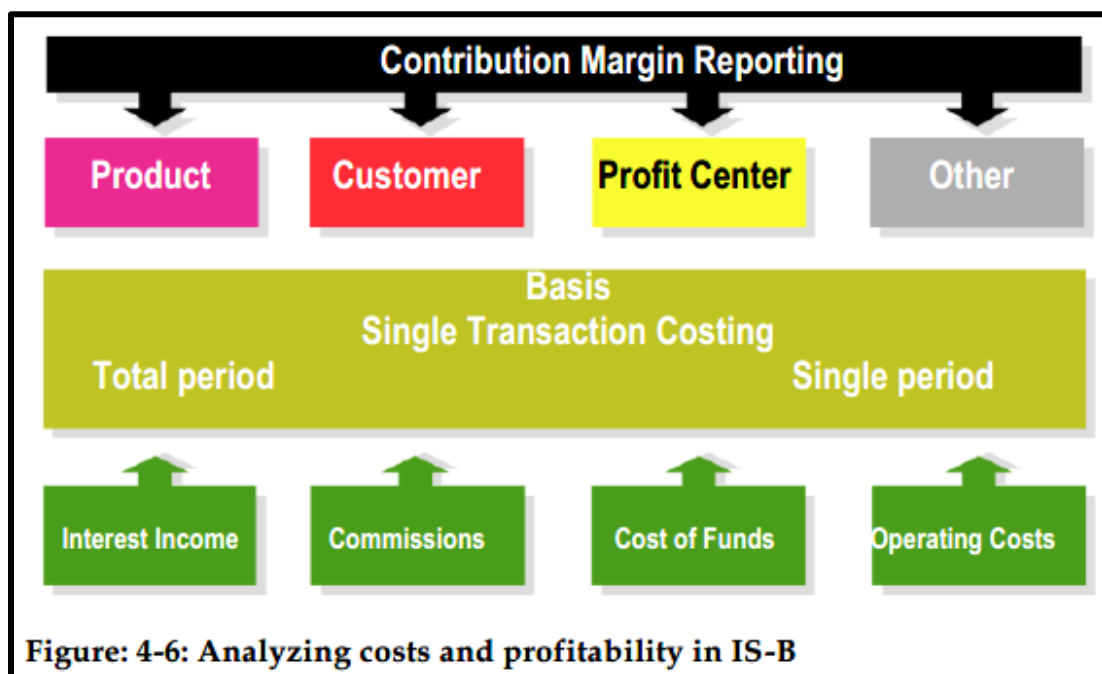
Ex. 1007 at 63 (emphasis added). The figure above depicts calculating multiple marginal values of profit by calculating:

- net interest (*i.e.*, Interest Income, Opportunity Income, Equity Capital Costs),
- other revenue (*i.e.*, Commission Income), and
- direct expense (*i.e.*, Commission costs, Standard unit costs)

Net interest, in the figure above, is calculated by taking interest income and adjusting for the opportunity income and equity capital costs. Commission income may be considered “other revenue” since commission income is a profit contribution from a non-interest source. Similarly, commission costs may be considered a direct

expense since commission costs are marginal costs and non-interest costs. By disclosing the calculation of NI, OR, and DE, *SAP-IS-B* anticipates and renders obvious element 3[a].

506. *SAP-IS-B* also depicts the calculation of NI, OR, and DE in the following figure:



Ex. 1007 at 42. Figure 4-6 depicts the calculation of net interest (*i.e.*, interest income less cost of funds), other revenue (*i.e.*, commissions), and direct expenses (*i.e.*, operating costs) applied to different objects (*i.e.*, Product, Customer, Profit Center, other). By disclosing the calculation of each of NI, OR, and DE, *SAP-IS-B* anticipates and renders obvious element 1[e]. *SAP-IS-B* also teaches ways to calculate each of these marginal profit values, as described in elements 3[b]-3[d] below.

507. As discussed in Section VII.A.2(ii), calculating a marginal value of profit, including calculating net interest, other revenue, and direct expense was well-known, routine, and conventional in the art at the time of the invention. Calculating net interest, other revenue, and direct expense was commonplace in accounting and was taught in accounting and finance textbooks at the time of the invention. Ex. 1013 at 27-28, 96-102, 396, 591-592. Calculating net interest, other revenue, and direct expense was often required by accounting regulations. Ex. 1018 at 12, 14-15, 37. Therefore, it is my opinion that *SAP-IS-B* anticipates and renders obvious element 3[a]. Further, it would have been obvious for a POSITA to combine the teachings of *SAP-IS-B* with well-known and routine elements in the art to render element 3[a] obvious.

3[b] wherein net interest (NI) is the summation of interest income, value of funds provided and earnings on equity funds used less the sum of interest expense and costs of funds used

508. Element 3[b] recites a calculation for net interest as “the summation of interest income, value of funds provided and earnings on equity funds used less the sum of interest expense and costs of funds used.” This equation can be written as:

$$NI = \sum IntInc + VOF + EarningsOnEquityFunds - IntExp - COF$$

where “NI” is net interest, “IntInc” is interest income, “VOF” is value of funds provided, “EarningsOnEquityFunds” is the earnings on equity funds used, “IntExp” is interest expense, and “COF” is cost of funds used. Elements of this formula is similar to the funds transfer pricing model, in that it calculates a cost of funds used and value of funds provided for every product. See Ex. 1013 at 904-916 (showing common use of formula). It is my opinion that this calculation of net interest is anticipated and rendered obvious by *SAP-IS-B*.

509. *SAP-IS-B* describes calculating net interest income per transaction according to funds transfer pricing, explaining that:

A market rate approach to transfer pricing is used to *calculate the interest margin* in interest-related business.

Each single transaction is set against an alternative transaction on the money and capital market. The *difference between the customer interest rate and the alternative market interest rate (opportunity rate)* based on volume, represents the interest terms contribution.

IS-B offers schemes for *calculating the interest terms contribution* which are either *based on daily balances or nominal average balances* (in accordance with a traditional market rate approach) *or on cash flows and effective capital* (in accordance with the present value).

Understood as
“Interest
Income” or
“Interest

Discussed below
as including
“Cost of Funds,”
“Value of
Funds,” and
“Earnings on
Equity Funds”

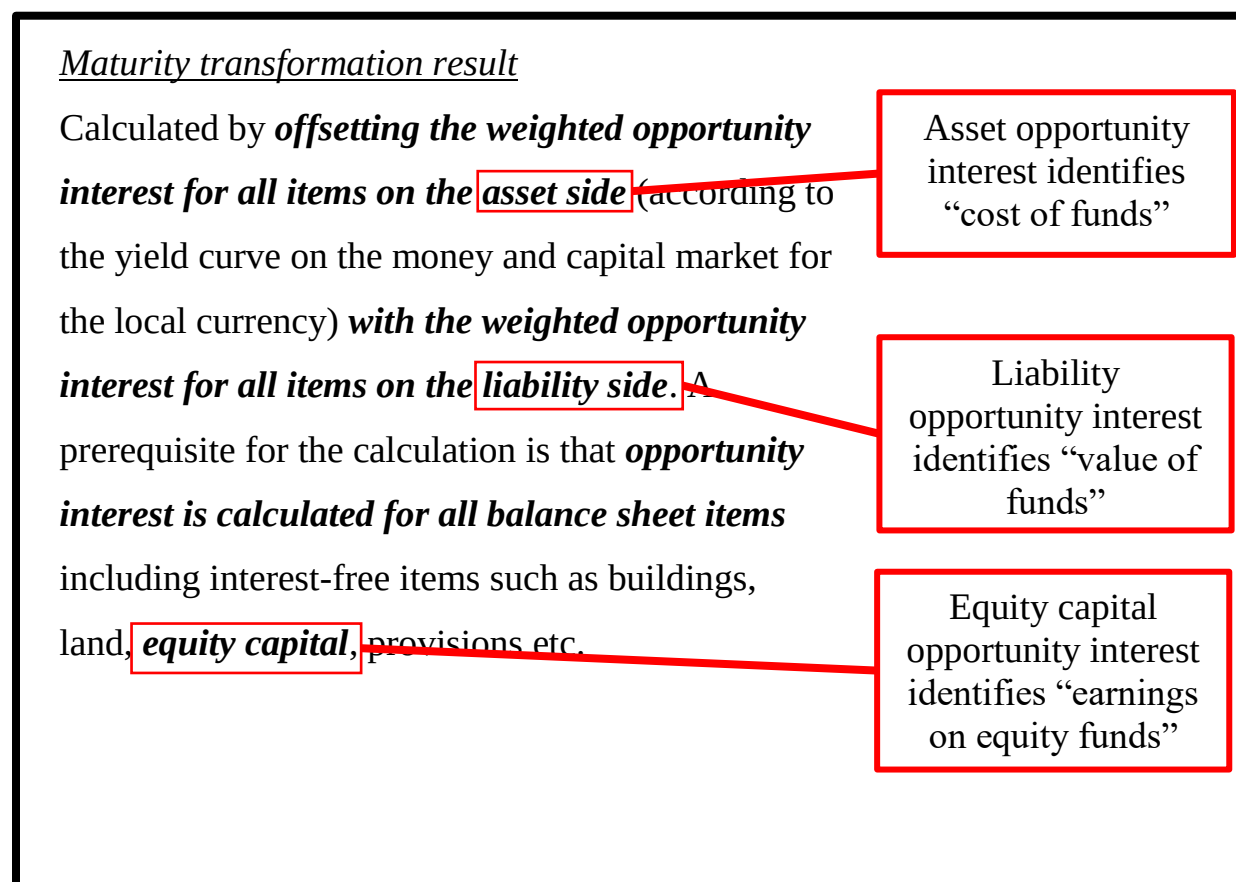
Ex. 1007 at 49. *SAP-IS-B* describes calculating interest margin according to a market rate approach to transfer pricing, where the interest margin is the difference between the customer interest rate (*i.e.*, interest income *less* interest expense) and the opportunity rate (discussed below as including cost of funds, value of funds, and earnings on equity funds). A POSITA would have understood that the customer interest rate refers to the interest income for an asset or the interest expense for a liability. *SAP-IS-B*, above, also discloses calculating the interest terms contribution based on the interest margin and the nominal average balance of the transaction. In terms of the equation of element 3[b], *SAP-IS-B*, above, discloses:

$$\begin{aligned}
 NI &= \sum \boxed{CustInt_A} + \boxed{OppRate_L} + \boxed{OppRate_B} - \boxed{CustInt_L} - \boxed{OppRate_A} \\
 NI &= \sum \boxed{IntInc} + \boxed{VOF} + \boxed{EarningsOnEquityFunds} - \boxed{IntExp} - \boxed{COF}
 \end{aligned}$$

In the equation above, “CustInt_A” is the customer interest rate for assets (*i.e.*, “IntInc”), “OppRate_L” is the opportunity rate for liabilities (*i.e.*, “VOF”), “OppRate_B” is the opportunity rate for balance sheet items (*i.e.*, “earnings on equity funds”), “CustInt_L” is the customer interest rate for liabilities (*i.e.*, “IntExp”), and “OppRate_A” is the opportunity rate for assets (*i.e.*, “COF”).

510. While the paragraph above does not expressly identify the components that are calculated for opportunity rates, *SAP-IS-B* discloses calculating

opportunity interest rates for all balance sheet items, including equity capital, as follows:



Ex. 1007 at 89. *SAP-IS-B* describes the maturity transformation result used in calculating net interest income as a weighted opportunity interest for all items on the asset side (*i.e.*, cost of funds), the liability side (*i.e.*, value of funds provided), and other balance sheet items (*i.e.*, earnings on equity funds used). When combined with the interest margin above, *SAP-IS-B* discloses the net interest calculation of element 3[b]. In terms of the formula of element 3[b], the paragraphs above disclose calculating:

$$\begin{aligned}
 NI &= \sum \boxed{CustInt_A} + \boxed{OppRate_L} + \boxed{OppRate_B} - \boxed{CustInt_L} - \boxed{OppRate_A} \\
 NI &= \sum \boxed{IntInc} + \boxed{VOF} + \boxed{EarningsOnEquityFunds} - \boxed{IntExp} - \boxed{COF}
 \end{aligned}$$

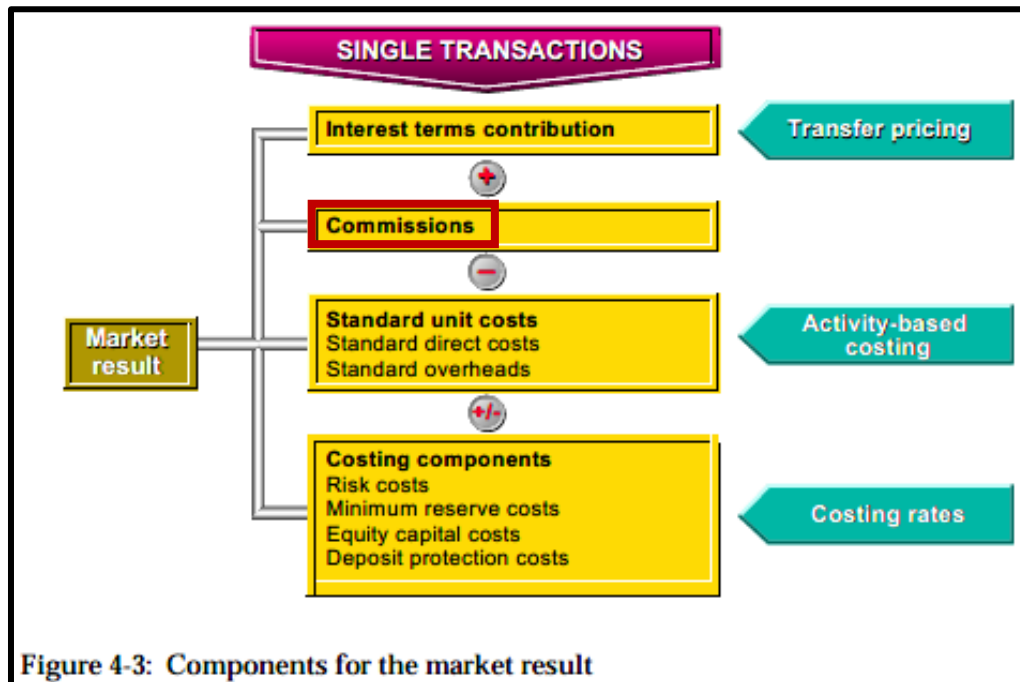
It is my opinion that the discussion of net interest calculation and opportunity funds transfer pricing in *SAP-IS-B* anticipates and renders obvious element 3[b].

511. As discussed in Section VII.A.2(ii), calculating net interest at both an organizational level and product level was well-known, routine, and conventional in the art at the time of the invention. Calculating net interest using transfer pricing was taught in accounting textbooks at the time of the invention, and was often required by accounting regulations and banking capital reserve requirements. Ex. 1013 at 913-916. Therefore, it is my opinion that *SAP-IS-B* anticipates and renders obvious element 3[b]. Further, it would have been obvious for a POSITA to combine the teachings of *SAP-IS-B* with well-known and routine elements in the art to render element 3[b] obvious.

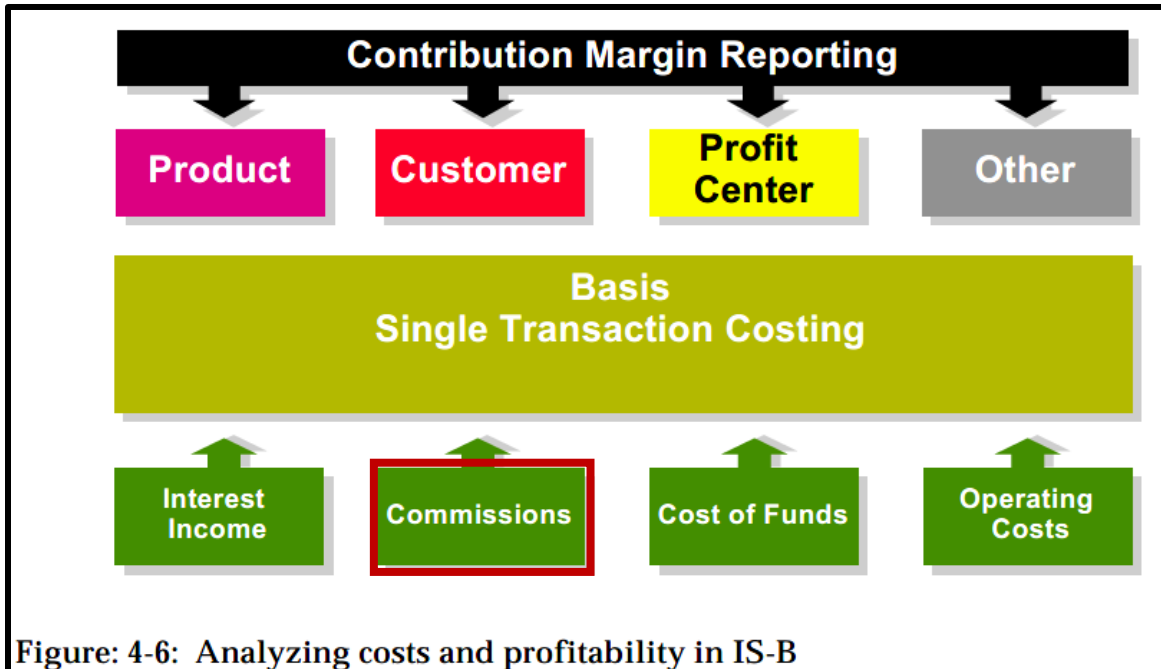
3[c] other revenue (OR) is a measure of profit contribution from non-interest related sources

512. Element 3[c] recites calculating other revenue (OR) as “a measure of profit contribution from non-interest related sources.” A common form

of other revenue in banks comes from commissions, fees, and charges. For example, *SAP-IS-B* depicts the profit calculation for a single transaction as:



Ex. 1007 at 33 (emphasis added). In the figure above, *SAP-IS-B* teaches attributing commissions (expense and income) to a single transaction. *SAP-IS-B* distinguishes commission income from the interest terms contribution in the figure above, indicating that commission is considered revenue from a non-interest source, or “other revenue.” *SAP-IS-B* also depicts that “Commissions” are treated separately from “Interest Income” in the below figure:



Ex. 1007 at 42 (emphasis added). This same figure also depicts attributing commissions to a single transaction, and allocating that transaction to a Product, Customer, and/or Profit Center.

513. SAP-IS-B further describes the allocation of commissions as:

Commissions

Commissions and fees are transferred from the banking systems as **amounts per single transaction**. You can **display commission income and costs** (commission payments to third parties) **separately**, e.g. as per

- commission earnings and
- commission expenses (commission collected through third parties)

The *commissions are either fully assigned to the transaction in the reporting period in which they arise or equally distributed in the subsequent periods*. If they are distributed, you can specify the number of settlement periods for distribution.

Ex. 1007 at 54-57. *SAP-IS-B* discloses allocating commissions and fees separately for a single transaction. The commission income can be considered “other revenue” in terms of the ‘316 Patent since commission income is revenue from a non-interest source. Similarly, commission expense can be considered a direct expense, since commission expense is a non-interest related expense that is directly attributable to a transaction. For the reasons above, *SAP-IS-B* discloses calculating other revenue in the form of commission income, thus rendering element 3[c] anticipated and obvious.

514. As discussed in Section VII.A.2(ii), calculating other revenue at an organizational level and product level was well-known, routine, and conventional in the art at the time of the invention. Based on the disclosures described above, *SAP-IS-B* anticipates and renders obvious element 3[c]. Further, it would have been obvious for a POSITA to combine the teachings of *SAP-IS-B* with well-known and routine elements of calculating other revenue to render element 3[c] obvious.

3[d] and direct expense (DE) is the profit value reduction due to marginal resource consumption by the object.

515. Element 3[d] recites that the “direct expense (DE) is the profit value reduction due to marginal resource consumption by the object.” *SAP-IS-B* discloses the calculation of direct expenses as a portion of operating costs, describing:

Operating Costs

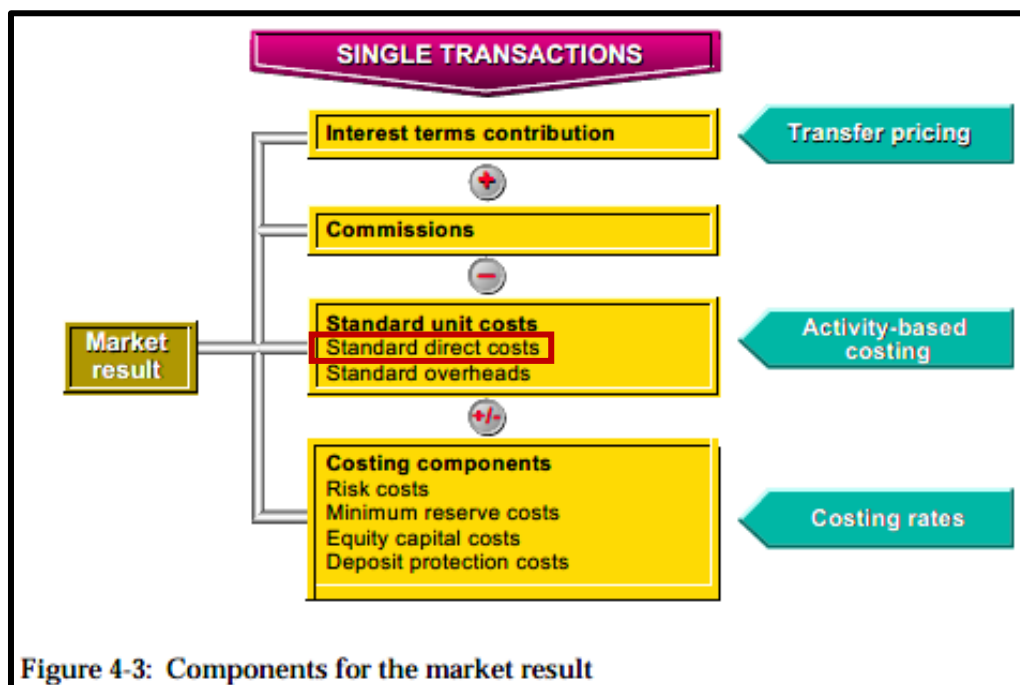
The *calculation of the operating costs is user-specific and is characterized by flexible calculation components* in a costing sheet. You may, for example, opt to display the operating costs on three allocation levels:

- *standard unit costs (direct and directly attributable costs)*
- cost center overhead rates (indirect costs of cost centers close to the market)
- overhead surcharges.

This means that you have the flexibility to either fully absorb the cost involved in a single transaction or carry out partial, multi-level costing.

Ex. 1007 at 54-58. As described above, *SAP-IS-B* discloses calculating direct expense as standard unit costs, where standard unit costs comprise both direct costs and directly attributable costs (marginal resource consumption) per transaction (object). By describing calculating and attributing direct costs to a single transaction, *SAP-IS-B* anticipates and discloses element 3[d] of calculating direct expense as a profit value reduction due to marginal resource consumption by the object (*i.e.*, a single transaction).

516. *SAP-IS-B* depicts calculating direct expense in the following figure:



Ex. 1007 at 33 (emphasis added). In the figure above, *SAP-IS-B* discloses calculating direct expense as “standard direct costs,” which are allocated to a single

transaction to calculate profit (*i.e.*, market result). By depicting the calculation of direct expenses, *SAP-IS-B* anticipates and renders obvious element 3[d].

517. Based on the disclosures above, *SAP-IS-B* anticipates and renders obvious element 3[d]. Further, as discussed in Section VII.A.2(ii), calculating direct expense at a transactional, organizational, customer, and product level was well-known, routine, and conventional in the art at the time of the invention. Ex. 1013 at 27-28, 96-102. It would have been obvious for a POSITA to combine the teachings of *SAP-IS-B* with the routine calculation of direct expenses to render element 3[d] obvious.

518. Since *SAP-IS-B* discloses calculating a marginal value of profit, including calculating each of NI, OR, and DE as prescribed in Claim 3, *SAP-IS-B* anticipates and renders obvious Claim 3. Additionally, it would have been obvious to a POSITA to combine the teachings of *SAP-IS-B* with well-known aspects of cost accounting and activity-based costing to render Claim 3 obvious.

3[e] indirect expense (IE) due to non-object related resource consumption

519. *SAP-IS-B* anticipates and renders obvious element 3[e]. Element 3[e] includes the steps of calculating indirect expense due to “non-object related resource consumption.” The use of a relational database management system is disclosed by *SAP-IS-B*, as discussed in relation to element 1[b].

520. The '316 Patent describes IE as “an apportioned profit value adjustment for all non-object related resource consumption by the business.” Ex. 1001 at 5:12-14. The '316 Patent also explains that the “step of calculating a profit adjustment value by calculating the value for indirect expense (IE) which is an apportioned profit value adjustment for all non-object related resource consumption.” Ex. 1001 at Claim 5.

521. *SAP-IS-B* anticipates and renders obvious calculating IE. *SAP-IS-B* discloses that:

The *calculation of the operating costs is user-specific and is characterized by flexible calculation components* in a costing sheet. You may, for example, opt to display the operating costs on three allocation levels:

- standard unit costs (direct and directly attributable costs)
- *cost center overhead rates (indirect costs of cost centers close to the market)*
- overhead surcharges.

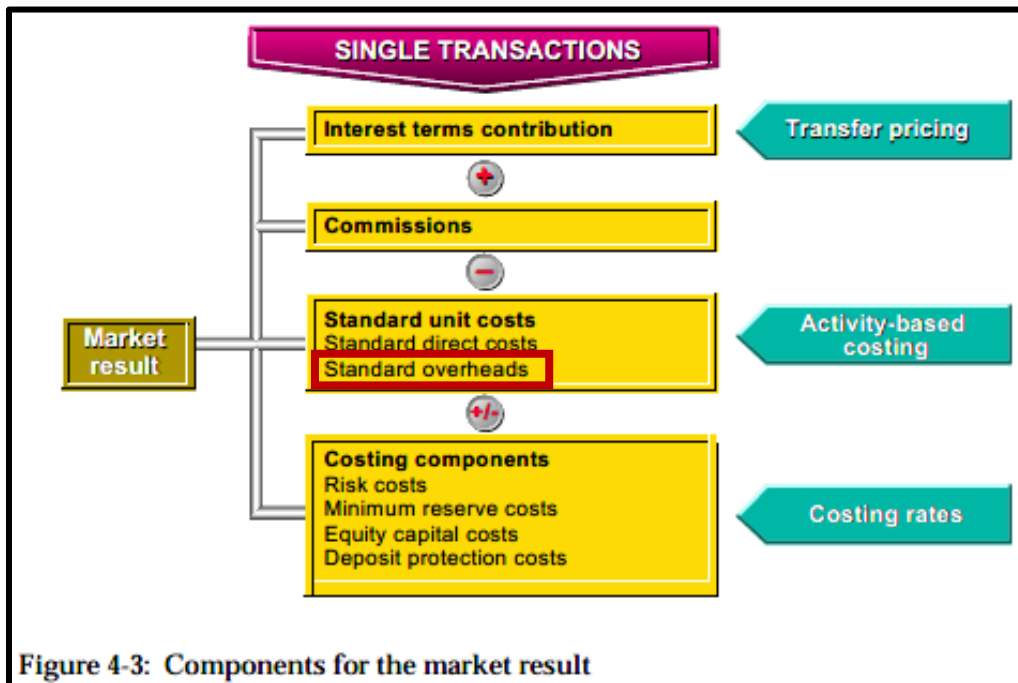
This means that you have the flexibility to either *fully absorb the cost involved in a single transaction* or carry out partial, multi-level costing.

Ex. 1007 at 54-58. Above, *SAP-IS-B* discloses allocating costs, including indirect costs, to any component (*i.e.*, object) by choosing to either fully absorb the cost or perform partial, multi-level costing.

522. *SAP-IS-B* discloses calculating IE for each transaction by describing that:

Interest income	
- Opportunity income	
= Interest terms contribution - active	
+ Commission income	
- Commission costs	
= <i>Commission contribution</i> (subtotal)	
= <i>Contribution margin I</i>	
- Standard unit costs	
- Standard cancellation costs	
- Equity capital costs	
= <i>Contribution margin II</i>	
- Indirect costs	- Indirect Expenses
= <i>Contribution margin III = market result</i>	

Ex. 1007 at 63. The figure above depicts calculating indirect expenses (*i.e.*, “Indirect Costs”). *SAP-IS-B* also depicts calculating indirect expenses as an overhead cost in the following figure:



Ex. 1007 at 33 (emphasis added). Since the figures above depicts calculating indirect expense, *SAP-IS-B* anticipates and renders obvious element 3[e].

523. Section VII.A.2(ii) explains that element 3[e] was well known in the art. It is my opinion that calculating indirect expenses was well-known, routine and conventional in the art. See Ex. 1013 at 298-308. *SAP-IS-B* anticipates and renders obvious element 3[e], and a POSITA would have known to combine conventional techniques of calculating indirect expenses with *SAP-IS-B* to render element 3[e] obvious.

4. Dependent Claim 4 is Anticipated and Obvious

4	The process of Claim 1, wherein the step of calculating at least one marginal value of profit includes the step of provisioning (P) for the selected set of prepared information, provisioning being the expected profit value adjustment for future outcomes related to the object.

524. I understand that Claim 4 depends from Claim 1, and that in order to disclose or render obvious this claim, each limitation of any base claim and any intervening claim must be met in addition to the instant claim limitation. It is my opinion that *SAP-IS-B* renders this claim obvious and teaches this limitation.

525. Claim 4 recites the steps of calculating at least one marginal value of profit including the step of “provisioning (P) for the selected set of prepared information,” where “provisioning being the expected profit value adjustment for future outcomes related to the object.” The ‘316 Patent also provides additional examples of what may be used to calculate provisioning, “such as: expected loss rates, reserve percentages, exposure factors, recovery rates, default probabilities and collection costs.”

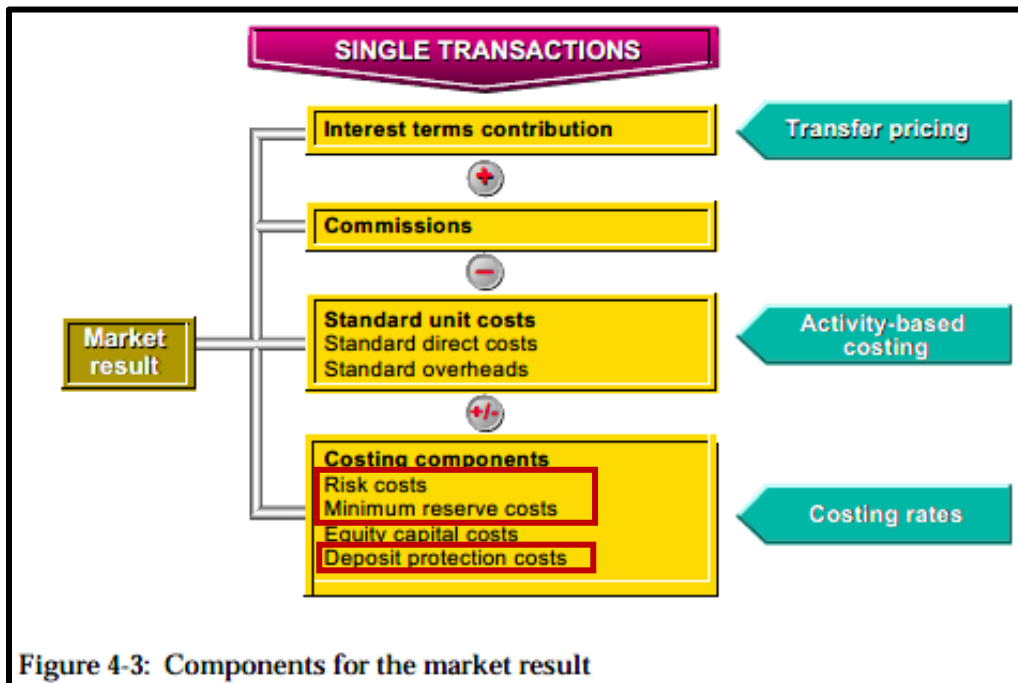
526. Provisioning for future outcomes was an obvious technique that was a well-known, routine, and conventional practice in the finance and banking sectors. Ex. 1018 at 6-8, 10-11. The ‘316 Patent admits that the practice of provisioning is well-known in the financial industry, stating:

“Provision — Adjusting current profit for expected future value changes is known as 'actuarial' provisioning. ***The***

technique is well known by the financial industry's accounting practice. DPM applies actuarial based methods in its object level profit calculations where the Provision pre-adjusts profit for contingent or known exposures to future profit.”

Ex. 1001 at 9:49-55. Above, the ‘316 Patent discloses that the technique of provisioning was “well-known by the financial industry’s accounting practice,” meaning that it would have been obvious to a POSITA to calculate profitability using provisioning.

527. Regardless, *SAP-IS-B* discloses provisioning, the expected profit value adjustment for future outcomes, by disclosing calculating minimum reserve costs, risk costs, and deposit protection costs. Each of these values is calculated as a profit adjustment for possible future outcomes, and attributed to a single transaction. For example, *SAP-IS-B* depicts calculating each of these provisions for a single transaction:



Ex. 1007 at 33 (emphasis added). In the figure above, *SAP-IS-B* discloses calculating risk costs, minimum reserve costs, and deposit protection costs, and allocating those costs to a single transaction in order to calculate the profitability (i.e., market result) of a transaction. *SAP-IS-B* describes:

Risk result

Reflects the ***allocated (standard) risk cost*** for the default risk offset against the ***actual risk cost (additions minus releases of specific provisions)***.

Ex. 1007 at 91. *SAP-IS-B* also describes deposit protection costs as “lost interest resulting from using the deposit protection systems (e.g. FDIC).” Ex. 1007 at 88. In describing each of risk costs, minimum reserve costs, and deposit protection costs, *SAP-IS-B* anticipates and renders obvious the provisioning of Claim 4.

528. *SAP-IS-B* also discloses provisioning in the following figure:

Interest income	
- Opportunity income	
= Interest terms contribution - active	
+ Commission income	
- Commission costs	
= <i>Commission contribution</i> (subtotal)	
= <i>Contribution margin I</i>	
- Standard unit costs	
- Standard cancellation costs	- Provisioning
- Equity capital costs	
= <i>Contribution margin II</i>	
- Indirect costs	
= <i>Contribution margin III = market result</i>	

Ex. 1007 at 63 (emphasis added). In the figure above, *SAP-IS-B* discloses calculating provisioning by calculating standard cancellation costs and allocating those costs to a single transaction. Since standard cancellation costs are a profit adjustment for expected future outcomes, *SAP-IS-B* discloses and renders obvious Claim 4.

529. Based on the disclosures above, *SAP-IS-B* anticipates and renders obvious Claim 4. As discussed in Section VII.A.2(iii), and as disclosed by the ‘316 Patent itself, calculating a provision at an organizational, customer and

product level was “well known by the financial industry's accounting practice” at the time of the invention. Ex. 1001 at 9:49-55; *see also* Ex. 1018 at 6-8, 10-11. It would have been obvious for a POSITA to combine the teachings of *SAP-IS-B* with the well-known element of provisioning for future events to render Claim 4 obvious.

5. Dependent Claim 5 is Anticipated and Obvious

5 The process of Claim 1, including the step of calculating a profit adjustment value by calculating the value for indirect expense (IE) which is an apportioned profit value adjustment for all non-object related resource consumption.

530. I understand that Claim 5 depends from Claim 1, and that in order to disclose or render obvious this claim, each limitation of any base claim and any intervening claim must be met in addition to the instant claim limitation. It is my opinion that *SAP-IS-B* renders this claim obvious and anticipates this limitation.

531. Claim 5 specifies that the “profit adjustment value” includes “calculating the value for indirect expense (IE), which is an apportioned profit value adjustment for all non-object related resource consumption.” The ‘316 patent describes calculating indirect expenses as “DPM's approach is to pool indirect costs and revenues and then apportion them,” and that “[a]ccountants refer to this profit measurement technique as ‘full allocation of profit.’” Ex. 1001 at 9:7-10. Thus, the ‘316 Patent indicates that full allocation of profit using pooled indirect expenses

were well-known, routine, and conventional for accountants at the time of the invention and therefore rendered obvious.

532. SAP-IS-B discloses the calculation of indirect expenses as a portion of overhead costs, describing:

Operating Costs

The ***calculation of the operating costs is user-specific and is characterized by flexible calculation components*** in a costing sheet. You may, for example, opt to display the operating costs on three allocation levels:

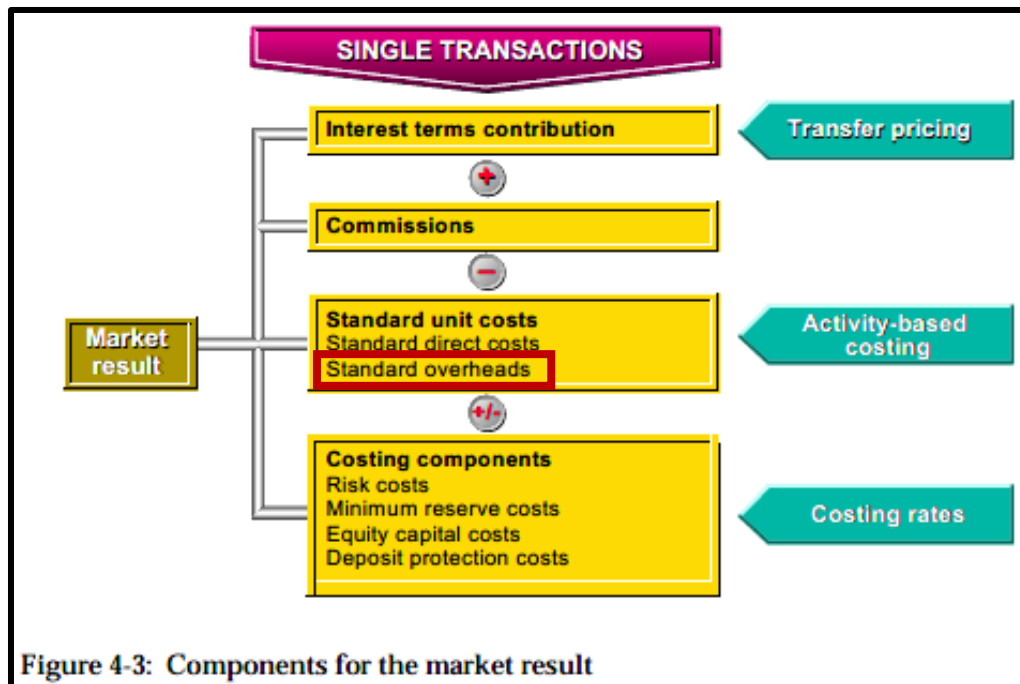
- standard unit costs (direct and directly attributable costs)
- ***cost center overhead rates (indirect costs of cost centers close to the market)***
- ***overhead surcharges.***

This means that you have the flexibility to either fully absorb the cost involved in a single transaction or carry out partial, multi-level costing.

Ex. 1007 at 54-58. As described above, SAP-IS-B discloses calculating indirect expense as cost center overhead per transaction. By calculating and attributing indirect costs to a single transaction, SAP-IS-B anticipates and discloses Claim 5 of

calculating indirect expense as an apportioned profit value adjustment for all non-object related resource consumption.

533. *SAP-IS-B* depicts calculating indirect expense in the following figure:



Ex. 1007 at 33. In the figure above, *SAP-IS-B* discloses calculating indirect expense as “standard overheads,” which are allocated to a single transaction to calculate profit (*i.e.*, market result). *SAP-IS-B* further depicts this calculation and allocation in the following figure:

Interest income					
- Opportunity income					
= Interest terms contribution - active					
+ Commission income					
- Commission costs					
= Commission contribution (subtotal)					
= Contribution margin I					
- Standard unit costs					
- Standard cancellation costs					
- Equity capital costs					
= Contribution margin II					
- Indirect costs					
= Contribution margin III = market result					

Interest Income/Expense
± Opportunity Values (COF/VOF)
(± Equity Capital Costs)
Net Interest

+ Other Revenue

- Direct Expenses

- Direct Expenses

- Provisioning

- Indirect Expenses

Ex. 1007 at 63 (emphasis added).

In the figure above, *SAP-IS-B* discloses calculating indirect expense as “indirect costs,” where these costs are allocated to a single transaction. By depicting the calculation and allocation of indirect expense, *SAP-IS-B* anticipates and renders obvious Claim 5.

534. It is my opinion, based on the information provided, that *SAP-IS-B* anticipates and renders obvious Claim 5. As discussed in Section VII.A.2(iv) and as indicated by the ‘316 Patent, calculating indirect expenses at an organizational, customer and product level was well-known in the art at the time of

the invention. Ex. 1001 at 9:7-10. It would have been obvious for a POSITA to combine the teachings of *SAP-IS-B* with the well-known calculation of indirect expenses to render Claim 5 obvious.

6. Dependent Claim 6 is Anticipated and Obvious

6 The process of Claim 5, wherein the combining step includes the steps of adding net interest (NI) and other revenues (OR), and subtracting therefrom direct expense (DE), provisioning (P) and indirect expense (IE).

535. I understand that Claim 6 depends from Claim 5, and that in order to disclose or render obvious this claim, each limitation of any base claim and any intervening claim must be met in addition to the instant claim limitation. It is my opinion that *SAP-IS-B* renders this claim obvious and teaches this limitation.

536. *SAP-IS-B* discloses calculating each of NI, OR, DE, P, and IE, as described in Sections VII.D.1, VII.D.3, 0, and VII.D.5. *SAP-IS-B* also discloses combining each of these calculations in the following figure:

Interest income					
- Opportunity income					
= Interest terms contribution - active					
+ Commission income					
- Commission costs					
= Commission contribution (subtotal)					
= Contribution margin I					
- Standard unit costs					
- Standard cancellation costs					
- Equity capital costs					
= Contribution margin II					
- Indirect costs					
= Contribution margin III = market result					

Interest Income/Expense
± Opportunity Values (COF/VOF)
(± Equity Capital Costs)
Net Interest

+ Other Revenue

- Direct Expenses

- Direct Expenses

- Provisioning

- Indirect Expenses

Ex. 1007 at 63 (emphasis added). The figure above depicts calculating multiple marginal values of profit by calculating:

- net interest (*i.e.*, Interest Income, Opportunity Income, Equity Capital Costs),
- other revenue (*i.e.*, Commission Income),
- direct expense (*i.e.*, Commission costs, Standard unit costs), and
- provisioning (*i.e.*, Standard Cancellation Costs).

with

- indirect expenses (*i.e.*, Indirect Costs),

to create

- a measure of object level profitability (*i.e.*, market result).

The figure above also depicts adding net interest and other revenue, and subtracting therefrom direct expense, provisioning, and indirect expense. Thus, *SAP-IS-B* anticipates and renders obvious Claim 6.

537. As discussed in Section VII.A.2(v), calculating and combining net interest, other revenue, direct expense, provisioning, and indirect expense was well-known, routine, and conventional in the art at the time of the invention. Calculating net interest, other revenue, direct expense, and provisioning was often required by accounting regulations. Ex. 1018 at 10-11. Combining these elements according to standard accounting rules was well-known, routine and conventional at the time of the invention. Ex. 1018 at 10-11, 37, 45. Therefore, it is my opinion that *SAP-IS-B* anticipates and renders obvious Claim 6. Further, it would have been obvious for a POSITA to combine the teachings of *SAP-IS-B* with well-known and routine elements in the art to render Claim 6 obvious.

7. Dependent Claim 8 is Anticipated and Obvious

8	The process of Claim 1, wherein the opportunity values are based on matched maturity funds transfer pricing theory, where the values are market alternative supplies or uses of funds having matched interest and payment characteristics.

538. I understand that Claim 8 depends from Claim 1, and that in order to disclose or render obvious this claim, each limitation of any base claim and any

intervening claim must be met in addition to the instant claim limitation. It is my opinion that *SAP-IS-B* renders this claim obvious and teaches this limitation.

539. Claim 8 recites the step where “the opportunity values are based on matched maturity funds transfer pricing theory,” and defines matched maturity funds transfer pricing theory as “market alternative supplies or uses of funds having matched interest and payment characteristics.” The concept of matched maturity funds transfer pricing theory was well-known, routine, and conventional in the art at the time of the invention. Ex. 1013 at 906-916. Additionally, *SAP-IS-B* anticipates and renders obvious using matched maturity funds transfer pricing theory to calculate profitability.

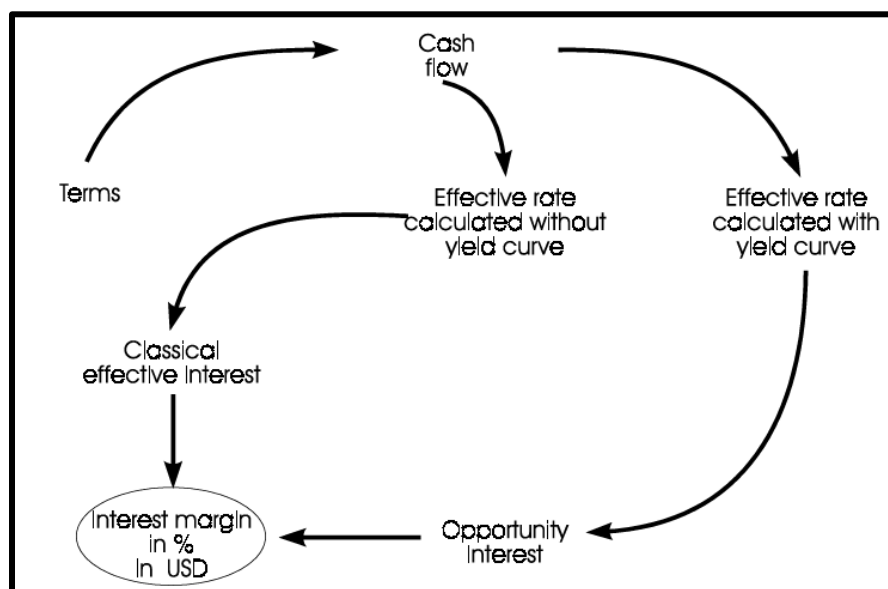
540. *SAP-IS-B* discloses calculating opportunity values using matched maturities funds transfer pricing, describing a “procedure for matched-maturities valuation” including calculating “***opportunity interest rate, as effective interest of alternative.***” Ex. 1007 at 52. *SAP-IS-B* further describes the use of matched maturities funds transfer pricing as:

Matched-maturities valuation

Within the present value concept, the ***matched-maturities valuation of a cash flow*** requires a ***duplication of the cash flows for a financial instrument using a bundle of other financial instruments with a similar duration.***

Ex. 1007 at 89. *SAP-IS-B* describes the process of matched-maturity valuation as matching a financial instrument's cash flow to another financial instrument with a similar duration.

541. *SAP-IS-B* depicts the calculation of opportunity values based on matched maturities in the following figure:



Ex. 1007 at 49. *SAP-IS-B*, in the figure above, introduces the concept of the yield curve to show how to calculate the interest margin for a given transaction based on the classical effective interest rate combined with the opportunity interest rate. *SAP-IS-B* further describes the procedure for calculating matched maturities valuation (using a present value method) as:

Procedure for matched-maturities valuation

When the terms are transferred to the data pool, the following values are calculated:

- Cash flow
- Effective interest of customer transaction, according to AIBD method, PAngV (Charges Disclosure Rule), Braess-Fangmeier method, Moosmüller method, US Method
- Present value of cash flow, evaluated with market rates (zero bond discounting factors)
- Present margin value, as total of present cash flow values
- Effective capital per payment date and present value of average tied-up effective capital
- Interest terms contribution per period (from one payment date to the next)
- Cash flow of alternative
- ***Opportunity interest rate, as effective interest of alternative***
- Interest terms contribution per reporting period.

Ex. 1007 at 52. As described above, *SAP-IS-B* discloses a method of matched maturities funds transfer pricing based on the present value of the financial instrument's cash flow, evaluated according to market alternative rates (*i.e.*,

calculated with yield curves). Based on the disclosures above, *SAP-IS-B* anticipates and renders obvious calculating opportunity values according to matched maturity funds transfer pricing.

542. Based on the disclosures above, *SAP-IS-B* anticipates and renders obvious Claim 8. As discussed in Section VII.A.2(vii), calculating opportunity values based on matched maturity funds transfer pricing theory was well-known, routine, and conventional in the art at the time of the invention. Ex. 1013 at 906-916. Calculating opportunity values based on matched maturity funds transfer pricing theory was often required by accounting and financial regulations. Ex. 1013 at 913-916. Therefore, it would have been obvious for a POSITA to combine the teachings of *SAP-IS-B* with well-known and routine elements of calculating matched maturity funds transfer pricing to render Claim 8 obvious.

543. *SAP-IS-B* teaches all of the elements in the claims above. To the extent that any element is alleged missing from *SAP-IS-B*, it would have been obvious to a POSITA to use the well-known teachings in the prior art, discussed above (VII.A), to meet those elements in implementing the system of *SAP-IS-B*. Moreover, a POSITA reading the various teachings and examples of *SAP-IS-B* would at once envisage the claimed arrangements of the challenged claims. I understand that “a reference can anticipate a claim even if it ‘d[oes] not expressly

spell out' all the limitations arranged or combined as in the claim, if a person of skill in the art, reading the reference, would 'at once envisage' the claimed arrangement or combination." *Blue Calypso LLC v. Groupon, Inc.*, 815 F.3d 1331, 1334 (Fed. Cir. 2016) (internal references omitted). I also understand that “reference need not always include an express discussion of the actual combination to anticipate” and “a reference may still anticipate if that reference teaches that the disclosed components or functionalities may be combined and one of skill in the art would be able to implement the combination.” *Id.* Here, it would also be obvious to combine the various teachings and examples of *SAP-IS-B* set forth above, as they are all discussed in the single reference and described as desirable approaches. A POSITA would be motivated to implement the teachings therein in accordance with the examples discussed in *SAP-IS-B*, and would expect success in carrying out that implementation in view of *SAP-IS-B*’s express teachings, suggestions and motivations set forth above. It would be common sense when implementing *SAP-IS-B*’s teachings to try utilizing the approaches set forth in *SAP-IS-B*’s example implementations.

E. Claims 9-24 and 29 are Rendered Obvious by *E&Y*, in view of *Blain*, in further view of *Kimball* and also by *E&Y*, *Blain*, *SAP-IS-B*, and *Kimball*

1. Dependent Claims 9, 13, 17, and 21 are Obvious

9 The process of claim 3, wherein the Net Interest (NI) is calculated as:

Int Inc(o_i)=Interest Income of object o_i
-COF(o_i)=Cost of funds used by object o_i
-Int Exp(o_i)=Interest Expense for object o_i
+VOF(o_i)=Value of funds provided by object o_i

according to:

Int Inc(o_i)=AAB(o_i)*rate_{asset}(o_i), only if object
attribute doesn't exist;

COF(o_i)=AAB(o_i)*Rt

Int Exp(o_i)=ALB(o_i)*rate_{liability}(o_i), only if object
attribute doesn't exist, and

VOF(o_i)=ALB(o_i)*Rt,

wherein:

AAB(o_i)=Average Asset Balance of the object o_i ,

ALB(o_i)=Average Liability Balance of the object o_i ,

rate_{asset}(o_i)=Effective interest rate for object o_i as an asset
balance,

rate_{liability}(o_i)=Effective interest rate for object o_i as a
liability balance, and

Rt=Treatment rate based on the identified treatment for the
object's product attributes.

- 13 The process of Claim 3, wherein Net Interest (NI) is calculated where summations are over the possible balance variables for the object, according to:

$$IntInc(o_i) = \sum_{\forall c,t} AB_{(asset\ c,t)}(o_i) * rate_{(asset\ c,t)}(o_i),$$

calculate only if

object attribute doesn't exist,

$$-COF(o_i) = \sum_{\forall c,t} AB_{(asset\ c,t)}(o_i) * R_{(asset\ c,t)}R_{(c,t)}(pt(o))$$

$$-IntExp(o_i) = \sum_{\forall c,t} AB_{(liability\ c,t)}(o_i) * rate_{(liability\ c,t)}(o_i),$$

only if object

attribute doesn't exist,

$$+VOF(o_i) = \sum_{\forall c,t} AB_{(liability\ c,t)}(o_i) * R_{(liability\ c,t)}R_{(c,t)}(pt(o)),$$

wherein

$AB_{(c,t)}(o_i)$ =Average Balances of the object o_i ,

$rate_{(c,t)}(o_i)$ =Effective interest rate for the corresponding balance asset or liability,

$Rt(o)$ =Object o 's product type/group as needed to identify treatment rate,

$R_{(c,t)}(pt(o))$ =Rate (treatment rate) for objects of this product type/group, given the balance class, and tier,

$Int\ Inc(o_i)$ =Interest Income of object o_i ,

$COF(o_i)$ =Cost of funds used by object o_i ,

$Int\ Exp(o_i)$ =Interest Expense for object o_i , and

$VOF(o_i)$ =Value of funds provided by object o_i .

- 17 The process of Claim 3, wherein Net Interest (NI) is calculated where summations are over the possible balance variables for the object, according to:

$$IntInc(o_i) = \sum_{\forall c,t} AB_{(asset\ c,t)}(o_i) * rate_{(asset\ c,t)}(o_i), \text{ only if object}$$

attribute doesn't exist,

$$-COF(o_i) = \sum_{\forall c,t} AB_{(asset\ c,t)}(o_i) * R_{(asset\ c,t)}(type_{p,a}(o_i)),$$

$$-IntExp(o_i) = \sum_{\forall c,t} AB_{(liability\ c,t)}(o_i) * rate_{(liability\ c,t)}(o_i),$$

only if object

attribute doesn't exist,

$$+VOF(o_i) = \sum_{\forall c,t} AB_{(liability\ c,t)}(o_i) * R_{(c,t)}(type_{p,a}(o_i)),$$

wherein:

$AB_{(c,t)}(o_i)$ =Average Balances of the object o_i ,

$rate_{(c,t)}(o_i)$ =Effective interest rate for the corresponding balance,

$Type_{p,a}(o_i)$ =Object o_i 's product and object attributes as needed to identify treatment,

$R_{(c,t)}(type_{p,a}(o_i))$ =Rate (treatment rate) for this object's product type, given the balance class, and tier/tenor,

$Int\ Inc\ (o_i)$ =Interest Income of object o_i ,

$COF\ (o_i)$ =Cost of funds used by object o_i ,

$Int\ Exp\ (o_i)$ =Interest Expense for object o_i , and

$VOF\ (o_i)$ =Value of funds provided by object o_i .

21 The process of Claim 3, wherein Net Interest (NI) is calculated where summations are over the possible balance variables for the object, according to:

$\text{Int Inc}(o_i) = \sum \text{AB}_{(asset\ c, t)}(o_i) * \text{rate}_{(asset\ c, t)}(o_i)$ only if object attribute doesn't exist,

$-\text{COF}(o_i) = \sum \text{AB}_{(asset\ c, t)}(o_i) * \text{R}_{(asset, t)}(\text{type}_{p, a, b}(o_i)),$

$-\text{Int Exp}(o_i) = \sum \text{AB}_{(liability, t)}(o_i) * \text{rate}_{(liability, t)}(o_i)$ only if object attribute doesn't exist,

$+\text{VOF}(o_i) = \sum \text{AB}_{(liability, t)}(o_i) * \text{R}_{liability, t}(\text{type}_{p, a, b}(o_i)),$

wherein:

$\text{AB}_{(c, t)}(o_i)$ = Average Balances of the object,

$\text{rate}_{(c, t)}(o_i)$ = Effective interest rate for the corresponding balance amounts,

$\text{type}_{p, a, b}(o_i)$ = Object o_i 's product, object attribute, and behavior types as needed to identify treatment rate,

$\text{R}_{(c, t)}(\text{type}_{p, a, b}(o_i))$ = Rate (treatment rate) for objects of this product type, balance class, and tier/tenor,

$\text{Int Inc}(o_i)$ = interest Income of object o_i ,

$\text{COF}(o_i)$ = Cost of funds used by object o_i ,

$\text{Int Exp}(o_i)$ = Interest Expense for object o_i , and

$\text{VOF}(o_i)$ = Value of funds provided by object o_i .

544. Dependent Claims 9, 13, 17, and 21 all recite substantially similar language and formulas for calculating net interest based on interest income, interest expense, cost of funds used, and value of funds provided. The primary differences between these claims relate to the factors used to select a treatment rate for the cost of funds and value of funds calculation. See Ex. 1001 at Claims 9, 13, 17, and 21. For example, Claim 13 discloses identifying the object's product type/group, and then determining the treatment rate on the product's type/group, given the balance class and tier. Claim 17 identifies the object's product and object

attributes, and then determining the treatment rate on the product's type, given the balance class and tier/tenor. Claim 21 identifies the object's product attributes, object attribute, and behavior types, and then determining the treatment rate based on the product type, balance class, and tier/tenor.

545. I understand that Claims 9, 13, 17, and 21 depend from Claim 3, and that in order to disclose or render obvious this claim, each limitation of any base claim and any intervening claim must be met in addition to the instant claim limitation. It is my opinion that *E&Y*, in view of *Blain*, in further view of *Kimball* renders this claim obvious and teaches this limitation.

546. Claims 9, 13, 17, and 21 recite calculating Net Interest (NI) by adding interest income and value of funds provided, and subtracting therefrom interest expense and cost of funds used. Each of these calculations are based on the average asset (or liability) balance of the object being measured, multiplied by an interest rate (or treatment rate) based on the object's product attributes. The '316 Patent discloses that the method of valuing an object's use or source of funds (*i.e.*, cost of funds used and value of funds provided) was commonly known in the art as Matched Maturity Funds Transfer Pricing theory. Ex. 1001 at 8:43-47. The '316 Patent states that:

Funds Treatment – Every object with cash flows affecting
a financial statement's balance sheet requires a ***method of***

valuing an object's use or source of funds. The common name for this approach to valuing is know [sic] as “Matched Maturity Funds Transfer Pricing.

Ex. 1001 at 8:43-47. This claim recites elements substantially similar to Claims 13, 17, and 21, all of which are rendered obvious by *E&Y*, in view of *Blain*, in further view of *Kimball*. It is my opinion that *E&Y*, in view of *Blain*, in further view of *Kimball* renders obvious Claims 9, 13, 17, and 21.

547. *E&Y* discloses calculating net interest using interest income, interest expense, and cost (or value) of funds. Ex. 1005 at 195, 254, Chapter 10; *supra* VII.B.1. While *Blain* does not disclose funds transfer pricing in detail, *Blain* discloses calculating profit using transfer pricing. Ex. 1006 at 311; *supra* VII.C.1.

548. *Kimball* describes the process of funds transfer pricing to calculate net interest for a business unit or product, explaining that:

Increasingly, banks use sophisticated funds-transfer-pricing systems to compute net-interest income for a business unit or product. In these systems, businesses generating deposits sell the deposits to a pool manager, accruing the difference between the rate paid on the deposits and the pool rate as net-interest income.

Ex. 1010 at 22. *Kimball* describes the funds transfer pricing system as calculating net interest for deposits as the difference between the rate paid on liabilities, such as deposits (*i.e.*, interest expense), and the liability pool rate (*i.e.*, value of funds provided). The “pool rate” referenced above is a liability pool rate for deposit accounts, which is the rate for the “value of funds provided” by the bank’s deposit accounts. *Kimball*, above, also describes the funds transfer pricing system as “increasingly” used at banks, implying that these systems were commonly known and used by those in the field at the time of the invention. *Kimball* further describes the funds transfer pricing process for assets as:

Business units that ***generate assets purchase funds from the pool, receiving the difference between the rate received on the asset and the pool rate as net-interest income.*** The ***pool rate is the rate at which the bank could raise or employ funds in the money markets;*** thus, it is a ***measure of opportunity cost to the bank.*** This rate divides the ***net-interest margin of the bank*** between the business unit generating the liability and the business unit generating the corresponding asset.

Ex. 1010 at 22. *Kimball* is describing the process of funds transfer pricing for assets, explaining that the difference between the rate received on an asset (*i.e.*, interest

income) and the asset pool rate (*i.e.*, cost of funds used) is the net interest income for assets. The “pool rate” in the paragraph above is an asset pool rate for bank assets, which is the rate for the “cost of funds used” on the bank asset. Combining the two paragraphs above, *Kimball* discloses calculating each of Interest Income, Interest Expense, Cost of funds used, and Value of funds provided in order to calculate net interest for all assets and liabilities. This calculation can be depicted, in terms of the formula of Claims 9, 13, 17, and 21 as:

$$\textbf{Kimball: } NI = AB_{asset}(rate_{asset} - R_{pool}) - AB_{liability}(rate_{liability} - R_{pool})$$

'137 Patent: *NI*

$$\begin{aligned} &= (AB_{asset} * rate_{asset}) - (AB_{asset} * R_{asset}) \\ &- (AB_{liability} * rate_{liability}) + (AB_{liability} * R_{liability}) \end{aligned}$$

By describing this net interest calculation based on funds transfer pricing, *Kimball* discloses and renders obvious Claims 9, 13, 17, and 21.

549. In addition, *Kimball* describes calculating the treatment rates for transfer pricing based on a product’s type, balance class (*i.e.*, asset or liability), and tier/tenor (*e.g.*, duration or maturity) by explaining that:

This simple approach to funds-transfer pricing is complicated somewhat because ***rates received on assets and paid on liabilities usually differ by maturity*** depending on the slope of the yield curve at the time the

asset or liability is added to the balance sheet. ***Most banks allow for this effect by creating multiple pools, or buckets, by maturity class.*** Thus, a ***business unit generating automobile paper purchases funds from the two-year bucket*** and is hedged against interest-rate risk for the life of the asset.

Ex. 1010 at 22. *Kimball*, in addition to disclosing the net interest calculation of Claims 9, 13, 17, and 21, discloses creating multiple pools for determining transfer rates based on the business unit (*i.e.*, product type), the asset or liability class (*i.e.*, balance class), and maturity (*i.e.*, tier/tenor). Thus, *Kimball*, in view of *E&Y*, in further view of *Blain*, renders obvious Claims 9, 13, 17, and 21.

550. As disclosed by the '316 Patent, and as discussed in Section VII.A.2(viii), calculating net interest according to funds transfer pricing was well-known, routine, and conventional in the art at the time of the invention. Ex. 1001 at 8:43-47; Ex. 1013 at 904-916. In describing how to calculate net interest using funds transfer pricing, *E&Y* and *Kimball* each render obvious Claims 9, 13, 17, and 21. Further, it would have been obvious for a POSITA to combine the well-known accounting practice of funds transfer pricing with a database at the time of the invention. Similarly, it would have been obvious to combine the elements of *E&Y*

and *Kimball* with the well-known elements of funds transfer pricing to render Claims 9, 13, 17, and 21 obvious.

2. Dependent Claims 10, 14, 18, and 22 are Anticipated and Obvious

551. Dependent Claims 10, 14, 18 and 22 all recite substantially the same claim language and formulas for calculating earnings on allocated equity based on the average asset balance, equity ratio, and treatment rate for equity. The only difference between these four claims is their dependency on Claims 9, 13, 17, and 21, respectively. See Ex. 1001 at Claims 10, 14, 18, and 22. A comparison of the four claims is provided below to demonstrate their similarity:

10. The process of claim 9, including the step of calculating earnings on allocated equity, where the summation is taken over all asset balances, according to: $EOAE(o_i) = R_{equity} * ER * \Sigma AB_{(asset,t)}(o_i), \text{ wherein:}$ $AB_{(asset,t)}(o_i)$ = Average Asset balances of the object o_i, including any allocated asset balances, ER = Equity Ratio, and R_{equity} = Treatment Rate for equity.	14. The process of claim 13, including the step of calculating earnings on allocated equity, where the summation is taken over all asset balances, according to: $EOAE(o_i) = R_{equity} * ER * \Sigma AB_{(asset,t)}(o_i), \text{ wherein:}$ $AB_{(asset,t)}(o_i)$ = Average Asset balances of the object o_i, including any allocated asset balances, ER = Equity Ratio, and R_{equity} = Treatment Rate for equity.
18. The process of claim 17, including the step of calculating earnings on allocated equity, where the summation is taken over all asset balances, according to: $EOAE(o_i) = R_{equity} * ER * \Sigma AB_{(asset,t)}(o_i), \text{ wherein:}$ $AB_{(asset,t)}(o_i)$ = Average Asset balances of the object o_i, including any allocated asset balances, ER = Equity Ratio, and R_{equity} = Treatment Rate for equity.	22. The process of claim 21, including the step of calculating earnings on allocated equity, where the summation is taken over all asset balances, according to: $EOAE(o_i) = R_{equity} * ER * \Sigma AB_{(asset,t)}(o_i), \text{ wherein:}$ $AB_{(asset,t)}(o_i)$ = Average Asset balances of the object o_i, including any allocated asset balances, ER = Equity Ratio, and R_{equity} = Treatment Rate for equity.

See Ex. 1001 at Claims 10, 14, 18, and 22. The claim language is exactly the same for each of the four claims, except for the claim dependencies.

10 The process of Claim 9, including the step of calculating earnings on allocated equity, where the summation is taken over all asset balances, according to:

$EOAE(o_i) = R_{equity} * ER * \Sigma AB_{(asset,t)}(o_i)$, wherein:
 $AB_{(asset,t)}(o_i)$ = Average Asset balances of the object o_i ,
including any allocated asset balances,
 ER = Equity Ratio, and
 R_{equity} = Treatment Rate for equity.

14 The process of Claim 13, including the step of calculating earnings on allocated equity, where the summation is taken over all asset balances, according to:

$EOAE(o_i) = R_{equity} * ER * \Sigma AB_{(asset,t)}(o_i)$, wherein:
 $AB_{(asset,t)}(o_i)$ = Average Asset balances of the object o_i ,
including any allocated asset balances,
 ER = Equity Ratio, and
 R_{equity} = Treatment Rate for equity.

- 18 The process of Claim 17, including the step of calculating earnings on allocated equity, where the summation is taken over all asset balances, according to:**

$$EOAE(o_i) = R_{equity} * ER * \Sigma AB_{(asset,t)}(o_i), \text{ wherein:}$$

$AB_{(asset,t)}(o_i)$ = Average Asset balances of the object o_i , including any allocated asset balances,
 ER = Equity Ratio, and
 R_{equity} = Treatment Rate for equity.

- 22 The process of Claim 21, including the step of calculating earnings on allocated equity, where the summation is taken over all asset balances, according to:**

$$EOAE(o_i) = R_{equity} * ER * \Sigma AB_{(asset,t)}(o_i), \text{ wherein:}$$

$AB_{(asset,t)}(o_i)$ = Average Asset balances of the object o_i , including any allocated asset balances,
 ER = Equity Ratio, and
 R_{equity} = Treatment Rate for equity.

552. I understand that Claim 10 depends from Claim 9, Claim 14 depends from Claim 13, Claim 18 depends from Claim 17, Claim 22 depends from Claim 21, and that in order to disclose or render obvious these claims, each limitation of any base claim and any intervening claim must be met in addition to the instant claim limitation. It is my opinion that *E&Y*, in view of *Blain*, in further view of *Kimball*, renders these claims obvious and teaches this limitation.

553. Claims 10, 14, 18, and 22 recites calculating earnings on allocated equity (EOAE) by multiplying the treatment rate of equity (R_{equity}) by the equity ratio (ER), and multiplying that result by the sum of all average asset balances ($AB_{(\text{asset},t)}$) associated with the object o_i . This option for allocating equity to objects is referred to in the '316 Patent as: "Option 2 EOAE calculation based on a simple equity ratio." Ex. 1001 at 14:36,44-51. I would note that the equation of Claims 10, 14, 18, and 22 are strikingly similar to the calculation of ROE and DuPont Analysis, both concepts well-known in the art at the time of the invention.

554. It is important to note that values multiplied outside the summation (" Σ ") can be moved into the summation argument by the associative and distributive properties of multiplication. Specifically, depending on whether the equity ratio is a common ratio for the entire organization or a specific equity ratio for the object, the equity ratio times the average asset balance is equal to the equity funds used by, or allocated to, the object o_i . For example, a loan of \$1,000 with an equity ratio of 20% results in \$200 of equity allocated to the loan ($\$1,000 \times 0.20 = \$200$). Indeed, the equity ratio is just the equity balance over the asset balance. The result of multiplying the equity ratio and the average asset balance of the object equals the equity used by the object. The result of multiplying the equity used by the object by the treatment rate for equity is the cost (or earnings) of equity used. It is important to note that there is no indication within the '316 claims or specification

as to how to calculate the treatment rate for equity. It should also be noted that while parent Claim 3 references calculating “earnings on equity funds used,” Claims 10, 14, 18, and 22 refer to the “step of calculating earnings on allocated equity.” For the purposes of this analysis, I am treating these two phrases as if they refer to the same concept.

555. *E&Y* discloses calculating the earnings on allocated equity using the equity ratio and a treatment rate for equity. Ex. 1005 at 14-15, 178, 219; *supra* VII.B.10. While *Blain* does not disclose the process of allocating equity in detail, *Blain* discloses calculating profit using transfer pricing. Ex. 1006 at 311; *supra* VII.C.1.

556. *Kimball* discloses calculating earnings on (or cost of) allocated equity as a source for funds used in the funds transfer pricing calculation, explaining that:

To business managers, ***capital is a source of funding for their businesses***, similar to CDs or purchased funds. Banks must recognize the ***role of capital as a source of funds*** and ***integrate capital into the funds-transfer-pricing system*** to measure accurately the ***profitability of a particular business, product, or customer relationship***.

Ex. 1010 at 22. *Kimball* describes integrating capital costs into the funds transfer pricing system (calculated on a per transaction basis) to measure the profitability of a business, product, or customer. *Kimball* explains how to integrate capital costs into the funds transfer pricing system:

To allow for ***equity's role as a source of funds***, then each business would ***receive an equity credit equivalent to the assigned equity times the transfer rate in the longest maturity bucket.***

Ex. 1010 at 22. *Kimball* describes calculating an equity credit as “assigned equity” times the “transfer rate.” A POSITA would have understood “assigned equity” as being the equity ratio (*i.e.*, ER) times the asset balance (*i.e.*, “AB”). A POSITA would have also understood the transfer rate to mean the treatment rate of equity (*i.e.*, “R_{equity}”). Thus, *Kimball* discloses the equation of Claims 10, 14, 18, and 22 as shown below:

$$EOAE(o_i) = \boxed{\text{TransferRate}} * \boxed{\text{AssignedEquity}}$$

$$EOAE(o_i) = \boxed{R_{equity}} * \boxed{ER * \sum AB_{(asset,t)}(o_i)}$$

For at least the reasons above, *Kimball* renders obvious Claims 10, 14, 18, and 22.

557. As discussed in Section VII.A.2(ix), calculating earnings on allocated equity using simple ratios was well-known, routine, and conventional in

the art at the time of the invention. Ex. 1018 at 17, 26-27, 69. In describing how to calculate earnings on equity allocation, *E&Y* and *Kimball* each render obvious Claims 10, 14, 18, and 22. Further, it would have been obvious for a POSITA to combine the teachings of *E&Y* and/or *Kimball* with the well-known and routine calculations of allocated equity using simple ratios to render Claims 10, 14, 18, and 22 obvious.

3. Dependent Claims 11, 15, 19, and 23 are Anticipated and Obvious

558. Dependent Claims 11, 15, 19, and 23 all recite substantially the same claim language and formulas for calculating earnings on allocated equity based on the amount associated with the object, an object weight, a risk-weighted capital ratio, and treatment rate for equity. The only difference between these four claims is their dependency on Claims 9, 13, 17, and 21, respectively. See Ex. 1001 at Claims 11, 15, 19, and 23. A comparison of the four claims is provided below to demonstrate their similarity:

11. The process of claim 9, including the step of calculating earnings on allocated equity according to: $EOAE(o_i) = R_{equity} * \Sigma [Amount(o_i) * Wt(o_i)] * Cap\ Ratio], \text{ wherein:}$ Amount(o_i)=Amount(s) associated with object ‘a’ This may be the average asset balances of the object ‘o_i’ including any allocated asset balances, or may be an object parameter, Wt(type(o_i))=Code needed to identify the weight for object o balances, at the object-type level, W(Wt(type(o_i)))=determined by the weight code, Cap Ratio=An appropriate risk-weighted capital ratio chosen, and R_{equity}=Treatment Rate for equity.	15. The process of claim 13, including the step of calculating earnings on allocated equity according to: $EOAE(o_i) = R_{equity} * \Sigma [Amount(o_i) * W(Wt(o_i))] * Cap\ Ratio], \text{ wherein:}$ Amount(o_i)=Amount(s) associated with object ‘a’ This may be the average asset balances of the object ‘o_i’ including any allocated asset balances, or may be an object parameter, Wt(type(o_i))=Code needed to identify the weight for object o balances, at the object-type level, W(Wt(type(o_i)))=determined by the weight code, Cap Ratio=An appropriate risk-weighted capital ratio chosen, and R_{equity}=Treatment Rate for equity.
19. The process of claim 17, including the step of calculating earnings on allocated equity according to: $EOAE(o_i) = R_{equity} * \Sigma [Amount(o_i) * W(Wt(o_i))] * Cap\ Ratio], \text{ wherein:}$ Amount(o_i)=Amount(s) associated with object ‘a’ This may be the average asset balances of the object ‘o_i’ including any allocated asset balances, or may be an object parameter, Wt(type(o_i))=Code needed to identify the weight for object o balances, at the object-type level, W(Wt(type(o_i)))=determined by the weight code, Cap Ratio=An appropriate risk-weighted capital ratio chosen, and R_{equity}=Treatment Rate for equity.	23. The process of claim 21, including the step of calculating earnings on allocated equity according to: $EOAE(o_i) = R_{equity} * \Sigma [Amount(o_i) * W(Wt(o_i))] * Cap\ Ratio], \text{ wherein:}$ Amount(o_i)=Amount(s) associated with object ‘a’ This may be the average asset balances of the object ‘o_i’ including any allocated asset balances, or may be an object parameter, Wt(type(o_i))=Code needed to identify the weight for object o balances, at the object-type level, W(Wt(type(o_i)))=determined by the weight code, Cap Ratio=An appropriate risk-weighted capital ratio chosen, and R_{equity}=Treatment Rate for equity.

See Ex. 1001 at Claims 11, 15, 19, and 23. The claim language is exactly the same for each of the four claims, except for the claim dependencies.

11 The process of Claim 9, including the step of calculating earnings on allocated equity according to:

$$EOAE(o_i) = R_{equity} * \Sigma [Amount(o_i) * W(Wt(o_i)) * Cap Ratio], \text{ wherein:}$$

Amount(o_i)=Amount(s) associated with object 'a' This may be the average asset balances of the object ' o_i ' including any allocated asset balances, or may be an object parameter,

Wt(type(o_i))=Code needed to identify the weight for object o balances, at the object-type level,

W(Wt(type(o_i)))=determined by the weight code,

Cap Ratio=An appropriate risk-weighted capital ratio chosen, and

R_{equity} =Treatment Rate for equity.

15 The process of Claim 13, including the step of calculating earnings on allocated equity according to:

$$EOAE(o_i) = R_{equity} * \Sigma [Amount(o_i) * W(Wt(o_i)) * Cap Ratio], \text{ wherein:}$$

Amount(o_i)=Amount(s) associated with object 'a' This may be the average asset balances of the object ' o_i ' including any allocated asset balances, or may be an object parameter,

Wt(type(o_i))=Code needed to identify the weight for object o balances, at the object-type level,

W(Wt(type(o_i)))=determined by the weight code,

Cap Ratio=An appropriate risk-weighted capital ratio chosen, and

R_{equity} =Treatment Rate for equity.

19 The process of Claim 17, including the step of calculating earnings on allocated equity according to:

$$EOAE(o_i) = R_{equity} * \Sigma [Amount(o_i) * W(Wt(o_i)) * Cap Ratio], \text{ wherein:}$$

Amount(o_i)=Amount(s) associated with object 'a' This may be the average asset balances of the object ' o_i ' including any allocated asset balances, or may be an object parameter,

Wt(type(o_i))=Code needed to identify the weight for object o balances, at the object-type level,

W(Wt(type(o_i)))=determined by the weight code,

Cap Ratio=An appropriate risk-weighted capital ratio chosen, and

R_{equity} =Treatment Rate for equity.

23 The process of Claim 21, including the step of calculating earnings on allocated equity according to:

$$EOAE(o_i) = R_{equity} * \Sigma [Amount(o_i) * W(Wt(o_i)) * Cap Ratio], \text{ wherein:}$$

Amount(o_i)=Amount(s) associated with object 'a' This may be the average asset balances of the object ' o_i ' including any allocated asset balances, or may be an object parameter,

Wt(type(o_i))=Code needed to identify the weight for object o balances, at the object-type level,

W(Wt(type(o_i)))=determined by the weight code,

Cap Ratio=An appropriate risk-weighted capital ratio chosen, and

R_{equity} =Treatment Rate for equity.

559. I understand that Claim 11 depends from Claim 9, Claim 15 depends from Claim 13, Claim 19 depends from Claim 17, Claim 23 depends from

Claim 21, and that in order to disclose or render obvious this claim, each limitation of any base claim and any intervening claim must be met in addition to the instant claim limitation. It is my opinion that *E&Y*, in view of *Blain*, in further view of *Kimball*, renders this claim obvious and teaches this limitation.

560. Claims 11, 15, 19, and 23 recite calculating earnings on allocated equity by multiplying a treatment rate of equity (R_{equity}) by the summation of the object asset balance (Amount), an object weighting ($W(Wt)$), and a risk-weighted capital ratio (Cap Ratio). Claims 11, 15, 19, and 23, and the '316 Patent, fail to specify what the "weight" of an object balance refers to, or how to calculate the weight. Furthermore, the '316 Patent fails to describe what an "appropriate" risk-weighted capital ratio is. Regardless, *E&Y*, in view of *Blain*, in view of *Kimball*, still discloses all elements of Claims 11, 15, 19, and 23, thus rendering obvious Claims 11, 15, 19, and 23. Additionally, the '316 specification describes the equity allocation formula of Claims 11, 15, 19, and 23 as a "regulatory definition." Ex. 1001 at 8:56-64. Since the equity allocation formula of Claims 11, 15, 19, and 23 was obvious enough to be included in regulations (e.g., the Basel Accords which, in the United States, are implemented by regulators including the Office of the Comptroller of the Currency and the Federal Reserve), this equity allocation formula would have been obvious to a POSITA.

561. Additionally, the ‘316 specification also explains that “[f]our exclusive options are provided for allocating equity to objects,” describing the equity allocation formula of Claims 11, 15, 19, and 23 as “Option 3 Equity allocation for all assets ***following industry standards.***” Ex. 1001 at 14:36-38,52-60. The fact that this equity allocation formula follows industry standards means that the formula was known within industry and would have been obvious for a POSITA to use. This description from the ‘316 specification demonstrate that the calculation of earnings on allocated equity according to Claims 11, 15, 19, and 23 were well-known, routine and conventional since they are established “industry standards.” Thus, the calculations of Claims 11, 15, 19, and 23 are rendered obvious as stated by the ‘316 Patent specification.

562. *E&Y* discloses calculating earnings on allocated equity using regulatory guidelines, including using a risk-adjusted capital ratio. Ex. 1005 at 13-14, 30, 218; *supra* VII.B.11. While *Blain* does not disclose funds transfer pricing in detail, *Blain* discloses calculating profit using transfer pricing. Ex. 1006 at 311; *supra* VII.C.1.

563. *Kimball* discloses calculating earnings on allocated equity based on assigned equity and a transfer rate (*e.g.*, hurdle rate):

To allow for ***equity's role as a source of funds***, then each business would ***receive an equity credit equivalent to the***

assigned equity times the transfer rate in the longest maturity bucket.

Ex. 1010 at 22. *Kimball* explains one method of “allocate[ing] capital based on regulatory requirements” by adjusting the amount of equity assigned to a transaction as:

For example, the *regulatory guidelines* assign an **8% Tier 1 capital requirement to credit card assets**, but based on the premiums paid in the brisk market for credit card portfolios, the *market-based capital for credit card portfolios is closer to 11% than to 8%.*

Ex. 1010 at 18-19. *Kimball* describes calculating earnings on allocated equity according to regulatory guidelines. A POSITA would understand that the Tier 1 capital requirement (*e.g.*, the Basel capital requirements) disclosed above is a risk-adjusted measure of the equity assigned to an asset class. In that example, the 8% capital requirement (*i.e.*, risk-adjusted capital ratio or CapRatio) would have a weight of 1. Alternatively, as described above, if the market-based capital rate is the desired equity allocation, the 8% regulatory capital requirements (*i.e.*, CapRatio) may be weighted (*i.e.*, $W(Wt(o_i)) = 1.375$) to arrive at the market-based capital allocation of 11% (*i.e.*, $1.375 * 8\% = 11\%$). When combined with the equity credit calculation, *Kimball* discloses calculating earnings on allocated equity as the transfer

rate (*i.e.*, R_{equity}) times the assigned equity, where the assigned equity is calculated as the regulatory capital requirement (*i.e.*, $CapRatio$) times a weight (*i.e.*, $W(Wt(o_i))$) times the asset balance (*i.e.*, $Amount(o_i)$). In terms of the formula of Claims 11, 15, 19, and 23, *Kimball* discloses:

$$\begin{array}{l}
 \textbf{Kimball: } EOAE(o_i) = \boxed{TransferRate} * \sum [\boxed{Balance_{asset}} * \boxed{Weight} * \boxed{CapReq_{Tier1}}] \\
 \textbf{'137 Patent: } EOAE(o_i) = \boxed{R_{equity}} * \sum [\boxed{Amount(o_i)} * \boxed{W(Wt(o_i))} * \boxed{CapRatio}]
 \end{array}$$

Thus, *Kimball* renders obvious Claims 11, 15, 19, and 23.

564. As disclosed in the '316 Patent, and as discussed in Section VII.A.2(x), calculating earnings on allocated equity using a treatment rate for equity, object asset balance, an object weight, and a risk-weighted capital ratio was well-known, routine, and conventional in the art at the time of the invention. Ex. 1001 at 8:59-64. In describing how to calculate earnings on allocated equity using a risk-adjusted capital ratio, using regulatory requirements, and/or using industry standards, *E&Y* and *Kimball* each render obvious Claims 11, 15, 19, and 23. Further, it would have been obvious for a POSITA to combine the teachings of *E&Y* and/or with well-known and routine elements calculating earnings on allocated equity using an object weight, a risk-weighted capital ratio, and a treatment rate for equity to render Claims 11, 15, 19, and 23 obvious.

4. Dependent Claims 12, 16, 20, and 24 are Anticipated and Obvious

565. Dependent Claims 12, 16, 20, and 24 all recite substantially the same claim language and formulas for calculating earnings on allocated equity based on the amount associated with the object, an equity allocation rule for a cohort, and treatment rate for equity. The only difference between these four claims is their dependency on Claims 9, 13, 17, and 21, respectively. See Ex. 1001 at Claims 12, 16, 20, and 24. A comparison of the four claims is provided below to demonstrate their similarity:

12. The process of claim 9, including the step of calculating earnings on allocated equity, according to: $EOAE(o_i) = R_{equity} * E_{cohort}(o)(Amount(o_i)),$ or $\Sigma R_{equity} * [\alpha + \beta * Amount(o_i)]$, wherein: Amount($o_i$)=An amount or amounts related to the object, such as average balances of the object (denoted $AB_{(c,s,t)}(o_i)$, Cohort(o_i)=The cohort of objects in which object o is a member, $E_{cohort}(o_i)$=The equity allocation rule for the cohort of object o, according to a linear (two-valued) function that operates on Amount(o_i) of the form $\alpha + \beta * Amount(o)$, and R_{equity}=Treatment Rate(s) for equity for the Amount(o_i) value(s).	16. The process of claim 13, including the step of calculating earnings on allocated equity, according to: $EOAE(o_i) = \Sigma R_{equity} * E_{cohort}(o)(Amount(o_i)),$ or $\Sigma R_{equity} * [\alpha + \beta * Amount(o_i)]$, wherein: Amount($o_i$)=An amount or amounts related to the object, such as average balances of the object (denoted $AB_{(c,s,t)}(o_i)$, Cohort(o_i)=The cohort of objects in which object o is a member, $E_{cohort}(o_i)$=The equity allocation rule for the cohort of object o, according to a linear (two-valued) function that operates on Amount(o_i) of the form $\alpha + \beta * Amount(o)$, and R_{equity}=Treatment Rate(s) for equity for the Amount(o_i) value(s).

20. The process of claim 17, including the step of calculating earnings on allocated equity, according to: $EOAE(o_i) = \Sigma R_{equity} * E_{cohort}(o)(Amount(o_i)),$ or $\Sigma R_{equity} * [\alpha + \beta * Amount(o_i)]$, wherein: Amount($o_i$)=An amount or amounts related to the object such as average balances of the object (denoted $AB_{(c,s,f)}(o_i)$), Cohort(o_i)=The cohort of objects in which object o is a member, $E_{cohort}(o_i)$=The equity allocation rule for the cohort of object o, according to a linear (two-valued) function that operates on Amount(o_i) of the form $\alpha + \beta * Amount(o)$ and R_{equity}=Treatment Rate(s) for equity for the Amount(o_i) value(s).	24. The process of claim 21, including the step of calculating earnings on allocated equity, according to: $EOAE(o_i) = \Sigma R_{equity} * E_{cohort}(o)(Amount(o_i)),$ or $\Sigma R_{equity} * [\alpha + \beta * Amount(o_i)]$, wherein: Amount($o_i$)=An amount or amounts related to the object such as average balances of the object (denoted $AB_{(c,s,f)}(o_i)$), Cohort(o_i)=The cohort of objects in which object o is a member, $E_{cohort}(o_i)$=The equity allocation rule for the cohort of object o, according to a linear (two-valued) function that operates on Amount(o_i) of the form $\alpha + \beta * Amount(o)$ and R_{equity}=Treatment Rate(s) for equity for the Amount(o_i) value(s).

See Ex. 1001 at Claims 12, 16, 20, and 24. The claim language is exactly the same for each of the four claims, except for the claim dependencies.

- 12 The process of Claim 9, including the step of calculating earnings on allocated equity according to:**

$$\text{EOAE}(o_i) = R_{\text{equity}} * E_{\text{cohort}}(o)(\text{Amount}(o_i)),$$

or $\Sigma R_{\text{equity}} * [\alpha + \beta * \text{Amount}(o_i)]$, wherein:

$\text{Amount}(o_i)$ = An amount or amounts related to the object, such as average balances of the object (denoted $\text{AB}_{(c,s,t)}(o_i)$,

$\text{Cohort}(o_i)$ = The cohort of objects in which object o is a member,

$E_{\text{cohort}}(o_i)$ = The equity allocation rule for the cohort of object o , according to a linear (two-valued) function that operates on $\text{Amount}(o_i)$ of the form $\alpha + \beta * \text{Amount}(o)$, and

R_{equity} = Treatment Rate(s) for equity for the $\text{Amount}(o_i)$ value(s).

- 16 The process of Claim 13, including the step of calculating earnings on allocated equity according to:**

$$\text{EOAE}(o_i) = \Sigma R_{\text{equity}} * E_{\text{cohort}}(o)(\text{Amount}(o_i)),$$

or $\Sigma R_{\text{equity}} * [\alpha + \beta * \text{Amount}(o_i)]$, wherein:

$\text{Amount}(o_i)$ = An amount or amounts related to the object, such as average balances of the object (denoted $\text{AB}_{(c,s,t)}(o_i)$,

$\text{Cohort}(o_i)$ = The cohort of objects in which object o is a member,

$E_{\text{cohort}}(o_i)$ = The equity allocation rule for the cohort of object o , according to a linear (two-valued) function that operates on $\text{Amount}(o_i)$ of the form $\alpha + \beta * \text{Amount}(o)$, and

R_{equity} = Treatment Rate(s) for equity for the $\text{Amount}(o_i)$ value(s).

- 20 The process of Claim 17, including the step of calculating earnings on allocated equity according to:**

$$\text{EOAE}(o_i) = \Sigma R_{\text{equity}} * E_{\text{cohort}}(o)(\text{Amount}(o_i)),$$

or $\Sigma R_{\text{equity}} * [\alpha + \beta * \text{Amount}(o_i)]$, wherein:

$\text{Amount}(o_i)$ = An amount or amounts related to the object, such as average balances of the object (denoted $\text{AB}_{(c,s,t)}(o_i)$,

$\text{Cohort}(o_i)$ = The cohort of objects in which object o is a member,

$E_{\text{cohort}}(o_i)$ = The equity allocation rule for the cohort of object o, according to a linear (two-valued) function that operates on $\text{Amount}(o_i)$ of the form $\alpha + \beta * \text{Amount}(o)$, and

R_{equity} = Treatment Rate(s) for equity for the $\text{Amount}(o)$ value(s).

- 24 The process of Claim 21, including the step of calculating earnings on allocated equity according to:**

$$\text{EOAE}(o_i) = \Sigma R_{\text{equity}} * E_{\text{cohort}}(o)(\text{Amount}(o_i)),$$

or $\Sigma R_{\text{equity}} * [\alpha + \beta * \text{Amount}(o_i)]$, wherein:

$\text{Amount}(o_i)$ = An amount or amounts related to the object, such as average balances of the object (denoted $\text{AB}_{(c,s,t)}(o_i)$,

$\text{Cohort}(o_i)$ = The cohort of objects in which object o is a member,

$E_{\text{cohort}}(o_i)$ = The equity allocation rule for the cohort of object o, according to a linear (two-valued) function that operates on $\text{Amount}(o_i)$ of the form $\alpha + \beta * \text{Amount}(o)$, and

R_{equity} = Treatment Rate(s) for equity for the $\text{Amount}(o_i)$ value(s).

566. I understand that Claim 12 depends from Claim 9, Claim 16 depends from Claim 13, Claim 20 depends from Claim 17, Claim 24 depends from Claim 21, and that in order to disclose or render obvious this claim, each limitation of any base claim and any intervening claim must be met in addition to the instant claim limitations. It is my opinion that *E&Y*, in view of *Blain*, in further view of *Kimball*, render this claim obvious and teach these limitations.

567. Claims 12, 16, 20, and 24 recite calculating earnings on allocated equity by summing all the treatment rates for equity multiplied by the equity allocation rule for the cohort of the object according to a linear function of the amounts (or balances) related to the object. The ‘316 Patent describes this equity allocation calculation as “Option 4 Equity allocation using an economic allocation rule, based on object cohorts and modern portfolio theory’s capital asset pricing model.” Ex. 1001 at 14:39-41, 15:1-19. Modern Portfolio Theory (“MPT”), and the related Capital Asset Pricing Model (“CAPM”) were well-known, routine, and conventional approaches to finance and accounting at the time of the invention. Ex. 1005 at 224. The ‘316 Patent further explains that “DPM’s equity allocation to the object level calculations may use . . . economic allocations based on econometric modeling (see book on Modern Portfolio Theory) methodologies.” Ex. 1001 at 8:59-64. The ‘316 Patent, in describing Claims 12, 16, 20, and 24 in terms of MPT and

CAPM, demonstrate that the equations in Claims 12, 16, 20, and 24 were well-known, routine, and conventional in the art and obvious for a POSITA to use.

568. The '316 Patent also conflates the calculations of Claims 12, 16, 20, and 24 with the concept of Shareholder Value Add ("SVA") of Claim 29, explaining that:

For those companies which use economic profit value calculations, the formula changes to:

$$\text{Profit}(o_i) = \{ [\text{NIR}(o_i) + \text{OR}(o_i) - \text{DE}(o_i) - \text{IE}(o_i) - P(o_i)] * (1 - \text{EffectiveTaxRate}) \} - \text{SVA}(o_i),$$

where

$$\text{SVA}(o_i) = \alpha(o_i) + \beta(o_i) * \text{Amount}(o_{ii}),$$

and $\alpha(o_i)$, $\beta(o_i)$ are functions for a cohort of objects in which o_i is a member, and $\text{Amount}(o_i)$ is given by a rule which maps o_i to a data value (such as balance, or allocated equity) also defined at the cohort level. (A cohort defined here represents a grouping of objects with similar risk characteristics, consistent with *Modern Portfolio Theory and the Capital Asset Pricing Model*.)

Shareholder Value Add (SVA) is a method financial analysts use to adjust profit measures for risk. The idea is to subtract from the profit measure the cost of the equity required to support whatever object is being measured. Companies use this risk adjustment measure essentially to ***burden the profit for risk being taken with the equity funds used by the object.*** These institutions will classify ***cohorts of risk*** and the risk cost equivalent as a ***percentage of account balance or allocated equity (i.e., "Hurdles")***.

Ex. 1001 at 22:36-59. Again, the ‘316 Patent explains that the process of allocating equity using cohorts with similar risk characteristics is taken from MPT and CAPM. In the specification, cohorts of risk are defined as a percentage of account balance or a percentage of allocated equity, referred to in the ‘316 Patent as “Hurdles” or a hurdle rate. In the paragraph above, the ‘316 Patent also explains that SVA is a “method financial analysts use to adjust profit measures for risk,” describing the method as one already well-known and routine for financial analysts. These descriptions in the ‘316 Patent make it clear that the concept of allocating equity using cohorts, as recited by Claims 12, 16, 20, and 24, was well-known, routine and conventional within the art at the time of the invention.

569. In the airline example provided in the ‘316 Patent, the patent describes:

NI EOAE—Option 4: Allocate equity based on mileage benefit and have it reduce NI by the weighted average cost of capital for the airline.

Rule

Populated in Step 2 are:

The Amount(seat) parameter is Customer:bene_miles

The equity rate is 9.75%

Calculate EOAE(seat)=Amount(seat)*equity
rate*cohort_wt

The cohort is based groups of each instance of loyalty_rtng and class of seat paired. Cohort_wt is “beta” and no “alpha.”

All other attributes and EOAE calculations results are null.

Ex. 1001 at 24:51-63. Above, the ‘316 Patent describes the process of Claims 12, 16, 20, and 24 as “allocat[ing] equity based on mileage benefit and have it reduce NI by the ***weighted average cost of capital for the airline.***” This demonstrates that the linear combination described in Claims 12, 16, 20, and 24 can also be considered the weighted average cost of capital (“WACC”). The concept of calculating WACC is a well-known, routine and conventional in the area of finance, and adjusting profit measures for WACC was widely practiced at the time of the invention. Ex. 1013 at 937-938. It would have been obvious to a POSITA to use WACC to calculate earnings on allocated equity.

570. *E&Y* discloses calculating earnings on allocated equity using market betas, business unit betas, cost of capital hurdle rates, market comparables, and CAPM. Ex. 1005 at 30, 224-226.

571. *Kimball* discloses calculating earnings on allocated equity based on assigned equity and a transfer rate (*e.g.*, hurdle rate):

To allow for ***equity's role as a source of funds***, then each business would ***receive an equity credit equivalent to the assigned equity times the transfer rate in the longest maturity bucket.***

Ex. 1010 at 22. *Kimball* discloses calculating assigned equity based on capital allocations of peer businesses (external cohorts), describing:

Match capital allocations to those of peer businesses

Given the shortcomings of the regulatory guidelines, ***banks could base capital allocations on the capital structure of independent, stand-alone peers.*** A bank would ***construct a peer group for each line of business and allocate capital according to the capital ratios of the peer group.*** For example, the commercial real estate business would be assigned equity as though it were an

independent, publicly traded real estate investment trust
investing in commercial mortgages (Exhibit 2).

Ex. 1010 at 19. *Kimball* describes calculating capital allocations based on the capital ratios of a peer group for each line of business. In terms of the equation of Claims 12, 16, 20, and 24, *Kimball* discloses:

$$EAOE(o_i) = \sum TransferRate * CapRatio_{peer}(Balance_{asset})$$
$$EAOE(o_i) = \sum R_{equity} * E_{cohort}(o)(Amount(o_i))$$

By disclosing a method of calculating earnings on allocated equity using peer groups, *Kimball* renders obvious the equations of Claims 12, 16, 20, and 24.

572. In addition to disclosing the equations of Claims 12, 16, 20, and 24 by allocating equity according to capital ratios of peer groups, *Kimball* presents another method of calculating EOAE by using the capital asset pricing model, explaining:

The most common method of ***calculating risk-based hurdle rates is based on the capital asset pricing model*** and incorporates three factors: the current risk-free rate, the expected return on equity compared to the risk-free rate, and a measure of the riskiness of the individual business relative to the equity market. The ***measure of the***

riskiness of the individual business, or "beta," is calculated as the volatility of returns on the individual business relative to the volatility of returns on all equity. The risk premium for the individual business is "beta" times the historical average difference between the return on equity and the risk-free rate. The hurdle rate is the sum of the risk premium and the risk-free rate.

Ex. 1010 at 24. *Kimball* describes the calculating EOAE using CAPM by determining a beta (a measure of covariance) for each individual business and using that value determine the hurdle rate for allocated equity for that business. In addition to disclosing calculating EOAE using peer groups, *Kimball* also renders obvious Claims 12, 16, 20, and 24 by disclosing calculating EOAE using CAPM.

573. As discussed in Section VII.A.2(xi) and as disclosed by the '316 Patent, calculating equity allocations based on cohorts, using MPT and CAPM, was well-known, routine, and conventional in the art at the time of the invention. Ex. 1001 at 8:59-64, 14:39-41. In describing how to calculate equity allocations using market betas and CAPM, *E&Y* and *Kimball* render obvious Claims 12, 16, 20, and 24. Further, it would have been obvious for a POSITA to combine the teachings of *E&Y* and/or *Kimball* with the well-known financial concepts of MPT and CAPM to render Claims 12, 16, 20, and 24 obvious.

5. Dependent Claim 29 is Anticipated and Obvious

29 The process of Claim 7, wherein the step of adjusting the measure for object level profitability is calculated as:

$$\text{Profit}(o_i) = \{ [\text{NIR}(o_i) + \text{OR}(o_i) - \text{DE}(o_i) - \text{IE}(o_i) - \text{P}(o_i)] * (1 - \text{EffectiveTaxRate}) \} - \text{SVA}(o_i),$$

where

$$\text{SVA}(o_i) = \alpha(o_i) + \beta(o_i) * \text{Amount}(o_i),$$

and

$\alpha(o_i)$, $\beta(o_i)$ are functions for a cohort of objects in which o_i is a member, and $\text{Amount}(o_i)$ is given by a rule which maps o_i to a data value (such as balance, or allocated equity) also defined at the cohort level.

574. I understand that Claim 29 depends from Claim 7, and that in order to disclose or render obvious this claim, each limitation of any base claim and any intervening claim must be met in addition to the instant claim limitation. It is my opinion that *E&Y* renders this claim obvious and teaches this limitation.

575. Claim 29 recites “adjusting the measure for object level profitability” calculated as the formula of parent Claim 6 multiplied by the effective tax rate, with shareholder value add (“SVA”) subtracted therefrom. SVA is defined as a function of $\alpha(o_i)$, $\beta(o_i)$, and $\text{Amount}(o_i)$ classified by a cohort of objects. The ‘316 Patent states that “[a] cohort defined here represents a grouping of objects with similar risk characteristics, *consistent with Modern Portfolio Theory and the*

Capital Asset Pricing Model.” Both Modern Portfolio Theory (“MPT”) and the Capital Asset Pricing Model (“CAPM”) were ubiquitously known and used in the areas of finance and accounting. The ‘316 Patent further describes SVA as:

Shareholder Value Add (SVA) is a method financial analysts use to adjust profit measures for risk. The idea is to subtract from the profit measure the cost of the equity required to support whatever object is being measured. ***Companies use this risk adjustment measure essentially to burden the profit for risk being taken with the equity funds used by the object.*** These institutions will classify ***cohorts of risk*** and the risk cost equivalent as a ***percentage of account balance or allocated equity (i.e., "Hurdles")***.

Ex. 1001 at 22:36-59. In the paragraph above, the ‘316 Patent explains that SVA is a “method financial analysts use to adjust profit measures for risk,” and that “companies use this risk adjustment measure,” describing the method as one already well-known, routine and conventional for financial analysts and companies to use. These descriptions in the ‘316 Patent make it clear that the concept of SVA using cohorts, as recited by Claim 29, was well-known, routine and conventional within the art at the time of the invention.

576. E&Y discloses calculating SVA using market betas, business unit betas, cost of capital hurdle rates, market comparables, and CAPM. Ex. 1005 at 30, 224-226.

577. Kimball also discloses calculating shareholder value add based on assigned equity and a transfer rate (*e.g.*, hurdle rate):

To allow for ***equity's role as a source of funds***, then each business would ***receive an equity credit equivalent to the assigned equity times the transfer rate in the longest maturity bucket.***

Ex. 1010 at 22. Kimball discloses calculating assigned equity based on capital allocations of peer businesses (external cohorts), describing:

Match capital allocations to those of peer businesses

Given the shortcomings of the regulatory guidelines, ***banks could base capital allocations on the capital structure of independent, stand-alone peers.*** A bank would ***construct a peer group for each line of business and allocate capital according to the capital ratios of the peer group.*** For example, the commercial real estate business would be assigned equity as though it were an

independent, publicly traded real estate investment trust
investing in commercial mortgages (Exhibit 2).

Ex. 1010 at 19. *Kimball* describes calculating capital allocations based on the capital ratios of a peer group for each line of business. In terms of the equation of Claims 12, 16, 20, and 24, *Kimball* discloses:

$$SVA(o_i) = \sum 0 + (TransferRate * CapRatio_{peer}) * Balance_{asset}$$
$$SVA(o_i) = \sum \alpha(o_i) + \beta(o_i) * Amount(o_i)$$

In the equation above, $\alpha(o_i) = 0$, $\beta(o_i) = TransferRate * CapRatio_{peer}$, and $Amount(o_i) = Balance_{asset}$. I note that $\alpha(o_i)$ can be considered to be zero in the same way the '316 Patent, in the airline example, assumes $\alpha(o_i)$ to be zero. Ex. 1001 at 28:30-33. By disclosing a method of calculating SVA using peer groups as cohorts, *Kimball* renders obvious the equations of Claim 29.

578. In addition to disclosing the equation of Claims 29 by allocating equity according to capital ratios of peer groups, *Kimball* presents another method of calculating SVA by using the capital asset pricing model, explaining:

The most common method of ***calculating risk-based hurdle rates is based on the capital asset pricing model*** and incorporates three factors: the current risk-free rate, the expected return on equity compared to the risk-free

rate, and a measure of the riskiness of the individual business relative to the equity market. The ***measure of the riskiness of the individual business, or "beta,"*** is calculated as the volatility of returns on the individual business relative to the volatility of returns on all equity. The ***risk premium for the individual business is "beta" times the historical average difference between the return on equity and the risk-free rate.*** The ***hurdle rate is the sum of the risk premium and the risk-free rate.***

Ex. 1010 at 24. *Kimball* describes the calculating SVA using CAPM by determining a beta (a measure of covariance) for each individual business and using that value determine the hurdle rate for allocated equity for that business. In addition to disclosing calculating SVA using peer groups (*i.e.*, cohorts), *Kimball* also renders obvious Claim 29 by disclosing calculating SVA using CAPM.

579. *Kimball* also teaches the simple tax calculation in Claim 29 of multiplying profit by (1-tax) to calculate after-tax profit:

Exhibit 1
Balance Sheet and Income Statement by Line of Business
(millions of dollars)

	Consumer Deposits	Consumer Lending	Mortgage Banking	Servicing	Commercial Real Estate	Treasury	Total Bank
Assets	3	794	2,182	28	1,357	2,764	7,128
Deposits	6,325	—	3	—	—	800	7,128
Gross interest income	120.2	23.5	—	—	16.1	18.9	178.7
Provision for losses	—	8.0	—	—	7.0	3.2	18.2
Net-interest income	120.2	15.5	—	—	9.1	15.7	160.5
Fees	3.0	3.0	60.1	58	5.2	—	129.5
Total revenue	123.2	18.5	60.1	58	14.3	15.7	289.8
Noninterest expense	97.0	4.9	48.5	55	4.3	1.8	211.5
Net income	26.2	13.6	11.6	3	10.0	13.9	78.3
Taxes	10.5	5.4	4.6	1.2	4.0	5.6	31.3
Net income after tax	15.7	8.2	7.0	1.8	6.0	8.3	47.0

Note: Taxes are assumed to be 40% of net income.

Ex. 1010 at 18. *Kimball*, above, teaches that “Net income after tax” is simply “Net Income” time (1-tax_rate), where tax_rate=40%. For example, for the “Consumer Deposits” line of business we have:

$$NetIncome * (1 - tax_{rate}) = NetIncome_{AfterTaxes}$$

$$26.2 \quad * \quad 0.60 \quad = \quad 15.7$$

580. As admitted by the ‘316 Patent, and as discussed in Section VII.A.2(xvi), calculating shareholder value add was well-known, routine, and conventional in the art at the time of the invention. In describing how to calculate SVA and allocated equity using CAPM, *E&Y* and *Kimball* render obvious Claim 29. By describing how to calculate SVA using peer groups (*i.e.*, cohorts), *E&Y*, in view of *Blain*, in further view of *Kimball* render obvious Claim 29. Further, it would have been obvious for a POSITA to combine the teachings of *E&Y* and/or *Kimball* with

the well-known financial concept of calculating SVA using CAPM to render Claim 29 obvious.

F. Ground 8: Claim 30 is Rendered Obvious by *E&Y*, in view of *Blain*, in further view of *McKenzie* and also *E&Y*, *Blain*, *SAP-IS-B*, and *McKenzie*

30 The process of Claim 7, wherein the step of adjusting the measure for object level profitability includes the calculation

$$\text{Profit}(o_i) = [\text{NIR}(o_i) + \text{OR}(o_i) - \text{DE}(o_i) - \text{IE}(o_i) - \text{P}(o_i)] * (1 - \text{EffectiveTaxRate}) \text{ where,}$$

for a two tier taxation system, Effective Tax Rate is calculated as:

$$\text{Effective Tax Rate} = (1 - \text{tax rate 2}) * (\text{tax rate 1}) + \text{tax rate 2.}$$

581. I understand that Claim 30 depends from Claim 7, and that in order to disclose or render obvious this claim, each limitation of any base claim and any intervening claim must be met in addition to the instant claim limitation. It is my opinion that the combination of *E&Y*, *Blain*, and *McKenzie* render this claim obvious and teaches this limitation.

582. It is my opinion that there is a motivation to combine *E&Y*, *Blain*, and *McKenzie* to render Claim 30 obvious. Both *E&Y* and *Blain* are directed to methods of measuring performance of an organization at a granular level. As discussed in Section VII.G.2, it would have been obvious to a POSITA to use *E&Y* and *Blain* together to create a system to calculate profitability. *McKenzie* is directed,

generally, to dividend taxation. Within the context of a business which may receive or distribute dividends, it would have been obvious to a POSITA to combine the teachings of *E&Y* and *Blain* with the dividend taxation calculations of *McKenzie*. Both *E&Y* and *Blain* discuss the calculation of taxes at a high level, but both leave out the details of applying local tax rules. *McKenzie* provides precisely that level of detail for dividend taxation in Canada.

583. Claim 30's calculation of a two-tier tax is a basic mathematical derivation and would have been obvious to a POSITA. *Supra* VII.A.2(xvii). Furthermore, *E&Y* renders obvious Claim 30. *Supra* VII.B.18. While the mathematical formula for a two-tier tax is an obvious mathematical derivation, *E&Y* does not explicitly state the formula of Claim 30. *McKenzie*, however, teaches calculating a two-tiered tax with the first tier being corporate taxes and the second tier being dividend taxes. *McKenzie* teaches that the "total effective tax rate" is:

$$\tau = \theta (1 - u) + u$$

where τ is the total effective tax rate, θ is the first tax rate, and u is the second tax rate. Ex. 1011 at 3. This is the exact formula used in Claim 30. Thus, the equation of *McKenzie* discloses and renders obvious the mathematical formula for calculating a two-tier tax.

584. Claim 30's calculation of a two-tier tax is a basic mathematical derivation and would have been obvious to a POSITA. While *E&Y* and *Blain* do not explicitly derive the two-tier effective tax rate of Claim 30, both teach calculating taxes. However, *McKenzie* discloses the exact equation used for calculating two-tier taxes in Claim 30. Thus, *E&Y*, in view of *Blain*, in further view of *McKenzie* teaches, and renders obvious, calculating two-tiered tax to determine object level profitability.

G. Motivations to Combine

585. The combination of *E&Y* and *Blain* renders obvious Claims 1-30. In addition, the combination of *E&Y*, *Blain*, and *SAP-IS-B* also renders obvious Claims 1-30. The combinations of *E&Y*, *Blain*, and *Kimball* and *E&Y*, *Blain*, *SAP-IS-B*, and *Kimball* render obvious Claims 9-24 and 29. The combinations of *E&Y*, *Blain*, and *McKenzie* and *E&Y*, *Blain*, *SAP-IS-B*, and *McKenzie* render obvious Claim 30.

1. Motivation to Combine

586. A POSITA would be motivated to combine *E&Y* with *Blain*. It is common sense to combine *E&Y*, whose express purpose is to “assist financial institutions with the design implementation, and management of performance information,” with *Blain*, describing a well-known system – SAP-R/3 – for “providing continuous measurement of the profitability of everything that is going

on.” Ex. 1005 at 5; Ex. 1006 at 193. Using the SAP-R/3 system of *Blain* to implement the profitability teachings of *E&Y* would be obvious for a POSITA to try due to the prevalence of the SAP system. Moreover, the SAP-R/3 system of *Blain* was known to POSITAs as an accounting and financial analysis tool and would have been one of a limited number of options when selecting software to implement *E&Y*’s teachings. Implementing *E&Y*’s teachings using the *Blain* system would also yield predictable results, because *Blain*’s system is designed to calculate the same profitability metrics, using the same concepts, that *E&Y* teaches.

587. Additionally, *E&Y* suggests, and provides motivation for, using a system like *Blain* to implement the teachings of *E&Y*. For example, *E&Y*’s discussion of a “[d]atabase gateway technology,” “scalable client-server processing platforms,” and “packaged software” would be recognized by a POSITA as describing a system like SAP-R/3. Ex. 1005 at 273-274.

588. As for *SAP-IS-B*, *Blain* expressly teaches combining SAP-R/3 with the “IS-B Industry Solutions for Banks” explaining that “IS-B is fully compatible with existing R/2 and R/3 installations” and provides “[b]ank profitability analysis.” Ex. 1006 at 585. While *Blain* does not describe IS-B’s calculations in detail, *SAP-IS-B* provides precisely that implementation detail. *SAP-IS-B* also suggests the combination, describing the installation and integration of the IS-B module into the SAP-R/3 system of *Blain*. Ex. 1007 at 9-12. The combination

of *Blain* and *SAP-IS-B* is suggested by both references, and the combination would yield predictable results for measuring profitability of a banking institution.

589. A POSITA would have also known to combine *E&Y*, a guide on performance measurement in financial institutions, with the SAP module that provides a system for performance measurements in banks as described by *SAP-IS-B*. Ex. 1005 at 5. The combination would yield a predictable result for calculating object level profitability for a financial institution.

2. Obviousness (*E&Y* and *Blain*)

590. The elements of Claims 1-30 are taught by *E&Y* (*Supra* VII.B) and the elements of Claims 1-2, 4-5, and 25 are taught by *Blain* (*Supra* VII.C). For the reasons discussed above, a POSITA would find it obvious to combine these teaches to render Claims 1-30 obvious.

591. For example, to the extent it is argued that *Blain* does not teach 1[d], it would have been obvious for a POSITA to use the transfer pricing calculations described in *E&Y* in the *Blain* system, since *Blain* was designed to allow a user to define rules for calculating profitability. As referenced in Section VII.A.1(v), element 1[d] was well-known in the art and it would have been obvious for a POSITA to combine the rules of 1[d] with the cost allocation rules, along with the identification of data in the database, with *Blain* to render 1[d] obvious.

592. Additionally, to the extent that *E&Y* is alleged to not expressly teach “rules” for its various calculations of values and profitability (1[d]-1[e]), *Blain*’s rules-based database system would be an obvious design choice to implement *E&Y*’s teachings for all the reasons discussed above and because *Blain*’s system permitted the use of rules to process the data, select objects, and perform calculations about those objects.

593. To the extent that it is argued that *E&Y* does not expressly teach SQL according to Claim 2, it would have been obvious to a POSITA to use the financial calculations of *E&Y* with the RDBMS (including SQL) of *Blain* to render Claim 2 obvious. Thus, the combination of *E&Y* and *Blain*, renders obvious Claims 1-30.

3. Obviousness (*E&Y*, *Blain*, and *SAP-IS-B*)

594. The elements of Claims 1-30 are taught by *E&Y* (*Supra* VII.B), the elements of Claims 1-2, 4-5, and 25 are taught by *Blain* (VII.C), and the elements Claims 1-6 and 8 are taught by *SAP-IS-B* (VII.D). For the reasons discussed above, a POSITA would find it obvious to combine these teaches to render Claims 1-30 obvious.

595. Specifically, it would have been obvious to a POSITA to combine the financial calculations of *E&Y* with the enterprise database system of *Blain* and *SAP-IS-B*. *Supra* VII.G.2. For example, with respect to Claim 2, it would

have been obvious for a POSITA to use an RDBMS with SQL described by *Blain* (VII.C.2) in the *SAP-IS-B* system, since the SAP-R/3 system of *Blain* was designed to fully integrate with the IS-B module of *SAP-IS-B*. *Supra* VI.C. Similarly, to the extent that it is argued that *E&Y* does not expressly teach establishing rules in the relational database (1[d]) it would have been obvious to a POSITA to use the financial calculations of *E&Y* with the rules-based system of *SAP-IS-B* (VII.D.1) and *Blain* (VII.C.1). As described above, the *SAP-IS-B* system is designed to have users input rules, like those of *E&Y*, into the enterprise system to calculate object level profitability. *Supra* VII.D. Thus, the combination of *E&Y*, *Blain*, and *SAP-IS-B* renders obvious Claims 1-30.

4. Obviousness (*E&Y*, *Blain*, and *Kimball*; *E&Y*, *Blain*, *SAP-IS-B*, and *Kimball*)

596. A POSITA would have combined *E&Y* and *Blain* with *Kimball* and also *SAP-IS-B*. Each of *E&Y*, *Blain*, and *SAP-IS-B* teach methods of measuring organizational performance at a granular level. As discussed above (VII.G.2), it would have been obvious to a POSITA to use *E&Y* and *Blain* together, and also with *SAP-IS-B*, to create a system to calculate profitability. Additionally, a POSITA implementing the profitability systems of *E&Y*, *Blain*, and *SAP-IS-B* would have known to look to banking and accounting publications like the *Bank Accounting & Finance* journal to provide current variations on profitability calculations. For example, *E&Y*, in the chapter discussing allocating equity entitled “Chapter 12:

Capital Issues,” incorporates an article from the Summer 1992 issue of the *Bank Accounting & Finance* journal. Ex. 1005 at 217. *E&Y, Blain*, and *SAP-IS-B* discuss allocating equity to products, customers, and lines of business, and a POSITA would know to look at *Kimball* to provide additional detail on how to allocate equity in such a system.

597. *E&Y* states that “more institutions are adopting shareholder-value-based planning, analysis, and reporting” and that “industry participants and analysts are debating and addressing basic methods” of implementing equity allocations for “disaggregated business lines, products, and perhaps even transactions.” Ex. 1005 at 228. *E&Y* suggests looking to references like *Kimball* to address shareholder-value analysis and equity allocations.

598. Also, a costing component of *SAP-IS-B* is “Equity capital costs,” and it would have been obvious to look to *Kimball* to provide detailed rules on calculating equity capital costs. The combination of *SAP-IS-B* and *Kimball* would yield the predictable results of calculating object level profitability with equity capital costs (earnings on allocated equity).

599. Additionally, Dr. Kimball’s paper 1997 *Innovations in Performance Measurement in Banking* cites both *Kimball* and *E&Y*; expressly suggesting their combination to yield predictable results.

600. The combinations of *E&Y* and *Blain*, and *E&Y, Blain*, and *SAP-IS-B* render obvious the claims from which 9-24 and 29 depend. *Supra* VII.G.3. *Kimball* further teaches the elements of Claims 9-24 and 29. It was obvious to combine *E&Y*'s financial calculations with the enterprise system of *Blain* or *Blain* and *SAP-IS-B*, and further with the equity allocation formulas of *Kimball*, rendering obvious Claims 9-24 and 29. For example, to the extent that *Blain* does not fully disclose calculating transfer pricing of element 1[c], *Kimball* provides precisely that level of detail. *Supra* VII.F. As discussed above, it would have been obvious to a POSITA to integrate the calculations of *Kimball* into a user-defined rules-based system of *Blain*, to yield predictable results.

601. Similarly, to the extent it is argued that *SAP-IS-B* does not fully disclose the NI, EOAE, and SVA calculations of Claims 9-24 and 29, the combination of *SAP-IS-B* and *Kimball* render these claims obvious. It would have been obvious for a POSITA to implement the formulas of *Kimball* in a user-defined rules-based system of *SAP-IS-B*, to achieve expected results for calculating object level profitability.

5. Obviousness (*E&Y, Blain*, and *McKenzie*; *E&Y, Blain, SAP-IS-B*, and *McKenzie*)

602. As discussed above (VII.G.3), it was obvious to use *E&Y* and *Blain* or *E&Y, Blain*, and *SAP-IS-B* to create a system to calculate profitability. *Supra* VII.G.2, VII.G.3. *McKenzie* is directed to dividend taxation. Considering a

business that receives or distributes dividends, it would be obvious to combine *McKenzie's* dividend taxation calculations with these other combinations. For example, *E&Y* and *Blain* discuss calculating taxes generally, and discuss international tax regimes, but leave out details to apply local tax rules or calculate multiple taxes. Ex. 1005 at 73; Ex. 1006 at 203-205, 473-477, 559-560. *McKenzie* provides precisely that level of detail for dividend taxation, and a POSITA would have applied this known technique to yield predictable results. Additionally, *McKenzie* was catalogued and indexed by the classification "Dividends & Taxation," making it obvious to a POSITA to look to *McKenzie* when determining methods of implementing taxation in a profitability system like *E&Y*, *Blain*, or *SAP-IS-B*. Ex. 1017 at ¶78.

VIII. RESERVATION OF RIGHTS

My opinions are based upon the information that I have considered to date. I am unaware of any evidence of secondary considerations with respect to the '316 Patent that would render any of the challenged claims non-obvious. I reserve the right, however, to supplement my opinions in the future to respond to any arguments raised by the owner of the '316 Patent and to take into account new information that becomes available to me.

I declare that all statements made herein of my knowledge are true, and that all statements made on information and belief are believed to be true, and that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Executed on November 9, 2018 in the State of Delaware.

By: Bruce Weber
Bruce Weber, Ph.D.

APPENDIX 1: MATERIALS CONSIDERED IN THE PREPARATION OF THIS DECLARATION

Exhibit No.	Description
1001	U.S. Patent No. 8,612,316 to Lepman (“‘316 Patent”)
1002	Prosecution File History for the ‘316 Patent
1004	C.J. Date, <i>A Guide to the SQL Standard</i> (2d ed. 1989) (“Date”)
1005	Ernst & Young, <i>The Ernst & Young Guide to Performance Measurement for Financial Institutions</i> (1995) (“E&Y”)
1006	Jonathon Blain et al., <i>Using SAP R/3</i> (1996) (“Blain”)
1007	<i>Detailed Functions – System R/3 – IS-B – The SAP Industry Solution For Banks</i> (Certified Translation of <i>Funktionen im Detail – IS-B System R/3: Einzelgeschäftskalkulation/Meldewesen</i> , Walldorf, Germany: SAP AG (1996)) (“SAP-IS-B”)
1008	Julie Mabberley, <i>Activity-based Costing in Financial Institutions</i> Pitman Publishing (1994) (“Mabberley”)
1009	Nic Stuchfield & Bruce Weber, <i>Modeling the Profitability of Customer Relationships: Development and Impact of Barclays De Zoete Wedd's Beatrice</i> , NYU Information Systems Working Papers Series IS-92-23 (Aug. 1992) (“Weber”)
1010	Ralph C. Kimball, <i>Calculating and Using Risk-adjusted ROE for Lines of Business</i> , Bank Accounting & Finance (Fall 1993) (“Kimball”)
1011	Kenneth J. McKenzie & Aileen J. Thompson, <i>Economic Effects of Dividend Taxation</i> , Tech. Committee on Bus. Tax’n, Working Paper 96-7 (Dec. 1996) (“McKenzie”)
1012	Frances X. Frei, Patrick T. Harker, Larry W. Hunter, <i>Innovation in Retail Banking</i> , Wharton Financial Institutions Center (Jan. 1998) (“Frei”)
1013	Charles T. Horngren et al., <i>Cost Accounting: A Managerial Emphasis</i> (9 th ed. 1997) (“Horngren”)
1014	C.J. Date, <i>An Introduction to Database Systems</i> (6th ed. 1995) (“Database Systems”).
1015	File History for US Patent Application No. 09/545,628
1017	Hall-Ellis Declaration
1018	Wells Fargo 1996 Annual Report (1997)

Exhibit No.	Description
1019	Ralph C. Kimball, <i>Innovations in Performance Measurement in Banking</i> , New England Economic Review (1997).
1020	Basel I Accords (1988)
1021	<i>Funktionen im Detail – IS-B System R/3: Einzelgeschäftskalkulation/Meldewesen</i> , Walldorf, Germany: SAP AG (1996) – Received from Stuttgart Library
1022	Affidavit of Christopher Butler of Internet Archive for <i>Funktionen im Detail: System R/3 IS-B The SAP Industry Solution For Banks</i> . Walldorf, Germany: SAP AG (1995).
1023	<i>Funktionen im Detail – IS-B System R/3: Einzelgeschäftskalkulation/Meldewesen</i> , Walldorf, Germany: SAP AG (1996) – Downloaded by Dr. Hall-Ellis from Wayback Machine dated July 1997

APPENDIX 2: CURRICULUM VITAE OF BRUCE WEBER

BRUCE W. WEBER

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University of Delaware
Newark, DE 19716

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EDUCATION

- Ph.D. The Wharton School, University of Pennsylvania
Decision Sciences, 1991. Dissertation: "Alternative Electronic Trading Systems"
Advisor: Eric Clemons. Thesis Chair: Colin Camerer
- M.A. The Wharton School, University of Pennsylvania
Decision Sciences, 1989
- A.B. Harvard University
Applied Mathematics, cum laude, 1984

EXPERIENCE

Alfred Lerner College of Business & Economics, University of Delaware 2011-present
Dean and Professor of Business Administration

- Direct the second largest of UD's seven colleges, and its dually AACSB-accredited programs in Accounting and Business
- Oversee the College's \$60 million budget, 151 permanent faculty members, 61 professionals, 3,515 undergraduates, 969 graduate students, and 30,000 living alumni
- Led College to 32 percent growth in enrollment, 29 percent increase in permanent faculty and professionals, and improvements in program and research rankings
- Grew alumni engagement and leadership advisory boards. Raised over \$51 million
- Secured external funding to establish the Horn Program in Entrepreneurship, the Institute for Financial Services Analytics (IFSA), the Michael '80 and Rosann Geltzeiler Trading Center, and the SWUFE-UD (Chengdu, China) Joint Educational Institute

London Business School, University of London (UK) 1991, 2002-2011

Professor of Information Management, 2006-2011

Subject Area Chair, Management Science & Operations (MSO), 2006-2011

Associate Professor of Information Management, 2002-2006

Visiting Faculty in Information Management, 1991

- Taught MBA core courses and electives, and delivered executive programs globally
- Founding Subject Area Chair for MSO, which grew to 11 tenure track faculty members

Zicklin School of Business, Baruch College, City University of New York 1999-2002

Associate Professor, Computer Information Systems Department,

Founding Director, Subotnick Financial Services Center (SFSC)

- Directed development and activities of the SFSC, a \$3 million, 75-workstation instructional facility for capital markets and financial technology education

Stern School of Business, New York University 1992-1998

Assistant Professor, Information Systems Department

- Stern School Excellence in Teaching prize, 1997

Visiting positions: **Nanyang Technological University**, Singapore, 2009; **Graduate School of Business, Columbia University**, 1998-1999; **Wharton School, University of Pennsylvania**, 1995

ADDITIONAL WORK EXPERIENCE

Oliver, Wyman & Co. (Consultants), Summer Associate, London UK, May-August 1988

Moody's Investors Service, Summer Associate, New York, NY May-August 1987

The MAC Group, Analyst, Cambridge, MA 1984-1986

RESEARCH INTERESTS

(a) Analyzing securities market mechanisms using computer simulation, modeling and experimental economics, (b) financial technology innovation, and (c) performance metrics for on-line markets in electronic commerce.

TEACHING INTERESTS

Information technology management, decision modeling and analytics, IT's impact on financial services, trading operations, and securities market structure.

BOOKS

Mastering the Art of Equity Trading Through Simulation: The TraderEx Course, (R. Schwartz, G. Sipress, B. Weber) John Wiley & Sons, 2010

The Equity Trader Course, (R. Schwartz, R. Francioni, B. Weber) John Wiley & Sons, 2006 – Translated into German and Simplified Chinese

JOURNAL PAPERS

1. "On the Fintech Revolution: Interpreting the Forces of Innovation, Disruption and Transformation in Financial Services" (P. Gomber, R. Kauffman, C. Parker, B. Weber) ***Journal of Management Information Systems***, Vol. 35, No. 1, 2018, pp. 220-265
2. "Fund Governance and Trade Events in a Student-Managed Portfolio" (K. Berkow, R. Jakotowicz, B. Weber) ***Journal of Trading***, Vol. 13, No. 1, Winter 2018, pp. 52-58
3. "Launching Successful E-Markets: A Broker-Level Order-Routing Analysis of Two Options Exchanges" (C. Parker, B. Weber) ***Journal of Management Information Systems***, Vol. 31, No. 2, 2014, pp. 47-76
4. "Impactful Research on Transformational Information Technology: An Opportunity to Inform New Audiences," (H. Lucas, R. Agarwal, E. Clemons, O. El-Sawy, B. Weber) ***MIS Quarterly***, Vol. 37, No. 2, June 2013, pp. 371-382
5. "The defensive use of IT in a newly vulnerable market: The New York Stock Exchange, 1980-2007" (H. Lucas, W. Oh, B. Weber) ***Journal of Strategic Information Systems***, Vol. 18, No. 1, March 2009, pp. 3-15

6. "Execution Costs and Market Design Worldwide" (F. Harris, B. Weber, E. Dimson, F. Hatheway, P. Bennett, G. Petrellab) **Journal of Trading**, Vol. 3, No. 1, Winter 2008, pp. 9-24
7. "Adoption of Electronic Trading at the International Securities Exchange" **Decision Support Systems**, Special issue on Economics and Information Systems, Volume 41, 2006, pp. 728-746
8. "Decision-Making in Equity Trading: Using Simulation to Get a Grip" (R. Schwartz, R. Francioni, B. Weber) **Journal of Trading**, Vol. 1, No. 1, Winter 2006, pp. 59-74
9. "The Impact of E-Commerce on Competition in the Retail Brokerage Industry" (Y. Bakos, H. Lucas, W. Oh, G. Simon, S. Viswanathan and B. Weber) **Information Systems Research**, Vol. 16, No. 4, December 2005, pp. 352-371
10. "Adoption of Electronic Options Trading at the ISE" **IT Professional**, IEEE Computer Society, Vol. 5, No. 4, July-August, 2003, pp. 22-29
11. "Toward New Metrics for Net-Enhanced Organizations" (D. Straub, D. Hoffman, C. Steinfield, B. Weber) **Information Systems Research**, Vol. 13, No. 3, September 2002, pp. 227-238
12. "The Impacts of e-Commerce on Financial Services: A Quantitative Analysis of Transparency, Differential Pricing, and Disintermediation" (E. Clemons, L. Hitt, B. Gu, M.E. Thatcher, B. Weber) **Journal of Financial Services Research**, Vol. 22, No. 1 & 2, August/October 2002, pp. 73-90
13. "Measuring E-Commerce in Net-Enabled Organizations" (Introduction to the Special Issue - D. Straub, D. Hoffman, C. Steinfield, and B. Weber) **Information Systems Research**, Vol. 13, No. 2, June 2002, pp. 115-124
14. "Advances in Research on Information Technologies in the Financial Services Industry" (R. Kauffman, B. Weber) **Journal of Organizational Computing & Electronic Commerce**, Vol. 12, No. 1, March 2002, pp. 1-4
15. "Electronic Trading Systems: Strategic Implications of Market Design Choices" (H. Levecq, B. Weber) **Journal of Organizational Computing & Electronic Commerce**, Vol. 12, No. 1, March 2002, pp. 85-103
16. "Next-Generation Trading in Futures Markets: A Comparison of Open Outcry and Order Matching Systems" **Journal of Management Information Systems**, Vol. 16, No. 2, Fall 1999, pp. 29-45
17. "Restructuring Institutional Block Trading: An Overview of the OptiMark System" (E. Clemons, B. Weber) **Journal of Management Information Systems**, Vol. 15, No. 2, Fall 1998, pp. 41-60
18. "Information Technology and Screen-Based Securities Trading: Pricing the Stock and Pricing the Trade" (E. Clemons, B. Weber) **Management Science**, Vol. 43, No. 12, December 1997, pp. 1693-1708
19. "Next-Generation Securities Market Systems: An Experimental Investigation of Quote-Driven and Order-Driven Trading" (R. Schwartz, B. Weber) **Journal of Management Information Systems**, Vol. 14, No. 2, Fall, 1997, pp. 57-79

20. "Adverse Selection and the Changing Competitive Balance Between Stock Exchanges and Off-Exchange Trading Venues" (E. Clemons, B. Weber) ***International Journal of Electronic Commerce***, Vol. 1, No. 3, Spring 1997, pp. 21-42
21. "Alternative Securities Trading Systems: Tests and Regulatory Implications of the Adoption of Technology" (E. Clemons, B. Weber) ***Information Systems Research***, Vol. 7, No. 2, June 1996, pp. 163-188
22. "Market Dominance as a Precursor of Underperformance: Emerging Technologies and the Competitive Advantage of New Entrants" (E. Clemons, D. Croson, B. Weber) ***Journal of Management Information Systems***, Vol. 13, No. 2, Fall 1996, pp. 59-75
23. "Reengineering Money: The Mondex Stored Value Card and Beyond" (E. Clemons, D. Croson, B. Weber) ***International Journal of Electronic Commerce***, Vol. 1, No. 2, Winter 1996-97, pp. 5-31
24. "Bypass Trading and Market Quality in Electronic Securities Exchanges" ***Journal of Organizational Computing***, Vol. 5, No. 3, 1995, pp. 327-353
25. "Segmentation, Differentiation, and Flexible Pricing: Experiences with Information Technology and Segment-tailored Strategies" (E. Clemons, B. Weber) ***Journal of Management Information Systems***, Vol. 11, No. 2, Fall 1994, pp. 9-36
26. "Disintermediated Trading Systems and Trade Execution Costs" ***The Exchange Quarterly and Quality of Markets Review***, Summer 1994, London Stock Exchange, London UK, pp. 24-33
27. "Modeling the Profitability of Customer Relationships: Development and Impact of BZW's BEATRICE" (N. Stuchfield, B. Weber) ***Journal of Management Information Systems***, Vol. 9, No. 2, Fall 1992, pp. 53-76
28. "Strategic Information Technology Investments: Guidelines for Decision-Making" (E. Clemons, B. Weber) ***Journal of Management Information Systems***, Vol. 7, No. 2, Fall 1990, pp. 9-28
29. "London's Big Bang: A Case Study of Information Technology, Competitive Impact, and Organizational Change" (E. Clemons, B. Weber) ***Journal of Management Information Systems***, Vol. 6, No. 4, Spring 1990, pp. 41-60

WORKING PAPERS

1. "Cryptocurrencies and Distributed Ledger Technologies – A Literature Review", (B. Weber, A. Novocin, J. Wood, J. Roberts) SWIFT Institute working paper, March 2018
2. "The Valuation Damage from Financial Systems Weaknesses: A Study of SOX Section 404 Disclosures", 2012
3. "Assessing Trading Tactics in the E-Mini S&P 500 Futures Market: A Comparison of Price Making and Price Taking", (Peter Levant, James Oh, Bruce Weber) 2009
4. "New Trading Technology in U.S. Options Exchanges: E-Market Diffusion among Broker-Dealers", London Business School, 2007
5. "Deal-Making: Phone or IM Chat? – How Communications Media Change Negotiation Outcomes", (N. Johnson, G. DeSanctis, R. Holowczak, B. Weber) 2006

REFEREED CONFERENCE PAPERS

1. "Developing Electronic Markets in Low-Tech Environments: India's Agriculture Markets" (C. Parker, B. Weber) **Proceedings**, pp. 93-107, 32nd International Conference on Information Systems (ICIS), Shanghai, China, December 2011
2. "Member-Owned Cooperatives vs. Shareholder-Owned For-Profit Firms – Is Demutualization Best for Today's Securities Exchanges" **Proceedings**, 15th International Cooperatives Forum, Munster, Germany, September 7-9, 2004
3. "Ramping Up Liquidity: Brokerage Firms' Adoption of Electronic Options Trading" **Proceedings**, INFORMS Conference on Information Systems and Technology (CIST) Atlanta, GA, October 18-19, 2003
4. "Screen-Based Trading in Futures Markets: Recent Developments and Research Propositions" **Proceedings**, 32nd Hawaii International Conference on Systems Sciences, January 1999
5. "Trade Execution Costs and Disintermediated Order Crossing Systems on the London Stock Exchange" **Proceedings**, Vol. IV, pp. 950-959, 28th Hawaii International Conference on Systems Sciences, January 1995
6. "Symbolic Representation of Securities Trade Settlement Messages: An Application of Formal Languages for Business Communications" (M. Ginsburg, S. Kimbrough, B. Weber) **Proceedings**, Vol. III, pp. 548-557, 27th Hawaii International Conference on Systems Sciences, January 1994
7. "Transparency and Bypass in Electronic Financial Markets", **Proceedings**, Vol. IV, pp. 865-874, 27th Hawaii International Conference on Systems Sciences, January 1994
8. "Evaluating Alternative Trading Mechanisms" (K. Cohen, R. Schwartz, B. Weber) **Proceedings, Global Competition in the Market for Markets: A Microstructure Conference in Honor of Kal Cohen**, Chapter 4, Fuqua School of Business, Duke University, November 1993
9. "Using Information Technology to Manage Customer Relationships" (N. Stuchfield, B. Weber) **Proceedings**, Vol. IV, pp. 860-869, 26th Hawaii International Conference on Systems Sciences, January 1993
10. "National Westminster's Strategic IT Infrastructure: Redefining Branch Banking with £500 Million, Making the Investment Decision, Managing the Risk" (E. Clemons, B. Weber) **Proceedings**, Vol. IV, pp. 697-705, 25th Hawaii International Conference on Systems Sciences, January 1992
11. "Information Technology and Changing Nature of the Financial Services Industry" (E. Clemons, B. Weber) **Proceedings**, pp. 93-116, IFIP TC8 Conference on Collaborative Work, Social Communications and Information Systems, Helsinki, Finland, August 1991
12. "Barclays deZoete Wedd's TRADE: Evaluating the Competitive Impact of a Strategic Information System" (E. Clemons, B. Weber) **Proceedings**, 23rd Hawaii International Conference on Systems Sciences, January 1990

BOOK CHAPTERS

1. "A Support Level for Technical Analysis" (R. Francioni, R. Schwartz, B. Weber) **Handbook of Finance**, Frank J. Fabozzi, Editor, John Wiley & Sons, 2008

2. "Technology for Trading: What Works and What Fails", **Springer Lecture Notes in Business Information Processing**, D.J. Veit et al. (Eds.) FinanceCom 2007, LNBIP 4, Springer-Verlag, 2008, pp. 181-189
3. "Financial DSS: Systems for Supporting Investment Decisions", Chapter 56, **Handbook on Decision Support Systems**, Springer, 2007, pp. 419-442
4. "Algorithmic Trading in Financial Markets: The Evolving Palette of Techniques", **The Handbook of Electronic Trading**, Joe Rosen (ed.) Capital Markets Media, 2007, pp. 161-172
5. "A Club or a Commons: Exclusivity vs. Open Access In E-Exchanges" **Online Commodities Trading**, ICFAI University Press, December 2005
6. "Member-Owned Cooperatives vs. Shareholder-Owned For-Profit Firms – Is Demutualization Best for Today's Securities Exchanges?" **Strategies for Cooperation**, Theresa Theurl and E.C. Meyer (eds.) Aachen, Germany, 2005, pp. 247-261
7. "Simulated Trading", Chapter 12 in **Equity Markets in Action: The Fundamentals of Liquidity, Market Structure and Trading**, R. Schwartz and R. Francioni, Wiley 2004, pp. 342-359
8. "The Optimark Experience: What We Learned" (E. Clemons, B. Weber) **The Electronic Call Auction: Market Mechanism and Trading - Building a Better Stock Market**, R.A. Schwartz (ed.) Kluwer Academic Publishers, 2001, Chapter 22, pp. 353-364
9. "Elements of Market Structure for On-Line Commerce" Chapter 2 in **Information Technology and Industrial Competitiveness: How Information Technology Shapes Competition**, Chris Kemerer (ed.) Kluwer Academic Publishers, Boston, 1998, pp. 15-32
10. "Assessing Alternative Market Structures Using Simulation Modeling" **Global Equity Markets: Technological, Competitive, and Regulatory Challenges**, R.A. Schwartz (ed.) Irwin Professional, 1995, Chapter 8, pp. 175-196
11. "Information Technology in the Major International Financial Markets" **Global Information Systems and Technology: Focus on the Organization and its Functional Areas**, P.C. Deans and K.R. Kewan (eds.) 1994, pp. 132-166
12. "Turmoil, Transparency, and Tea: The Impact of IT on London's Equities Market" (E. Clemons, B. Weber) **Perspectives on the Strategic and Economic Value of Information Technology Investments**, Banker, R. Kauffman, R. and M. Mahmood (eds.) Idea Group Publishing, Harrisburg, PA, 1992, pp. 211-240
13. "Exchange Customers and Off-Exchange Trading Systems: Trading Preferences of Professional Investors" (E. Clemons, B. Weber) **The City of London Research Project**, Chap. 14, London Business School, Richard Brealey (ed.) 1992

OTHER PUBLISHED PAPERS

1. "Corporations on Campus", (Bruce Weber, Jeffrey Saltz, Bob Heckman) **BizEd-AACSB International**, July-August 2012, pp. 28-33
2. "The Growing Threat of Rogue Trading" **Business Strategy Review**, Summer 2011, pp. 11-15
3. "Getting Best Execution" **Traders Magazine**, April 1, 2008, pp. 22-24
4. "Volatile Markets" **Business Strategy Review**, Summer 2007, pp. 60-67

5. "Financial Market Engineering" (Christof Weinhardt, B. Weber, Terrence Hendershott, Robert Schwartz) *Electronic Markets*, Volume 16, Number 2, May 2006, pp. 98-100
6. "Pandora's BOX?: Why Relegation Should Not Be an Option", *Securities Industry News*, September 12, 2005
7. "Teaching Market Microstructure to MBAs" *BizEd–AACSB International* (with R. Schwartz) 2005
8. "BOXed In, or Breaking Out – Who's Winning the Battle of the Electronic Options Exchanges", *Securities Industry News*, November 1, 2004
9. "Go With the Flow: Options Order Routing Among the Major Brokerage Firms", *Securities Industry News*, January 19, 2004
10. "Membership Structures Key to Exchange Order Routing", *Securities Industry News*, January 26, 2004
11. "Retail Order Routing: Which Brokers Get Price Improvement for Clients?", *Securities Industry News*, April 30, 2001
12. "Revolutionary Changes in the Securities Markets: Where is Technology Leading the Major Exchanges?" Proceedings, *Symposium on the Netcentric Economy*, Smith School of Business, University of Maryland, March 30, 2001.
13. "Why a Market for the NYSE Makes a Better Market", *Securities Industry News*, August 16, 1999.
14. "Holding Trading Costs Down" *Vision & Money*, magazine of the Deutsche Börse AG, October 1998, Frankfurt, Germany, pp. 62-64.
15. "Managing Technological Change" *Futures Industry*, March/April 1994, Futures Industry Association, Washington, D.C., pp. 9-13.
16. "How Markets are Going On-Line" *Electronic Markets/Elektronische Märkte*, St. Gallen, Switzerland, October 1993, pp. 6-11.

OTHER

Selected as NYU's nominee for the 1995 NSF Presidential Faculty Fellows program

Co-developer, with Robert A. Schwartz, of the market trading model used for the NASD "Head Trader" game, which was available on the Nasdaq.com website 1999-2011. Also co-developer of TraderEx simulation (<http://www.etraderex.com/>) a client-server software package for teaching topics in market structure and trading.

ACADEMIC AND PROFESSIONAL ACTIVITIES

Advisory Council Member (one of seven) *SWIFT Institute*, Society for Worldwide Interbank Financial Telecommunication (SWIFT) La Hulpe, Belgium, 2016-

Member, Advisory Board, Faculty of Business Administration, *Southwestern University of Finance and Economics* (SWUFE) Chengdu China, 2014-2017, and 2017-2020

Special Issue Co-Editor (with P. Gomber, R. Kauffman, C. Parker) Financial I.S. and the Fintech Revolution, *Journal of Management Information Systems*, Vol. 35, No. 1, 2018

Accreditation Peer Review Team Member, *AACSB International*, Paul College of Business and Economics, University of New Hampshire, February 17-19, 2019; Aston Business School, Aston University (UK) March 4-6, 2018; Questrom School of Business, Boston University, May 2-4, 2017; DeGroote School of Business, McMaster University (Canada) October 25-27, 2015; College of Business, University of Illinois/Urbana-Champaign, February 2-4, 2014

Editorial Board Member and Associate Editor for *Journal of Management Information Systems*, 2002-; *Journal of Trading*, 2005-

Past editorships: *Information Systems Research*, 1999-2005; *MISQ Quarterly*, 2007-13; *Electronic Markets: International Journal of Electronic Commerce*, 1998-2007; *Decision Support Systems*, 2003-08; SSRN Advisory Board for *Information Systems & Economics*, 2004-08

Co-Director, *Doctoral Training Centre in Financial Computing*, 2008-12, £6 million EPSRC-funded initiative between University College London, London School of Economics, and London Business School to support doctoral students and research

External Reviewer, Carnegie Mellon University in Qatar, visit and independent assessment of CMU's business administration and computer science programs, Doha, Qatar, March 27-29, 2011

Faculty Leader, Doctoral Consortium, International Conference on Information Systems, Shanghai, China, December 1-4, 2011

Conference Co-Chair, 1st European Retail Investment Conference (ERIC) Börse Stuttgart, Germany, February 23-25, 2011

Council Member, Association for Information Systems (AIS) Elected in 2008 for a three year term to represent Europe-Middle East-Africa (EMEA) region

Seminar Organizer (with Bob Schwartz and Benn Steil) *Global Equity Markets Seminar (GEMS)* Geneva, Switzerland (1996), ... Warsaw (2014), London (2015), New York (2016). A 3-day workshop presented annually in June on trading and market structure for 40-50 executives from stock exchanges and securities firms

Co-Chair, Economics & I.S. Track (with Eric van Heck, D.J. Wu) *International Conference on Information Systems (ICIS)* Phoenix, December 15-18, 2009

Faculty, *Credit Suisse Global Leaders Programme*, delivered "Developing Technological Savvy" in a 2-day, eight offerings per year program, 2008-11

Co-Chair (with Peter Gomber and Bob Schwartz) *Microstructure and Trading in Business Programs—An Academic Workshop*, London Business School, four events, June 2007-10

Program Director, *HSBC Information Technology Leadership*, designed and delivered 4-day, four offerings per year executive program, 2006-08

Workshop Co-Chair (with Erik Brynjolfsson, Michael Smith) *18th Workshop on Information Systems and Economics (WISE-18)* Evanston, IL, December 9-10, 2006

Co-Chair (with Bob Schwartz, Rich Holowczak) *Using Educational Trading Floors and Teaching Microstructure in MBA Programs—An Academic Workshop*, Baruch College, New York, held 2003-17

Track Chair, Economics and Information Systems, (with Prabhudev Konana) *International Conference on Information Systems (ICIS)* Washington DC, December 12-15, 2004

Special Issue Co-Editor (with D. Straub, C. Steinfield, D. Hoffman) *ISR Special Issue on Electronic Commerce Metrics*, two journal issues, June 2002 and September 2002

Special Issue Co-Editor (with R. Kauffman) *Journal of Organizational Computing and Electronic Commerce, Special Issue on IT in Financial Services*, Vol. 12, No. 1, March 2002

Workshop Co-Chair (with Eric Clemons) *10th Workshop on Information Systems and Economics (WISE-10)* New York, NY, December 11-12, 1998

- Coordinator, Mini-Tracks on "Market Technostructure" (with Eric Clemons, Bob Schwartz) and "Strategic and Competitive Information Systems" (with E. Clemons) **HICSS-30**, **HICSS-31**, and **HICSS-32**, January 1997-99
- Board of Directors, **Futures Industry Association, Operations Division**, 20-person group met monthly to recommend operational enhancements to U.S. futures exchanges and clearinghouses, 1995-2002
- Member, **OWC Institute**, Six-person academic research group sponsored by Oliver, Wyman & Co. (consulting firm) to examine topics in financial services, 1997-2005
- Executive teaching, Credit Suisse Corporate Finance/Capital Markets track, **International Bankers School**, Chicago, IL, December 14-18, 1998
- Guest editor (with Eric Clemons) **Journal of Management Information Systems**, special sections on "Strategic Information Systems", Vol. 13, No. 2, Fall 1996 (pp. 5-7); Vol. 14, No. 2, Fall 1997 (pp. 5-7); Vol. 15, No. 2, Fall 1998 (pp. 5-7) Vol. 16, No. 2, Fall 1999
- Guest editor (with Eric Clemons, Jeff Sampler, Jim Short) **International Journal of Electronic Commerce**, special issue of papers from the Seventh Workshop Information Systems Economics (WISE-7, London, UK, December 1995) Vol. 1, No. 3, Spring 1997
- Workshop Co-Chair (with Eric Clemons) **7th Workshop on Information Systems and Economics (WISE-7)** London, UK, December 8-10, 1995
- Refereeing for **Management Science**, **Information Systems Research**, **Communications of the ACM**, **Interfaces**, **Journal of Management Information Systems**, **Strategic Information Systems**, **Information & Management**, and **MIS Quarterly**
- Consulting for major financial services firms, Nasdaq Stock Market, the London Stock Exchange, Deutsche Börse, and the U.S. Office of Technology Assessment
- Selected for Doctoral Consortium, International Conference on Information Systems, Copenhagen, Denmark, December 1990
- Thesis Committees (and placement): *"Essays on the Effect of Technological Innovation on Markets and Operations"* (advisor) Christopher D. Parker, London Business School, 2012 (Penn State University); *"History, diffusion, and economic impact of payment system innovations in the financial services sector: An empirical analysis of SWIFT adoption"* Markos Zachariadis, London School of Economics & Political Science, 2011 (University of Warwick); *"Harnessing Tacit and Explicit Knowledge: An Empirical Investigation of Knowledge-Centric Drivers of Service Management Performance"* Benjamin Funk, London Business School, 2008; *"A Study of the Relationships of Strategic Information Systems Planning (SISP) Approaches, Objectives, and Context with SISP Success within U.K. Organisations"*, Alan R. Warr, London Business School, 2004 (industry); *"Simulation of Electricity Markets using Agent-Based Computational Learning"*, Fernando de Oliveira, London Business School, 2003 (University of Warwick); *"The Effects Of Media Richness on Decision-Making Under Uncertainty"*, Norman A. Johnson, Baruch, 2003 (University of Houston); *"The Impact of Search Engine Characteristics on Electronic Markets and Seller's Pricing"*; Ravi Aron, NYU, 1999 (Wharton); *"Data Mining of Large Business Databases"*, Balaji Padmanabhan, NYU, 1999 (Wharton); *"Information Technology and Market Design Innovations: Attractiveness and Adoption of Electronic Auctions for Initial Public Offerings"* (advisor) Hugues Levecq, NYU, 1997 (Baruch); *"Query-Driven Simulations for Decision Support"*, P.R. Balasubramanian, NYU, 1994 (Boston University); *"Formal Languages for Inter-Organizational*

Communications", Scott Moore, University of Pennsylvania, 1993 (Michigan); *"Business Value of Customer-Access Information Technology"*, Laura Lally, NYU, 1992 (Hofstra)

GRANTS AND FUNDING

- "Doctoral Training Centre in Financial Computing", £350,000 of a £6 million EPSRC grant to University College London, London School of Economics, and London Business School, 2009-11
- "Board Effectiveness and Information Management", (£600,000) Oracle Corp., 2006-09
- "Trading Room of the Future", (computer equipment and services donation to Baruch's Subotnick Center), (\$500,000) Compaq Computer Corp. and Nortel Networks, 2000-02
- "Development of 4-class course module to be used with Nasdaq HeadTrader simulation", (\$90,000) Nasdaq Educational Foundation, 2001
- "Next-Generation Financial Market Systems", Accenture L.P., 1993-2001
- "Order Submission Data: Analysis and Report", New York Stock Exchange, 1999
- Develop and teach new MBA course in "Market Trading and Structure", Nasdaq Educational Foundation, 1997-99
- "Assessment of the Cantor Exchange trading mechanism", Cantor Fitzgerald L.P., 1998
- Development of an Interactive Computerized Market Simulation", NYU Salomon Center for the Study of Financial Institutions, 1994-95

INVITED TALKS AND PANELS

- "Tapping into Academic Research in Today's Turbulent World", *SIBOS-SWIFT*, Toronto, Canada, October 18, 2017
- "Banks and their Vision for the Future", *SWIFT Digital Disruption in Financial Services* conference, Toronto, Canada, November 30, 2016
- "FinTech: Reshaping Banking with Co-opetition" and "Disruption and New Dynamics of the FinTech Talent Pipeline", *SIBOS-SWIFT*, Geneva, Switzerland, September 26-28, 2016
- "Business Models for New Realities – The View from an RCM University," *AACSB International Conference and Annual Meeting (ICAM)* Tampa, FL, April 27, 2015
- "Launching Successful E-Markets: A Broker-Level Diffusion Analysis of Two Options Exchanges", with Chris Parker, *Workshop on Information Systems and Economics*, WISE-22, St. Louis, MO, December 11, 2010
- "Challenging Issues for Markets and Exchanges", *Istanbul Stock Exchange's 25th Anniversary Conference*, Istanbul, Turkey, December 9, 2010
- "Flash Crashes, Order Routing, and Market Fragmentation" and "Modeling the Diffusion of Two Options E-Exchanges", *INFORMS*, Austin TX, Nov. 7-10, 2010
- "Becoming Metrics-Driven: The CIO's Role in Enterprise Performance Management", *Pentio CIO Forum*, Copenhagen, Denmark, September 10, 2010
- "The Four Horsemen of the Behavioral Apocalypse – How IT helps investors avoid decision-making errors", *Portfolio Construction 2010-Building wealth through knowledge*, London March 23 and Manchester March 25, 2010
- "WISE-20 Year Celebration: Are We WISE About Sub-Fields in IS? Lessons from Forming and Sustaining a Research Community", *International Conference on Information Systems*, Phoenix, December 16, 2009
- "Becoming Metrics-Driven: Focusing Enterprise Performance Management on Active Strategic Goals", *Oracle EPM Forum*, Stockholm November 9, 2009, Copenhagen November 13, 2009

- "IT Control Requirements in SOX: Shareholder Value Impacts" and "Persistence in Returns of Firms with SOX Material Weaknesses", *INFORMS*, Washington DC, October 12-15, 2008
- "Electronic Markets: Theory and Evidence from 20 Years of Research", Panel Chair, *ICIS*, Montreal, Canada, December 9-11, 2007
- "Financial Control Systems and Gains from SOX Remediation" and "Valuation Impacts of IT Weaknesses in SOX Reports", *INFORMS*, Seattle, November 6-9, 2007
- "Cost-vs-Benefit: Achieving optimal latency in algorithmic trading" and "Coping with MiFID Data Requirements", *Market Data Technology conference*, London, September 6-7, 2007
- "IT and Internal Control Deficiencies in Sarbanes-Oxley (SOX) Disclosures", MIT-Sloan School, August 15, 2007
- "The Stock Exchange of the Future: Insider Forecasts", Global Leadership Summit, London Business School, July 2, 2007
- "Execution Cost and Market Design Worldwide", FMA European Conference Barcelona, Spain, May 31, 2007
- "Assessing Developments in Electronic Cash and Mobile Payments", Workshop on Electronic Payments & E-Commerce in China (EPECC) Chengdu, China, May 19, 2007
- "New Trading Technology in U.S. Options Exchanges: E-Market Diffusion among Broker-Dealers", Research Seminar, Smith School of Business, U. of Maryland, April 30, 2007
- "Postponing the Inevitable: The NYSE Moves to an Electronic Market" Netcentricity Conference, Smith School of Business, U. of Maryland, April 27, 2007
- "Research payments and pricing mechanisms", Fourth AQ Research annual conference, London, March 14, 2007
- "Using Market Data to Manage Trading Costs: Tools for getting value from data," Market Data Technology conference, London, September 7, 2006
- "New Trading Technology in U.S. Options Exchanges: Network Effects and Broker-Specific Effects in E-Market Growth", Georgia Tech, Atlanta, GA, September 15, 2006
- "E-Commerce in Financial Services", Worcester College, Oxford University, August 2, 2006
- "Unbundling and the future of Buyside-Sellside relations–Is this Big Bang II?" The Third AQ Research Conference, London, April 5, 2006
- "IT-Enabled Transformations: Research That Bridges the Functional Divides", *International Conference on Information Systems*, Las Vegas, NV, December 14, 2005
- "The Industrialization of Financial Trading: What's Holding Back Open, Standards-based Market Platforms?" *E-finance conference on Bank Strategy and Operations*, Institute of Information Systems, Frankfurt University, October 11, 2005
- "Transactions Cost Analysis and Performance Measurement", *Best Execution Across Financial Markets conference*, London, September 30, 2005
- "A Club or a Commons: Exclusivity vs. Open Access in E-Exchanges", *Workshop on Information Systems and Economics*, WISE-16, College Park, MD, December 11, 2004
- "Governance of Stock Exchanges: Cooperative and Shareholder Models" *ICT-International Cooperatives Conference*, University of Munster, Munster, Germany, September 9, 2004
- "An Asset Accumulation View of IT: Evidence from New York Stock Exchange, 1982-2003" *I.S. Research Workshop*, Broad School, Michigan State Univ., February 27, 2004
- "IT as a Platform for Agility", Panelist, *INFORMS CIST-Conference on Information Systems and Technology*, Atlanta, GA, October 18, 2003
- "Brokerage Firms' Adoption of Electronic Options Trading", proceedings paper presented at *INFORMS CIST*, Atlanta, GA, October 18, 2003

- "Where is Technology Leading the Major Securities Exchanges?" *Symposium on the Netcentric Economy*, Smith School of Business, University of Maryland, March 30, 2001
- "Using Trading Rooms in Teaching and Research", *INFORMS*, Sponsored Session in the *Financial Services Section*, Salt Lake City, Utah, May 8, 2000
- "E-Commerce in Financial Services", *25th Annual International Futures Industry Conference*, two 2-hour tutorials to FIA delegates, Boca Raton, FL, March 15-16, 2000
- "Screen-based Futures Trading: Comparisons with Floor Markets", *INFORMS Financial Services Section*, Cincinnati, OH, May 3, 1999
- "The CIO's Top 3 Issues", *Nortel Networks CIO Council*, New York, NY, December 14, 1999
- "Screen-based Futures Trading: Comparisons with Floor Markets", *INFORMS Financial Services Section*, Cincinnati, OH, May 3, 1999
- "Comments on the Cantor Financial Futures Exchange (CFFE)", Invited Speaker, Public Meeting regarding the Cantor Financial Futures Exchange, *Commodity Futures Trading Commission (CFTC)* Washington DC, August 11, 1998
- "Simulations of Stock Exchange Trading Mechanisms", *Columbia Business School Financial Engineering group*, July 28, 1998
- "Does Scale Correlate with Efficiency?", panel moderator, *Conference on Operations and Productivity in Financial Services*, Stern School, April, 17, 1998
- "Teaching Market Structure and Trading with the I-SMARTS Trading Simulation", with R.A. Schwartz, *Nasdaq Economic Advisory Board*, New York, NY, March 26, 1998
- "Bleeding Edge Technology", Financial Executives Institute (FEI) Professional Development Seminar, *Information Technology: Today's Strategic Decisions—Tomorrow's Quagmire?*, Iselin, NJ, March 23, 1998
- "Market Technostructure", half-day tutorial with E. Clemons and R. Schwartz, *31st Hawaii International Conference on Systems Sciences*, January 6, 1998
- "Elements of Market Structure for On-Line Commerce", invited talk at *Electronic Commerce Workshop*, Carnegie-Mellon University GSIA, July 19, 1997
- "Next-Generation Delivery of Investment Services: An Introduction" with Kevin E. Parker, Managing Director and CIO, Morgan Stanley & Co., *Creating Value in Financial Services Conference*, Stern School, March 7, 1997
- "Barbarians at the Gates of I.S.? – A Finance Perspective", *International Conference on Information Systems (ICIS)* Cleveland, OH, December 17, 1996
- "Experimental Investigations of Next-Generation Electronic Markets", *Workshop on Information Systems and Economics*, WISE-8, Cleveland, OH, December 14, 1996
- "Managing Globalization: Technological and Management Challenges" with Jack Baroudi, Director, Morgan Stanley & Co., *Center for Research on Information Systems – Affiliates Seminar*, Stern School, February 15, 1996
- "Productivity Impacts of I.T. in Financial Services", *Decision Science Institute*, Boston, November 20, 1995
- "Interactive Market Design Simulations", *International Forum on Alternative Structures for Securities Markets*, Georgetown University, Washington DC, September 22, 1995
- "Simulation Analysis of Alternative Trading Mechanisms", *NASDAQ Stock Market*, Washington, DC, February 17, 1995
- "Representing and Transmitting Trading Information", *Futures Industry Association*, Absecon, NJ, October 15, 1994 and *Managed Futures Association*, Palm Beach, FL January 9, 1995

"Assessing Alternative Market Structures Using Simulation Modeling", *Global Competition in the Market for Markets: A Microstructure Conference in Honor of Kal Cohen*, Duke University, November 2, 1993

"Using Simulation to Assess Market Structures", *Salomon Center Conference on Global Equities Markets: Technological, Competitive, and Regulatory Challenges*, New York University, October 21, 1993

"Competitive Impacts of Information Systems", *Conference on Managing Advanced Information Technology*, Syracuse University, October 15, 1993

"Evaluating Alternative Trading Mechanisms for Screen-based Securities Markets", *Center for Financial and Contracting Studies*, University of Pittsburgh, November 6, 1992

Other: Speak/read German, married, two teenage children, avid distance runner

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