

Accounting for Intellectual Property Products: International Guidelines for National Economic Accounting and U.S. Rules for Financial Accounting*

Dylan G. Rassier[†]

U.S. Department of Commerce
Bureau of Economic Analysis
National Economic Accounts

November 2013

Abstract

The international guidelines for national economic accounting recommend capitalizing expenditures related to intellectual property products (IPPs) in some cases where U.S. rules for financial accounting require immediate expensing of the same expenditures. This paper outlines the international guidelines and the U.S. rules for expensing or capitalizing expenditures related to IPPs. The paper highlights notable differences in accounting for four categories of IPPs identified in the international guidelines: 1) research and development, 2) mineral exploration and evaluation, 3) computer software and databases, and 4) entertainment, literary, and artistic originals. In addition to the accounting differences, the paper introduces a measurement challenge associated with the concept of current cost accounting under national economic accounting and demonstrates that national economic accounting measures of production and income and financial accounting measures of operating income and net income are all higher when expenditures related to IPPs are capitalized.

JEL Codes: E01, E23, M40, M41

Keywords: measurement, production, national economic accounting, accounting, financial accounting

* *The views expressed in this paper are solely those of the author and not necessarily those of the U.S. Department of Commerce or the Bureau of Economic Analysis.*

[†] Dylan Rassier, Economist, U.S. Department of Commerce, Bureau of Economic Analysis, Washington, DC | 202-606-9892 | dylan.rassier@bea.gov.

1. Introduction

International guidelines for national economic accounting are provided by the *System of National Accounts 2008 (SNA2008)*, which is a collaboration led by a group of international organizations. The international guidelines yield measures of national economic activity within an accounting framework that is based on economic concepts. U.S. rules for financial accounting are embodied by generally accepted accounting principles (GAAP), which are established for nongovernmental entities by the Financial Accounting Standards Board (FASB) and the Securities and Exchange Commission (SEC). The U.S. rules yield financial information on individual firms within an accounting framework that is based on financial accounting concepts.¹

Similarities and differences in the international guidelines and the U.S. rules may be explained by their respective objectives. The objective of the international guidelines is to provide measures of national economic activity to policy makers, investors, business leaders, researchers, and other interested users. Thus, the international guidelines are a system in which symmetric treatment is given to both parties of a transaction, and national economic accounts are designed to summarize transactions from the perspectives of both sellers and buyers. The objective of the U.S. rules is to provide financial information on individual firms to managers, investors, creditors, and other interested users. Thus, financial accounts are designed to summarize transactions for a firm in isolation. To meet their respective objectives, the international guidelines and the U.S. rules share fundamental principles such as double-entry bookkeeping with debit and credits and accrual methods to match revenues and expenses in the

¹ U.S. GAAP is established for state and local governments by the Governmental Accounting Standards Board. In addition, International Financial Reporting Standards (IFRS) are established by the International Accounting Standards Board and have been adopted by more than 60 countries as the authority for financial accounting. Governmental accounting rules and IFRS are outside the scope of this paper.

same accounting period.² However, given an accounting framework based on economic concepts that include opportunity cost, the international guidelines recommend measures on a current cost basis rather than a historic cost basis, which imposes a measurement challenge that is unique to national economic accounting.

For expenditures related to intellectual property products (IPPs), the international guidelines recommend capitalizing the expenditures in some cases where the U.S. rules require immediate expensing of the same expenditures. From a national economic accounting perspective, expensing expenditures related to IPPs assumes the expenditures only contribute to production and the related income in the current period, whereas capitalizing expenditures related to IPPs assumes the expenditures contribute to current and future production and income generation. From a financial accounting perspective, immediate expensing assumes the expenditures only contribute to sales and the related profits in the current period with no contribution to sales and profits in future periods. Thus, there is a conceptual difference between the international guidelines and the U.S. rules in the treatment of IPPs.

One important conceptual change in the *SNA2008* from previous versions of the international guidelines is the treatment of research and development (R&D) as IPPs. Under the *SNA2008*, R&D is recognized as capital formation because of the future economic benefits associated with R&D. Under previous versions of the international guidelines, R&D was treated as intermediate consumption, which was consistent with immediate expensing required under the U.S. financial accounting rules.³ The U.S. Bureau of Economic Analysis (BEA) generally

² Given a seller and buyer for each transaction, national economic accounts give rise to quadruple-entry accounting: a debit and credit for the seller and a debit and credit for the buyer.

³ The conceptual change is a result of considerable research by international organizations and national statistical offices. Likewise, some work in financial accounting research focuses on changing the U.S. requirements for R&D from immediate expensing to capitalization (Amir and Lev, 1996; Lev and Sougiannis, 1996; Collins et al., 1997; Aboody and Lev, 1998; Francis and Schipper, 1999; Lev and Zarowin, 1999; Penman, 2009; Cifteci et al., 2013).

accounts for IPPs according to recommendations in the *SNA2008*. As a result, the recent 2013 comprehensive revision of the U.S. National Income and Product Accounts (NIPAs) incorporates the conceptual change in the treatment of R&D and incorporates a change in the treatment of entertainment, literary, and artistic originals to be consistent with the *SNA2008* (Smith and Holdren, 2013).

In response to the conceptual change for R&D and to accounting differences for other IPPs, this paper outlines the international guidelines for national economic accounting under the *SNA2008* and the U.S. financial accounting rules under GAAP for expensing or capitalizing expenditures related to IPPs. While the paper focuses specifically on the treatment of expenditures related to R&D because they are subject to recent significant changes, the paper highlights accounting differences for four categories of IPPs identified in the *SNA2008*: 1) R&D, 2) mineral exploration and evaluation, 3) computer software and databases, and 4) entertainment, literary, and artistic originals. In addition to the accounting differences, the paper introduces a measurement challenge associated with the concept of current cost accounting under national economic accounting and demonstrates that national economic accounting measures of production and income and financial accounting measures of operating income and net income are all higher when expenditures related to IPPs are capitalized.

The paper proceeds from here with five additional sections. The next section provides a broad overview of the *SNA2008* and provides more details on the recommendations for capitalizing expenditures related to IPPs. The third section discusses U.S. financial accounting rules for expensing or capitalizing expenditures related to intangibles. Section four introduces current cost accounting and the measurement challenge national economic accounting statisticians face as a result of treating IPPs as capital assets. Section five demonstrates

differences generated in key national economic accounting measures and key financial accounting measures as a result of expensed and capitalized expenditures related to IPPs. The last section summarizes.

2. The System of National Accounts 2008

The *SNA2008* is a collaboration led by five international organizations: the United Nations, the European Commission, the Organization for Economic Cooperation and Development (OECD), the International Monetary Fund, and the World Bank Group. Countries are encouraged to follow the recommendations provided in the international guidelines in order to facilitate comparability of national income and product statistics. In addition, some organizations' member countries are periodically required to report statistics that are consistent with the international guidelines. The *SNA2008* is the most recent version of international guidelines for national economic accounting. A previous version of the international guidelines was issued in 1993 (i.e., *SNA1993*).

2.1. General Overview of the SNA2008

The accounting framework of the *SNA2008* is structured as a sequence of accounts that reflect stocks of assets and liabilities and related economic flows for national economies. Each account in the sequence yields a residual or balancing item that is carried forward to the next account in the sequence. The sequence of accounts includes three categories of accounts: 1) current accounts, 2) accumulation accounts, and 3) a balance sheet. Tables 1.1 and 1.2 summarize the sequence of accounts.⁴ To understand the treatment of IPPs and their place in the

⁴ The summary here is simplified in five ways. First, the summary is limited to a national level without making distinctions for institutional units, sectors, establishments, and industries. In the *SNA2008*, institutional units are individual agents within the economy, such as businesses and persons, and sectors include groups of institutional units such as the corporate sector and the household sector. An establishment is a unit of business that performs a single economic activity, and industries include groups of establishments that perform similar economic activities. Second, the summary is limited to gross measures without including net measures. In the *SNA2008*, the difference between gross and net is consumption of fixed capital (CFC), which is a measure of economic depreciation. Third,

accounting framework of the *SNA2008*, it is helpful to have a basic understanding of each category of accounts.

Current Accounts

Table 1.1 summarizes the current accounts. The current accounts include a production account, which reflects production, and income accounts, which reflect the generation, distribution, and uses of income from production. The production account is the first account in the sequence and yields value-added as a residual between output and intermediate consumption of materials, energy, and purchased services. Value-added is referred to in the *SNA2008* as gross domestic product or GDP and is conceptually equivalent to GDP and gross domestic income (GDI) in the NIPAs.⁵ The income accounts of the *SNA2008* are composed of a primary distribution of income account, a secondary distribution of income account, and a use of disposable income account.

The primary distribution of income account shows the generation of income from production and the allocation of income to the primary factors involved in production: labor, capital, and government. Primary income accrues to factors of production as a result of their direct contribution to production or through the ownership of assets used in production. The primary distribution of income account includes three subaccounts that are useful to understand the relationship between national economic accounts and business financial accounts: 1) the

potential flows to and from the rest of the world are omitted. Fourth, “operating surplus” includes both incorporated and unincorporated enterprises. In the *SNA2008*, “operating surplus” is the surplus from production accruing to incorporated enterprises, and “mixed income” is the surplus from production accruing to unincorporated enterprises owned by households. Finally, some sub-accounts of the income accounts are omitted because their inclusion is not necessary to understand the treatment of IPPs.

⁵ In practice, GDP and GDI in the NIPAs are measured differently than value-added. GDP is measured as the sum of expenditures on final consumption and investment. GDI is measured as the sum of incomes generated in production. Thus, U.S. GDP is an expenditure-based measure, and U.S. GDI is an income-based measure. Value-added is a production-based measure, which is measured at BEA in the U.S. Input-Output (IO) Accounts. The benchmark IO Accounts are published approximately every five years and provide a balanced framework that includes expenditure-based measures, income-based measures, and production-based measures. In benchmark years, expenditure-based GDP is reconciled with the expenditure-based measures in the benchmark IO Accounts.

generation of income account, 2) the entrepreneurial income account, and 3) the allocation of other primary income account.

Value-added is carried forward to the generation of income account. In concept, value-added equals the income generated in production. Thus, the generation of income account reflects value-added used up by producers through payments of compensation to employees and payments of production taxes to governments (net of subsidies received from governments). The balancing item in the generation of income account is operating surplus, which is the surplus from production prior to any deductions for property income payments.

Operating surplus is carried forward to the entrepreneurial income account, which reflects income received by business, adjusted by property income receipts and payments attributable to business. Entrepreneurial income is carried forward to the allocation of other primary income account, which also records income received by labor and government and property income receipts and payments attributable to other than business. The balancing item in the primary distribution of income account is national income.

The secondary distribution of income account shows the redistribution of primary income through income taxes and transfers. The balancing item in the secondary distribution of income account is disposable income, which is shown in the use of disposable income account for final consumption expenditures or saving. Saving is the starting point for the accumulation accounts.

The balancing items of the current accounts may be measured gross or net. In the *SNA2008*, the difference between gross and net is consumption of fixed capital (CFC), which is a measure of economic depreciation. While CFC is excluded from the summary in table 1.1 for simplicity, CFC plays an important role in the current accounts by revealing the extent to which production and the related income are affected by declines in invested capital. Thus, CFC plays

a role in national economic accounts similar to the role of depreciation and amortization in business financial accounts, where income is measured gross (i.e., operating income) and net (i.e., net income) of depreciation and amortization.

Accumulation Accounts

Accumulation accounts reflect changes in assets, liabilities, and net worth as a result of volume changes, price changes, and saving from production. Accumulation accounts include four accounts: the capital account, the financial account, the other changes in the volume of assets account (OCVA), and the revaluation account. The capital account shows transactions in non-financial assets and capital transfers, which result in a redistribution of wealth. The financial account reflects transactions in financial assets and liabilities such as stocks and bonds. OCVA records changes in the values of assets that result from flows other than transactions, such as catastrophic losses or discovery of subsoil resources. The revaluation account captures holding gains and losses, which reflect changes in prices but do not reflect transactions and do not arise from production. Table 1.2 summarizes the contents of the accumulation accounts.

Balance Sheet

The balance sheet is also summarized in table 1.2. The balance sheet reflects stocks of assets and liabilities and changes in assets and liabilities for the accounting period. The difference between assets and liabilities is net worth. Stocks of assets and liabilities are carried over from the previous accounting period. Changes in assets and liabilities are determined by flows in the current accounts and the accumulation accounts, including saving, OCVA, holding gains and losses, and net acquisitions of non-financial assets and financial assets and liabilities. Closing stocks of assets and liabilities are the last entries shown in the sequence of accounts.

2.2. Capital Account of the SNA2008

The capital account shows transactions in non-financial assets and capital transfers. Assets in the *SNA2008* are defined as follows (*SNA2008*, para. 10.8): “An asset is a store of value representing a benefit or series of benefits accruing to the economic owner by holding or using the entity over a period of time. It is a means of carrying forward value from one accounting period to another.” Non-financial assets are either produced or non-produced. Produced assets result from a production process and include fixed assets, inventories, and valuables. In order to be considered a fixed asset, an asset must be used in production for more than one year. Inventories may be used in production or may be held for sale or other uses. Valuables are stores of value that are generally not used in production. Non-produced assets result from a process other than production and include natural resources; contracts, leases, and licenses; and purchased goodwill and marketing assets.

As summarized in table 1.2, there are five sources of changes in assets in the capital account: gross fixed capital formation (GFCF), changes in inventories, acquisitions less disposals of valuables, CFC, and acquisitions less disposals of non-produced assets. There are two sources of changes in liabilities and net worth: saving and capital transfers. The total of saving and capital transfers yields changes in net worth that are available for the acquisition of non-financial and financial assets. If changes in assets exceed changes in liabilities and net worth, the difference yields net borrowing. If changes in liabilities and net worth exceed changes in assets, the difference yields net lending. Thus, net lending or net borrowing is the balancing item of the capital account.

Capitalizing fixed assets in the capital account requires statisticians to derive related measures of GFCF and CFC. The *SNA2008* defines GFCF as follows (*SNA2008*, para. 10.32):

“Gross fixed capital formation is measured by the total value of a producer’s acquisitions, less disposals, of fixed assets during the accounting period plus certain specified expenditures on services that add to the value of non-produced assets.” CFC is defined as follows (*SNA2008*, para. 10.25): “Consumption of fixed capital is the decline, during the course of the accounting period, in the current value of the stock of fixed assets owned and used by a producer as a result of physical deterioration, normal obsolescence or normal accidental damage.” GFCF includes fixed assets purchased by a producer from other producers and includes fixed assets produced by a producer and retained for the producer’s own use in future production (i.e., own-account production). Thus, CFC also includes fixed assets produced on own-account.

2.3. Capitalization of IPPs in the SNA2008

The asset boundary for fixed assets in the capital account includes IPPs as long as the IPPs meet the one-year criterion for fixed assets. The *SNA2008* defines IPPs as follows (*SNA2008*, para. 10.98): “Intellectual property products are the result of research, development, investigation or innovation leading to knowledge that the developers can market or use to their own benefit in production because use of the knowledge is restricted by means of legal or other protection.” There are four specific categories of IPPs identified in the *SNA2008*: 1) R&D, 2) mineral exploration and evaluation, 3) computer software and databases, and 4) entertainment, literary, and artistic originals. In addition, there is a general category identified for other IPPs.

Similar to other types of fixed assets, IPPs may be purchased from other producers or produced internally. According to the *SNA2008*, the amounts capitalized should be consistent with the future economic benefits the IPPs are expected to provide, which can be determined by the market prices of purchased IPPs or by the costs associated with own-account IPPs where market prices are unavailable. Costs should be capitalized regardless of the actual commercial or

technological success of an endeavor because all costs form part of a future successful endeavor. While some IPPs may require many failures to reap one success, businesses are not presumed to incur costs related to IPPs with an expectation of ultimate failure. Once IPPs are recorded in the capital account, subsequent charges should be made to CFC over the useful lives determined for the IPPs.⁶

R&D

The *SNA2008* defines R&D as follows (*SNA2008*, para. 10.103): “Research and [experimental] development consists of the value of expenditures on creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and use of this stock of knowledge to devise new applications. This does not extend to human capital as assets within the SNA.” Under the *SNA1993*, expenditures on R&D were treated as intermediate consumption. As a result, GFCF resulting from R&D was limited to legal rights or contractual agreements such as patents and trademarks, which granted access to the underlying R&D but did not recognize any future economic benefits associated with R&D. The *SNA2008* recognizes future economic benefits and treats R&D as IPPs. Under the new treatment, legal rights and contractual agreements are no longer recorded in the capital account.⁷

Mineral Exploration and Evaluation

Mineral exploration and development is defined in the *SNA2008* as follows (*SNA2008*, para. 10.106): “Mineral exploration and development consists of the value of expenditures on exploration for petroleum and natural gas and for non-petroleum deposits and subsequent evaluation of the discoveries made.” Similar to R&D, the *SNA2008* recognizes future economic

⁶ Measurement of capitalized amounts and subsequent charges to CFC are outside the scope of this paper, but guidance is offered in Li (2012), OECD (2010), and Aizcorbe (2009) in addition to the *SNA2008*.

⁷ BEA capitalizes expenditures related to R&D since the 2013 comprehensive revision of the NIPAs (Smith and Holdren, 2013). Previous work on R&D at BEA is described in Robbins and Moylan (2007) and Lee and Schmidt (2010).

benefits associated with mineral exploration and evaluation, which is undertaken to discover new deposits of minerals or fuels that may eventually be commercially exploited. Mineral exploration and evaluation was also treated as GFCF in the *SNA1993*.⁸

Computer Software and Databases

Computer software and databases are grouped together in the *SNA2008* because databases are a form of software. Computer software is defined as follows (*SNA2008*, para. 10.110): “Computer software consists of computer programs, program descriptions and supporting materials for both systems and applications software.” Databases are defined as follows (*SNA2008*, para. 10.112): “Databases consist of files of data organized in such a way as to permit resource-effective access and use of the data.” The *SNA2008* distinguishes computer software and databases intended for internal use and computer software and databases intended for sale. When computer software and databases are used internally, costs are capitalized regardless of the stage of development during which the cost is incurred. When computer software and databases are copied and sold, the purchased copies are treated as GFCF if the one-year criterion for fixed assets is satisfied. Similar to mineral exploration and development, computer software and databases were also treated as IPPs and capitalized under the *SNA1993*.⁹

Entertainment, Literary, and Artistic Originals

The definition of entertainment, literary, and artistic originals in the *SNA2008* is as follows (*SNA2008*, para. 10.115): “Entertainment, literary and artistic originals consist of the original films, sound recordings, manuscripts, tapes, models, etc., on which drama performances, radio and television programming, musical performances, sporting events, literary and artistic

⁸ BEA capitalizes expenditures related to mineral exploration and evaluation in the NIPAs as part of mining and petroleum and gas structures.

⁹ BEA capitalizes expenditures related to software in the NIPAs since the 1999 comprehensive revision of the NIPAs (Moulton et al., 1999).

output, etc., are recorded or embodied.” Entertainment, literary, and artistic originals were also treated as GFCF in the *SNA1993*.¹⁰

3. Intangibles under U.S. Financial Accounting Rules

There are two organizations recognized for issuing authoritative U.S. GAAP for nongovernmental entities: FASB and the SEC. The single source of authoritative GAAP issued by FASB for nongovernmental entities is provided by the FASB Accounting Standards Codification. In addition to the Codification, the Securities and Exchange Commission (SEC) issues rules and interpretive releases, which serve as authoritative GAAP for SEC registrants.

The FASB Codification refers to IPPs as intangibles or intangible assets, both of which may be included in the asset boundary. Under topic 350 (Intangibles—Goodwill and Other) of the Codification, there are four categories of intangibles: 1) goodwill, 2) general intangibles other than goodwill, 3) internal-use software, and 4) website development costs.¹¹ An intangible asset is defined in the Codification simply as a non-financial asset that lacks physical substance.¹² In addition to topic 350, topic 730 (Research and Development) of the Codification includes rules that relate to the *SNA2008* category for R&D. Likewise, topics 93 (Extractive Activities), 985 (Software), and 92 (Entertainment) include industry-specific rules that relate to

¹⁰ BEA capitalizes expenditures related to entertainment, literary, and artistic originals in the NIPAs since the 2013 comprehensive revision of the NIPAs (Smith and Holdren, 2013).

¹¹ The Codification is structured with numbered topics, which are broken down further into numbered subtopics, sections, and paragraphs. There are nine groups of topics: general principles, presentation, assets, liabilities, equity, revenue, expenses, broad transactions, and industry. The reference for any given paragraph is ordered as topic-subtopic-section-paragraph. For example, 350-10-15-1 refers to paragraph 1 of section 15 of subtopic 10 of topic 350.

¹² The Codification distinguishes “intangibles” from “intangible assets” and considers goodwill an intangible separate from intangible assets. Likewise, under the *SNA2008*, goodwill is not identified as a category of IPPs, which result from production. Goodwill in the *SNA2008* is considered non-produced. The accounting treatment for goodwill is generally the same under the Codification and the *SNA2008*. Goodwill associated with business combinations is capitalized under the Codification. Likewise, goodwill is recorded in the capital account of the *SNA2008* if the goodwill is associated with a market transaction that usually requires a business combination (i.e., purchased goodwill). Under both the Codification and the *SNA2008*, the amount of capitalized goodwill is generally the difference between the fair market value of the assets and liabilities acquired and the amount paid by the acquirer. In contrast to the accounting for business combinations, costs associated with goodwill that is not separately identifiable are expensed as incurred under both the Codification and the *SNA2008*.

the *SNA2008* categories for mineral exploration and evaluation, computer software and databases, and entertainment, literary, and artistic originals, respectively.¹³

Figures 1.1 and 1.2 summarize the general rules for expensing or capitalizing expenditures related to intangibles according to the Codification. Like the *SNA2008* for IPPs, the Codification recognizes two sources for intangibles: purchased intangibles and internally-produced intangibles. Figure 1.1 includes purchased intangibles; figure 1.2 includes internally-produced intangibles. As shown in figure 1.1, purchased intangibles may be acquired individually or in a group of intangibles or they may be acquired through a business combination. The accounting rules for intangibles acquired individually or in a group of intangibles depends whether the intangible is software or an intangible other than software or goodwill. However, intangibles acquired through a business combination are generally recognized as assets and capitalized. The accounting rules for expensing or capitalizing expenditures related to internally-produced intangibles in figure 1.2 also vary by type of intangible.

Regardless of whether an intangible is purchased or internally-produced, a key condition for recognizing an asset under the Codification is identifiability. Identifiable assets meet at least one of two criteria: 1) separability and 2) contractual-legal origin. According to glossary definitions in the Codification, separable assets are “capable of being separated or divided from the entity and sold, transferred, licensed, rented, or exchanged, either individually or together with a related contract, identifiable asset, or liability, regardless of whether the entity intends to do so.” Likewise, assets with a contractual-legal origin arise from “contractual or other legal rights, regardless of whether those rights are transferable or separable from the entity or from

¹³ For all intangibles recognized as assets, the FASB Codification offers separate guidance regarding amortization and impairments, which are outside the scope of this paper.

other rights and obligations.” In addition to identifiability, alternative future uses, uses in R&D or production, and technological feasibility are important conditions for recognizing some categories of intangibles as assets under the Codification. Thus, figures 1.1 and 1.2 demonstrate that the rules for expensing or capitalizing expenditures related to intangibles under the Codification are more intricate than the guidelines for IPPs under the *SNA2008*. However, the rules under the Codification generally relate to each category of IPPs identified in the *SNA2008*.

R&D

The Codification includes five categories of costs to be identified with R&D activities: 1) materials, equipment, and facilities, 2) personnel, 3) intangible assets purchased from others with no alternative future uses, 4) contract services, and 5) indirect costs. Under the Codification, expenditures on R&D are expensed as incurred regardless of the success of the R&D. In contrast to the *SNA2008*, the justification for expensing R&D expenditures is due to the uncertainty associated with any future economic benefits. As a result, expenditures on R&D are distinguished from expenditures on intangibles that may evolve from the results of R&D and result in asset recognition, such as legal fees incurred to obtain a patent. Thus, in figure 1.2, R&D expenditures are associated with goodwill and other intangibles that are unidentifiable, have indeterminate lives, or are inherent to business continuity, which are expensed as incurred.

Mineral Exploration and Evaluation

According to the Codification, the following expenditures related to the production of oil and gas do not contribute to capital formation and should be expensed as incurred: geological and geophysical costs; costs of carrying and retaining undeveloped properties; and costs of drilling exploratory wells and other wells that do not find proved reserves. The justification for expensing the expenditures is that the expenditures do not increase the potential for property to

contain oil and gas reserves, which is required under the Codification for recognizing an asset. Given the uncertainty associated with each of the expenditures, they are considered a form of R&D. Thus, extractive activities are also associated in figure 1.2 with goodwill and other intangibles that are unidentifiable, have indeterminate lives, or are inherent to business continuity.¹⁴

Computer Software and Databases

As shown in figures 1.1 and 1.2, the Codification includes separate rules for expensing or capitalizing expenditures related to purchased software and internally-produced software.

Purchased Software. Software that is purchased to be used internally is capitalized if it is used in production, but purchased software used internally for R&D is only capitalized if the software has an alternative future use. If there is no alternative future use, the software is expensed, which is consistent with other expenditures for R&D. Purchased software to be sold, leased, or marketed is recognized as an asset and capitalized if the software has an alternative future use. If the purchased software to be sold, leased, or marketed has no alternative future use, recognition of an asset depends on the establishment of technological feasibility. Under the Codification (para. 985-20-25-2), technological feasibility “is established when the entity has completed all planning, designing, coding, and testing activities that are necessary to establish that the product can be produced to meet its design specifications including functions, features, and technical performance requirements.” Until the software is determined to be technologically feasible, expenditures to establish technological feasibility are expensed as R&D. Once technological feasibility is established, production costs are capitalized as assets until the

¹⁴ Under the Codification, extractive activities include mining and oil and gas. The treatment summarized here applies explicitly in the Codification to oil and gas, but the summary generalizes the treatment for the same expenditures in mining because mining is not explicitly excluded.

software is available to customers. Subsequent expenditures for maintenance and customer support are expensed as incurred.

Internally-Produced Software. For internally-produced software, there is no test for alternative future use. Thus, internally-produced software is expensed if it is used internally for R&D, regardless of alternative future use. Expenditures related to internally-produced software to be used internally for production are included in one of three stages: 1) preliminary project stage, 2) application development stage, and 3) operation stage. Costs associated with the first and third stage are expensed as incurred. Costs incurred in the second stage are recognized as assets and capitalized. Expenditures related to internally-produced software to be sold, leased, or marketed are subject to the same test for technological feasibility and treated the same as expenditures related to purchased software to be sold, leased, or marketed. Expenditures related to website development are considered with internally-produced software and allocated to one of five stages: 1) planning stage, 2) application and infrastructure development stage, 3) graphics stage, 4) content stage, and 5) operating stage. Costs associated with the first and last stage are expensed as incurred. Costs associated with the other stages are treated the same as either costs for internal-use software or costs for software to be sold, leased, or marketed.

Entertainment, Literary, and Artistic Originals

The Codification generally recognizes expenditures associated with music and films as assets to be capitalized. Thus, music and films in figure 1.2 are associated with goodwill and other intangibles that are identifiable, which are recognized as assets and capitalized. However, the capitalization of costs associated with music depend on the past performance and current popularity of the artist, which may require expensing as indicated by the dashed line from expenditures related to music in figure 1.2.

4. Current Cost Accounting

The *SNA2008* recommends that the costs of production be consistent with the economic concept of opportunity cost. Opportunity cost is the value of the next best alternative that is foregone when a resource is used. Current cost accounting is offered in the *SNA2008* as a practical solution to opportunity cost. Under current cost accounting, a resource used in production is valued at its actual or estimated current market price at the time production takes place. Thus, current cost accounting requires measures of prices to adjust resources to current values. In the capital account, current cost accounting requires price indices over time for different classes of assets. In the case of previously capitalized expenditures related to IPPs, data on current prices may not be readily available because there are no observed transactions.

In contrast to the *SNA2008*, the U.S. financial accounting rules require a resource to be recorded on a historic cost basis, which is determined by the actual costs incurred to acquire the resource. Historic costs are considered to be more objective than current costs. Based on historic costs, the Codification (para. 805-50-30-1) requires an asset to be recorded at the cost incurred by the acquirer. In the case of intangible assets, the capitalized cost is determined by an observed market price or an observed price negotiated between the seller and buyer. Under historic cost accounting, there are no future price adjustments required. Thus, national economic accounting statisticians face a measurement challenge under current cost accounting that is unique to national economic accounting.¹⁵

5. Effects on National Economic Accounting Measures and Financial Accounting Measures

Expensing expenditures related to IPPs assumes the expenditures only benefit the current period, which affects accounting measures in the current period. Capitalizing expenditures

¹⁵ Measurement of prices related to IPPs are outside the scope of this paper, but guidance is offered for R&D in Copeland and Fixler (2012), Robbins et al. (2012), Corrado et al. (2011), and Copeland et al. (2007).

related to IPPs assumes the expenditures provide current and future benefits, which affects accounting measures in the current and future periods. Thus, in addition to affecting the capital account, capitalizing IPPs affects the production account and the income accounts of the *SNA2008*. Likewise, capitalizing expenditures related to IPPs in lieu of expensing also generates differences in financial accounting measures.

Prior to considering the effects on national economic accounting measures and financial accounting measures, table 2 provides a concordance of the measures to facilitate understanding of each. In addition to salaries and wages, compensation under national economic accounting includes benefits and other supplements. Under financial accounting, operating expenses include selling, general, and administrative expenses as well as expenditures related to IPPs and other indirect production costs that are required to be expensed as incurred. Cost of sales includes direct costs, including compensation, attributable to the production of goods and services. Thus, there are some differences in scope between cost of sales and intermediate consumption and between operating expenses and compensation and taxes on production less subsidies, which affects the concordance between value-added (GDP) in national economic accounting and gross margin in financial accounting. Likewise, some economic accounting measures are conceptually different than the corresponding financial accounting measure. For example, CFC in national economic accounting is based on current cost accounting, and depreciation and amortization in financial accounting is based on historic cost accounting.

National Economic Accounting Measures

Based on Hulten and Hao (2008), table 3 summarizes the effects of expensing or capitalizing on the production account and the generation of income account. The top panel of table 3 shows expenditures related to purchased IPPs, and the bottom panel shows expenditures

related to internally-produced IPPs. In each panel, Q denotes output, X denotes intermediate consumption, and R denotes expenditures related to IPPs, such as R&D expenditures. In addition, when expenditures are capitalized, the capitalized amounts are subject to economic depreciation at a rate denoted γ , where $0 < \gamma < 1$.

Purchased IPPs. Whether expenditures related to purchased IPPs are expensed or capitalized, output is presumably the same because the contribution of purchased IPPs to output should not depend on expensing or capitalizing. However, if purchased IPPs are capitalized rather than expensed, intermediate consumption decreases by the amount of the expenditures, R , which is offset by an equal increase in value-added (GDP). Likewise, gross operating surplus increases by R . Given the charge to CFC for economic depreciation, the difference in net operating surplus is $(1-\gamma)R$.

Internally-Produced IPPs. If expenditures related to internally-produced IPPs are expensed, the expenditures are treated as intermediate consumption in the production of products other than IPPs with no impact on the output of IPPs. If the expenditures are capitalized, they are treated as intermediate consumption in the production of IPPs, and the capitalized amount is treated as output of IPPs. Whether internally-produced IPPs are sold to other producers or used internally, there is presumably a return, denoted Π , associated with the output. Thus, if internally-produced IPPs are capitalized in lieu of expensing, output increases by the amount of the expenditures plus the associated return, $(1+\Pi)R$. Intermediate consumption stays the same because capitalizing internally-produced IPPs does not change the purchases of intermediate inputs. Likewise, value-added (GDP) and gross operating surplus increase by $(1+\Pi)R$, and net operating surplus increases by the output of IPPs adjusted for economic depreciation $(1+\Pi-\gamma)R$.

Financial Accounting Measures

Similar to table 3 for national economic accounts, table 4 summarizes differences generated for financial accounting measures with expensed and capitalized expenditures related to purchased intangibles and internally-produced intangibles. In table 4, S denotes sales, C denotes cost of sales, and R denotes expenditures related to R&D. In addition, the return to own-account R&D and the associated amortization rate are Π and γ ($0 < \gamma < 1$), respectively.

Purchased Intangibles. Similar to output in table 3, sales in table 4 are presumably the same whether expenditures related to purchased R&D are expensed or capitalized. If purchased R&D is capitalized rather than expensed, operating expenses decrease by the amount of the expenditures, R , which is offset by an equal increase in earnings before interest, taxes, depreciation, and amortization (EBITDA) (i.e., operating income). Given the charge to amortization, the difference in earnings before interest and taxes (EBIT) and net income are each $(1-\gamma)R$. The changes for operating income, EBIT, and net income in financial accounts are equivalent to the changes for their counterparts in national economic accounts.

Internally-Produced Intangibles. Similar to the treatment of internally-produced IPPs in national economic accounts, if expenditures related to own-account R&D are expensed, the expenditures are treated as operating expenses with no impact on sales. If the expenditures are capitalized, they may be treated as the cost of sales in the production of intangibles, and the capitalized amount may be treated as sales of intangibles. Thus, capitalizing own-account R&D instead of expensing increases the cost of sales by the amount of the expenditures, R , which are offset by an equal decrease in operating expenses. In addition, sales increase by the amount of the expenditures plus the associated return, $(1+\Pi)R$, which is also reflected in EBITDA (i.e., operating income). Given the charge to amortization, the difference in EBIT and net income are

each $(1+\Pi-\gamma)R$. The changes for sales, operating income, EBIT, and net income are equivalent to the changes for their counterparts in national economic accounts.

6. Summary

This paper outlines international guidelines under the *SNA2008* and U.S. rules under the FASB Codification for expensing or capitalizing expenditures related to IPPs. The paper highlights notable differences in accounting for four categories of IPPs identified in the *SNA2008*: 1) R&D, 2) mineral exploration and evaluation, 3) computer software and databases, and 4) entertainment, literary, and artistic originals. First, with an exception for some software development costs, expenditures on R&D are generally expensed as incurred under the Codification. Under the *SNA2008*, expenditures on R&D are generally capitalized. Second, software development costs are capitalized under the Codification only when the technological feasibility of the software has been established. Under the *SNA2008*, expenditures associated with developing software and databases are capitalized regardless of technological feasibility. Third, expenditures associated with mineral exploration and evaluation are generally expensed under the Codification but capitalized under the *SNA2008*. Finally, accounting for entertainment, literary, and artistic originals is generally the same under the Codification and the *SNA2008* except that the commercial success of music is considered under the Codification.

In addition to the differences in accounting, the paper introduces a measurement challenge associated with the concept of current cost accounting under national economic accounting and demonstrates the effects of expensing or capitalizing expenditures related to IPPs on national economic accounting measures and financial accounting measures. With respect to current cost accounting, national economic accounting statisticians face a paucity of data on current prices that are required to adjust previously capitalized expenditures related to IPPs to

current values. With respect to the effects on national economic accounting measures and financial accounting measures, operating surplus and value-added (GDP) are higher in national economic accounts when expenditures related to IPPs are capitalized. Likewise, measure of operating income, EBIT, and net income are higher in financial accounts when expenditures related to IPPs are capitalized.

References

- Aboody, David and Baruch Lev. 1998. "The Value Relevance of Intangibles: The Case of Software Capitalization." *Journal of Accounting Research*, 36, pp. 161-191.
- Aizcorbe, Ana M., Carol E. Moylan, and Carol A. Robbins. 2009. "Toward better Measurement of Innovation and Intangibles." *Survey of Current Business*, 89(1), pp. 10-23.
- Amir, Eli and Baruch Lev. 1996. "Value-relevance of nonfinancial information: The wireless communications industry." *Journal of Accounting and Economics*, 22, pp. 3-30.
- Ciftci, Mustafa, Masako Darrough, and Raj Mashruwala. 2013. "Value Relevance of Accounting Information for Intangible-Intensive Industries and the Impact of Scale: The US Evidence." *European Accounting Review*, forthcoming.
- Collins, Daniel W., Edward L. Maydew, and Ira S. Weiss. 1997. "Changes in the value-relevance of earnings and book values over the past forty years." *Journal of Accounting and Economics*, 24, pp. 39-67.
- Copeland, Adam and Dennis Fixler. 2012. "Measuring the Price of Research and Development Output." *Review of Income and Wealth*, 58(1), pp. 168-182.
- Copeland, Adam, Gabriel W. Medeiros, and Carol Robbins. 2007. "Estimating Prices for R&D Investment in the 2007 R&D Satellite Account." Bureau of Economic Analysis/National Science Foundation 2007 R&D Satellite Account Background Paper.
- Corrado, Carol, Peter Goodridge, and Jonathan Haskel. 2011. "Constructing a Price Deflator for R&D: Calculating the Price of Knowledge Investment as a Residual." The Conference Board Economics Program working paper series EPWP #11-03.
- European Commission, International Monetary Fund, Organization for Economic Cooperation and Development, United Nations, and World Bank. 2009. *System of National Accounts 2008*. New York, NY: United Nations.
- Financial Accounting Foundation, Financial Accounting Standards Board. Accounting Standards Codification. Topics 350-20, 350-30, 350-40, 350-50, 730-10, 805-20, 805-30, 926-20, 928-340, 932-720, 985-20.
- Francis, Jennifer and Katherine Schipper. 1999. "Have Financial Statements Lost Their Relevance?" *Journal of Accounting Research*, 37(2), pp. 319-352.
- Hulten, Charles R. and Xiaohui Hao. 2008. "What is a Company Really Worth? Intangible Capital and the 'Market to Book Value' Puzzle." National Bureau of Economic Research working paper 14548.

- Lee, Jennifer and Andrew G. Schmidt. 2010. "Research and Development Satellite Account Update." *Survey of Current Business*, 90(12), pp. 16-27.
- Lev, Baruch and Theodore Sougiannis. 1996. "The capitalization, amortization, and value relevance of R&D." *Journal of Accounting and Economics*, 21, pp. 107-138.
- Lev, Baruch and Paul Zarowin. 1999. "The Boundaries of Financial Reporting and How to Extend Them." *Journal of Accounting Research*, 37(2), pp. 353-385.
- Li, Wendy C.Y. 2012. "Depreciation of Business R&D Capital." NBER Summer Institute/CRIW Workshop working paper.
- Moulton, Brent R., Robert P. Parker, and Eugene P. Seskin. 1999. "A Preview of the 1999 Comprehensive Revision of the National Income and Product Accounts." *Survey of Current Business*, 79(8), pp. 7-20.
- Organization for Economic Cooperation and Development. 2010. *Handbook on Deriving Capital Measures of Intellectual Property Products*.
- Penman, Stephen H. 2009. "Accounting for Intangible Assets: There is Also an Income Statement." *Abacus*, 45, pp. 358-371.
- Robbins, Carol A., Olympia Belay, Matthew Donahoe, and Jennifer Lee. 2012. "Industry-Level Output Price Indexes for R&D: An Input-Cost Approach with R&D Productivity Adjustment." BEA working paper WP2013-2.
- Robbins, Carol A. and Carol E. Moylan. 2007. "Research and Development Satellite Account Update." *Survey of Current Business*, 87(10), pp. 49-64.
- Smith, Shelly and Alyssa E. Holdren. 2013. "Preview of the 2013 Comprehensive Revision of the National Income and Product Accounts." *Survey of Current Business*, 92(3), pp. 13-39.

Table 1.1
Summary Current Accounts of the SNA2008

<i>Uses</i>	<i>Resources</i>
<i>Production Account</i>	
	Output
Intermediate Consumption	
Value-added (GDP)	
<i>Primary Distribution of Income Account</i>	
<i>Generation of Income sub-Account</i>	
	Value-added (GDP)
Compensation of employees	
Taxes on production less subsidies	
Operating surplus	
<i>Entrepreneurial Income sub-Account</i>	
	Operating surplus
Property income	Property income
Entrepreneurial income	
<i>Allocation of Other Primary Income sub-Account</i>	
	Entrepreneurial income
	Compensation
	Taxes on production less subsidies
Property income	Property income
National income	
<i>Secondary Distribution of Income Account</i>	
	National income
Current transfers	Current transfers
Current taxes on income, wealth, etc.	Current taxes on income, wealth, etc.
Disposable income	
<i>Use of Disposable Income Account</i>	
	Disposable income
Final consumption expenditures	
Saving	

Source: Adapted by the author from the SNA2008.

Table 1.2
Summary Accumulation Accounts and Balance Sheet of the SNA2008

<i>Assets</i>	<i>Liabilities and Net Worth</i>
<i>Capital Account</i>	
	Saving
Gross fixed capital formation (GFCF)	
Changes in inventories	
Acquisitions less disposals of valuables	
Consumption of fixed capital (CFC) (-)	
Acquisitions less disposals of non-produced assets	
	Capital transfers receivable (+)
	Capital transfers payable (-)
	Changes in net worth due to saving and capital transfers
Net lending (+) / net borrowing (-)	
<i>Financial Account</i>	
	Net lending (+) / net borrowing (-)
Net acquisitions of financial assets	Net acquisitions of financial liabilities
<i>Other Changes in the Volume of Assets Account</i>	
OCVA	OCVA
	Changes in net worth due to OCVA
<i>Revaluation Account</i>	
	Holding gains and losses
Holding gains and losses	Changes in net worth due to holding gains and losses
<i>Balance Sheet</i>	
Opening assets	Opening liabilities and net worth
Transactions in non-financial assets and financial assets and liabilities	Transactions in non-financial assets and financial assets and liabilities
	Saving and capital transfers
	OCVA
	Holding gains and losses
Closing assets	Closing liabilities and net worth

Source: Adapted by the author from the SNA2008.

Table 2
Concordance of National Economic Accounting Measures and Financial Accounting Measures

<i>National Economic Accounting</i>	<i>Financial Accounting</i>
Output	Net sales
–	Less: Cost of sales
–	<hr/>
–	Gross margin
Less: Intermediate consumption	Less: Operating expenses
<hr/>	–
Value-added (GDP)	–
Less: Compensation	–
Less: Taxes on production less subsidies	–
<hr/>	<hr/>
Gross operating surplus	Operating income (EBITDA)
Less: CFC	Less: Depreciation and amortization
<hr/>	<hr/>
Net operating surplus	Earnings before interest and taxes (EBIT)
Less: Net property income	Less: Net interest paid
<hr/>	<hr/>
Net entrepreneurial income before current taxes	Income before income taxes
Less: Current taxes on income, wealth, etc.	Less: Provision for income taxes
<hr/>	<hr/>
Net entrepreneurial income after current taxes	Net income

Source: Author's concordance of national economic accounting measures and financial accounting measures.

Notes: Some economic accounting measures are conceptually different than the corresponding financial accounting measure. For example, CFC is based on current cost accounting, and depreciation and amortization is based on historic cost accounting. EBITDA = earnings before interest, taxes, depreciation, and amortization.

Table 3
National Economic Accounting Measures with Expensed and Capitalized Expenditures

	<i>Expensed</i>	<i>Capitalized</i>
<i>Purchased IPPs</i>		
Output	Q	Q
Less: Intermediate consumption	$X + R$	X
Value-added (GDP)	$Q - X - R$	$Q - X$
Less: Compensation	W	W
Less: Taxes less subsidies	T	T
Gross operating surplus	$Q - X - W - T - R$	$Q - X - W - T$
Less: CFC	D	$D + \gamma R$
Net operating surplus	$Q - X - W - T - D - R$	$Q - X - W - T - D - \gamma R$
<i>Internally-Produced IPPs</i>		
Output	Q	$Q + (1 + \Pi)R$
Less: Intermediate consumption	$X + R$	$X + R$
Value-added (GDP)	$Q - X - R$	$Q - X + \Pi R$
Less: Compensation	W	W
Less: Taxes less subsidies	T	T
Gross operating surplus	$Q - X - W - T - R$	$Q - X + \Pi R - W - T$
Less: CFC	D	$D + \gamma R$
Net operating surplus	$Q - X - W - T - D - R$	$Q - X - W - T - D + (\Pi - \gamma)R$

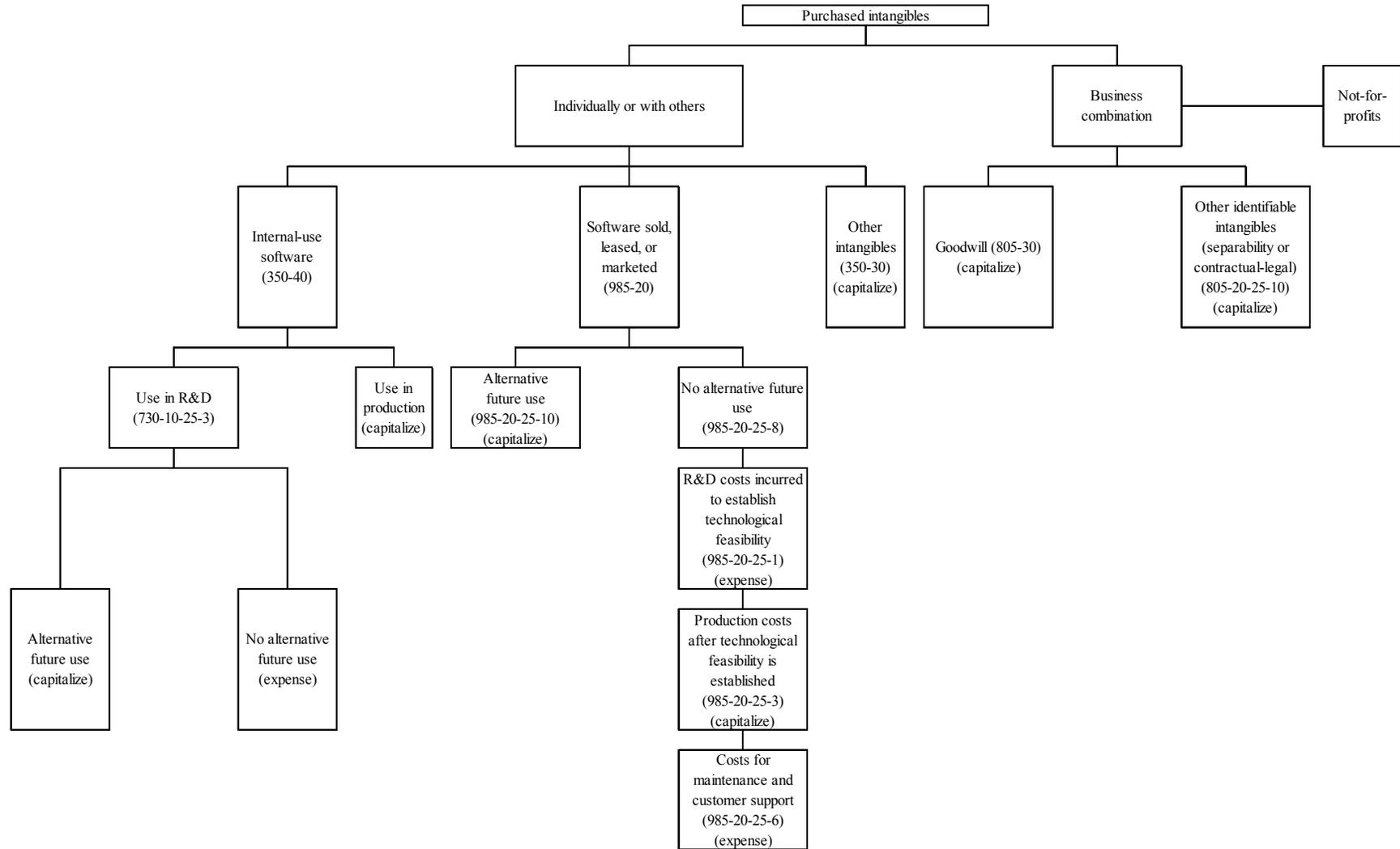
Source: Adapted by the author from Hulton and Hao (2008).

Table 4
Financial Accounting Measures with Expensed and Capitalized Expenditures

	<i>Expensed</i>	<i>Capitalized</i>
<i>Purchased Intangibles</i>		
Net sales	S	S
Less: Cost of sales	C	C
Gross margin	$S - C$	$S - C$
Less: Operating expenses	X	X
Less: R&D	R	
Operating income (EBITDA)	$S - C - X - R$	$S - C - X$
Less: Depreciation and amortization	D	$D + \gamma R$
Earnings b/f interest and taxes (EBIT)	$S - C - X - D - R$	$S - C - X - D - \gamma R$
Less: Interest and income taxes	T	T
Net income	$S - C - X - D - T - R$	$S - C - X - D - T - \gamma R$
<i>Internally-Produced Intangibles</i>		
Net sales	S	$S + (1+\Pi)R$
Less: Cost of sales	C	$C + R$
Gross margin	$S - C$	$S - C + \Pi R$
Less: Operating expenses	X	X
Less: R&D	R	
Operating income (EBITDA)	$S - C - X - R$	$S - C - X + \Pi R$
Less: Depreciation and amortization	D	$D + \gamma R$
Earnings b/f interest and taxes (EBIT)	$S - C - X - D - R$	$S - C - X - D + (\Pi - \gamma)R$
Less: Interest and income taxes	T	T
Net income	$S - C - X - D - T - R$	$S - C - X - D - T + (\Pi - \gamma)R$

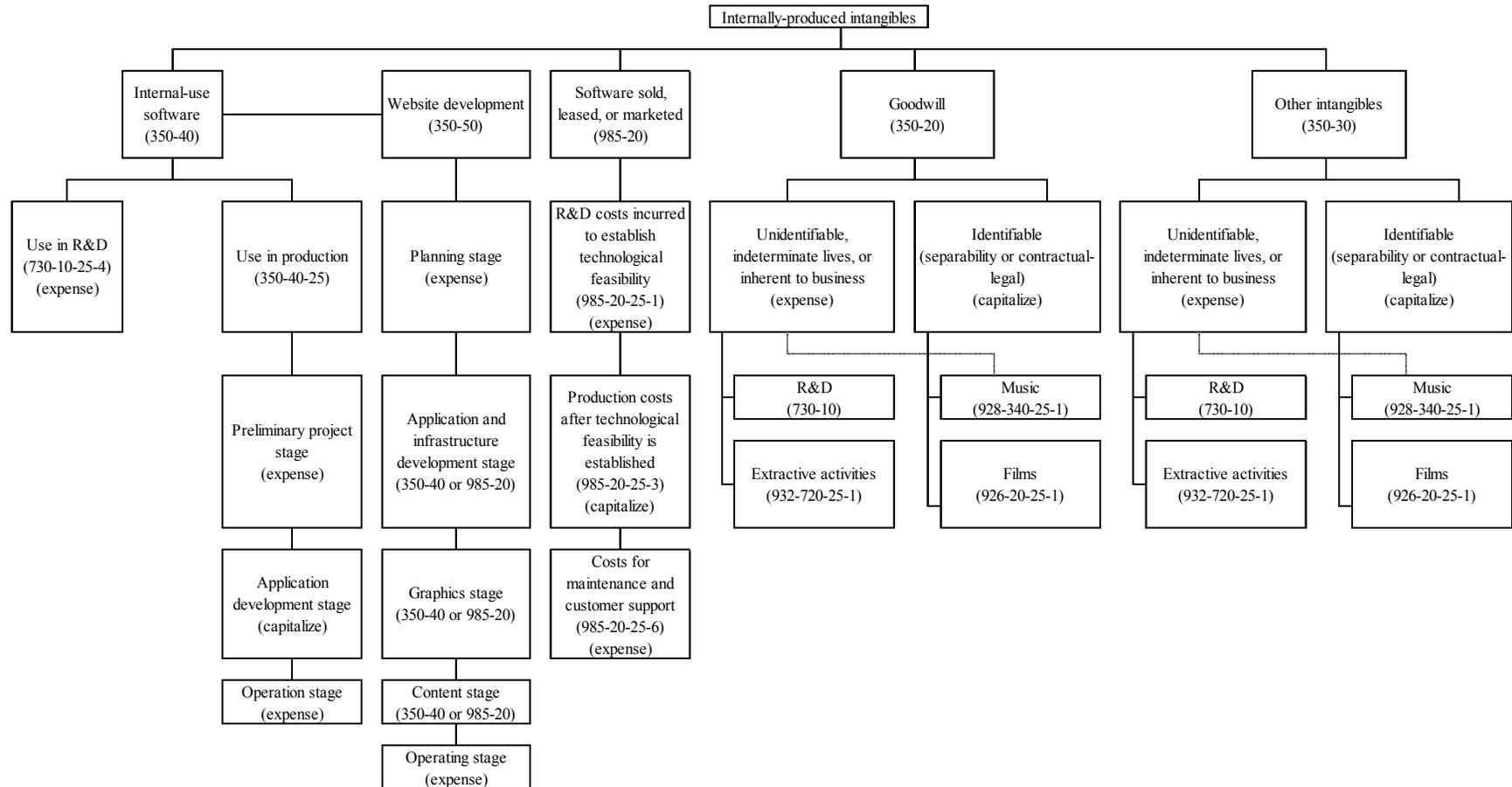
Source: Adapted by the author from Hulton and Hao (2008).

Figure 1.1
Summary of FASB Codification for Expenditures Related to Purchased Intangibles



Source: Author's summary of the FASB Codification.

Figure 1.2
Summary of FASB Codification for Expenditures Related to Internally-Produced Intangibles



Source: Author's summary of the FASB Codification.