

**Accounting for cloud computing activities under the
acquisition or development of software to be utilized
and accessed by the customer
(An Evaluation Study)**

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Abstract

The unique nature of cloud computing has a considerable influence on the accounting treatment of its assets and generated revenues, where also highlights many rapid technological and accounting developments and changes that arise in accounting issues that affect directly and indirectly on the nature of the activities and services provided by cloud computing companies.

Due to the absence of clear, authoritative guidance has prompted a variety in practice, where there is no clear authoritative guidance to assure harmonious treatment for recording costs of intangible assets developed for internal use at which in information economy such assets partially recognized in the accounting records of cloud computing entities — mainly concerning accounting recognition, measurement, and disclosure for the assets' value used to construct cloud computing technology related to the acquisition or development of software to be utilized and accessed by the customer within cloud computing activities their impact on financial statements.

So, the research aims to display, analyze, and evaluate the nature of cloud computing and the current treatments related to the acquisition or development of software to be utilized and accessed by the customer within cloud computing activities under the recent accounting releases.

Based on studying the problem of the research and achieving their goals, the researcher tested the central hypothesis of the study, where: Current accounting standards and guidelines for the acquisition or development of software to be utilized and accessed by the customer do not fit with the distinctive characteristics of cloud computing companies' activities in the business environment. Research depends on the inductive approach, to make theoretical and evaluation study under the objectives of the study and to verify the acceptance or rejection of the study hypotheses.

Where the research, discussing and analyzing the Cloud Computing Definitions, Cloud Computing Infrastructure, Special Characteristics of Cloud Computing Transactions, and evaluate and analysis of the accounting treatment of acquisition or development of software to be utilized and accessed by the customer (Guidance Under FASB Statement No. 86 that codified at (ASC 985-20), Guidance Under Statement of Position (SOP) 98-1 that codified at (ASC 350-40), and Guidance under the provision of IAS 38 entitled "Intangible Assets".

Finally, the study hypothesis is accepted, and the researcher suggests to develop an accounting framework for cloud computing companies' activities in light of the unique nature and characteristics and to test the proposed framework in the Egyptian business environment.

Keywords: Cloud Computing, Internal-use Software, Cloud Service Hosting Arrangement, Internally generated intangible assets, Research and Development Costs, Cloud Computing Infrastructure, Cloud Computing treatment issues, Software Hosting Arrangement, Comparative accounting treatment, Utilize or access software.

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1: Introduction

Nowadays, wealth, growth, and welfare are driven by intangible assets. The structure of companies has changed dramatically, shifting the focus of value creation from physical-based activities to intangible based value creation. In this way of transformation, some intangible assets as software are fast becoming commodities or used as a process to provide services being freely available or on subscription to society through open or closed source methodologies.¹ Since quite a while ago, guided accounting rules for detailed requirements about companies providing cloud computing arrangements when they could involve some packaging of product & service or a bundled service only. However, cloud computing companies have been left to their thoughts on the most proficient method to reflect costs incurred of owning & managing cloud computing technology in the financial statements without clear guidance clarifying the accounting treatment of such transactions and reflecting the related straightforward accounting treatment in an effective manner.²

The rise of cloud computing turns on chances for developing nations to take an interest in global markets without the regular basic physical and organizational structures and facilities that are utilized to encourage commercial exchange.³ Cloud computing as a utility presented firstly by McCarthy (1961) and posteriorly scout about by Licklider (1963), who sought after a globally comprehensive computer network organize. Where the development of cloud innovation & technology first introduced from expensive and complicated information innovation arrangements and undertaking applications within enterprises in the 1980s and empowered by the ongoing extension of the Web in the 1990s. Besides, the dramatic drop in data transfer capacity costs and other mechanical advances have added to the rise of cloud computing. Cloud computing gives physical, tangible, and quantifiable business benefits by permitting multi-client, ongoing access without the in advance finance cost, unlike past ages versions application provided by service providers. Nonetheless, difficulties for the appraisal and administration of the risks faced by cloud computing technologies for both managers and auditors due to the multifaceted nature and decent variety of cloud computing design, combined with the division between ownership and controls of data, conceivable interruption of service, and recovery of data.⁴

Many allege that failure of the accounting profession to accommodate the fundamental changes in the business environment because it has not improved timely

¹ Garcia-Garcia, Jesus; Maria Isabel Alonso de Magdalena. "Valuation of Open Source Software: How do you put a value on free?". *Journal of Management, Finance and Accounting*, Volume 3, Issue 1, Jan/Apr 2013, P. 4-5.

² Adapted & Amended from Whitehouse, Tammy. "Cloud Computing Accounting Consequences Roll In". *Accounting & Auditing, Compliance Week*, Working Paper, January 2016, P. 24.

³ Hailu, Aymayehu. "Factors influencing cloud-computing technology adoption in developing countries". Unpublished Doctoral Thesis – Doctor of Philosophy, Capella University, 2012, P.34.

⁴ Alzli, Fatima A., Yeh, Chia-Lun. "Cloud Computing: Overview and Risk Analysis". *Journal of Information systems*, Vol. 26, No. 2, (Fall 2012), PP. 13-14.

Quoting, go! For Further details:

- McCarthy, J.; Centennial Keynote Address, Massachusetts Institute of Technology, 1961.

- Licklider, J. C.: "Memorandum for Members and Affiliates of the Intergalactic Computer Network", Washington, D.C.: Advanced Research Projects Agency, (1963).

- Grabaki, S. V., Leech, S. A., & Schmidt, P. J.: "A review of ERP research: A future agenda for accounting information systems", *Journal of Information Systems*, Volume 25, No. 1, (2011), PP. 37-78.

- Mohamed, A.: "A history of cloud computing", (2009). Available at: <http://www.computerresearch.com/Articles/200906/10/235429/A-history-of-cloud-computing.html>

- Information Systems Audit & Control Association (ISACA). "Cloud Computing: Business Benefits with Security". Governance and Assurance Perspectives. Rolling Meadows, IL: ISACA, (2009).

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guidance for reporting intangible assets. Also, regulatory attention has focused on the disclosure of companies concerning intangible assets. According to the FASB, hundreds of studies, articles, and consultants' reports have criticized accounting for its failure to respond to essential changes in the economy due to an incomplete address of the financial reporting to the issues of accounting for intangible assets.¹

Under GAAP, internally generated intangible assets could be capitalized, revalued, and amortized. Under IFRS, the development costs can be capitalized if all criteria of IAS 38 are satisfied, and they can be revalued upward only when an active market exists (which is unlikely in practice). Furthermore, only intangible assets with a finite useful life can be amortized, and intangible assets with infinite useful lives must be tested for impairment every period. The recoverable amount under the impairment test must be measured at present value, while firms could choose between undiscounted and discounted cash flow under GAAP.² In 2002, the FASB and IASB announced their intention to develop high-quality, compatible accounting standards that could be utilized for both domestic & cross-border financial reporting (the Norwalk Agreement). The two bodies are currently working to harmonize differences between their respective standards, and one such difference is in the treatment of research and development costs.³ The boards' goal is to enhance the usefulness of the information provided in the financial statements to support users to make decisions in their capacity as capital providers.⁴

The value of the economic entity must be seen as the economic concept of "production function", according to which the entity's economic performance is generated by using three major classes of assets: physical, financial, and intangible.⁵ Moreover, in discussing the costs of owning and managing cloud computing infrastructure, the concept of the total cost of ownership, which means the method for addressing the real cost related to such infrastructure.

Where, the structure of the research is based on different sections as follows: The Research Problem, The Research Main Objective, The General Hypothesis of the Research, The Importance, Contribution, & Potential Outputs of the Research, The Proposed Methodology of the Research, Cloud Computing Definitions, Cloud Computing Infrastructure, Special Characteristics of Cloud Computing Transactions, Evaluation and Analysis of the Accounting treatment of acquisition or development of software to be utilized and accessed by the customer (Guidance Under FASB Statement No. 86 that codified at (ASC 985-20), Guidance Under Statement of Position (SOP) 98-1 that codified at (ASC 350-40), and Guidance under the provision of IAS 38 entitled "Intangible Assets", and then, Conclusion.

¹ Clem, Anne, Cowan, Arnold R., and Jeffrey, Cynthia, "Market Reaction to Proposed Changes in Accounting for Purchased Research and Development in R&D-Intensive Industries", *Journal of Accounting, Auditing & Finance*, Volume 39, Issue 4, October 2004, PP. 405-406.

² Jin, Kai; Shue, Yanwen; Taylor, Stephen; "Matching between revenues and expenses and the adoption of International Financial Reporting Standards", *Pacific-Basin Finance Journal*, Volume 35, Part A, November 2015, P. 94.

³ Myer, Patricia G; Schneider, Richard G., "The Comparative Reporting Impact of the FASB and IASB Treatments of Research and Development Expenditures", *Journal of Business and Accounting*, Volume 5, Issue 1, Fall 2012, P. 50.

⁴ Financial Accounting Standard Board (FASB), "Convergence with the International Accounting Standards Board (IASB)", Norwalk, CT: Financial Accounting Foundation, 2002. Available at: http://www.fash.org/intl-convergence_fash.shtml.

⁵ Dimescu, Tatiana; Smedu, Raluca; "Conversations Regarding Accounting Recognition of Intangibles in the Company's Performance", *Procedia Economics and Finance*, Volume 39, 2016, P. 58.

2: The Research Problem:

The absence of clear, authoritative guidance has prompted a variety in practice, where there is no clear authoritative guidance to assure harmonious treatment for recording costs of intangible assets developed for internal use at which in information economy such assets partially recognized in the accounting records of cloud computing entities. Mainly concerning accounting recognition, measurement, and disclosure for the assets' value used to construct cloud computing technology related to the acquisition or development of software to be utilized and accessed by the customer within cloud computing activities their impact on financial statements.

The economic, technology, and accounting developments associated with the cloud computing companies' activities have formed a clear burden on the extent to which the current accounting rules for these developments formulate and depict a precise treatment for such the activities of those companies. That resulted in the emergence of many of the accounting issues that are related to those activities, services, and how to recognize and measure and report it accurately to reflect the economic reality of transactions and then popped the need for the continued development of the accounting rules and instructions to fit in with these rapid developments.

Based on the above, the problem stems based on the following question:

What is the extent of the current deficiencies of accounting for cloud computing companies' activities related to the acquisition or development of software to be utilized and accessed by the customer with the inability of the current accounting standards and guidelines to accommodate this type of technology?

3: The Research Main Objective:

The research aims to display, analyze, and evaluate the nature of cloud computing and the current treatments related to the acquisition or development of software to be utilized and accessed by the customer within cloud computing activities under the recent accounting releases.

4: The General Hypothesis of the Research:

Based on studying the problem of the research and achieving their goals, the researcher tested the central hypothesis of the study, where:

- Current accounting standards and guidelines for the acquisition or development of software to be utilized and accessed by the customer do not fit with the distinctive characteristics of cloud computing companies' activities in the business environment.

5: The Importance, Contribution, & Potential Outputs of the Research:

The Proposed study shall contribute to the existing literature in the following areas:

1. The Study benefits from its scientific side through accounting development for cloud computing companies' activities in the Egyptian business environment by proposing an integrated framework to account for these activities under the unique nature and characteristics of the cloud computing technology. Where such development made for the accounting for asset's value and other expenditures related to the acquisition or development of software to be utilized and accessed by the customer in light of cloud computing companies' activities. So that they considered as the conceptual cornerstone to developing the current accounting standards to accommodate cloud computing technology companies' activities to cope with the new and advanced business technology changes in order to eliminate the current accounting treatments

gap to enhance the quality of financial reporting & the rationalization of users' economic decisions.

2. The Study benefit from its practice side, as it earns the companies working in the field of cloud computing, a competitive advantage that stands out their transactions through the possibility of accounting for the assets' value and other expenditures used to construct cloud computing technology related to the acquisition or development of software to be utilized and accessed by the customer in light of cloud computing companies' activities. Moreover, thus pigments the added value of the company and its ability to compete, survive and leadership in the light of their financial reports and thus rationalize its users' decisions and highlight the high ability to attract investors.
3. An Accounting perspective on cloud computing technology companies' activities does not have enough attention by the research and literature of Arab and foreign (scarcity of research), and that despite the increasing growth of these activities internationally, which requires studies and research to the issues generated by them. This apparent lack of accounting literature related to this field has resulted in accounting treatments variation for this kind of activities in the light of accounting for the assets' value and other expenditures related to the acquisition or development of software to be utilized and accessed by the customer used to construct cloud computing technology and accounting for revenues generated on such companies' activities.

Thus, diminishing the knowledge gap in accounting for cloud computing technology activities at cloud service provider companies is the primary goal of this study.

4. However, various indicators could show exacerbate future issues on accounting for cloud computing companies' activities in the real Egyptian environment as follows: despite the lack of the effective utilization of the activities of cloud computing in the Egyptian institutions for many years earlier as the cloud computing needs for reliable infrastructure. The infrastructure in Egypt could be functional but needs further developed. Moreover, it needs high abilities for the service providers, in order to establish high capacities for connection to the internet. Additionally, the analysis of massive data in Egypt services did not find their share until now, because of the low volume of data available, but that some Egyptian and international enterprises operating in Egypt began to the inclusion of these activities to keep pace with technological developments enormous abroad. *The accounting aspects' attention to cloud computing technology activities is necessary with increasing the effective use of those activities and indicators of its development significantly in the coming years to mitigate the accounting issues arose from the provision of such technology.*

6: The Proposed Methodology of the Research:

Researcher depends on inductive approach, to make theoretical and evaluation study under the objectives of the study and to verify the acceptance or rejection of the study hypotheses as follows: the researcher uses academic scientific study through extrapolation and analysis some of the most important reportedly accounting thought, and previous studies, Arabic and foreign references, accounting standards, and professional guidelines related to "accounting for cloud computing companies' activities" and the associated accounting for hosting arrangements. Moreover, an induction for the standards, and accounting guidance, as well as the views of researchers, and academic studies in the accounting for the assets' value and other expenditures related to the acquisition or development of software to be utilized and accessed by the customer used

to construct cloud computing technology. All of that will help the researcher effectively to stand on the current status of the Arab Republic of Egypt on cloud computing activities and its accounting treatment.

7: Cloud Computing Definitions

Although comprehensive discussions and much consideration relating to cloud computing have found, there was no one commonly accepted definition.¹ Diverse definitions for the term cloud computing has made by various experts, where *Mario's* study illustrates that there is a minimum of twenty-two different cloud definitions in everyday use.² Due to the absence of an agreed-upon definition for cloud computing, that considered a standout amongst the most confounding issues encompassing the cloud and its related services. Likewise, every creating innovation, the obscurity of transparency, lucidity, and consensus frequently prevents the overall assessment and acceptance of that innovation.

Two technological setting bodies that have presented a pattern of definition for cloud computing are the U.S. National Institute of Standards & Technology (NIST) & the Cloud Security Alliance. They defined Cloud Computing as "a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction."³ Where, the fundamental attributes of cloud computing provided from this definition as *measured & on-demand self-service, with a rapid elasticity, resource pooling, and broad network access.*⁴

From all of that, there is no precise definition describe the concept of cloud computing from the accounting perspective in order to account for such assets associated with cloud computing infrastructure within the scope of the Cloud Service Provider point of view. Therefore, the researcher suggests the following connotation in order to include the main conceptual characteristics of cloud computing from an accounting perspective *where the suggested cloud computing definition is "a composition of virtualized intangible resources that have a dynamic nature-based on pooled tangible resources. Through which could offering multiple-clients a right to access or use on a recurring fee basis with a scalable virtualized infrastructure or an abstracted set of measured, on-demand, and flexible applications and services using abroad network, located under the full integrated control among the service provider and their clients on an ongoing basis, based on an agreement".*

From this broad definition, we could recognize that cloud computing considered an asset from a cloud service provider perspective. Where such assets of cloud computing infrastructure composed of tangible & intangible resources that could have a changeable

¹ Chen, Thomas; Chuang, Ta-Tao; Nakatani, Kazuo: "The Perceived Business Benefit of Cloud Computing: An Exploratory Study", *Journal of International Technology and Information Management*, Vol. 25, No. 4, 2016, P.102.

² Ebenezer, Eyo Esther Shalini; Onime-Anwili, K.B.; Kyel, Michael Effiah: "Accounting in the Cloud: How Cloud Computing Can Transform Businesses (The Ghanaian Perspective)", *Proceedings of the Second International Conference on Global Business, Economics, Finance and Social Sciences*, Chennai, India, Working Paper, (July 2014), P. 3.

³ *Sources:*

- Information Systems Audit & Control Association (ISACA), "Cloud Computing: Business Benefits with Security", *Governance and Assurance Perspectives*, Rolling Meadows, IL: ISACA, 2009, P.4

- Mell, P. and Grance, T., "The NIST definition of cloud computing", (2011). Available at: <http://nvd.nist.gov/feeds/csp/CloudComputing/The-NIST-Definition-of-Cloud-Computing.pdf>

⁴ Denarov, Mikhail; Osman, Ibrahim: "The Impact of Cloud Computing on Organizations in regard to Cost and Security", unpublished Master's Thesis – Masters of Science in Information Technology and Management, UMEA University, 2012, P.3.

Quinn, Jensen, W., and Grance, T.: "Guidelines on Security and Privacy in Public Cloud Computing", NIST, Special Publication 800-144, Gaithersburg, MD: NIST, 2011, P. 11. www.nist.gov.

nature. Through such assets, the provider could offer numerous activities to users that arose from such transaction revenues and leases from the vendor perspectives, which situated under the full shared control of the service provider and their clients continuously in light of an agreed contract. Where clients could "rent," "subscribe to," "are appointed," or "are allowed access to" the applications from a central supplier.

8: Cloud Computing Infrastructure

According to *Sprague, Gary D. et al.* classifies the cloud computing infrastructure which based on a composition of hardware and software into two components, as follows:¹

1. **The physical layer:** comprises the hardware resources in order to support the cloud services provided, which commonly incorporates data center (server-based), storage spaces & network elements.
2. **The abstraction layer:** conveyed over the physical level that comprises the software, which shows the fundamental cloud attributes.

While within *Molnar, D. et al.* study illustrate that the cloud computing infrastructure has three key elements, as follows:²

1. **Physical Infrastructure:** the service provider sets the physical plant (buildings, energy, backup, air conditioning, etc.), computer hardware, and network.
2. **Software Infrastructure:** including operating systems or cloud infrastructure such as database services, PKI (Public Key Infrastructure³), include costs about Web site development as intangible assets.
3. **Human Infrastructure:** designated staff by the service provider to manage the infrastructure, and thus be able to access the resources of the lessee.

9: Special Characteristics of Cloud Computing Transactions:⁴

1. **No transfer of a Computer Program:** Cloud computing transactions have the privilege to access and use software or data storage or virtual server instances; however, they do not commonly include the transfer of a computer program to the client. A "private cloud" transaction regularly will include an exchange of a PC program and most likely would be characterized as a sale or lease of software.
2. **No transfer of Intangible Property:** Cloud transactions ought not to include the exchange of intangible property rights. IaaS, PaaS, and SaaS clients have given for the limited purpose of permitting the client to remote access to specific hardware and software resources on a pooled basis. Just the output of the software shown, and the provider does not possess copyright in such output.

In some transactions, copyrighted audio and visual content might stream to the client. It is difficult for the customer to get or misuse any intangible property rights other than those vital for it to consume the digital content. Where the client may have the privilege to perform or show the content for its appropriate utilization, such

¹ Sprague, Gary D.; Reid, Taylor S. "A Break in the Clouds: A Proposed Framework for Analysing Cloud Computing Transactions", *Taxes*, Volume 92, Issue 3, (Mar 2014), P.32.

² Molnar, David, Schechter, Stuart, "Self Hosting vs. Cloud Hosting: Accounting for the Security Impact of Hosting in the Cloud", Microsoft Research Paper, 2011, p. 3.

³ **Public Key Infrastructure:** is a tool for securing private information, which accommodates a digital certificate that can recognize an individual or an association and directory services that can store and when renounce the certificates. For Further information: Unnikrishnan, Premalatha, Op. Cit., (September 26, 2012). Available at SSRN: <http://ssrn.com/abstract=2154224>

⁴ Sprague, Gary D.; Reid, Taylor S.; Op. Cit., (Mar 2014), P.31-43.

performance or display commonly would not be at a place open to the public (at least for private consumer transactions).

3. **Transactions with trade-offs between leasing and services contracts:** Whether these transactions are considered services or leases require an analysis of the substance of the rights that the customer has in the property.

If the provider does not exchange property to the client in a cloud computing transaction, then a service characterization would be proper. While clients generally will not get ownership of property in a cloud computing transaction, the provider will utilize different sorts of property to perform its commitments in cloud transactions. The first characterization issue for cloud computing transactions is the distinction between leasing and service transactions.

10: Evaluation and Analysis of the Accounting treatment of acquisition or development of software to be utilized and accessed by the customer

Cloud computing companies incurred costs to either develop or acquire were the accounting for such costs of the related software can base on the structure of the cloud, the method of usage for the software, and the nature of the arrangement.

The treatment of Cloud development costs relies on whether they are software related. For instance, once a "technological feasibility" occurs, software development costs ought to be capitalized. Cloud computing companies with no plans to sell, lease, or license the software will follow the internal-use software guidance, which has an earlier threshold for capitalization. Moreover, there is no direct guidance on capitalization of up-front service setup costs; however, a relationship can be made to other accounting guidance.¹

One major area of difference between the two standards setting bodies' (FASB & IASB) is in the treatment of research and development costs, while in general, an inconsistency found in treatments accepted by the U.S.A., U.K., Australian, and IAS setting bodies' for the software development expenditure. Hence, expenditure on research and development and internally generally intangible assets are generally not recognized as assets because of initial claims that future benefits are uncertain, and an identifiable 'cost' from an external party transaction does not exist. However, there are some exemptions to this principle; these differences summarized in the table (2). It is possible to recognize the 'development' component of research and development & internally generated intangible assets under the GAAP rules of some European countries, Australia, & New Zealand.²

The FASB's SFAS No. 2 in 1974 that codified at ASC 730-10 entitled "Accounting for Research and Development Costs".³ However, the IASB standard discussed this issue at (IAS 38) entitled "Intangible Assets" issued at 1998 and amended at 2004, that internally developed software expenditure should be regarded as an intangible asset if future economic benefits are probable & the cost of the asset can be reliably measured, as will be discussed below.⁴ In contrast, the U.K. accounting standard (SSAP) No. 13 issued in

¹ Pearl, Michael; Moline, Robert; and Woods, Bob; On the Horizon: Insights into the Cloud for Finance and Accounting professionals; Price water house Coopers View, Research Paper, December 2013, P. 5.

² Wyall, A., and Abernethy, Margaret A.; "Framework for measurement and reporting on intangible assets", Intellectual Property Research Institute of Australia, Working Paper, 2003, P. 12.

³ Financial Accounting Standards Board (FASB), Statements of Financial Accounting Standards, SFAS 2, "Accounting for Research and Development Costs", Financial Accounting Foundation, 1974.

⁴ Sources:

- International Accounting Standards Board (IASB), International Accounting Standards, IAS 38 "Intangible Assets", March 2004.

- Wulfe, Mandy, "Accounting for Intangibles and Managerial Information", SSBN Working Paper Series, September 2010, P. 6.

1977, revised in 1989, amended in 1997, 1998, entitled "Accounting for Research and Development," which does not require this treatment but could permit that software could be recognized as an intangible asset.¹ Similarly, allowing capitalization of a 'new product'² development expenditure, as it is expected that such costs to be recoverable with no reasonable doubt as illustrated at both *Australian Accounting Standard (AAS) No. 13* issued at 1983, entitled "Accounting for Research and Development Costs", and Australian Accounting Standard Board (AASB) No. 1011 issued at 1987 with an identical title.³ Where the overall comparative treatment & definitions of research and development will be as follows in the table (1) under *SFAS 2*, codified as (*ASC 730-10*), (*AAS 13 & AASB 1011*), *SSAP 13*, and *IAS 38*. Where research and development efforts aimed at discovering new products and technologies less reliably produce results. However, when successful, research and development produce considerable benefits over long horizons because of its scalability, patent protection, and non-erosive properties, as introduced by (*Enache L. et al.*) study.⁴

While (*Chiang, C. et al.*) study report that the stock market reacts positively to the announcement of an increase in research and development spending by high-technology companies and reacts negatively to a similar announcement by low-technology companies.⁵ Nevertheless, the research and development spending of successful developers increases value while that of non-successful developers decreases firm value as documented by (*Shorridge, R.*) study.⁶

Furthermore, *SFAS No. 2* was the first accounting standard to prescribe accounting practices for R&D activities.⁷ Where this provision left the question of whether software development costs constituted research and development or capitalizable costs mostly unanswered.⁸ So, the widespread application of *Statement No. 2* to software creates only the illusion of comparability.⁹ Additionally, international comparative disclosure requirements, amortization, & impairment test of R&D costs should be made to describe the variances between guidance in the table (3).

However, costs of a software proposed for internal use, though it may be used in to develop a product, is not part of or included in the actual product or service sold. Therefore, this software is used by the vendor in the production of the product or providing the service, but the customer does not acquire the software or the future right to

¹ Accounting Standards Board (UK), *SSAP 13*, "Accounting for Research and Development", 1998.

² 'Product' including 'product, service, process or technique' and as such could be interpreted as encompassing processes for the delivery of financial services as defined in AASB 1011.

³ Sources:

- Australian Accounting Research Foundation (AARF), Australian Accounting Standard AAS 13, "Accounting for Research and Development Costs", 1983.

- Australian Accounting Standards Board (AASB), AASB 1011, "Accounting for Research and Development Costs", 1987.

⁴ Enache, Luminita and Srivastava, Anup, "Should Intangible Investments be Separately Reported or Combined with Operating Expenses?", Working Paper, Canadian Academic Accounting Association (CAAA) Annual Conference, (March 28, 2016), PP 3-4. Available at SSRN: <https://ssrn.com/abstract=2715722>

⁵ Chiang, C. Catherine; Menash, Yaw M., "The Determinants of Investor Valuation of R&D Expenditure in the Software Industry", *Review of Quantitative Finance and Accounting*, Vol. 22, June 2004, P. 204.

⁶ Shorridge, R., "Measuring R&D Success: A Study of New Drug Approvals in the Pharmaceutical Industry", working paper, Ball State University, 2001, P. 10.

⁷ Chan, Howard W H; Faff, Robert W; Ghoshghori, Philip; Hu, Yew Kee, "The relation between R&D intensity and future market returns: does expensing versus capitalization matter?", *Review of Quantitative Finance and Accounting*, Vol. 29, Issue 1, (Jul 2007), P. 27.

⁸ Sources:

- Sanders, George; Munter, Paul; Moores, Tommy, "Software: The unrecorded asset", *Management Accounting*, Volume 76, Issue 2, Aug 1994, P. 58.

- Munter, Paul, "Accounting for internal use software", *CPA Journal*, Vol. 67, Issue 2, Feb. 1997, P. 2.

⁹ Lhotka, Joseph D.; Erickson, Naomi S., "Accounting for Software: A Step Forward", *Journal of Accountancy*, Vol. 158, Issue 5, Nov. 1984, P. 118.

use it, the software is considered within a cloud service hosting arrangement so that ASC 350-40 (formerly SOP 98-1) is applicable. In contrast, costs of software to be sold, leased, or otherwise marketed incorporates software that is part of an actual product or process to be sold to a client. That type of software is for usage at the customer's location considered to be a software hosting arrangement that covered under ASC 985-20 (formerly FASB Statement No. 86), as will be discussed in detail within the table (4).¹

Table (1): The Overall Comparative treatment of research and development expenditures & its definitions²

Source	U.S.A. FASB (SFAS 2 (ASC 730-10), 1974)	Australia (AAS 13, 1983) & (AASB 1011, 1987)	U.K. (SSAP 13, 1989)	International, IASB (IAS 38, 1998)
Treatment if item included as R&D	Requires all R&D costs to be charged to expense as incurred.	May Capitalize	May Capitalize	- Development costs allowed to be capitalized as an intangible asset if they are determined future economic benefits. - It is required all research costs to be charged to expense as incurred.
Included	Formulation Modification or design of a process.	- Design & formulation of possible new or improve process alternatives. - Evaluation of process alternatives.	- Design of services, systems, or processes involving new technology. - Improving substantially those already produced or installed.	N.A.
Definition of Research	<i>"Research is planned search or critical investigation aimed at discovery of new knowledge with the hope that such knowledge will be useful in developing a new product or service (hereinafter "product") or a new process or technique (hereinafter "process") or in bringing about a significant improvement to an existing product or process".</i>	N.A.	N.A.	<i>"Research is original and planned investigation undertaken with the prospect of gaining new scientific or technical knowledge and understanding".³</i>

¹ Anonymous. "Statement of position 98-1--accounting for the costs of computer software developed or obtained for internal use", Journal of Accountancy, Vol. 185, Issue 4, (Apr 1998), P. 92.

² Sources:

- International Accounting Standards Board (IASB), International Accounting Standards, IAS 38 "Intangible Assets", March 2004, P.1037.
- Financial Accounting Standards Board (FASB), FASB Accounting Standards Codification, ASC 730-10, "Research and Development", Financial Accounting Foundation, 2014, P. 738.
- Atkinson, Keith; McGaughey, Ronald, Op. Cit., 2006, P. 88.
- Walker, R. G.; Oliver, G. R., "Accounting for expenditure on software development for internal use", Abacus, Volume 41, Issue 1, February 2005, P. 71.

³ Bowen, Robert M.; Jolliffeau, Janc; Margolin, Loren, "iRobot Corporation's Intellectual Property: Accounting For Research And Development Under U.S. GAAP Versus IFRS", Journal of Business Case Studies (Online), Littleton, Vol. 9, No. 4, (2013), P. 328.

Continue Table (1)

Source	U.S.A. FASB (SFAS 2 (ASC 730-10), 1974)	Australia (AAS 13, 1983) & (AASB 1011, 1987)	U.K. (SSAP 13, 1989)	International, IASB (IAS 38, 1998)
Definition of Development	"Development is the translation of research findings or other knowledge into a plan or design for a new product or a process of or for a significant improvement to an existing product or process whether intended for sale or use".	N.A.	N.A.	"Development is the application of research findings or other knowledge to a plan or design for the production of new or substantially improved materials, devices, products, processes, systems, or services before the start of commercial production or use". ¹
Excluded	Adaptation of an existing capability to a specific requirement or customer's demands as part of continuing commercial activity.		Periodic alteration to existing services or processes even though they may represent some improvement.	N.A.
Treatment if the item not R&D	May Capitalize	Expense	Expense	N.A.

Table (2): An International Matrix shows Various Accounting treatment for Internally Generated Intangible Assets and R&D Assets among different countries²

Accounting treatment	R&D assets	Internally generated intangible assets
No or Very limited recognition	Canada, China, Denmark, Germany, IASB, Malaysia, Norway, Saudi Arabia, South Africa, United Kingdom, & the United States.	Canada, China, Denmark, Germany, IASB, India, Israel, Japan, Norway, Spain, United Kingdom, & the United States.
Recognition with a short amortization period	European Union Directives, Greece, Italy, Japan, Netherlands, & Sweden.	The Netherlands & Saudi Arabia.
Voluntary choice or discretion under an accounting standard to recognize	Australia, Belgium, Brazil, Czech Republic, Finland, France, India, Luxembourg, New Zealand, & Spain.	Australia, Belgium, Brazil, Bulgaria, Czech Republic, Finland, France, Italy, Luxembourg, Malaysia, New Zealand, & European Union Directives.

¹ Buxton, Robert M., Joffe, Jane, Margheim, Lynn. Ibid. (2013), P. 328.

² Wynt, A., and Abernethy, Margaret A., "Framework for measurement and reporting on intangible assets", Intellectual Property Research Institute of Australia, Working Paper, 2003, P. 14.

Table (3): International comparative disclosure requirements, Amortization, and Impairment test of R&D Costs

Impairment test of R&D Costs		
Disclosure	Amortization	Annual Impairment Test?
United States - (SFAS 2)		
☒ Total R&D expensed.	N/A *	N/A
United Kingdom - (SSAP 13)		
☒ Accounting policy. ☒ Deferred development costs & the amount brought forward at the beginning & carried forward at the end of each period. ☒ Amount of development costs amortized distinguishing between current year expenditure and amortization of deferred development expenditure (Large companies only).	Usually less than five years	Yes
Australia - (AASB 1011)		
☒ The expense during the fiscal year is disclosed before crediting any related grants. ☒ The amount of R&D costs expensed during the financial year and deferred to future financial years before crediting any related grant. ☒ The amount of deferred R&D costs at the end of the financial year, with accumulated amortization charges shown separately as a deduction from there. ☒ The basis for amortizing any deferred R&D costs (if R&D is material).	Useful life	Yes
Japan - (JASB 9)		
☒ Total R&D expensed.	N/A	N/A
Malaysia - (MASB 4)		
☒ The accounting policies adopted for R&D costs. ☒ The amount of R&D costs recognized as an expense in the period. ☒ The amortization methods used. ☒ The useful lives or amortization rates used; and a reconciliation of the balance of unamortized development costs at the beginning & end of the period, showing: development costs recognized as an asset, as an expense, allocated to other asset accounts, and development costs written back.	Usually less than five years	Yes
IASB - (IAS 38)		
☒ Useful life or amortization rate. ☒ Amortization method. ☒ Gross carrying amount. ☒ Accumulate amortization. ☒ In the income statement (line items in which amortization is included). ☒ Reconcile the carrying amount at the beginning and the end of the period, showing: additions, retirements/disposals, revaluations, impairments, reversals of impairments, amortization, and foreign exchange differences. ☒ Explain about any intangible amortized over longer than 20 years. ☒ Descript about the carrying amount of separately material intangible assets. ☒ Specific disclosure about intangible assets acquired by government grants.	Rebuttable presumption of 20 years useful life	Yes

* Not Applicable

¹ Khudrrou, M. Iqbal, Shaikh, Junaid M., Colson, Robert H. "Toward Research and Development Costs Harmonization", CPA Journal, Vol. 73, Issue 9, Sep. 2003, P. 52.

Table (4): Accounting treatment for Development or Acquisition of Software to Be Used by the Customer Under US GAAP

Points of details	US GAAP	
	Software Hosting Arrangement <i>ASC 985-20 (formerly FASB Statement 86) & ASC 985-606-55-121</i>	Cloud Service Hosting Arrangement <i>ASC 350-40 (formerly SOP 98-1) & ASC 730-10</i>
Cloud Service Provider's business model (Nature of the arrangement)	Permits its customers to take possession of internally developed or externally purchased software applications or to specific software applications for use at the customer's location. In other words, the hosting arrangement contains a software element.	Permits its customers to access internally developed or externally purchased software applications or to specific software applications within the cloud on-demand via the Internet. In other words, the hosting arrangement does not contain a software element.
The pattern of Software usage by Cloud Service Provider	The software will be sold, leased, or marketed.	The software is utilized to produce a product or in a process to provide a service (e.g., software that is used in producing a product or used to facilitate a process ¹), but but the client is not given the right to obtain or use the software on their premises. Where, it is clarified that a "process may be a system whose output is to be sold, leased, or otherwise marketed to others and may be used internally as a part of a manufacturing activity or a service activity where the service itself is marketed" ² at ASC 730-10 entitled "Research and Development". That also related to the software to be used in research & development, which subject to FASB Statement No. 2, entitled "Accounting for Research and Development Costs", & FASB Interpretation No. 6, entitled "Applicability of FASB Statement No. 2 to Computer Software".
Software characteristics & Applied Accounting Guidance provided to	Accounting for External-use software costs incurred to obtained or internally develop software that will be sold, leased, or marketed.	Accounting for Internal-use software costs that related to: ³ • Software obtained, internally developed, or modified for "internal use" or to meet the entity's internal needs and • During software development, no substantive plan exists or is under development to sell (or market) the software to external customers.

¹ Sannellitter Jr., Robert J., Pacter, Paul, "Accounting for Software", *Journal of Corporate Accounting & Finance* (Wiley), Volume 6, Issue 2, Winter 1994/1995, P. 45, 51.

² Financial Accounting Standards Board (FASB), FASB Accounting Standards Codification, ASC 730-10, "Research and Development", Financial Accounting Foundation, 2014, P.735.

³ Sources:

• American Institute of Certified Public Accountants (AICPA), Statement of Position 98-1, "Accounting for the costs of computer software developed or obtained for internal use", New York: American Institute of Certified Public Accountants, 1998.

• Sardo, Al. Arcely, Al., "Accounting for Internal-Use Software", *Journal of Corporate Accounting & Finance* (Wiley), Volume 9, Issue 4, Summer 1998, P. 48.

Continue Table (4):

Points of details	US GAAP	
	<u>Software Hosting Arrangement</u> <i>ASC 985-20 (formerly FASB Statement 86) & ASC 985-606-55-121</i>	<u>Cloud Service Hosting Arrangement</u> <i>ASC 350-40 (formerly SOP 98-1) & ASC 730-10</i>
Recognition	All incurred costs to establish the technological feasibility of the software are research & development cost and should be expensed as incurred, and subsequent production costs once after the technological feasibility has been established should be capitalized.¹ Software Development Costs (SDC) were classified into three categories or phases: <u>Phase One</u>: R&D costs incurred prior to technological feasibility, <u>Phase Two</u>: Software Development Costs incurred after establishing technological feasibility but before commercial production, and <u>Third Phase</u>: Costs takes place after Commercial production as the product is available for general sale to customers.²	Cloud software development projects are deemed to occur in three stages: preliminary project, application development, and post-implementation.³ Costs charged during the preliminary project stage are generally expensed as incurred, and the post-implementation stage includes Maintenance costs that would be expensed as incurred, and software upgrades costs will be capitalized as will be discussed below at the Accounting treatment for Ongoing Services Costs. While costs charged during the application development stage are capitalized as an asset.⁴
Complementary Guidance	ASC 985-606-55-121 illustrates that in a hosting arrangement that contains a software element. If the following criteria are satisfied:⁵ 1. The customer takes possession, or given the contractual right to take possession, of the software at any time during the contractual period with no significant penalty. 2. It is possible for the customer to either operate the software on its hardware or engage another third party unrelated to the vendor to host the software for the customer.	Cloud Service Provider maintains the software on its servers & allows clients to access, but the client is not given the right to have the software at any time during the contractual period as within a public cloud or on-demand access. Then, the <u>reengineering activities</u>⁶ are ignored within the guidance of SOP No. 98-1. Therefore, discussed later that dealt within <i>Emerging Issues Task Force (EITF) in Issue No. 97-13</i> entitled "Accounting for Costs Incurred in Connection with a Consulting Contract or an Internal Project that Combines Business Process Reengineering and Information Technology".

¹ Atkinson, Keith; McGaughey, Ronald, "Accounting for Data: A Shortcoming in Accounting for Intangible Assets", Academy of Accounting and Financial Studies Journal, Volume 10, Issue 2, P. 88.

² Wise, Spense; Hyington, J Ralph, "Taxes and financial accounting for computer software", Business Entities, Volume 5, Issue 2, Mar./Apr. 2003, P. 38.

³ Schneider, Gary P.; Sheikh, Aamer; Simone, Kathleen A., "Accounting for Software Development Costs: Issues with a rule-based standards", Business Studies Journal, Volume 4, Issue 1, 2012, P. 2.

⁴ Nushbaum, Edward E.; Weiss, Judith, "Costs of Software for Internal-Use SOP", Journal of Corporate Accounting & Finance (Wiley), Volume 9, Issue 4, Summer 1998, PP. 145-146.

⁵ Coleman, Michael; Santusky, Michael; French, Jim; and Williams, Christopher, Op. Cit., August 2014, PP. 1-2.

⁶ *Reengineering activities* are associated with new or upgraded systems, where the reengineering activities include preparation of requests for the proposal, current state assessment, process reengineering (systems analysis), and restructuring of the work force.

Adapted from:

- Savage, Arlene; Callaghan, Joseph H.; Peacock, Eileen, "Accounting for the Development Costs of Internal-Use Software", Journal of Information Systems, Volume 18, Issue 1, Spring 2004, P. 114.

- Sardo, Al; Arcady, Al., Op. Cit., Summer 1998, P. 52.

Continue Table (4):

Points of details	US GAAP	
	Software Hosting Arrangement ASC 985-20 (formerly FASB Statement 86) & ASC 985-606-55- 121	Cloud Service Hosting Arrangement ASC 350-40 (formerly SOP 98-1) & ASC 730-10
		Transformation", that requires the related costs for reengineering activities should be expensed as incurred. ¹ Indeed, the business process reengineering could be either a part of some of the software-related activities or a separate activity. ² Where those costs are like costs for reengineering business processes for improving efficiency under Accounting Principles Board (APB) Opinion No. 17 was issued, which entitled "Intangible Assets". ³

10-1: Guidance Under FASB Statement No. 86 that codified at (ASC 985-20)

In response to the pressure directed by the Securities and Exchange Commission (SEC) and the American Institute of Certified Public Accountants (AICPA). The FASB issued "Accounting for the Costs of Computer Software to be Sold, Leased, or Otherwise Marketed" in 1985.⁴ In which Software Development Costs (SDC) were classified into three categories or phases: Phase One: R&D costs incurred prior to technological feasibility, Phase Two: Software Development Costs incurred after establishing technological feasibility but before commercial production, and Third Phase: Costs takes place after Commercial production as the product is available for general sale to customers.⁵ Unlike Software Development Expenditures, SFAS No. 2 that requires managers for immediate expensing of all Research and Development (R&D) expenditures, as incurred. Thus, in contrast to SFAS No. 86, where capitalization of software research and development costs (SDC) considered the only exception to SFAS No. 2, managers have no discretion over the treatment of these expenditures.⁶ In an accurate wording, SFAS No. 86 distinguishes between before and after "technological feasibility" has been established for software under development, where the accounting treatment under such guidance could be illustrated in the table (5).⁷

Despite the guidelines provided by SFAS No. 86, there is still a great deal of discretion and flexibility in the capitalization process. SFAS No. 86 also requires disclosure of the unamortized software costs included on the balance sheet, and the total amount of expense charged in the income statement as for amortization of capitalized software costs

¹ Financial Accounting Standards Board (FASB), EITF No. 97-13, "Accounting for Costs Incurred in Connection with a Consulting Contract or an Internal Project that Considers Business Process Reengineering and Information Technology Transformation", Norwalk, CT: FASB, 1997.

² Munier, Paul, "Accounting for software development costs", The CPA Journal, Vol. 69, Issue 2, Feb. 1999, P. 72.

³ American Institute of Certified Public Accountant (AICPA), Accounting Principles Board (APB) Opinion No. 17, "Intangible Assets", New York, NY: American Institute of Certified Public Accountant, 1970.

⁴ Financial Accounting Standards Board (FASB), "Accounting for the Costs of Computer Software to be Sold, Leased or Otherwise Marketed", Statement of Financial Accounting Standards No. 86, Norwalk, CT: FASB, 1985.

⁵ Wisc, Spence; Byington, J Ralph, "Taxes and financial accounting for computer software", Business Entities, Volume 5, Issue 2, Mar./Apr. 2003, P. 38.

⁶ Wolfe, Mandy, Op. Cit., September 2010, P. 3.

⁷ Trumbles, Mark A., "Accounting Method Choice in the Software Industry: Characteristics of Firms Electing Early Adoption of SFAS No. 86", Accounting Review, Volume 64, No. 3, July 1989, P.530-531.

and for written down amounts to net realizable value.¹ Where a summary of the requirements of *SPAS No. 86* will be illustrated as follows:²

1. Costs incurred internally in creating a software product considered as an expense when incurred as research and development until the establishment of technological feasibility.
2. The establishment of technological feasibility is made upon the completion of a detail program design or completion of a working model.
3. After that, all software production costs are capitalized and then reported at the lower of unamortized cost or net realizable value.
4. Capitalized costs are amortized based on revenue for each product with an annual minimum amount equal to the straight-line amortization through the remaining estimated economic life of the product.

Table (5): Guidance under FASB Statement No. 86, that codified at (ASC 985-20)³

Activity	Software to be Sold or Leased	Internal-Use Software
A. INTERNALLY DEVELOPED SOFTWARE		
1. Initial development		
a. Costs of creative research and development activities	Charge to expense	Charge to expense
2. Technological feasibility established:⁴		
a. Costs of product development after completion of detail program design or working model	Capitalize on the cost of product master as an intangible asset and amortize	Not applicable
b. Costs of duplication and production	Capitalize as inventory and charge cost of sales when sold	Not applicable
3. Determined to have future economic benefits:⁵		
a. Subsequent costs of development	Not applicable	Capitalize as an intangible asset and amortize
B. PURCHASED SOFTWARE		
1. Used in products for sale or lease	Capitalize as inventory and charge cost of sales when sold	Not applicable
2. Used in office or manufacturing process	Not applicable	Capitalize as an intangible asset and amortize
3. Used in R&D	Charge to expense	Charge to expense

¹ Krishnan, Gopal V.; Wang, Changjiang (John): "Are Capitalized Software Development Costs Informative About Audit Risk?", *Accounting Horizons*, Vol. 28 Issue 1, Mar. 2014, PP: 39-57.

² Wulfe, Melinda Sue, *Op. Cit.*, 2009, P. 18.

³ Samuelster Jr., Robert J.; Pacter, Paul, *Op. Cit.*, Winter 1994/1995, P. 45.

⁴ Technological feasibility requires that the functions, features, and technical requirements of the software are described in a logical and detailed form, ready to be coded. This is known as a detail program design. Technological feasibility is established when the developer has completed all of the planning, designing, coding, and testing that is necessary to demonstrate that the software will work and can be produced. The criterion of technological feasibility for cost capitalization is intended to be consistent with the definition of R&D activities under FASB Statement 2. It also is consistent with the concept of an asset as a probable future economic benefit, because technological feasibility requires that the software be functional before its costs can be capitalized.

⁵ Economically Beneficial Assets where the software should meet the more nebulous criteria of the definition of an asset—generally that it can provide future economic benefits to the business in the form of cash inflows, cost reductions, or usefulness in operations.

10-2: Guidance Under Statement of Position (SOP) 98-1 that codified at (ASC 350-40):

This Statement entitled "*Accounting for the costs of computer software developed or obtained for internal use*", where accounting standard setters acknowledge that internal-use software: (1) has costs that are explicitly identifiable, (2) has a life span that can be reasonably expected, (3) is estimated to provide future economic benefits sufficient to recover costs, and (4) fulfill asset recognition criteria.¹ Where *(Bean, L., et al.)* study considered one of the prominent empirical studies on SOP No. 98-1 that provide evidence of the industries affected by the adoption of this statement and features of the disclosures made actually by a sample of early-adopter entities.²

This statement provides that development or acquirement of software that is intended for internal use, covering two broad categories of software that are externally acquired or internally developed, as shown below:

- a) Externally acquired software: the accounting treatment for externally acquired software, should be capitalized with its total purchase price. If the purchase price includes training employees' compensation or maintenance activities, then the vendor should separate these costs from the purchase price and charge as an expense.³
- b) Internally developed software: AcSEC specifies that there are deemed to occur to software development and use in three stages as follows: 1) preliminary project stage, 2) application development stage, and post-implementation/operation stage.⁴ Where the accounting treatment within those stages could be sketched within the figure (1).

First Stage: Preliminary project stage:

Cloud computing Companies' Objectives, to be in the process of evaluating alternatives and making strategic decisions regarding allocation of resources among alternative projects at which neither software development method nor vendor has been chosen or selected.⁵

Cloud computing Companies' activities generated costs, where the entity is exploring approaches to accomplishing its objectives could include costs: a) the conceptual formulation of alternatives, b) evaluation of alternatives, c) Determining whether the required technology exists, and d) Final Selection of alternatives.⁶

In order to create the following activities: creating an assessment for the evaluation of the team, then defining systems requirements & set standards of performance parameters to undertake the expectations. Furthermore, verify that the technology expected to accomplish performance parameters exists, considering other reengineering efforts, issuing requests for proposals to vendors, evaluating vendor proposals received & selecting software consultants, and considering alternative software development methods.⁷

Cloud computing Companies' accounting treatment required is that all expenses in the preliminary project stage are expensed as incurred, where no software development

¹ Savage, Arline; Callaghan, Joseph H.; Peacock, Eileen, Op. Cit., Spring 2004, P. 114.

² Bean, L.; and Jernigan, B. D.: "Exploring new accounting guidance for internal use software under SOP 98-1". *Journal of Business and Behavioural Sciences*, (Fall), PP. 123-139.

³ Savage, Arline; Callaghan, Joseph H.; Peacock, Eileen, Op. Cit., Spring 2004, P. 114.

⁴ Munter, Paul, "A Quick Guide to Accounting for Software and Web Sites". *Journal of Corporate Accounting & Finance* (Wiley), Volume 13, Issue 5, Jul/Aug 2002, P. 26.

⁵ *Source:*

- Munter, Paul, Ibid, Jul/Aug 2002, P. 26.

- Savage, Arline; Callaghan, Joseph H.; Peacock, Eileen, Op. Cit., Spring 2004, P. 115.

⁶ Nysbunt, Edward E.: Op. Cit., Summer 1998, P. 145.

⁷ Schneider, Gary P.; Sheikh, Amer; Simione, Kathleen A.: Op. Cit., 2012, P. 3.

activity is underway in this stage under the view that all activities within this stage as analogous to research and development activities.¹ Furthermore, there is no guidance related to categorizing these costs separately in the income statement. As a result, companies can continue to apply period cost accounting to these costs and need not apply any unique accounting or reporting to the costs.²

Second Stage: Application development stage:

Cloud computing Companies' Objectives, is creating and implementing a specific intangible that will provide benefits for some set of future periods; that is, it will have value and useful life.³

Indicators for the Cloud computing Companies' at the beginning of this stage, as of the work of the preliminary project stage is accomplished, as indicated by factors such as; cloud computing companies' management with the appropriate explicitly or implicitly authorizes to the development of the project. Then funding is approved for the project to be developed internally.

Furthermore, there are an expected probability and a reasonable belief based on the available evidence that the software will be developed and will be used and functioned for its intended purpose.⁴

Cloud computing Companies' activities generated costs, where the types of costs incurred in this stage would typically include: 1) complete writing program code, 2) designing specific interface elements, 3) pilot testing elements of the software, 4) debugging and testing the software, and 5) the final installation & configuration of the software.⁵ These costs might be accomplished by incurring extra additional costs including:⁶

- External direct costs of purchasing software elements, materials, and services consumed in developing or obtaining internal-use software that is provided by third parties,
- Payroll and related costs for time spent devoted by new or existing employees who are directly associated with the internal-use software development project (including payroll taxes and employee benefits related to the time worked in the application development stage), and
- Related Interest costs capitalized following the provisions of SFAS No. 34, entitled "Capitalization of Interest Cost".⁷

Cloud computing Companies' accounting treatment required is that all expenses incurred referred to them above during this stage must be capitalized as an asset that seen as analogous to the actual construction of an asset. While Overhead allocations of any kind,

¹ Savage, Arline, Callaghan, Joseph H.; Perreuck, Eileen. Op. Cit., Spring 2004, P. 115.

² Munter, Paul. Op. Cit., Jul/Aug 2002, P. 26.

³ Schneider, Gary P.; Sheikh, Amer; Simone, Kathleen A.; Op. Cit., 2012, P. 3.

⁴ Sources:

• Schneider, Gary P.; Sheikh, Amer; Simone, Kathleen A.; Op. Cit., 2012, P. 3.

• Munter, Paul. Op. Cit., Jul/Aug 2002, P. 26.

• Nushaum, Edward E.; Weiss, Judith. Op. Cit., Summer 1998, P. 145.

⁵ Schneider, Gary P.; Sheikh, Amer; Simone, Kathleen A.; Ibid. 2012, P. 3.

⁶ Sources:

• American Institute of Certified Public Accountants (AICPA). Statement of Position 98-1, "Accounting for the costs of computer software developed or obtained for internal use". New York: American Institute of Certified Public Accountants, 1998, P. 26418.

• Munter, Paul. Op. Cit., Jul/Aug 2002, P. 27.

• Nushaum, Edward E.; Weiss, Judith. Op. Cit., Summer 1998, P. 146.

⁷ FASB. Statements of Financial Accounting Standards, SFAS 34, "Capitalization of Interest Cost", Stanford, CT: Financial Accounting Foundation, 2008.

including general administrative costs and training costs for employees to use the new software, are expensed as incurred.¹

Cloud computing Companies' discontinue capitalization of Costs when the following events occur: 1) It is no longer possible that the project will be completed, and 2) The software is substantially complete, including substantially all testing, and ready for its intended use.²

Third Stage: Post-implementation stage:

Cloud computing Companies' Objectives are performing Ongoing Services for the developed internal-use software.

Indicators for the Cloud computing Companies' of the beginning of this stage, is that after the internal-use software is placed into service, installed, tested, and begins regular operations, this stage is underway.³

Cloud computing Companies' activities generated costs & accounting treatment required, where mainly costs specified to train employees for using the developed software will be expensed.⁴

At this stage, the capitalized cost of the developed or acquired internal-use software must be evaluated for:

- ❖ Amortization: Where amortization is done throughout expected benefit on a straight-line basis or on another systematic and rational manner that is more representative of the software's use.⁵

Amortization for each component or module should begin when the software is ready for its intended use, regardless of whether the software is placed in service in stages that may extend into the next reporting period. However, if the functionality of a completed module is entirely dependent on the completion of other modules, it should not be amortized until the other modules upon which it is functionally dependent are ready for their intended use.⁶

- ❖ Impairment: is done under *International Accounting Standard (IAS) No. 36*, entitled "Impairment of Assets", which had been initially issued by the International Accounting Standards Committee (IASC) in June 1998 and adopted by the IASB in April 2001.⁷ While within the US, GAAP should be recognized and measured based on the guidance in *FASB Statement No. 121*, entitled "Accounting for Impairment of Long-Lived Assets and for Long-Lived Assets To Be Disposed of".⁸

SFAS No. 121 and its successor *SFAS No. 144* can serve as platforms for research and development accounting. *SFAS No. 121* uses an impairment test that adds the nominal (undiscounted) cash flows. If the book value of the asset

¹ AICPA, Statement of Position 98-1, "Accounting for the costs of computer software developed or obtained for internal use", New York: American Institute of Certified Public Accountants, 1998, P. 20418.

² Nushbaum, Edward E.; Weiss, Judith, Op. Cit., Summer 1998, P. 146.

³ Schneider, Gary P.; Sheikh, Azmer; Simone, Kathleen A.; Op. Cit., 2012, P. 3.

⁴ Savage, Arline; Callaghan, Joseph H.; Percock, Eileen, Op. Cit., Spring 2004, P. 115.

⁵ Munter, Paul, Op. Cit., Jul/Aug 2002, P. 27.

⁶ Sources:

- Nushbaum, Edward E.; Weiss, Judith, Op. Cit., Summer 1998, P. 147.

- Sardo, Al Arcady, Al., Op. Cit., Summer 1998, P. 50.

⁷ International Accounting Standards Board (IASB), International Accounting Standards, IAS 36 "Impairment of Assets", April 2001.

⁸ Sources:

- Financial Accounting Standards Board (FASB), Statement of Financial Accounting Standard, SFAS 121, "Accounting for Impairment of Long-Lived Assets and for Long-Lived Assets To Be Disposed of", Norwalk (CT): Financial Accounting Standards Board, 1993.

- Anonymous, "Internal-Use Computer Software: The Fixed Asset of the Information Age", *Journal of Accountancy*, Vol. 183, Issue 3, (Mar. 1997), P. 15.

overrides the sum of the nominal net cash flows (NCF), impairment has incurred. If an asset is impaired, the discounted cash flow (DCF) is used to measure the amount that to be written down. Recent statement *SFAS No. 144* uses the probability-weighted cash flow estimation approach to calculate the expected present value (EPV), which was introduced in *CON No. 7 "Using Cash Flow Information and Present Value in Accounting Measurements"*. Application of *CON No. 7* will provide consistent guidelines for the measurement of net present values of each research and development project.¹ Intangible assets that were considered to have indefinite useful lives were no longer required to be amortized but rather, were required to be tested at least annually for impairment.²

The SOP 98-1 indicates that internal use software has been impaired if any of the following events or indicators occur during the development of the software or while it is in use:³

- ☒ The software is not expected to provide substantive service potential.
- ☒ A subsequent change occurs in the extent or manner in which the software is used or expected to be used.
- ☒ A significant change to the software is made or expected to be made.
- ☒ The cost to develop or modify internal-use software significantly exceeds the amount initially expected to be incurred (cost overruns) to develop or modify the software.

While the indicators and circumstances that suggest the software under internal development may not or are not expected to be accomplished and placed into service would include the following:⁴

- ☒ No expenditures budgeted or incurred for the project.
- ☒ Programming issues could not be resolved on a timely basis.
- ☒ Significant cost overruns.
- ☒ Findings that purchasing externally developed software instead would be more cost-effective.
- ☒ Introduction of technologies in the marketplace that makes the completion of the software under internal development imprudent.
- ☒ Unprofitability or discontinuation of the business segment or unit for which the software is being developed.

In particular, AcSEC specifies that when the internal-use software is no longer expected to be completed and enter into service, the asset should be treated as if

¹ Sources:

• Lam, Marco; Coffey, David, "A Re-examination of the Accounting for Research and Development costs: Evidence from Compaq's Acquisition of Acquired in-progress Research and Development", Allied Academics International Conference, Proceedings of the Academy of Accounting and Financial Studies, Vol. 7, No. 1, (2002), P. 70.

• Financial Accounting Standards Board (FASB), Statement of Financial Accounting Standard, SFAS 144, "Accounting for Impairment of Long-Lived Assets and for Long-Lived Assets To Be Disposed of", Niswalt (CT): Financial Accounting Standards Board, 2001.

² Delamash, FirasNaim, "An examination of the value relevance and bias in the accounting treatment of intangible assets in Australia and the US over the period 1994-2003 using the Feltham and Ohlson (1995) framework", unpublished Doctorial Thesis - Doctor of Philosophy (PhD), University of Western Australia, 2007, P. 13.

³ Sources:

• Nisbaum, Edward E.; Weiss, Judith, Op. Cit., Summer 1998, P. 147.

• Sarda, Al; Arcady, Al., Op. Cit., Summer 1998, P. 50-51.

⁴ Sources:

• Laeche, Randall W.; Meeting, David T.; Nardocchia, Michelle R., "SOP 98-1: Accounting for the costs of computer software developed or obtained for internal use", Ohio CPA Journal, Vol. 58, Issue 1, (Jan-Mar 1999), P. 32.

• Laeche, Randall W.; Meeting, David T.; Klinghorn, Richard G., Ibid., (May 1999), P. 45.

abandoned or held for disposal, where the entire capitalized cost is recognized as an impairment loss.¹

While the rest of the treatment details will be discussed below at the Accounting treatment for activities generated costs incurred under the Ongoing Services for performing application maintenance or upgrades and enhancements.

Software Development Life Cycle (SDLC):²

The *Software Development Life Cycle (SDLC)* is referred to as "a logical, formalized, and standardized set of activities used to manage a systems development project". That composed of four main phases as follows:

- 1) Systems Planning is related to how information architecture can be utilized to implement a business strategy.
- 2) Systems Analysis: identifies business processes required to implement business strategy, and models are developed. Where process models, data models, and interaction models are developed as part of this phase.
- 3) Systems Design: is related to describing & document how specific procedures are used to implement the business processes, and generating the data structures of the data model developed is systems analysis, where the design has two parts external design and internal or technical design.
- 4) Systems Construction: the design outputs lead to implementation through the generation of data definition language & application code, as well as user interfaces.

The SDLC accounting treatment will be shown at the table (6) that is divided into two main categories:

- (1) When a model-based approach is used for systems development: where analysis costs are material concerning other project stages' costs. That divided into:
 - a. Usage with downstream effects for systems development. (Inherent reusability)
 - b. Usage without downstream effects. (reusability at management discretion).
- (2) When a non-model-based approach is used: where analysis costs are immaterial concerning other project stages' costs.

¹ Minter, Paul, "AcSEC Tackles Accounting for Internal-Use Software", *Journal of Corporate Accounting & Finance* (Wiley), Vol. 9, Issue 1, (Autumn 1997), P. 33.

² Savage, Arthur; Callaghan, Joseph H.; Peacock, Ellen. Op. Cit., Spring 2004, P. 116.

Table (6): Comparison for the Accounting Treatment of SOP No. 98-1 and Systems Development Life Cycle Phases

Phases		Accounting Treatment			
SOP No. 98-1	SDLC	SOP No. 98-1	SDLC		
			Model-based		Non-Model-Based
			With Downstream effects	Without Downstream effects	
Preliminary Project	Planning	Expense	Expense	Expense	Expense
No mention of Analysis or Modeling	Analysis	Expense by implication, given conservatism convention	Capitalize	Capitalize or Expense	Expense
Application Development	External Design	Capitalize	Capitalize	Capitalize	Capitalize
	Internal Design		Capitalize	Capitalize	Capitalize
	Construction		Capitalize	Capitalize	Capitalize
Post-implementation /Operation	Falls outside of the SDLC	Expense	Expense	Expense	Expense

Purchases Treatment of Multi-phased Software for internal use under SOP 98-1²

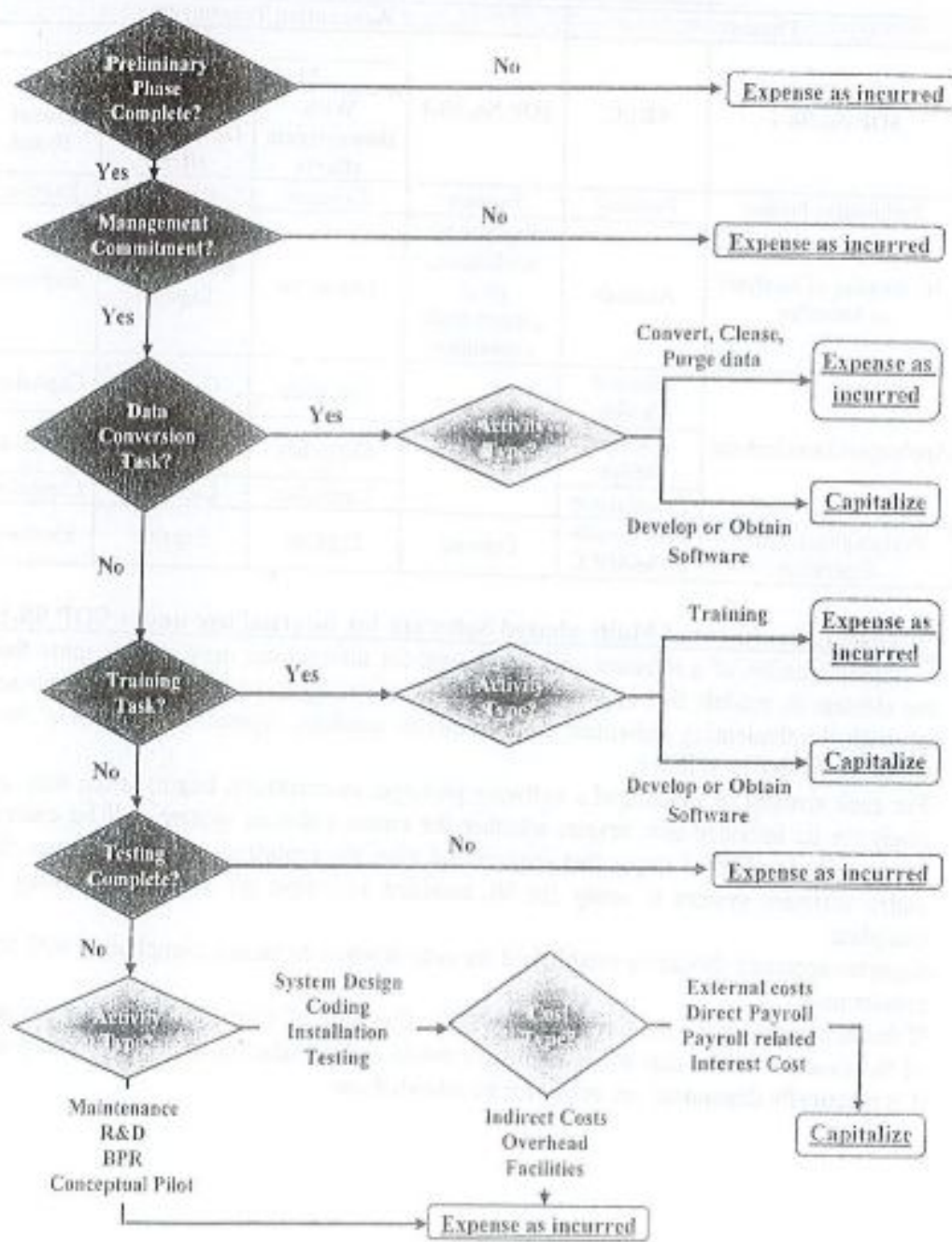
Implementation of a software package bought for internal use may include more than one element or module that may take place simultaneously or separately using a phased approach. Implementing individual components or modules separately under *SOP 98-1* will be applicable as follows:

- For each element or module of a software package, amortization begins when they are ready for its intended use, despite whether the entire software system will be entered into service in planned stages that may extend after the reporting period. However, the entire software system is ready for its intended use after all substantial testing is complete.
- Separate accounts should be established for each module to ensure compliance with this requirement.
- If the functionality of a module is subject to the finishing of other modules, amortization of that module should start when both that module and the other modules, at which point it is practically dependent, are ready for its intended use.

¹ Savage, Arline; Callaghan, Joseph H.; Pearson, Ellen, *Ibid.*, Spring 2004, PP: 118, 119.

² Luecke, Randall W.; Meering, David T.; Klingstern, Richard G., "New AICPA standards and accounting for the costs of internal-use software", *Healthcare Financial Management*, Vol. 53, Issue 5, (May 1999), PP: 43-44.

Figure (1): Accounting treatment for internal-use software under SOP 98-1¹



¹ FASB Staff Position, SOP 98-1, 2001, P. 12.

10-3: Guidance under the provision of IAS 38 entitled "Intangible Assets":

A critical difference between the U.S. standards and International Accounting Standards (IAS) provides a view contrary to the U.S. treatment of R&D. *IAS 38* is that the international accounting rule concerning research and development divides R&D into a research phase and a development phase. This guidance requires that a distinction be made between research and development and requires that research costs be expensed, but allows development costs to be capitalized and amortized if they produce probable future economic benefits under specific criteria.¹ Therefore, the overall accounting treatment of intangible assets under *IAS 38* are sketched within the figure (2).

According to FASB within SFAC No. 6 entitled "*Elements of Financial Statements*" that defines an asset as "*a probable future economic benefit obtained or controlled by a particular entity as a result of past transactions or events*", where an asset has three essential characteristics to come into existence:²

- 1) It incorporates a probable future benefit that involves a capacity, individually or combined with other assets, contributing directly or indirectly to future net cash inflows.
- 2) A particular entity can gain benefits and prevent others' access to it.
- 3) The transaction or another event-giving rise to the entity's right to or control of the benefit has already occurred.

While within *IAS 38*, requires acquired externally or internally developed item recognized as an intangible asset, if an entity could demonstrate that the item meets these attributes:³

(a) **The definition of an intangible asset:** as "*an identifiable non-monetary asset that cannot be seen, touched or physically measured, which are created through time and/or effort and that are identifiable as a separate asset*".⁴ Where an asset is a "*resource controlled by an entity as a result of past events*"; and from which predicted future economic benefits flow to the entity.⁵

- 1) **Identifiability:** "*An asset is identifiable if it either: (a) is separable, i.e., is 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; or (b) arises from contractual or other legal rights, regardless of whether those rights are transferable or separable from the entity or other rights and obligations*".⁶
- 2) **Control:** A firm controls an asset if it has the power to gain the future economic benefits that flow from the implicit resource and to prevent the access of others to those benefits. The ability to control the probable future economic benefits from an intangible asset would typically stem from legal rights that are enforceable in

¹ Givoly, Dan and Shi, Charles, "Accounting for Software Development Costs and the Cost of Capital: Evidence from IPO Underpricing in the Software Industry", *Journal of Accounting, Auditing & Finance*, Volume 23, Issue 2, April 2008, P. 275.

² Financial Accounting Standards Board (FASB), *Statement of Financial Accounting Concepts*, SFAC 6, "Elements of Financial Statements", Norwalk (CT): Financial Accounting Standards Board, 2008, P.2.

³ International Accounting Standard Board (IASB), *International Accounting Standards*, *IAS 38 "Intangible Assets"*, March 2004, P.1036-1045.

⁴ Garcia-Garcia, Jesus; Maria Isabel Alonso de Magdalena, Op. Cit., Jan/Apr 2013, P. 8.

⁵ International Accounting Standards Board (IASB), "Framework for the preparation and presentation of financial statements", London: International Accounting Standards Board, 2001.

⁶ Petkov, Rossen, "Initial Identification of Internally generated Intangible Assets in the Context of the Definitions of an Asset and an Intangible Asset", *The Journal of Theoretical Accounting Research*, Volume 6, No.2, Spring 2011, P. 2.

an official courtroom, or an entity may be capable of controlling the future economic benefits in some other way.

- 3) **Future economic benefits:** The future economic benefits generated from an intangible asset may incorporate revenue from selling of products or services, cost savings, or other benefits generated from the usage of the asset by the entity.¹

(b) **The recognition criteria:** Initial recognition of an intangible asset was at its cost, in the financial statements, if, and only if: (a) it is probable that any expected future economic benefits that are related to the asset will flow to the entity; and (b) the cost or value of the asset can be measured reliably.²

Where the R&D and Software development costs are capitalized only after technical and commercial feasibility of the asset for sale or use, have been established. That means an entity must intend and be able to complete the intangible asset and either use it or sell it and be able to demonstrate how the asset will generate future economic benefits. Resources to complete the project and the ability to measure cost are also required.³

While within *International Financial Reporting Standards (IFRS) No. 3*, that issued at 2004 & amended at 2007, entitled "*Business Combinations*" is supplemented with illustrative examples of items & types of intangible assets acquired in business combinations that meet the definition of an intangible assets as Marketing-related intangible assets, Customer-related intangible assets, Artistic-related intangible assets, Contract-based intangible assets, Technology-based intangible assets.⁴

Internally Generated Intangibles other than Goodwill⁵

A. **Recognition:** Expenditures of the creation of intangible assets are to be classified alternatively as either research activity or development activity:

1. The immediate expense of costs incurred in the research phase; and
2. If costs incurred in the development phase fulfill the recognition criteria for an intangible asset, that costs should be capitalized. However, if costs have been expensed during the development phase, they cannot later be capitalized. An intangible asset arising from development shall be recognized if, and only if, an entity can demonstrate all the following:⁶

- Availability for sale or use of the intangible asset as if the technical feasibility of completing such an asset has pertained.
- Its intention to complete the intangible asset and use it or sell it.
- Its ability to use or sell it.

¹ Mirza, Abbas Ali ;Ankarath, Nandakumar; "International Trends in Financial Reporting under IFRS: Including Comparisons With US GAAP, China GAAP, and India Accounting Standards", John Wiley & Sons 2015, P. 160.

² Sources:

- Petkov, Rossen, Op. Cit., Spring 2011, P. 3.

- Taylor, Mike; Webster, Margaret; Sugden, David; Bramley, Andrew; "Accounting "gets real" in dealing with virtual manufacturing", *Journal of Intellectual Capital*, Volume 6 Issue 3, (2005), P. 325.

³ Sources:

- Garcia-Garcia, Jesus; Maria Isabel Alonso de Magdaleno, Op. Cit., Jan/Apr 2013, P. 9.

- Mynati, Patricia G. Schroeder, Richard G., Op. Cit., Fall 2012, P. 51.

⁴ Sources:

- Petkov, Rossen, Op. Cit., Spring 2011, P. 3.

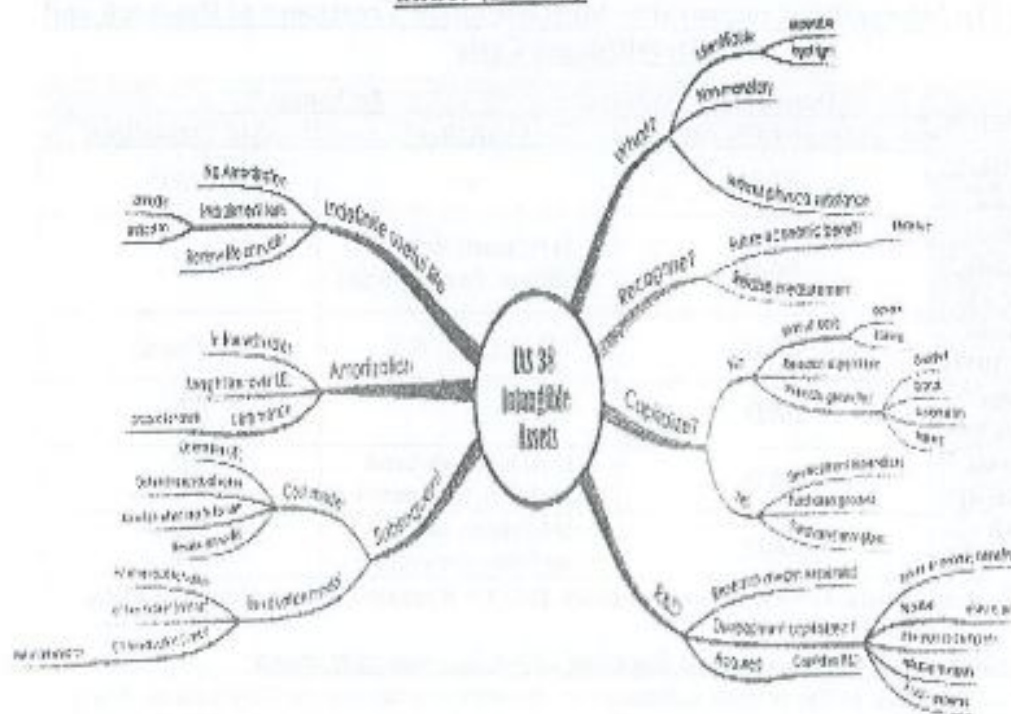
- International Accounting Standards Board (IASB), *International Financial Reporting Standards, IFRS 3, "Business Combinations"*, IASB, London 2007.

⁵ Bruce Mackenzie, Daniel Coetsee, Blaize Colyvas, Tapiwa Njilizana, Raymond Chamboko, Brandon Hanekom and Edwin Selbst; Op. Cit., 2014, P. 199 - 212.

⁶ Seifert, W.; Rosenberg, D.; Stock, E.; "Involving convergence between the recognition of an intangible asset for financial reporting purposes and strategic management accounting and project management techniques", *Mediterranean Accounting Research*, Vol. 14, Issue 2, (2006), P. 57.

- Means of how probable future economic benefits are generated from an intangible asset.
 - A required adequate resource to complete the intangible asset.
 - Its capability of a reliable measure for the costs associated with the intangible asset during such development.
- B. Measurement of the cost of intangibles: The status under which the intangible asset has been acquired will define the measurement of its cost.
- C. Subsequent measurement to initial recognition: validity of two alternative measurement bases could be used:
- Cost model: beyond initial recognition, an intangible asset should be carried at its cost less any accumulated amortization & any accumulated impairment losses.
 - Revaluation model: As with tangible assets, the standard for intangibles permits revaluation after the initial acquisition, with the asset that is written up to fair value.
- D. Derecognition of Intangible Assets: An intangible asset should be derecognized (1) on disposal or (2) when no future economic benefits are predicted from its use or disposal.

Figure (2): Accounting Treatment of Cloud Computing Intangible Assets under (IAS 38)



In the case of purchased software, according to IASB, Software purchased for sale would be treated as inventory. However, software held for licensing or rental to others should be recognized as an intangible asset. On the other hand, the cost of software purchased by an entity for its use and which is integral to the hardware (because without

¹ Adapted from: <https://www.charterededucation.com/product/life-mind-maps>

that software the equipment cannot operate) would be treated as part of cost of the hardware and capitalized as property, plant, and equipment. Thus, the cost of an operating system bought for an in-house computer, or cost of software bought for computer-controlled machine tool, is considered as part of the related hardware.¹

Simplification has been a considerable concentration for the FASB lately. Aligning development costs related to software for external use, internal-use software, and different technologies into a solitary accounting model could be noteworthy rearrangements. One conceivable single-model arrangement is the IASB model for accounting for research and development costs. Under IASB, research costs are expensed as incurred, but costs associated with the development of an intangible asset are capitalized as completion is feasible, management intends to and has the available resources to complete such assets, and there is a market to sell externally or use internally the intangible asset. A solitary model like the one utilized under IASB may be feasible in the US. However, extra clearness might be required in specific areas, such as regardless of whether the feasibility of completion contrasts from accomplishing technological feasibility, and whether software should continue to be distinguished from other technologies.² Where an international comparative for recognition of research and development costs were made at the table (7) for more illustration of how such simplification is various in adoption between countries.

Table (7): International comparative for Recognition Treatment of Research and Development Costs³

Jurisdiction	Outsourced	In-house	
	Recognized as Asset	Capitalized	Not Capitalized
United States (SFAS 2)	R&D	--	R&D
United Kingdom (SSAP 13)	R&D	D (if meets deferral condition, then optional)	R
Australia (AASB 1011)	R&D	R (applied) & D	R (basic)
Japan (JASB 9)	R&D	--	R&D
Malaysia (MASB 4)	R&D	D (if meets deferral condition, then must)	R
IASB (IAS 38)	R&D	D (if meets deferral condition, then must)	R

* R = Research costs, D = Development costs, R&D = Research & Development costs.

After Evaluation all of the treatments discussed above the researcher found:

- The differences in the overall comparative accounting treatment within United States - (SFAS 2 (ASC 730-10)), United Kingdom - (SSAP 13), Australia - (AAS 13 - AASB 1011), Japan - (JASB 9), Malaysia - (MASB 4), IASB - (IAS 38) and other countries relating to the following phrases, may lead to fundamental implementation issues, especially in: Treatment if item included as Research and development, Treatment if item

¹ Bruce Mackenzie, Danie Coetzee, Blaise Colyvas, Tapwa Njikizana, Raymond Chamboko, Brandon Hineken and Edwin Selbst, *Op. Cit.*, 2014, P. 202.

² Paul. Bell, Dublin, Pet. "Point of View - Revisiting accounting for software development costs: An initial first step", PricewaterhouseCoopers LLP, Research Paper, October 2016, P. 3.

³ Khudam, M. Iqbal, Shukh, Junaid M.; Colson, Robert H., *Op. Cit.*, Sep. 2003, P. 54.

not Research and development, Research and development definitions, Internally Generated Intangible Assets and R&D Assets, faces different recognition levels among different countries, Differences between outsourced and in-house research and development costs, and Disclosure requirements, Amortization, and Impairment test of R&D Costs.

- That authoritative guidance within SFAS 86 (ASC 985-20) entitled "Accounting for the Costs of Computer Software to be Sold, Leased, or Otherwise Marketed" & ASC 985-606-55-121 based on different nature of the arrangement, Different pattern of Software usage, Different Software characteristics & Applied Accounting Guidance provided, and Non-convenient recognition criteria based on technological feasibility, could not accurately fit with the distinctive characteristics of cloud computing companies' activities in the business environment.
- Internally developed software treated in three stages as follows: 1) preliminary project stage, 2) application development stage, and post-implementation / operation stage under AICPA's Accounting Standards Executive Committee (AcSEC)'s conclusions in Statement of Position (SOP) 98-1, which codified at ASC 350-40 entitled "Accounting for the Costs of Computer Software Developed or Obtained for Internal Use", could not accurately fit with the distinctive characteristics of cloud computing companies' activities in the business environment.
- The authoritative guidance within SFAS 86 (ASC 985-20) entitled "Accounting for the Costs of Computer Software to be Sold, Leased, or Otherwise Marketed" & IAS 38 entitled "Intangible Assets" are non-convenient based on mainly the later mentioned phrases, and thus do not fit with the distinctive characteristics of cloud computing companies' activities in the business environment as follows: Non-convenient with accounting treatment for Software Development Life Cycle (SDLC), Non-convenient with accounting treatment open source generated assets face the problem of the control over them, Non-convenient with purchases treatment of Multi-phased Software for internal use, Phases to recognition of internally developed items and recognition criteria for an asset takes place only after technical and commercial feasibility of the asset for sale or use have been established, No conceptual basis in the definition of an asset for applying different recognition rules to intangible assets purchased from outsiders and the same assets created internally and inadequacy of the current definition of asset to accommodate the nature of such assets, Improper valuation method based on its cost, Improper subsequent measurement to initial recognition, High uncertainty of their expected future benefits, and that future benefits from investments in intangibles, making them difficult to measure, Inadequacy for the existence of a transaction in the past only as an essential characteristic for asset to come into existence, Inadequacy for the concept of exclusive control of resources as an essential characteristic for asset to come into existence, Improper detection criteria for the amortization period to be used for recognized intangible assets, There are time gap and correlation gap that frustrate attempts to recognize intangible assets in financial statements, The differences between software and other types of technology could sufficient to justify different accounting models, If impairment is indicated, an internally developed software asset is tested based on undiscounted cash flow and this is very difficult with software developed for internal use because there may not be an identifiable stream of cash flow, Lack of centralized digital asset lifecycle management can contribute to capital expenditure forecasting and reporting issues, Managing compliance from forecast-to-decommissioning requires new capabilities not resident in manufacturing models, and Capitalization and asset policies require clear connection to data management practices to avoid regulatory issues.

11: Conclusion:

The researcher found that a tremendous disharmony between current issued guidance that may be related to accounting for expenditures on cloud computing companies' activities, especially those companies with international operations. Additionally, a lack and weakness of guidance under current releases and pronouncement that could capture the essence and the nature of the real activities for cloud computing companies. Moreover, inability to reflect the economic reality with loss of comparability of these activities within the same entity with branches in different countries and different standards and inconsistent guidelines. Furthermore, the multiplicity and complexity of accounting guidance and treatments, despite recent trends to modify accounting standards and the conceptual framework of financial accounting, led to great difficulty in accommodating the nature of those activities efficiently.

While for clarifying the accounting treatment for expenditures incurred under the activities for development or acquisition of software to be utilized and accessed by the customer. Under US GAAP, there is a variation in the treatment of software costs proposed for internal use, though it may be used in to develop a product, is not part of or included in the sold actual product or service. Therefore, this software is used by the vendor in the production of the product or providing the service, but the customer does not acquire the software or the future right to use it, the software is considered within a cloud service hosting arrangement so that *ASC 350-40* (formerly *SOP 98-1*) is applicable. In contrast, a variant treatment for costs of software to be sold, leased, or otherwise marketed incorporates software that is part of an actual product or process to be sold to a client. That type of software is for usage at the customer's location considered to be a software hosting arrangement that covered under *ASC 985-20* (formerly *FASB Statement No. 86*).

Although the guidance that could be related to cloud service hosting arrangement were under *ASC 350-40* (formerly *SOP 98-1*) may apply to such activities, but this guidance is still weak and could not sketch the overall nature related to cloud computing companies' activities under development or acquisition of software to be utilized and accessed by the customer.

Nevertheless, under IASB, with more trend for simplification in using a single model to accommodate such activities. However, that model is similar to the one used by US GAAP for treating costs of software to be sold, leased, or otherwise marketed incorporates software that is part of an actual product or within a process to be sold to a customer with a little bit differences. Thus these treatments cannot adequately accommodate the nature of those activities.

From all of that, the study hypothesis for the current accounting standards and guidelines for the acquisition or development of software to be utilized and accessed by the customer do not fit with the distinctive characteristics of cloud computing companies' activities in the business environment are accepted, and the researcher suggest to develop an accounting framework for cloud computing companies' activities, in light of the unique nature and characteristics and testing the proposed framework at the Egyptian business environment.

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THEORY OF THE EARTH AND ITS HISTORY

1. The Earth is a sphere of about 8000 miles in diameter. It is composed of a solid inner core, a liquid outer core, and a solid mantle. The crust is the thin outer layer of the Earth. The atmosphere is the layer of gases surrounding the Earth. The hydrosphere is the layer of water surrounding the Earth. The biosphere is the layer of life on the Earth.

2. The Earth's history is divided into three main periods: the Pre-Cambrian, the Cambrian, and the Post-Cambrian. The Pre-Cambrian period is the longest and is divided into three sub-periods: the Archean, the Proterozoic, and the Eozoic. The Cambrian period is the shortest and is divided into two sub-periods: the Cambrian and the Ordovician. The Post-Cambrian period is the longest and is divided into three sub-periods: the Silurian, the Devonian, and the Carboniferous.

3. The Earth's history is marked by several major events: the formation of the Earth, the formation of the atmosphere, the formation of the hydrosphere, the formation of the biosphere, the formation of the crust, the formation of the core, the formation of the mantle, the formation of the oceans, the formation of the continents, the formation of the mountains, the formation of the rivers, the formation of the lakes, the formation of the ice sheets, the formation of the glaciers, the formation of the deserts, the formation of the forests, the formation of the animals, the formation of the plants, the formation of the fossils, the formation of the rocks, the formation of the minerals, the formation of the metals, the formation of the alloys, the formation of the compounds, the formation of the elements, the formation of the atoms, the formation of the molecules, the formation of the cells, the formation of the tissues, the formation of the organs, the formation of the systems, the formation of the organisms, the formation of the communities, the formation of the ecosystems, the formation of the biosphere.

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