Accounting for cloud computing activities under developing or acquisition of web-site, ongoing services, and acquiring a contract (An Evaluation Study)

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Abstract

The current accounting model fails in recognition with all changes in the value drives, especially in the field of cloud computing technology agreements. Although the accounting for software and hosting agreements have earned a controversy from the FASB, but did not gain such controversy by IASB, or at the level of academic studies, and finally at the local level, represented in Egyptian Commission for Accounting and Auditing Standards.

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.

So, the research aims to display, analyze, and evaluate the nature of cloud computing and the current treatments related to developing or acquisition of web-site, ongoing services, and acquiring a contract 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 developing or acquisition of web-site, ongoing services, and acquiring a contract 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, The Major Actors in Cloud Computing, Cloud Service Provider Scenarios Framework, Special Characteristics of Cloud Computing Transactions, and Evaluation and Analysis of the Accounting treatment for expenditures incurred under developing or acquisition of Web Site activities, activities of acquiring or obtaining a contract and activities of Ongoing Services.

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, Web-site activities expenditure, Cloud Computing Infrastructure, Cloud Computing treatment issues, obtaining a contract, upgrades and enhancement, Routine maintenance, Incremental costs.

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1: Introduction

There has been extensive development in computer utilization for commercial enterprise, education, and governmental purposes in the previous few years. In the meantime, the overall idea of the Internet has released worldwide markets' competition and new markets. The integration of expanded competition, computer utilization, and extensive cooperation have carried with it the consequent need to amplify the use of available resources while restricting expenses. Where, the usage of cloud computing and data administration capacities for expansive, regularly topographically scattered associations and unique individuals to be accessible at a centralized level is one region of improving interest for meeting these necessities.[1]

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.[2] Cloud computing has executed to the scope of areas, including e-commerce enterprise, healthcare, education, community building, governance, telecommuting, and emergency response. Moreover, new advancements are prospering in developing markets, making them appealing to both worldwide and local cloud providers looking for new revenue opportunities. Where, multinational organizations are setting up cloud and data centers and enhancing clouds in developing regions, adopting specific approaches to deal with managing the districts' particular requirements.[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]

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[1] Ross, Virginia Watson, "Factors Influencing the Adoption of Cloud Computing by Decision Making Managers", Doctor of Philosophy – unpublished, Capella University, February 2010, P. 1.

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

[3] Murugesan, San; "Cloud Computing Gives Emerging Markets a Lift," IT Professional Magazine, Volume 13, Issue 6, (2011), PP. 60-61.

[4] Alali, Fatima A., Yeh, Chin-Lan; "Cloud Computing: Overview and Risk Analysis", Journal of information systems, Vol. 26 No. 2, (Fall 2012), PP. 13-14.

Quoting, and 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).
- Grabski, 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.computerweekly.com/Articles/2009/06/10/235429/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, (2009a).

The importance of intangible assets did not arise out of anywhere but associated with the emergence of the elements of the new knowledge-based economy, which relies on knowledge assets, which represent the core of the industry, especially the fields of information technology. Therefore, the financial accounting model after developing should be characterized by the capacities of significant dynamic in order to be able to develop for tracking those changes in the surrounding environment characteristics as these changes confirmed the separation of the old economy from the new knowledge economy and knowledge-based.[1]

However, still, the current accounting model fails in recognition with all changes in the value drives, especially in the field of cloud computing technology agreements. Although the accounting for software and hosting agreements have earned a controversy from the FASB, but did not gain such controversy by IASB, or at the level of academic studies, and finally at the local level, represented in Egyptian Commission for Accounting and Auditing Standards. Additionally, accounting for cloud computing companies' activities, in particular, did not gain such controversy because of its characteristics and distinctive combination.

While the form of accounting developments within the accounting practice environment, a substantial and apparent burden in the failure of accounting for cloud computing companies' activities to accommodate those activities adequately. While raised many questions about those activities and services and the associated legal, procedural, and legislative aspects, and whether they effectively contribute to strengthening the capacity of the activity or legal perspective or adversely affects. Where, those companies need to develop laws and legislation to regulate the rights and duties and the complexities of various undertakings between the company and its partners' service providers, and customers to ensure mutual rights and obligations. to accommodate those activities and services.

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, The Major Actors in Cloud Computing, Cloud Service Provider Scenarios Framework, Special Characteristics of Cloud Computing Transactions, Evaluation and Analysis of the Accounting treatment for expenditures incurred under developing or acquisition of Web Site activities, activities of acquiring or obtaining a contract and activities of Ongoing Services, and then Conclusion.

- Blaskovich, J., & Mauldin, N., "Information technology outsourcing: A taxonomy of prior studies and direction for future research", Journal of Information Systems, Volume: 25, No. 1, (2011), pp. 1-36.

[1] El Ardi, Mohamed Mohamed wedad, "The n.v. of economic value added model as an input for the development of financial reporting under conditions of uncertainty", Doctor of Philosophy thesis – unpublished, Faculty of Commerce, Helwan University, 2006, P. 1.

2: The Research Problem:

With time, always the nature and types of cloud activities and cloud service hosting agreements have changed - as computing systems via the Internet - and especially cloud computing technology. However, remained many of the problems faced by accounting for cloud computing agreements ongoing and which represent great importance in determining the appropriate accounting treatment for this type of computing system via the Internet. Moreover, financial reporting loses its credibility to highlight the real and actual entities' value, due to the inability to account appropriately such activities. Because of the unique characteristics of technology and combination, and where the current lists in those statements do not reflect the real value of the entity and primarily businesses entities that operate in the field of cloud computing technology.

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.

In addition to assembling, some of the companies operate in the Egyptian environment to only those fixed assets without highlight the intangible assets of which addressed. What if the different useful life of the tangible asset for that of an intangible asset, as enhancement or upgrade costs that extend the ability of the software to perform tasks or make an application more comfortable to use and which are different from those costs, which extends the ability of tangible asset.

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 developing or acquisition of web-site, ongoing services, and acquiring a contract with the inability of the current accounting standards and guidelines to accommodate this type of technology?

3: The Research Objective:

The research aims to display, analyze, and evaluate the nature of cloud computing and the current treatments related to developing or acquisition of web-site, ongoing services, and acquiring a contract 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 developing or acquisition of web-site, ongoing services, and acquiring a contract 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 developing or acquisition of web-site, ongoing services, and acquiring a contract 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 developing or acquisition of web-site, ongoing services, and acquiring a contract 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 developing or acquisition of web-site, ongoing services, and acquiring a contract 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 developing or acquisition of web-site, ongoing services, and acquiring a contract 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.

Sosinsky, B., clarifies that the utilization of the word "Cloud" & referred to two significant features:[3]

- ✓ **Cloud computing abstraction**, while abstraction did to the focal points of system execution from clients and providers, though applications based on an unspecified tangible system, data storage in obscured locations, outsourced systems administered to others, and client accessibility from everywhere.
- ✓ **Cloud computing virtualization;** as virtualization of systems happened through gathering and participating resources. The provision of systems and capacity-on-demand from a unified infrastructure, multi-tenancy is empowered, costs evaluated on a metered basis, and talented resources in a nimbleness manner.

However, ***Buyya, R. et al. define cloud computing*** as *"a utility-oriented & internet-centric way of delivering IT services on demand, these services cover the entire computing stack: from the hardware infrastructure packaged as a set of virtual machines to software services such as development platforms and distributed applications".*[4] While

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[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, Lia Esther Shalin; Omane-Antwi, K.B.; Kyei, Michael Effah; " 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] Sosinsky, Barrie; "Cloud Computing Bible", Indianapolis: Wiley Publishing, Inc., (2011), p. 4.

[4] Buyya, Rajkumar; Vecchiola, Christian; Selvi, S. Thamarai; "Mastering cloud computing: foundations and applications programming", Elsevier Inc., 2013, P. 111.

Cloud computing defined by Gartner as "A style of computing in which scalable and elastic IT-enabled capabilities to deliver as a service using Internet technologies.[1]

The exact meaning of cloud computing's essential qualities has demonstrated amazingly elusive. There is an extensive understanding that cloud computing focuses on specific center ideas. A few superintendents have noticed that cloud computing has both an external-looking and internal-looking face. From the external point of view for an end-user vision at the cloud, it shifts works that used to be performed by PCs situated at the system's edge (such as hosting software and data) into servers & data centers established in the network's center. From the internal point of view for how single cloud computing components connect with other cloud computing components, the emphasis is on the capability to organize and incorporate applications and data operating on numerous machines through mechanisms into a consistent entirety.[2]

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 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

Hoseini, Leila study exhibit that Cloud computing infrastructure composed of four layers as follows:[3]

1. **Hardware/data center layer:** is the last layer in the cloud design, and the primary duty is to oversee & manage tangible assets of cloud, involving physical servers, routers, switches, power, and cooling systems. Practically, data centers are a significant house, grasping hardware layer implementation. A data center more often involves a vast number of servers set and sorted out among racks while they interconnected through switches, routers, and different fabrics.
2. **Virtualization layer:** The primary obligation of the virtualization layer is to make a pool of storage and computing resources by apportioning physical assets through the

[1] Gartner. "IT Glossary, Cloud Computing". 2013a. [Online]. Available at http://www.gartner.com/it-glossary/cloud-computing.
[2] Yau, Christopher S., "Cloud Computing: Architectural and Policy Implications, Rev. Ind. Organ. Volume 38, P. 406 – 407.
[3] Hoseini, Leila; "Advantages and Disadvantages of Adopting ERP Systems Served as SaaS from the Perspective of SaaS Users", unpublished Master's Thesis – Masters of Science, School of Information and Communication Technology, KTH University, 2012, PP.15-16.

use of virtualization technologies. This layer gives tremendous support to what is claimed about adaptable features of cloud computing. for example, dynamic resource task/release through the utilization of virtualization innovations.

3. **Platform layer:** found on the top of the virtualization layer. Such layer includes operating systems, programming languages tools, and application structures. This layer assumes a mediator part amongst applications and virtual machine containers while minimizing the difficulties of conveying applications on virtual machine containers straightforwardly.
4. **Application layer:** this layer sits on top of the cloud infrastructure, including real cloud applications. Cloud applications are not quite the same as typical applications from the point that they can influence the dynamic scaling of cloud infrastructure for accomplishing better performance and availability while diminishing working cost.

While within *Molnar, D. et al. study* illustrate that the cloud computing infrastructure has three key elements, as follows: [1]

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 Infrastructure[2]), 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: The Major Actors in Cloud Computing [3]

Not each cloud computing, there is a service provider who owns and operates a data center.[4] Every performer is an entity (a person or an organization) that takes an interest in a transaction or process and performs tasks in cloud computing. That composed of eight main actors: *Cloud Service Consumer, Cloud Service Provider, Cloud Service Carrier, Cloud Service Auditor, Cloud Service Broker, Cloud Service Partners, Cloud Service Coordinator, and Cloud Service Exchange.*

10: Cloud Service Provider Scenarios Framework [5]

A cloud service provider might want to relocate (or "on board") new clients from other cloud service providers. What is required is to relocate new end-user "service instances[6]" to their services from other, possibly, contending, differentiated services. That would permit the CSP to let their clients seamlessly move and adjust to their service offerings. The cloud service provider operates the Fluid-Cloud framework and offers it as a service.

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[1] 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.

[2] *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 removes the certificates.
For Further interesting: Umakrishnan, Premalatha, "Leveraging Emerging Technologies", Working Paper, (September 26, 2012), Available at SSRN: http://ssrn.com/abstract=2151323

[3] Liu, Fang; Tong, Jin; Mao, Jian; Bohn, Robert; Messina, John; Badger, Lee; & Leaf, Dawn; "NIST Cloud Computing Reference Architecture", U.S. Department of Commerce, Cloud Computing Program, Information Technology Laboratory, National Institute of Standards and Technology, Special Publication 500-292, Sept. 2011, P. 1-20.

[4] Gasser, Urs, "Cloud Innovation and the Law: Issues, Approaches, and Interplay", Swiss National Centre of Competence in Research, Working Paper No 2013/21, (August 2013), P. 8.

[5] Edwards, Andy; Metsch, Thijs; Elmroth, Erik; Marshall, James; "Fluid Cloud: An Open Framework for Relocation of Cloud Services", The 5th USENIX Workshop on Hot Topics in Cloud Computing (HotCloud'13) Conference, Virginia Palace, 2013.

[6] Note: Def.: Service Instance - A logical container that comprises the application & the data.

11: Special Characteristics of Cloud Computing Transactions: [1]

1. **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.

2. **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.

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

12: Evaluation and Analysis of the Accounting treatment of developing or acquisition of web-site, ongoing services, and acquiring a contract

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.[2] Moreover, in discussing the costs of owning & managing cloud computing infrastructure, and the concept of the total cost of ownership, that means the method for addressing the real cost related to such infrastructure. Cloud computing assets also are divided into tangible and intangible. Therefore, this section classifying the current accounting treatments for expenditures on cloud computing activities into three categories.

12-1: Accounting treatment for expenditures incurred under developing or acquisition of Web Site activities

Cloud computing companies are incurring significant costs to develop or modify internet web-sites. A cloud service provider's web site utilized mainly as a marketing tool in order to 1) attract attention, 2) describe, promote, or advertise services offered, 3)

[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.31-43.

[2] Danescu, Tatiana Sandra, Raluca; "Considerations Regarding Accounting Recognition of Intangibles in the Company's Performance", Procedia Economics and Finance, Volume 39, 2016, P. 58.

supplant manual processes or services, 4) sell & providing services, or 5) do a Combination of such activities, or 6) for other purposes.[1]

Within the US GAAP, The provision of the related guidance was amplified by the *Emerging Issues Task Force (EITF) in Issue No. 00-02*, which codified at *ASC 350-50* entitled "*Accounting for Web Site Development Costs*". Generally, the EITF reached conclusions similar to the AICPAs Accounting Standards Executive Committee (AcSEC)'s conclusions in *Statement of Position (SOP) 98-1*, that codified at *ASC 350-40* entitled "*Accounting for the Costs of Computer Software Developed or Obtained for Internal Use*". As such, the EITF identified similar "stages" for the development of a Web site.[2]

However, for accounting software to be sold leased or otherwise marketed will be accounted under the provision *Statements of Financial Accounting Standards (SFAS) No. 86*, that codified at *ASC 985-20* entitled "*Accounting for the costs of computer software to be sold, leased, or otherwise marketed*" for which a plan is being developed or already exists for an external marketing of the software.[3]

While within the international level, the provision of the related guidance was amplified by *IAS 38* entitled "*Intangible Assets*" with a related interpretation, *SIC-32* entitled "*Intangible Assets – Website Costs*" which illustrates that "*a website developed by an entity using internal expenditure, whether for internal or external access, is an internally generated intangible asset*".[4] A website arising from development shall be recognized as an intangible asset if it satisfies the requirements of *IAS 38* concerning recognition and measurement as well as probable future economic benefits.[5]

The SEC staff notes that SOP 98-1, states that "*If the software is used by the vendor in . . . providing the service, but the customer does not acquire the software or the future right to use it, the software is covered by this SOP*".[6] In particular, *EITF 00-2* that codified at *ASC 350-50*, *SOP 98-1* that codified at *ASC 350-40* & *IAS 38 (SIC 32)*, provides relatively the same guidance on whether to capitalize or expense costs incurred in each stage of the website development stages and identifies the following stages.[7] Moreover, the main criteria for capitalization or expensing costs associated with developing or acquisition of Web Site could be illustrated in the table (1).

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[1] Sources:
- Talley, J., Falkenhagen, D., "Accounting for Costs Associated With Cloud Computing", the National Office Accounting Standards and Communications Group of Deloitte, Research Paper, Issue 3, October 2012, P. 3.
- 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. 28.

[2] Munter, Paul, Ibid, Jul/Aug 2002, P. 26.

[3] Financial Accounting Standards Board (FASB), FASB Accounting Standards Codification, ASC 985-20, "Accounting for the costs of computer software to be sold, leased , or otherwise marketed", Financial Accounting Foundation, 2014.

[4] International Accounting Standards Board (IASB), International Accounting Standards Interpretation, SIC 32 "Intangible Assets – Website Costs", March 2002.

[5] 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. 161.

[6] Baker, C. Richard, "Does the New Economy Require New Accounting?: An Examination of Accounting for Internet Activities", Penn State University, Research Paper, 2014, P. 6, Available at: http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.202.8398&rep=rep1&type=pdf (Last Accessed at: 25/6/2017

[7] Sources:
- International Accounting Standards Board (IASB), International Accounting Standards Interpretation, SIC 32 "Intangible Assets – Website Costs", March 2002.
- Financial Accounting Standards Board (FASB), FASB Accounting Standards Codification, ASC 350-50, "Intangibles – Goodwill and Other: Website Development Costs", Financial Accounting Foundation, 2014, P. 652.

Table (1): Main Criteria for capitalization or expensing costs associated with developing or acquisition of Web Site [1]

Recognized as an Expense	Capitalized as an/a	
	Intangible Asset	Tangible Asset
- Recognition of a period cost only if the costs incurred not directly attributed to preparing the website for operating it. - Nature of costs incurred based on that: an entity will develop a website primarily for advertising and promoting its products, moreover will not likely that this site will generate future economic benefits from its use.	- They are recognized as an intangible asset, only if the costs incurred are directly attributed to preparing the website for operating as proposed by management. - Nature of costs incurred based on that: an entity will use the Web site to take orders for delivery & there is an apparent probability to generate future economic benefits, and the costs will be fixed.	For Acquisition of hardware components

Where the accounting treatment for activities generated costs that incurred in developing of a website within each stage are illustrated at the figure (1), and will be treated as follows:

1) Planning stage:

Cloud computing Companies' activities generated costs, includes the initiation of feasibility studies, defining objectives and specifies, defining hardware specifications evaluating of the alternatives, selecting preferences and, etc.[2] Where the accounting treatment within this stage illustrated at the table (2) under the provision of EITF 00-2, SOP 98-1 (ASC 350-50) & IAS 38 (SIC 32).

Table (2): Accounting Treatment at the Planning Stage [3]

Recognized as an Expense	Capitalized as an/a	
	Intangible Asset	Tangible Asset
Recognition of expense as incurred, which are specific, similar & clearly consistent in nature to the *"Research Phase"* under the *IAS 38* & *"Preliminary project stage"* in the provision of *SOP 98-1*.	Not recognized at all, as intangible assets	Not recognized at all, as tangible assets

2) Web site application and infrastructure development stage:

Cloud computing Companies' activities generated costs, includes operations related to the domain name, acquisition or developing of hardware components and operating software, develop application code, installing the software developed applications on the web-server(s), testing reliability, etc.[4] Where the accounting treatment within this stage illustrated at the table (3) under the provision of EITF 00-2, SOP 98-1 (ASC 350-50), IAS 38 (SIC 32), IAS 16, and ASC 360.

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[1] Dorel, Mates; Marian, Socoliuc; Elena, Hlaciuc, "Accounting treatment of Web-design according to International Standards of Financial Reporting IAS/IFRS: An International and National Approach", Annals of the University of Oradea, Economic Science Series, Volume 18, Issue 3, 2009, PP. 1038-1040.

[2] Dorel, Mates; Marian, Socoliuc; Elena, Hlaciuc, Ibid, 2009, P.1038.

[3] Sources:
- International Accounting Standards Board (IASB), International Accounting Standards Interpretation, SIC 32 "Intangible Assets – Website Costs", March 2002.
- Financial Accounting Standards Board (FASB), FASB Accounting Standards Codification, ASC 350-50, "Intangibles – Goodwill and Other: Website Development Costs", Financial Accounting Foundation, 2014, P. 654.

[4] Dorel, Mates; Marian, Socoliuc; Elena, Hlaciuc, Op. Cit., 2009, PP. 1038 - 1039.

Costs about the acquisition of tangible assets, such as purchasing and developing hardware, should be dealt with under IAS 16.[1] While obtain & register an internet domain name, generally would be capitalized as an intangible asset under the provision of *Statements of Financial Accounting Standards (SFAS) No. 142* that codified at *ASC 350* entitled "*Intangibles – Goodwill and Other*".[2]

However, within *IAS 38* entitled "intangible assets and SIC 32, obtaining a domain name, developing code for the application, developing operating software, stress testing and installing developed applications on the web-server, should be expensed when incurred unless fulfilled the conditions prescribed by *IAS 38*.[3] Additionally, fees incurred incurred for web-site hosting, which involves paying a certain amount of fee periodically for hosting the web site on their server(s) that connected to the internet to an internet service provider, would be generally expensed throughout the benefit.[4]

3) Graphical development stage:

Cloud computing Companies' activities generated costs, includes the work of the overall graphical design for the presentation of web pages, the choice of format page, the choice of colors, etc.[5] Where the accounting treatment within this stage illustrated at the table (3) (3) under the provision of EITF 00-2, SOP 98-1 (ASC 350-50), IAS 38 (SIC 32), IAS 16, and ASC 360.

After a web site is launched, any modifications to graphics should be evaluated to define whether the modifications referred to as a maintenance or enhancements of the web site,[6] which will be discussed below at the accounting treatment for activities generated costs that incurred under the ongoing services within part (12-3).

Table (3): Accounting treatment at the Website application & Infrastructure Development Stage, and Graphical Development Stage

Recognized as an Expense	Capitalized as an/a	
	Intangible Asset	Tangible Asset (IAS 16) & ASC 360
Recognition of expense as incurred, if it meets the above-specified criteria as expenses in the table (1).	- Mainly recognized as intangible assets, as meets the criteria for recognition as illustrated in the table (1). - Developing initial graphics costs are part of the software and generally should be capitalized following *SOP 98-1*.[7]	For the acquisition of hardware components at web site application and infrastructure development stage recognized as tangible assets and will be accounted under *IAS 16 & ASC 360* that both entitled "*Property, Plant & Equipment*".[8]

[1] Bruce Mackenzie, Diane. Coetsee, Blaise, Colyvas, Tapiwa, Njikizana, Raymond, Chamboko, Brandon, Hanekom, and Edwin, Selbst: "Wiley 2014: Interpretation and Application of International Financial Reporting Standards". John Wiley & Sons, Inc., 2014, P. 213.

[2] Financial Accounting Standards Board (FASB), Statements of Financial Accounting Standards, SFAS 142, "Goodwill and Other Intangible Assets", Stanford, CT: Financial Accounting Foundation, 2001.

[3] Bruce Mackenzie, Diane. Coetsee, Blaise, Colyvas, Tapiwa, Njikizana, Raymond, Chamboko, Brandon, Hanekom, and Edwin, Selbst: Ibid, 2014, P. 213.

[4] Munter, Paul, Op. Cit., Jul/Aug 2002, P. 30.

[5] Durel, Mates: Marian, Socoliuc, Elena, Hlaciuc, Op. Cit., 2009, P. 1039.

[6] Munter, Paul, Op. Cit., Jul/Aug 2002, P. 29.

[7] Financial Accounting Standards Board (FASB), EITF Issue No. 00-2 "Accounting for Website Development Costs", Norwalk, CT: FASB, 2000b.

[8] Sources:

- International Accounting Standards Board (IASB), International Accounting Standards, IAS 16 "Property, Plant and Equipment", Dec. 2003, Available at: https://www.iasplus.com/en-standards/ias/ias16
- Financial Accounting Standards Board (FASB), Accounting Standards Codification (ASC), ASC 360 "Property, Plant and Equipment", FASB Accounting Standard Codification, Financial Accounting Foundation, Available at: https://www.iasplus.com/en-us/standards/fasb/broad-transactions/asc360

4) Content development stage

Content refers to "*information included on the Web site, which may be textual or graphical in nature and may reside in separate databases that are integrated into (or accessed from) the Web page with software or it may be coded directly into the Web pages*".[1]

Cloud computing Companies' activities generated costs, includes creating, acquitting, preparing information, training, saving information whether as text or graphics on the website before the website development; content information; products or services offered by the entity; information about the company; sections that subscribers access; contact details and correspondence; rescue of the information and other costs.[2] Where the the accounting treatment within this stage illustrated at the table (4) under the provision of EITF 00-2, SOP 98-1 (ASC 350-50) & IAS 38 (SIC 32).

Website content development costs in order to develop the initial or ongoing website content are not explicitly addressed in the *SOP 98-1 (ASC 350-50)*, where content development costs are usually higher than software costs for the website. Additionally, content development costs deemed to be advertising costs should be accounted for under *SOP 93-7* entitled "*Reporting Advertising Costs*".[3]

Table (4): Accounting treatment At the Content Development Stage

Recognized as an Expense	Capitalized as an Intangible Asset
- Recognition of expense as incurred, if it meets the above-specified criteria as expenses in the table (1). - Data conversion costs expensed as incurred and, thus, costs to input content expensed as incurred.[4] incurred.[5]	- It could be recognized as intangible assets, as it meets the criteria for recognition, as illustrated in the table (1). - Software used to integrate the database with a web site generally capitalized.[5]

5) Operating stage

Cloud computing Companies' activities generated costs, within the context of multiple activities such as training, administration, maintenance, update graphics and content review, registration the website through search engines, adding new functions, features, and content (links to other sites, etc.), securing information, analyze the use of the site (count the number of visitors), review how to access safety, and other costs.[6] Therefore, the accounting treatment within this stage illustrated at the table (5) under the provision of EITF 00-2, SOP 98-1 (ASC 350-50) & IAS 38 (SIC 32).

This stage is similar to the "*Post-implementation/operating stage*" under the provision of *SOP 98-1*. A further discussion will be made at the accounting treatment for activities generated costs incurred under the ongoing services concerning maintenance and enhancement transactions within part (12-3).

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[1] Munter, Paul, Op. Cit., Jul/Aug 2002, P. 29.
[2] Durel, Mates; Marian, Socoliuc; Elena, Hlaciuc, Op. Cit., 2009, PP. 1039 - 1040.
[3] Sources:
- Noll, Daniel, "Accounting for internal-use software", Journal of Accountancy, Vol 186, Issue 3, 1Sep 1998, P. 98.
- AICPA, Statement of Position 93-7, "Reporting Advertising Costs", New York: American Institute of Certified Public Accountants, 1993, P. 19851.
[4] Munter, Paul, Op. Cit., Jul/Aug 2002, P. 31.
[5] Munter, Paul, Ibid, Jul/Aug 2002, P. 31.
[6] Sources:
- Munter, Paul, Ibid, Jul/Aug 2002, P. 29.
- Durel, Mates; Marian, Socoliuc; Elena, Hlaciuc, Op. Cit., 2009, P. 1040.

Other expenditures, such as selling & administrative overhead (excluding cost which can be directly attributed to the preparation of website for utilizing), initial operating losses & inefficiencies incurred before the website achieves its planned operating status, and training costs of employees to operate the website, should all be expensed as incurred under IFRS.[1]

Table (5): Accounting Treatment at the Operating Stage

Recognized as an Expense	Capitalized as an Intangible Asset
- Recognition of expense as incurred, if it meets the above-specified criteria as expenses in the table (1). - Where costs related to registering the website with internet search engines are expensed as incurred, these expenditures represent advertising costs that are expensed as incurred per *SOP 93-7* entitled "*Reporting on Advertising Costs*" that codified at *ASC 340-20* entitled "*Capitalized Advertising Costs*".[2]	- Recognized as intangible assets, as meets the criteria for recognition as illustrated in the table (1). - While costs related to adding extra functionalities or features are capitalized if they meet the definition of "*upgrades and enhancements*" under the provision of *SOP 98-1*, as discussed below at the Accounting treatment for activities generated costs incurred under the Ongoing Services within part (12-3).

Finally, entities must estimate the useful life on a reasonable basis, due to significant rapid progression and advancement in the field, websites likely to be in all respects highly obsolete in terms of technology. Moreover, for a subsequent measurement for website developing costs, it is difficult to apply the revaluation model concerning fair value to be estimated by reporting to an active market, and therefore as the website is unlikely to have an active market, the best implementation model based on cost could be more practical.[3]

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

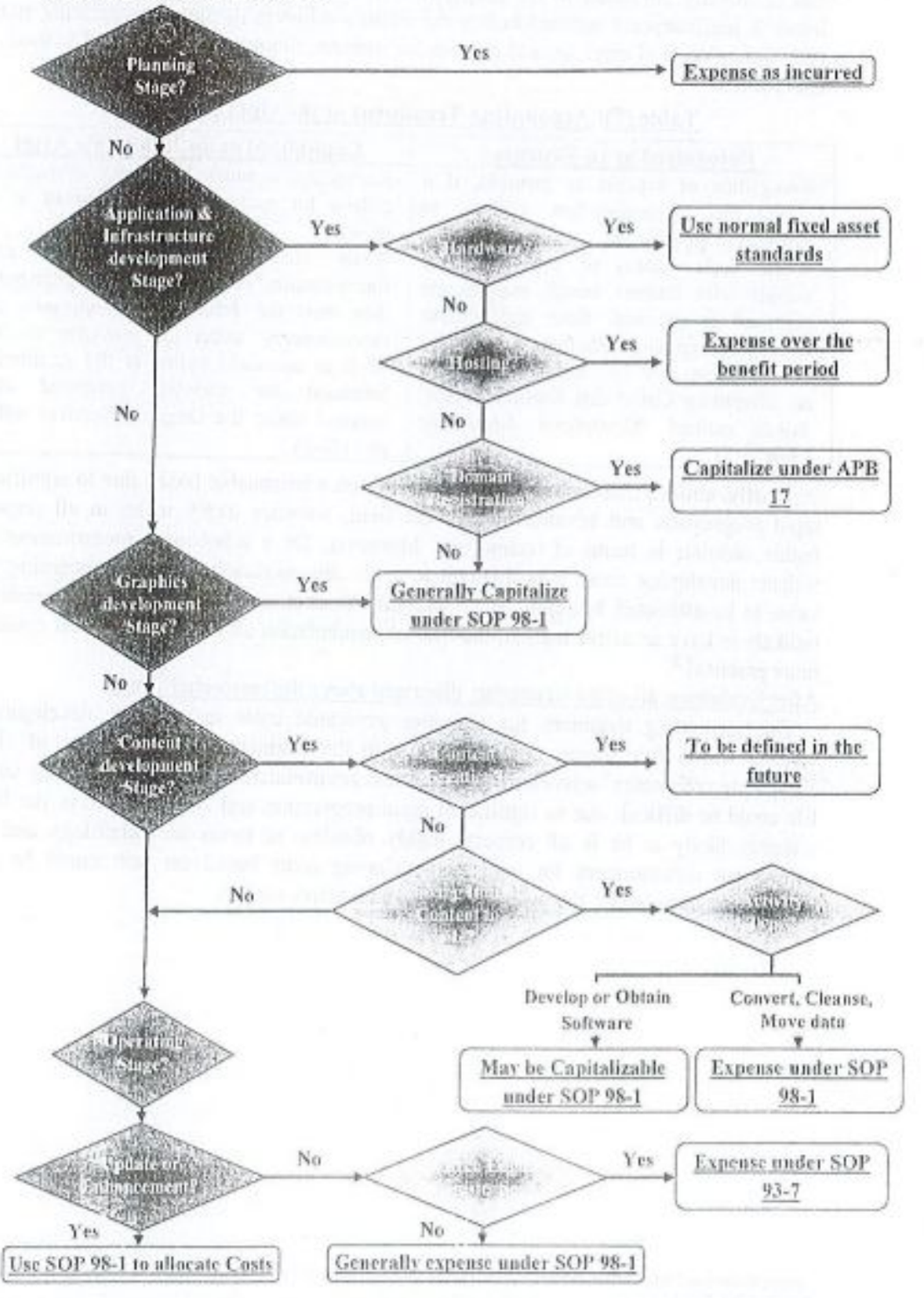
The accounting treatment for activities generated costs incurred in developing a website within five stages, could not fit with the distinctive characteristics of cloud computing companies' activities in the business environment, the estimation of the useful life could be difficult due to significant rapid progression and advancement in the field, websites likely to be in all respects highly obsolete in terms of technology and the subsequent measurement for website developing costs based on cost could be still impractical; as unlikely, the website is to have an active market.

[1] Bruce Mackenzie, DanielCoetsee, BlaiseColyvas, TapiwaNjikizana, Raymond Chamboko, Brandon Hanekom and Edwin Selbst: Op. Cit., 2014, P. 214.

[2] American Institute of Certified Public Accountants (AICPA), Statement of Position 93-7, "Reporting on Advertising Costs", New York: American Institute of Certified Public Accountants, 1993.

[3] Dorel, Mates; Marian, Socoliuc; Elena, Hlaciuc, Op. Cit., 2009, P. 1040.

Figure (1): Accounting treatment for activities generated costs that incurred in developing of Web Site [1]



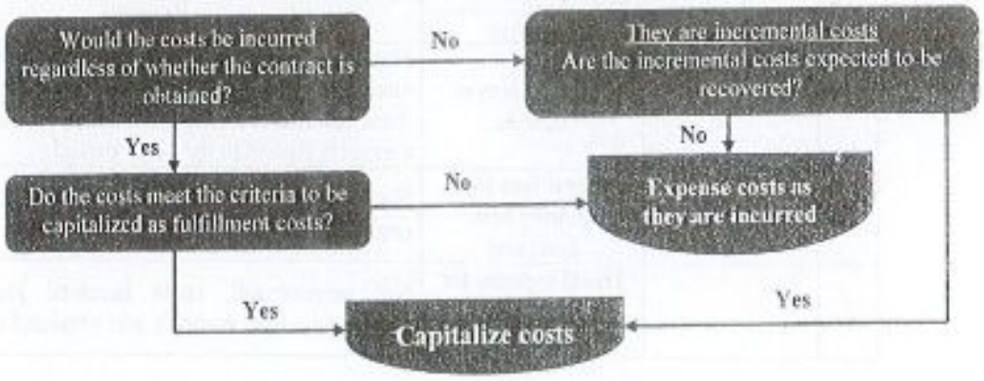
[1] Flanagan, Paul: "Accounting for Web Site Development Costs - Applying EITF 00-2", Christopher Technology Consulting LLC, Research Paper, 2001, PP. 4, 8.

12-2: Accounting treatment for expenditures incurred under the activities of acquiring or obtaining a contract

When acquiring a new contract, a cloud service provider may incur particular costs, such as costs to set up a new customer or sales commissions. There is a lack of the U.S. GAAP & IASB previous guidance on accounting for costs incurred to acquire a contract, and there is no specific guidance on how these costs presented.[1] While the new standards address specific cost guidance related to the accounting for the cost incurred as part to obtain or fulfill a contract with a customer as in the figure (2). In May 2014, FASB issued *(ASU) 2014-09,* added a subtopic to the codification, *ASC 340-40, "Other Assets and Deferred Costs: Contract with Customers"*, under *(Topic 606)"Revenue from Contracts with Customers"*, and also, the IASB issued *IFRS 15, "Revenue from Contracts with Customers"*.[2]

The new guidance requires entities to capitalize on the incremental costs to obtain a contract with a customer if the firm expects to recover such costs through the execution of the contract.[3] The new guidance defined *incremental costs to obtain a contract* as *"costs that an entity incurs to obtain a contract with a customer that it would not have incurred if the contract had not been obtained."*[4] Recovery can be direct (i.e., through reimbursement under the contract) or indirect (i.e., through the margin inherent in the contract).[5]

Figure (2): Capitalize or expense costs to obtain a contract [6]



[1] Chandra, Vikhar. & Reddy, Jagan; "Revenue Recognition Considerations for SaaS Companies", Ernst & Young LLP, Limited publication, 2016, P. 9.

[2] For Further details:
- Financial Accounting Standards Board (FASB), Accounting Standards Update (ASU) 2014-09, ASC 606 "Revenue from Contracts with Customers", Financial Accounting Foundation, May 2014.
- International Accounting Standards Board (IASB), International Financial Reporting Standard (IFRS), IFRS 15 " Revenue from Contracts with Customers", IFRS Foundation, London, May 2014.

[3] Association of International Certified Professional Accountants (AICPA), "Financial Reporting Brief: Roadmap to Understanding the New Revenue Recognition Standards", New York, NY, Financial Reporting Center, Research Paper, September 2016, P. 20.

[4] Huhacker, Andrew., Hures, Jennifer, Chiriatti, Chris, Hegg, Lauren, "Revenue Recognition: Accounting for Costs of Obtaining a Contract", The National Office Accounting Standards and Communications Group of Deloitte, Research Paper, 2019, P. 2. Available at: https://www.iasplus.com/en/publications/us/accounting-spotlight/2019/rev-rec-costs-to-obtain-a-contract.pdf (Last accessed at 22/8/2019).

[5] Earnst and young, "Applying IFRS in Software and Cloud Services: The new revenue recognition standard - software and cloud services", EYGM Limited publication, January 2015, P. 32.

[6] Burgmeier, Nick, Muir, Scott, Mosier Paul, "Revenue for Software and SAAS Handbook", KPMG LLP, Research Paper, December 2018, P. 624. Available at: https://frv.kpmg.us/content/dam/frv/en/pdfs/2017/NT_Revenue_for_software_and_SaaS.pdf (Last accessed at 22/8/2019)

While costs to obtain a contract that does not qualify for capitalization should be expensed as incurred for more clarification, a commission paid to a sales supervisor based on achieving a certain threshold of new contracts would be capitalized. However, commissions paid on multiple factors, which obtaining a contract was only one factor would not be included, and those costs would be expensed. [1]

Furthermore, if the contract period is less than one year, an entity is required to recognize contract acquisition costs as an expense. Some technological entities support this treatment, particularly those that pay sales commissions upon entering into long-term contracts such as cloud service entities.[2] Commissions paid for connecting new customers can vary depending on the length of the service contract and the type of service plan, including any enhanced services sold. The longer the service contract and the higher the monthly proceeds (e.g., service plans with relatively high or unlimited minutes of use), the greater the commission costs.[3]

Additionally, this guidance states that "*an entity to amortize capitalized costs of obtaining a contract with a customer on a systematic basis that is consistent with the transfer to the customer of the goods or services to which the asset relates.*"[4]

To summarize evaluating costs to obtain a contract on whether particular costs are incremental costs of obtaining a contract with a customer or not as follows in the table (6):

Table (6): Treatment of Incremental & Non-incremental costs of obtaining a contract with a customer [5]

No.	Costs		Reasons
	Capitalized	Expense	
1		Fixed employee salaries	Not incremental costs to obtain a contract with a customer, so should not be capitalized. Even if these salaries are based, partially, on the number of contracts signed in the prior period.
2		Legal fees for drafting new contracts	Not incremental, both parties can walk away from negotiations.
3		Travel expense for pitching new contracts	Not incremental, costs incurred regardless of whether the new contract was obtained or not.

[1] Hubacker, Andrew, Burns, Jennifer, Chiriatti, Chris, Hegg, Lauren, Ibid., 2019, P. 2. Available at: https://www.iasplus.com/en/publications/us/accounting-spotlight/2019/revenue-costs-of-obtaining-a-contract/file (Last accessed at 22/8/2019).

[2] Ernst & Young, "Technology entities raise key issues in revenue recognition project, to the point, FASB-Proposed Guidance", Ernst & Young LLP., May 2012, P. 3.

[3] Ashley Wright, Jason Waldie, Lindsey Morris, Dominic Wong, Michelle Dion, "In depth: A look at Current Financial Reporting Issues – New Revenue Guidance", PwC refers to the United States member firm, Research Paper, July 2017, P. 16. Available at: https://www.pwc.fr/fr/assets/files/pdf/2014/01/ifrs15pwc-recognise-loans-contracts-with-customers-industry-supplement-sector-applications.pdf

[4] Gary Matuszak, Jam Barsten, Lynn DeVaughn, Rusty Thomas, "Building a Successful Cloud Provider Service: Accounting and Tax Considerations", KPMG LLP, Research Paper, 2012, PP. 12-13. Available at: https://www.kpmg.com/US/en/IssuesAndInsights/ArticlesPublications/Documents/building-successful-cloud-provider-service.pdf

[5] Source:

- Stadt., Neal, "Accounting for Contract Costs are Changing.... Are You Ready?", Holthouse Carlin van trigt LLP., working paper, P. 2. Available at: https://www.hcvt.com/media/publication/93_Contract%20Costs%20Article_Neal5_FINAL_083008.pdf (Last accessed at 22/8/2019).
- Hubacker, Andrew, Burns, Jennifer, Chiriatti, Chris, Hegg, Lauren, "Revenue Recognition: Accounting for Costs of Obtaining a Contract", The National Office Accounting Standards and Communications Group of Deloitte, Research Paper, 2019, PP. 2-5, Available at: https://www.iasplus.com/en/publications/us/accounting-spotlight/2019/revenue-costs-of-obtaining-a-contract/file (Last accessed at 22/8/2019).

Continue table (6):

No.	Costs		Reasons
	Capitalized	Expense	
4		Partial bonus payments based on sales of an employee	If the bonus payments depend on factors other than just sales of an employee, they may not be incremental costs to obtain a contract with a customer.
5		Salaries of sales reps working on landing new contracts	Not incremental, salary expenses are incurred regardless of whether the new contract was obtained or not.
6	Commissions tied to a service condition		- If the service condition is considered to be substantive, so some or all of the sales commission is likely not an incremental cost of obtaining a contract with a client. - However, if the service condition is considered to be non-substantive, the commission is likely to be an incremental cost to obtain a contract with a client.
7	Fringe benefits		Are attributed directly to sales commissions or other costs also qualified as incremental costs of obtaining such a contract and should be capitalized.
8	Bonus on quarterly sales targets for new contracts		Incremental, bonuses are paid only on new contracts that were signed.
9	Commissions paid to sales managers managing sales reps for new contracts		Incremental, commissions are paid only on new contracts that were signed.
10	Commissions subject to a threshold		The value of the commission varies in tiered structures is considered an incremental cost to obtain a contract with a customer that should be capitalized.
11	Stock-based compensation		Equity awards tied directly to obtain a contract with a customer may represent an entity's incremental costs of obtaining such a contract.

After Evaluation all of the treatments discussed above the researcher found:
The new guidance under *(Topic 606)"Revenue from Contracts with Customers"*, and besides, the IASB issued *IFRS 15, "Revenue from Contracts with Customers"* requiring entities to capitalize the *incremental costs* to acquire a contract with a customer if the firm expects to *recover* such costs, through execution of the contract do not fit with the distinctive characteristics of cloud computing companies' activities in the business environment.

12-3: Accounting treatment for expenditures incurred under the activities of Ongoing Services:

Once a customer's cloud services begin, a cloud service provider can incur costs to maintain & support the ongoing level of service. Based on the specific cloud structure, these costs may be related to various activities, such as software enhancements, hardware upgrades or replacements, or routine maintenance, as illustrated in the table (7).[1]

Table (7): A Comparative Accounting Treatment between routine maintenance services & enhancements or upgrades related costs under US GAAP & IFRS

<table>
<tr><th colspan="3">Under US GAAP</th></tr>
<tr><th>Routine Maintenance services (without providing additional features and functionality)</th><th colspan="2">Enhancements or upgrades services (non-maintenance-related) (providing additional features and functionality)</th></tr>
<tr><td>Costs related are generally expensed as incurred,[2] as related to routine work without providing any additional features and functionalities than that presented in the original software implementation.</td><td colspan="2">Costs related are qualified for capitalization in certain circumstances, as modifications that providing additional features and functionalities not present in the original software implementation — those modifications enabling the software to perform tasks that it previously was not capable of performing.[3]</td></tr>
<tr><td rowspan="2">While not explicitly defined in ASC 350-40, maintenance defined in ASC 985-20-20 as "activities undertaken after the product is available for general release to customers to correct errors or keep the product updated with current information [including] routine changes and additions".[4]
Cost of "Internal and/or external"[5] software maintenance could include modifications to the software to apply bug fixes, correct errors or omissions, install minor-</td><td>Software Hosting Arrangement
SFAS 86 (ASC 985-20)</td><td>Cloud Service Hosting Arrangement
SOP 98-1 (ASC 350-40)</td></tr>
<tr><td>Allows for capitalization of particular costs related to enhancements to external-use products, through applying software capitalization model to "product enhancements" if technological feasibility of the-</td><td>Allows for capitalization of Internal and/or external costs for specified upgrades & enhancements[6] to internal-use software if the costs will lead to additional functionality.[7]</td></tr>
</table>

[1] Talley, J.; Falkenhagen, D., Op. Cit., October 2012. P. 6.
[2] Sardo, Al; Arendy, Al., Accounting for Internal-Use Software". Journal of Corporate Accounting & Finance (Wiley), Volume 9, Issue 4, Summer 1998, P. 50.
[3] Nusbaum, Edward E.; Weiss, Judith. Op. Cit., Summer 1998, P. 146.
[4] Talley, J.; Falkenhagen, D., Op. Cit., October 2012. P. 6.
[5] Nusbaum, Edward E.; Weiss, Judith. "Costs of Software for Internal-Use SOP". Journal of Corporate Accounting & Finance (Wiley), Volume 9, Issue 4, Summer 1998, P. 147.
- *Internal costs*: Expense as incurred for maintenance that cannot be distinguished from minor upgrades and enhancements.
- *External costs*: Expense over the contract period for maintenance or unspecified upgrades and enhancements, or the both, on a straight-line basis or on another systematic and rational basis that is more representative of the services received.
[6] Costs incurred solely to repair a design flaw or to perform upgrades that extend the useful life of the software without adding to its capability (i.e. migrating to a web based platform) should be expensed.
[7] Sardo, Al; Arendy, Al., Op. Cit., Summer 1998, P. 50.

Continue table (7):

Under US GAAP		
Routine Maintenance services (without providing additional features and functionality)	**Enhancements or upgrades services (non-maintenance-related) (providing additional features and functionality)**	
	Software Hosting Arrangement *SFAS 86 (ASC 985-20)*	**Cloud Service Hosting Arrangement** *SOP 98-1 (ASC 350-40)*
- upgrades, provide other general support services or continuing consulting contracts with providers of help services related to purchased elements of the software and training.[1]	-product enhancement has been established. Which include enhancements that extend life or significantly enhance the marketability of a product.[2]	That is, such modifications to enable the software to perform tasks that it was previously incapable of performing, which could change all or part of the existing software specifications.[3]
Under IFRS		
Under *IAS 38* entitled "*Intangible Assets*", there is no authoritative guidance found related to accounting treatment for routine maintenance and ongoing services related costs & enhancements or upgrades related costs incurred by cloud service provider to maintain and support the ongoing level of service, in addition to there is no distinction between both classification of costs. Where, the reference to maintenance found in Paragraph No. 9, which states that "*entities frequently expend resources, or incur liabilities, on the acquisition, development, maintenance or enhancement of intangible resources such as scientific or technical knowledge*".[4] Moreover, in Paragraph No. 90 about the factors that considered in determining the useful life of an intangible asset, where one of this factors is "*the level of maintenance expenditure required to obtain the expected future economic benefits from the asset and the entity's ability and intention to reach such a level*". While in Paragraph No. 91 states that "*The term 'indefinite' does not mean 'infinite'. The useful life of an intangible asset reflects only that level of future maintenance expenditure required to maintain the asset at its standard of performance assessed at the time of estimating the asset's useful life, and the entity's ability and intention to reach such a level*".[5]		

[1] Schneider, Gary P.; Sheikh, Aamer; Simione, Kathleen A.: "Accounting for Software Development Costs: Issues with a rule-based standard", Business Studies Journal, Volume 4, Issue 1,2012, P. 4.
[2] Master, Prof. Op. Cit., Jul/Aug 2002, P.29.
[3] 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. 93.
[4] International Accounting Standards Board (IASB), International Accounting Standards, IAS 38 "Intangible Assets", March 2004, P. A1033.
[5] International Accounting Standards Board (IASB), International Accounting Standards, IAS 38 "Intangible Assets", March 2004, P. A1052.

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

- The non-existence of authoritative guidance found related to accounting treatment for routine maintenance and ongoing services related costs & enhancements or upgrades related costs incurred by cloud service provider to maintain and support the ongoing level of service, in addition to there is no distinction between both classification of costs under *IAS 38* entitled *"Intangible Assets"* do not fit with the distinctive characteristics of cloud computing companies' activities in the business environment.
- The authoritative guidance found related to accounting treatment for routine maintenance and ongoing services related costs & enhancements or upgrades related costs within *SFAS 86 (ASC 985-20)* entitled *"Accounting for the Costs of Computer Software to be Sold, Leased, or Otherwise Marketed"* do not fit with the distinctive characteristics of cloud computing companies' activities in the business environment.
- The non-existence of authoritative guidance found related to accounting treatment for routine maintenance and ongoing services related costs & enhancements or upgrades related costs incurred by cloud service provider to maintain and support the ongoing level of service, in addition to there is no distinction between both classification of costs under any *FASB statements at the United States Level* do not fit with the distinctive characteristics of cloud computing companies' activities in the business environment.

13: 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.

The research is starting the evaluation and analysis by discussing the accounting treatment for expenditures incurred under developing or acquisition of website activities. Where such activities are based on five main stages, but in order to reach the proper accounting for such activities are dependent on the purpose of usage, which is subject to management intention of use. There may be similarity in accounting treatment between international and US versions, but it is clear from the analysis of those treatments that the asset capitalization is delayed in light of the expenses incurred as a result of the inherent conservatism taken into account by those standards in general.

Additionally, illustrating the accounting treatment for expenditures incurred under the activities of acquiring or obtaining a contract. Where the threshold of capitalizing the costs associated with obtaining the contract from customers is based on whether such incurred costs are incremental and expected to be recovered, were it is amortized on a systematic basis. Such a threshold for capitalization could not accommodate all of the activities related to obtaining a contract from a customer and could the company incurs additional costs within the income statement that may be capitalized as an asset within

the balance sheet. So additional guidelines and criteria are required to accommodate these activities with the deficiency in defining the current criteria.

Also, the researcher addressed accounting treatment for expenditures incurred under the activities of ongoing services. Conversely to US GAAP, under the IASB there is no authoritative guidance found related to the accounting treatment for routine maintenance and ongoing services related costs & enhancements or upgrades related costs incurred by the cloud service provider to maintain and support the ongoing level of service, in addition to there is no distinction between both classifications of costs.

From all of that, the study hypothesis for the current accounting standards and guidelines for developing or acquisition of web-site, ongoing services, and acquiring a contract 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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Tourism-led economic growth hypothesis and the nexus between international tourism revenue and economic growth in Saudi Arabia

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Abstract

International tourism is a primary service in the global economy, and positively contributes to the economy by providing hard currency, creating employment opportunities, and accumulating physical capital. This study investigates the relationship between international tourism revenue (ITR) and GDP in Saudi Arabia and tests the tourism-led economic growth (TLEG) hypothesis using time series Granger causality analysis. We find sufficient evidence to show that international tourism has a positive and statistically significant impact on economic growth in Saudi Arabia, thus confirming the theoretical assumptions of the TLEG hypothesis and the results of prior empirical studies. Our results are consistent with the TLEG hypothesis of a positive relationship between ITR and real GDP. We find the elasticity of ITR is 0.56, which indicates a 1% increase in international tourism revenue will lead to an economic growth increase of approximately 0.56% in the short term.

Keywords: Economic Growth, Granger Causality, Saudi Arabia, Tourism-Led Economic Growth

JEL: C23, C33, F43, O54, Z0

1.

Introduction

The tourism industry is one of the fastest growing industries for many developing and developed countries, as well as an important economic activity. According to the World Tourism Organization (WTO), tourism will be the second largest sector in 2020, led only by the petrochemical industry (WTO, 2016). From a macroeconomic perspective, the tourism sector produces 5% of world GDP and 30% of world export services (UNWTO, 2012). International tourism in particular has seen important developments and become a substantial sector in many economies. Globally, it is increasingly being recognized as an important source of revenue and an essential tool for promoting economic growth. Many governments recognize the important role of international tourism in economic growth and its potential benefits for their countries, including increased government revenues, more job opportunities, and providing foreign exchange earnings that can support the balance of payments. According to the UNWTO, the number of international tourists worldwide in 2015 reached 1.602 billion and generated receipts of approximately $2 trillion (UNWTO, 2015).

Following the influential works of Copeland (1991), Hazari and Sgrò (1995), and Lanza and Pigliaru (1995), the role played by tourism in the economic development of countries has captured increasing attention. Andereck et al. (2005) and Matarrita-Cascante (2010) state that developing international tourism is a common strategy for economic growth in many countries. Recently, researchers have empirically shown tourism's direct effect on economic growth.

The findings of these studies indicate there are potential correlations that converge on four main hypotheses (Chatziantoniou et al., 2013). The first two assume a unidirectional causality between the two variables, either from tourism to economic growth or from economic growth to tourism. The third hypothesis assumes there is a bidirectional causal relationship between tourism and economic growth, and the fourth assumes they have no relationship at all.

There is a long tradition of domestic tourism in Saudi Arabia from Hajj pilgrimages, Umrrah, Madinah visitors, and summer and winter resort tourism. However, the Kingdom entered the international tourism market in the second half of the last century after the Saudi government realized the importance of international tourism for economic development and as a source of income. As a result, it established tourism institutions and facilities such as the Saudi Commission for Tourism and National Heritage and provided incentives for private investment in this promising sector.

Economists have shown considerable interest in investigating the relationship between international tourism and economic growth, known in the literature as the tourism-led economic growth (TLEG) hypothesis. This study investigates the relationship between international tourism revenue (ITR) and gross domestic product (GDP) and tests the TLEG hypothesis in Saudi Arabia using time series Granger causality analysis. Several studies support the idea that tourism expansion increases both short- and long-term economic growth. A portion of the literature considers exports a driver of economic growth, but there is growing attention to non-tradable goods, such as tourism. However, empirical studies on the relationship between

international tourism and economic growth have delivered contradictory results. These differences in findings are due to the use of different models and datasets, as well as the existence of different economic structures among countries. This study aims to examine whether there is a short-term relationship between international tourism and economic growth in Saudi Arabia and the nature of the causality between them.

International tourism helps generate income and increase efficiency through greater competition among national firms and their international competitors (Bhagwati & Srinivasan, 1979; Krueger, 1980), facilitating the exploitation of economies of scale both at the local and international levels (Helpman & Krugman, 1985). International tourism in Saudi Arabia, the focus of this study, is known to contribute to growth through different channels. According to the MAS Center (2016), revenue is the first motive for promoting international tourism; the added value of the tourism sector in Saudi Arabia reached $22.8 billion by the end of 2016, representing 3.5% of GDP and 4.9% of non-oil-GDP. Creating employment opportunities is the second motive; 882,900 jobs have been created in this sector, 27.8% of them held by Saudis, accounting for 7.7% of total employment and 8.3% of jobs in the private sector (MAS, 2016). A third motive is economic diversification, and there are a variety of other factors.

This study examines the causality relationship between international tourism receipts (including holy cities visitors) and GDP in Saudi Arabia. The remainder of the paper is structured as follows. Section 2 presents some relevant theoretical and empirical literature. Section 3 describes the estimation methodology and data, while Section 4 presents the results and findings. Section 5 concludes the paper.

2. Literature review

Over the last few decades, many scholars have attempted to understand the real link between international tourism revenue and economic growth.

2.1 Tourism and economic growth

The positive relationship between tourism and economic growth is based on a group of studies of single countries: for example, in the Spanish case, Balaguer and Cantavella-Jord´a (2002); Durbarry (2004) for Mauritis; Dritsakis (2004) for Greece; Oh (2005) for South Korea; Gunduz and Hatemi-J. (2005) for Turkey; Kim et al. (2006) and Sanchez Carerra et al. (2008) for Mexico; Lee and Chien (2008) for Taiwan; Katircioglu (2009) for Cyprus; and Mishra et al. (2011) for India. Using quarterly data from Spain between 1975 and 1997, Balaguer and Cantavella-Jorda (2002) apply the methods developed by Johansen (1988) and Johansen and Juselius (1990) and find tourism Granger causes economic growth in Spain. Kim et al. (2006) use quarterly data from 1971 to 2003 and show there is bidirectional Granger causality between tourism and economic growth for Taiwan. In the case of South Korea, Oh (2005) uses the test developed by Engle and Granger (1987) but is unable to find evidence of co-integration between tourism and GDP. His findings show economic growth does not Granger causes tourism. Lee and Chang (2008) find that, in the long run, there are unidirectional causality relationships from tourism

development to economic growth in the case of OECD countries, while a bidirectional relationship is indicated in the sample of non-OECD countries.

In general, these studies state that while a causal relationship between tourism and economic growth is mostly supported, the nature and direction of the relationship changes over individual countries and country groups.

2.2 International tourism and economic growth

The literature generally indicates that international tourism generates economic growth. Sugiyarto et al. (2003) and Croes and Vanegas (2006) suggest international tourism contributes to an increase in income levels and per capita GDP. International tourism is one of the main export services because of its positive contributions in the form of provision of hard currency, creation of employment opportunities, and the accumulation of physical capital. McKinnon (1964) argues that international tourism brings in currency that can in turn be used to import capital goods, and the greater the proportion of investment ploughed back into the capital goods sector, the faster the output grows in the long run. Several empirical studies support this hypothesis, including Brida and Pulina (2010), Croes and Vanegas (2008), and Fayissa et al. (2011), which focus on Latin American countries. Dritsakis (2012) examines international tourism receipts, international tourism arrivals, exchange rates, and GDP per capita for seven Mediterranean countries for 1980–2007. He confirms that tourism positively contributes to economic growth. From their empirical work, Schubert et al. (2011) find that the increased demand for tourism in Antigua and Barbuda leads to economic development and better terms of trade.

2.3 TLEG hypothesis

The popular explanation of the relationship between international tourism and economic growth is the tourism-led economic growth (TLEG) hypothesis. Balaguer and Cantavella-Jordà (2002) were the first to describe this concept, and since then increasing attention has been paid to the issue. Several studies have found evidence in favor of the TLEG hypothesis, including Gani (1998), Shan and Wilson (2001), Eugenio-Martin et al. (2004), Soukiazis and Proença (2008), Gunduz and Hatemi (2005), Kim et al. (2006), Cortés-Jiménez and Pulina (2006), Louca (2006), Noriko and Motosugu (2007), Fayissa et al. (2007), Carrera et al. (2008), and Katircioglu (2009). Following the TLEG hypothesis, these economists investigate the possible causal relationship between international tourism and economic growth. Although some find evidence of short-term causality from international tourism to economic growth, it is unclear whether international tourism growth actually drives economic growth or, alternatively, economic growth strongly contributes to international tourism growth. The TLEG hypothesis proposes that there should be a specific direction: international tourism activity stimulate the economic development of destinations (Hazari & Sgro, 1995; Vanegas & Croes, 2003; Sanchez Carrera et al., 2008; Proenca & Soukiazis, 2008).

Matin (1992) suggests the TLEG hypothesis is expected to hold only when the overall economy is linked to tourism developments in the form of spillovers and other externalities. According to this hypothesis, there is a stream of benefits from

international tourism to the economy, which spill over in multiple directions (Schubert et al., 2011). Brida and Pulina (2010) and McKinnon (1964) suggest that tourism increases foreign exchange earnings, which are used to finance imports. Ballaguer and Cantavella-Jorda (2002), Bhagwati and Srinivasan (1979), and Krueger (1980) indicate international tourism encourages investment and leads local firms toward high efficiency due to the increase in competition. Brida and Pulina (2010) state that, because tourism activities heavily depend on human capital, international tourism reduces unemployment. Finally, Andriotis (2002) and Croes (2006) conclude that international tourism leads to positive economies of scale, therefore reducing costs of production for national businesses.

Eeckels et al. (2012) produce empirical evidence for the TLEG hypothesis by examining the relationship among the cyclical components of GDP and international tourism revenue, applying spectral analysis to Greece from 1976 to 2004. They find the cyclical component of international tourism income has a significant effect on the cyclical component of GDP, supporting the TLEG hypothesis. In the case of Mexico, Carrera et al. (2008) suggest the TLEG hypothesis holds for the Mexican economy. Using cointegration analysis, they find that international tourism income initially has a significant positive effect on economic growth.

Zortuk (2009) examines the relationship between international tourism income and economic growth in Turkey by examining quarterly data from the first quarter of 1990 to the third quarter of 2008 using a Granger causality test. His findings support the TLEG hypothesis in the case of Turkey. Cortés-Jiménez et al. (2009) use cointegration and Granger causality tests to examine TLEG in the Italian and Spanish economies, using two sets of data from 1954 to 2000 and 1964 to 2000, respectively. They find that international tourism income leads to economic growth.

Finally, some studies offer support for both the TLEG and economic-driven tourism growth hypotheses, and report bidirectional causality between tourism developments and economic growth (Lee & Chang, 2008; Cortés Jiménez et al., 2006; Durbarry, 2004; Lanza et al., 2003; Shan & Wilson, 2001).

3. Data and methodology

3.1 Data

This study uses time series data from Saudi Arabia for 2004 to 2016. Data were collected from the Saudi Arabia Monetary Agency (SAMA, 2016) and Saudi Commission for Tourism and National Heritage's (MAS-Center 2016) annual statistical report (see Figure 1).

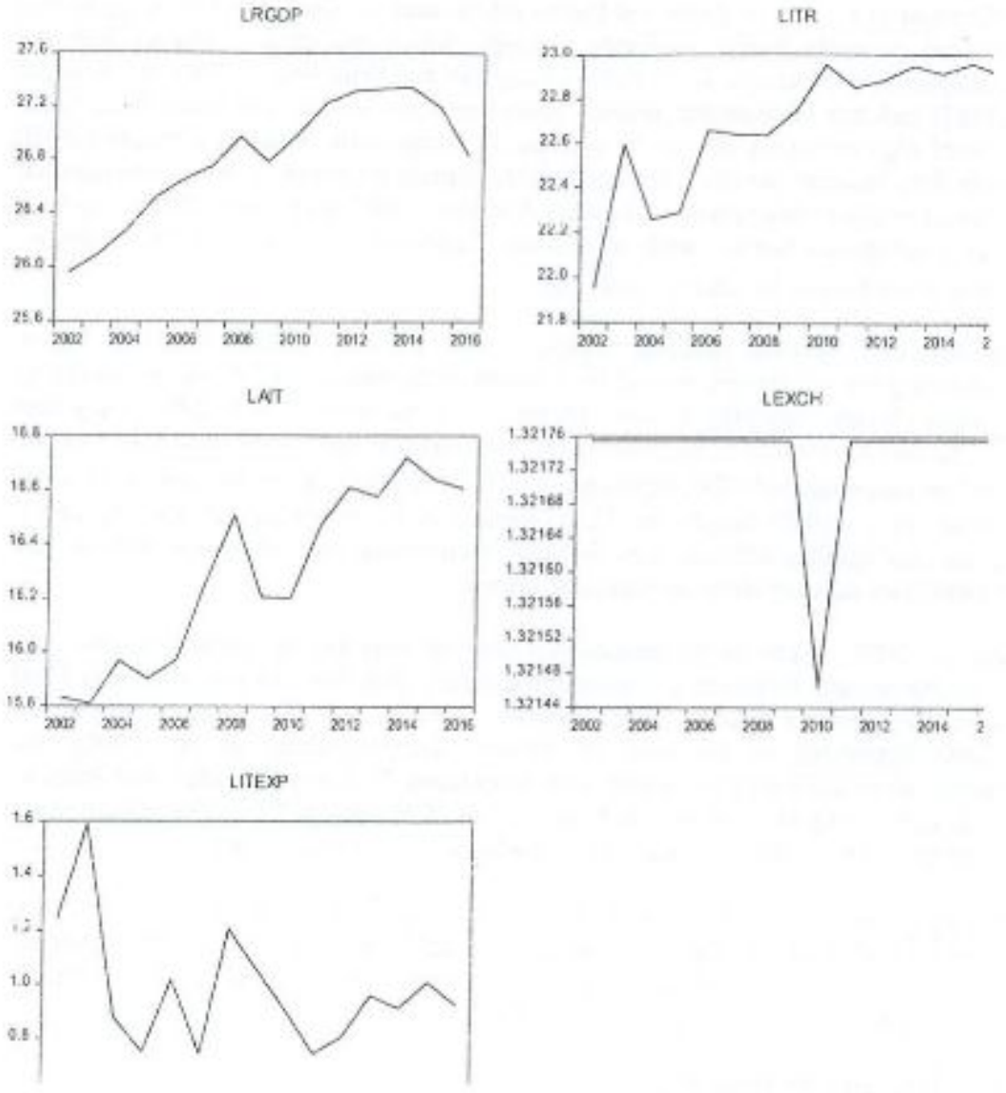

Figure 1 - Change in model variables from 2004 to 2016

Our analysis considers visitors to the holy cities of Makkah and Madinah. ITR is measured as international tourism revenue divided by total export value (TEX); economic growth is measured using real GDP (RGDP). All data used in the study were transformed into logarithms.

Figure 2 shows the total international tourist arrivals (MAS, 2016). These data include arrivals to the two holy cities as Hajj pilgrimages, Umrrah visitors, and Madinah visitors. The international tourist arrivals series shows an upward trend, and there is an increase in the fluctuation in total visitor arrivals between 2011 and 2015.

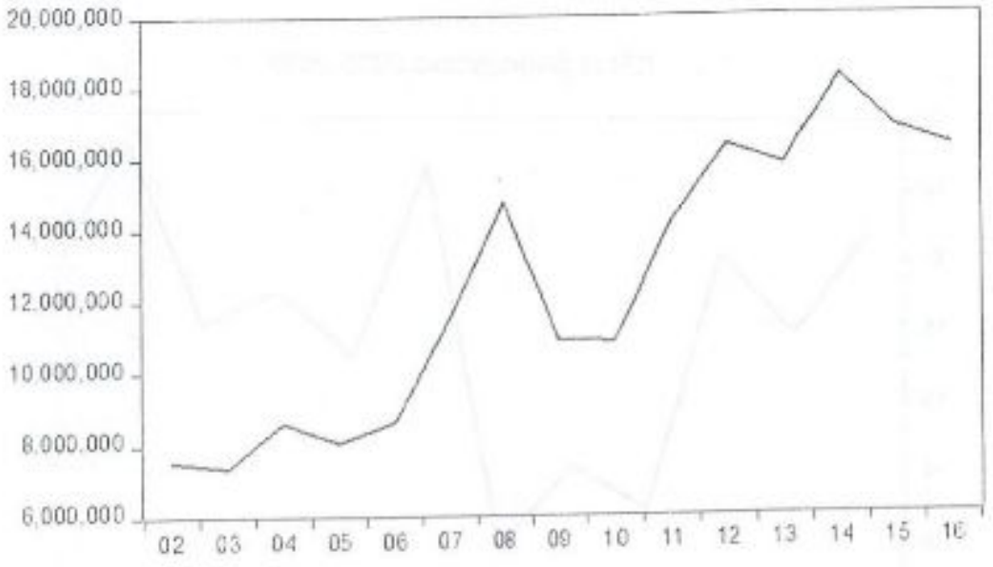

Figure 2 - International tourism arrivals in Saudi Arabia

Table 1 illustrates Saudi Arabia's share of international tourism in the Middle East market, with an average for the period of 26.83%. From 2004, tourism in Saudi Arabia has shown remarkable increases in terms of both the number of international tourists visiting and tourism revenue. In the period from 2004 to 2015, the number of tourists has reached 155.02 million, increasing from 8.59 million people in 2004 to 18.02 million people in 2015, with an average annual increase of 12.36% (SAMA, 2016).

Table 1: Tourist arrivals in the Middle East and Saudi Arabia's share (millions)

Year	Middle East (International Tourist Arrivals) - Millions	Saudi Arabia Share%
2004	36.00	23.80
2005	33.70	23.90
2006	39.30	21.90
2007	45.60	25.50
2008	55.20	26.70
2009	52.90	20.60
2010	54.70	19.80
2011	49.50	26.80
2012	50.60	32.20
2013	49.20	32.10
2014	52.40	34.80
2015	53.30	33.80

Source: MAS Center, Saudi Commission for Tourism & National Heritage, 2016.

Figure 3 shows the total revenue obtained from international tourist activities based on the MAS annual report in 2016.

Figure 3 - Saudi Arabian international tourism revenue ($ billions)

Table 2 shows that international tourism revenue in Saudi Arabia reached a total of $110 billion between 2002 and 2016, growing from $3.418 billion in 2002 to $9 billion in 2015 with an average annual increase of 4.49% (SAMA, 2016). Both the energy and financial crises are reflected in Saudi Arabia's total international tourist revenue between 2006 and 2010, as shown in Figure 3, because of the reduced propensity to spend. In fact, international tourism revenue is considered the first motive and added value of the tourism sector in Saudi Arabia. According to MAS, it reached $22.8 billion by the end of 2016, which equals 3.5% of GDP and 4.9% of non-oil GDP.

Table 2: International tourism revenue (ITR) and real GDP (US$) in Saudi Arabia

Years	RGDP	ITR
2002	188,600,090,216	3,418,000,000
2003	214,662,988,750	6,486,000,000
2004	257,369,496,021	4,626,000,000
2005	326,464,456,233	4,769,000,000
2006	374,400,794,756	6,907,000,000
2007	413,481,962,865	6,775,000,000
2008	517,039,257,294	6,744,000,000
2009	426,821,485,411	7,536,000,000
2010	524,016,685,065	9,317,000,000
2011	665,955,002,937	8,400,000,000
2012	730,061,950,070	8,690,000,000
2013	740,387,011,028	9,263,000,000
2014	749,832,556,917	8,949,500,000
2015	642,574,750,157	9,381,000,000
2016	448,271,765,137	8,936,700,000

Source: SAMA (2016).

3.2 Methodology

Based on the TLEG hypothesis, the variables RGDP, AIT, ITR, ITEXP, and EXC where RGDP is the real GDP, AIT is the international tourist arrivals, ITR is the international tourism revenue, ITEXP is the international tourism exports and EXC is the currency exchange rate. They used to test the significance of international tourism revenue as an explanation for economic growth; these variables are standard in the literature. The model proposed by Balaguer and Cartavella-Jorda (2002), Parrilla et al. (2007), Sanchez Carrera et al. (2008), and Eeckels et al. (2012) is employed to examine the TLEG hypothesis using Saudi Arabian data. To begin our empirical framework, we specify a baseline model for the following regression equations:

$$RGDP = f(AIT, ITR, TEX, EXC) \quad (1)$$

$$RGDP_t = \alpha_0 + \beta_1 ATR_t + \beta_2 ITR_t + \beta_3 TEX_t + \beta_4 EXC_t + \epsilon_t \quad (2)$$

The series are expressed in natural logarithms to measure the impact of the change in one variable on another.

$$LnRGDP_t = \alpha_0 + \beta_1 LnATR_t + \beta_2 LnITR_t + \beta_3 LnITEX_{pt} + \beta_4 LnEXCH_t + \epsilon_t \quad (3)$$

where,

LnRGDP$_t$ = natural log of real GDP; *LnAIR*$_t$ = natural log of international tourist arrivals; *LnITRt* = natural log of international tourism revenue (represents real tourism receipts in local currency); *LnITEXPt* = natural log of tourism exports; *LnEXCHt* = natural log of the exchange rate, α_0 = model intercept, β_1, β_2, β_3 and β_4 = parameters; and ϵ = error term.

4. Results

Classic econometrics and the ordinary least squares (OLS) method was applied to this model using the E-views software package. The analysis proceeds first by examining the stationarity of the series studied. We measure the level of variable stationarity by determining the order of integration series using the Dickey–Fuller (ADF) test (Dickey & Fuller, 1979).

4.1 Testing for unit roots

According to econometrics literature, unit root tests must be done to identify whether the model variables are stationary to guarantee their non-stationarity for examining a long-term relationship. To check for stationarity, the augmented Dickey–Fuller (ADF) unit root test is carried out on the time series in levels and differenced forms. In this study, the test includes a constant but not a time trend as shown in equation (3), as recommended by Dickey and Fuller (1979).

$$\Delta Y = \alpha_1 + \alpha_2 \Delta Y_{t-1} + \lambda_{t-1} + \mu \qquad \text{Intercept (constant) only} \quad (3)$$

The results are shown in Tables 3 and 4 and indicate that the time-series for LRGDP, LAIT, and LINEXP are not stationary at levels I(0); the null hypothesis of non-stationarity for these variables is not rejected. However, the time-series for LITR and LEXCH are stationary and integrated of order one I(1). However, when we take the first differences of these variables, only LRGDP and LAIT are not stationary, and LAIT, LEXCH, and LITEXP become stationary. Accordingly, the time series for all variables of the study are integrated of order one I(1).

Table 3: Testing unit root in levels.

Variable	1% Level	5% Level	10% Level	T-Statistics
LRGDP	-4.004425	-3.098869	-2.690439	-2.26318
LITR	-4.121990	-3.144920	-2.713751	-3.668760

LAIT	-4.121990	-3.144920	-2.713751	-0.719724
LEXCH	-4.004425	-3.098896	-2.690439	-3.741657
LINEXP	-4.004425	-3.098896	-2.690439	-3.069153

Table 4: Testing unit root in 1st differences.

Variable	1st Diff. 1%	1st Diff. 5%	1st Diff. 10%	T-Statistics
LRGDP	-4.057910	-3.119910	-2.701103	-1.426958
LITR	-4.297073	-3.212696	-2.747676	-0.532385
LAIT	-4.121990	-3.144920	-2.713751	-4.481136
LEXCH	-4.057910	-3.119910	-2.701103	-5.744563
LINEXP	-4.297073	-3.212696	-2.747676	-3.254559

The ADF test statistics at the first difference level provide sufficient evidence to conclude that the trends of the null hypothesis and its alternative hypothesis, respectively, are as follows:

H_0: There is no significant relationship between international tourism revenue and economic growth in Saudi Arabia.

H_1: There is a significant relationship between international tourism revenue and economic growth in Saudi Arabia.

The results of the stationarity analysis in Tables 3 and 4 show that we cannot reject the null hypothesis of unit roots for all variables in levels form. However, the null hypothesis is rejected when the ADF test is applied to the first differences of LAIT, LEXCH, and LITEXP. Following the previous results, this study examines the long-term relationship between the variables using VAR (Johnson & Juselius, 1990). LRGDP, LAIT, LITR, and LINEXP contain unit roots in the levels test. Some of them are stationary at first differences, except LEXCH which is stationary in both levels and first differences. Because of data limitations (15 observations) from 2002 to 2016,

we were unable to conduct a co-integration test among the variables as suggested by Johnson and Juselius (1990).

4.2 Granger causality test

In the next step, we test for causality among the variables to study the causal interactions that exist between the model variables. Several articles on the use of Granger causality tests to analyze time-series data appear in the literature. The concept of Granger causality was introduced by Granger (1969) and Sims (1972) and has since been widely used to determine the importance of the interaction between two series. Granger's original work in 1969 on the definition of non-causality has attracted so much attention in economics that it hardly needs any introduction. The simplest meaning of causality was provided by Granger (1980) as 'X (time series) variable X causes Y, if the probability of Y conditional on its own past history and the past history of X does not equal the probability of Y conditional on its own past history alone' (p. 346). Table 3 shows the results of the Granger causality tests between the main variables. Even though we have data limitations, these techniques allow us to determine the existence of interactions among the variables being considered.

The simplest test for causality is to estimate the regression using the following model:

$$x_t \quad c_1 \quad {}_{i\ o}^{p} \ {}_i x_{t\ i} \quad {}_{j\ 1}^{p} \ {}_j y_{t\ j} \quad u_t$$

Using OLS and then conducting a F-test of the null hypothesis below,

H_0: $\beta_1 = \beta_2 = \ldots = \beta_p = 0$

H_0: $X_t = a_0 + a1\ Xt_{-1} + \ldots + amX_{t-m} + b1Z_{t-1} + \ldots + bmZ_{t-m} + \varepsilon_t$

Restricted:

$X_t = a_0 + a_1 X_{t-1} + \ldots + a_m X_{t-m} + \varepsilon_t$

In testing for Granger causality, two variables are usually analyzed together, while testing for their interaction. There are four possible results of the analysis:

1) Unidirectional Granger causality from variable Y, to variable X_t,

2) Unidirectional Granger causality from variable X_t to Y_t,

3) Bi-directional causality, or

4) No causality.

Taking LRGDP as the dependent variable and LITR as the independent variable, the results indicate there is short-term causality between the variables. The main results obtained from the pairwise Granger causality analysis are presented in Table 5.

Table 5: Granger causality test

Null Hypothesis	Obs.	F-Statistic	Prob.
LITR does not Granger cause LRGDP	13	3.47482	0.0385
LRGDP does not Granger cause LIRT		5.83364	0.0274

The results indicate that short-term causality runs from LRGDP to LITR and vice versa, with a lag of one and two, and there is a bidirectional relationship between LRGDP and LITR in Saudi Arabia. As shown in Table 5, the F-value of 0.0274 is statistically significant at the 5% level. Consequently, the null hypothesis that LRGDP does not Granger cause international tourism revenue is rejected. Moreover, the null hypothesis that international tourism revenue does not Granger cause real GDP is also rejected based on the F-value of 3.47. Hence, the Granger causality test confirms unidirectional causality from LRGDP to LITR.

4.3 Statistical estimation

Classical econometrics and the ordinary least squares (OLS) method were applied in this study. The regression has a high R^2 of 0.91 and statistically significant parameters as shown in Table 6.

Table 6: Statistical estimation

Dependent Variable: LRGDP

Variables	Coefficients	Standard Error	T-Stat	Prob.
C	214.2669	855.2560	0.250500	0.8073
LITR	0.561188	0.256121	2.191109	0.0532
LAIT	0.726587	0.244962	2.966125	0.0141
LEXCH	-160.0772	646.3642	-0.247658	0.8094
LITEXP	-0.439645	0.202693	-2.169024	0.0553
R^2	0.914199			
R^2(Adjusted)	0.879879			

There is a positive relationship between the natural log of the real gross domestic product and the natural log of international tourist revenue in the case of Saudi Arabia.

$$LRGDP = 214.2669 + 0.561188\ LAIR + 0.726587\ LAIT - 160.0772\ LEXCH - 0.439645\ LITEXP. \quad (4)$$

Equation 4 shows the positive effects of international tourist revenue on economic growth. The elasticities of LITR and LAIT are 0.56% and 0.72%, respectively, which indicates that a 1% increase in international tourism revenue will increase economic growth within the range of 0.56% to 0.72% in the short-term. Consequently, in the case of Saudi Arabia, the TLEG hypothesis suggests the relationship between international tourism revenue and economic growth is unidirectional, running from international tourism revenue to economic growth. According to the elasticity results, international tourism has a positive and statistically significant effect on economic growth in Saudi Arabia, thus confirming the theoretical assumptions of the TLEG hypothesis and the findings of existing empirical studies.

5. Discussion and conclusion

The main objective of this study is to test whether the TLEG hypothesis holds for Saudi Arabia. The study uses Granger causality tests to analyze the relationship between LITR and LRGDP. As with most TLEG hypothesis studies, we find sufficient evidence to support the hypothesis. The results are consistent with the hypothesis that there is a positive relationship between LITR and LRGDP. Consequently, the findings provide statistical grounds for rejecting the null hypothesis of an insignificant relationship between international tourism revenue and real GDP in the Saudi Arabian economy.

The evidence suggests the TLEG hypothesis is confirmed for Saudi Arabia; that is, there is short-term unidirectional causality from international tourism revenue to economic growth; an appears to be the one of the main causal factors for economic growth in Saudi Arabia. In our results, LRGDP stimulates LITR and both LITR and LAIT cause economic growth in the short-term. Hence, overall, there is empirical evidence that policies to promote international tourism activities will increase growth. As Oh (2005) remarks, it is commonly believed that tourism has contributed positively to economic growth and generated economic expansion. The findings also indicate that economic development may be necessary to expand international tourism activity in the short term in the case of Saudi Arabia.

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