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A CLOUD TECHNOLOGY MIGRATION MANAGEMENT STRATEGY MODEL FOR SME'S IN IRAQ : AN OVERVIEW

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ABSTRACT

Purpose: Cloud computing has to play a major role in addressing inefficiencies and make a profitable contribution towards the Growth and Competitiveness mainly for SMEs. Cloud Computing came into prominence when Service Providers were offering a wide range of Cloud Based Solutions for Business. But the acceptance and interest shown towards Cloud Computing is less. The purposose of this paper is to evaluate the factors that affect the adoption of Cloud Computing in developing economy Small and Medium Enterprises (SMEs).
Design/methodology/approach: The study was carried out by mens of a non-experimental exploratory research design. The exploratory phase of this study included a critical and exploratory investigation of secondary data. This involved study, modelling and development of secondary data to highlight the results of the study
Findings: The study findings highlights the Cost education in IT infrastructure and maintenance, Improving Communication, versatility and business coherence as the principal drivers of cloud Service. Furthermore, the findinsg reveal that the key elements which impact the distribution of Cloud Computing and adoption were the Support from Top Management, Tried and Tested, fitness of Cloud Vendor, resistance towards adopting a new technology, compatibility and presence of IT Infrastructure.
Research implications: By solving this problem, we could develop results and methodologies that specifically meet the needs of SMEs by energizing and accelerating the rate of adopting Cloud Computing from the Service Providers.
Keywords: *Cloud Service Provider (CSP), Service-Oriented Architecture (SOA), SOA Migration, Adoption, and Reuse Technique (SMART), Service Migration Interview Guide (SMIG), Small and Medium Enterprises (SMEs)*

1. INTRODUCTION

This segment covers the blueprints of the relevant literature, writing and hypotheses which focus around the subject of Cloud Computing, virtualization (which is the principal innovation behind Cloud computing) and relocation of Cloud Infrastructure and programming, keeping in mind the end goal to give ensuing analysis and discussion. It will be distinguishing the literature knowledge gap and attempt to bridge the same.

The secondary search and survey of related materials would go about acting as a fulcrum in identifying the previous work carried out in the migration to the Cloud Computing. It also tries to identify and evaluate the different models for systems, applications and infrastructure, with a perspective view to focus on the potential opportunities existing for the adoption of Cloud Technology. To characterize target applications and infrastructure architecture, and audit guides for the distinctive activities scrutinized to help migration to the Cloud Technology.

This study would be centred around cloud comuputing adoption and migration parameters. Also, the study will be delimited within the confines of exploratory design, with secondary data. The source of secondary data gathered for this research is the Literature search, hence the goal of this literature search would be to review past works in line iwtht he subjectomatter. This will fulfil the study objective which is to evaluate the factors that affect the adoption of Cloud

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Computing in developing economy Small and Medium Enterprises (SMEs).

This review would incorporate developed search of internet websites, gathering, conference papers and published information. Different searches were carried out on Journals and article reviews, daily newspapers. Centered searching of online was done by utilizing such essential keywords such as "Small and Medium Scale Enterprises"', Cloud computing'', "Cloud Computing Migration Strategy'', "Cloud Computing Adoption", Cloud Computing Deployment Models", System Migration.

1.1 A Brief Summary Of The Department Of Registration Of Societies

At the inception of the 20th Century,Company Registrar was established in line with the Statement No. 26 dated 06th February, 1919 by the General Civilian Military Ruler during the First World War that applied the Indian Company Act No. 7 of 1913.The Ministry of Finance, and then by Ministry of Economics and finally by the Directorate of General Companies Supervision and Registration had implemented the law which was established by the Ministry of Trade Regulation No. 55 of the 1959. This Directorate was in charge of the enlistment and observing of organizations and applied the Commercial Companies Law bearing No. 31 of 1957 which replaced the Indian Company Act. This law was considered as the First Iraqi Legislation which specialized in Enrollment and catching up different organizations. The law was revised, amended and had interpenetrated with a percentage of the visions under the Unified Law, which is the Companies Registrar Law bearing No. 36 issued in 1983. In the Mid 1987 a law was issued to cancel all the Committees and bring under the Umbrella of Ministry's Head Quarters in February, 1988.[1]

The Company's Registrar was established under the following divisions, namely a) National Companies, b) Foreign Companies c) Commercial Companies d) Statistics Division. The General Companies Division was established after careful Inspection and Monitoring of the Division after the issuance of General Companies Law bearing No. 22 of 1997. After the downfall of Saddam Hussein Regime on 9th April, 2003 CPA No. 64 of 2004 the pervious law was suspended and amended to bring transparency benchmarks or standards. Transforming of Iraq from Centralized to the free MARKET economy. In Iraq before 9th April, 2003 the number of Registered Companies was about 8374 in numbers of distinctive sorts and exercises branches was 109 and its delegate work places was 85 the Annual Average of Registered Companies did not exceed 400 of diverse types but as per current numbers went up by 51659 by 30th May, 2012. As per Fig 1 show the Companies Registered before 2003 to 2012.[1]

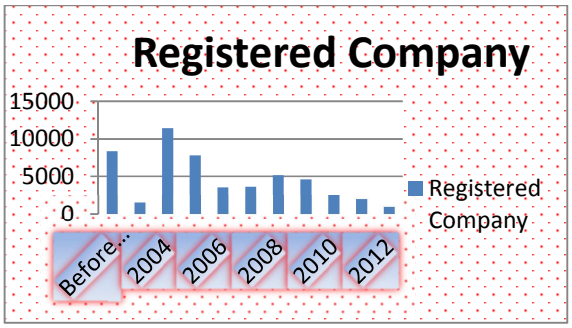

Figure 1 Graphical Representation of Registered Company's

In the same year in the month of May the company had started to reorganize its works and brought about the upliftment of the Companies or revamp its works and brought back its plundered Registered Companies after the ruin. The registered organization number turned in 1536 up to 31/12/03 And given the momentum of work, expansion and speed of achievement has been the 2010 introduction of two sections (section shareholding companies) and (Department of the founding companies of Iraq).

1.2 Cloud Computing Parameters

As indicated [2] Cloud registers is the standard transformation of the following decade. NIST defines distributed computing as cited [3] are the most predominant and prevailing and it states subsequently that distributed computing is "A model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction". The service models include: Software-as-a- Service (SaaS), Platform-as-a-Service (PaaS), and Infrastructure-as-a-Service (IaaS) [2], (*See Figure 2 below*)

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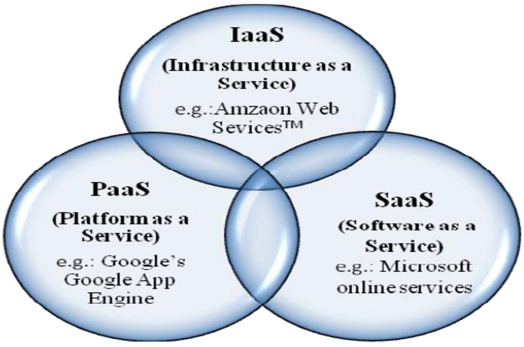

Figure 2: Cloud Computing Service Models [4]

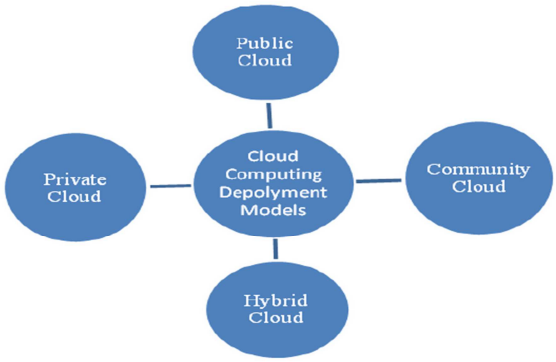

Figure 3 : Cloud Computing Deployment Models [7]

SaaS offers customers to use the applications running on a cloud infrastructure constructed by the CSP. The services are accessible from various client devices, such as a web browser (e.g., web-based email) or a program interface. Ex:- Facebook, G-mail™ etc.

PaaS provides customers to deploy onto the cloud infrastructure, consumer-created or acquired applications created using programming languages, libraries, services, and tools supported by the provider. Examples of PaaS providers are Microsoft's Azure™Service Platform, Google's Google App Engine [4][3]

IaaS offers the buyer to procure preparing, stockpiling, systems, and other crucial registering assets, permitting the customer to send and run self-assertive programming, which can incorporate working frameworks and application [3]. This application is suitable for the enterprises with very large data storage, one-time processing demands [4] [5]. Amazon Web Services™ is one of the examples of IaaS service provider [4]. Each of the above mentioned cloud service model has a different level of business risk.

As indicated by [6], Cloud might be sent and conveyed in distinctive ways. The organization is all the more about how the framework is set up and conveyance is all the more about how administrations are given. An organization can opt to deploy cloud as a Private Cloud, Community Cloud, Public Cloud or Hybrid Cloud (*See Figure 3 below*)

Private Cloud (*see figure 4a below*) is preferred option for organizations with the requirement of a very secure unshared Work System [8]. Where the cloud infrastructure is accessible to the general public and shared in a pay as you go model of payment, it is referred to as a public cloud (see figure 4b below). The cloud resources are accessible via the internet and the provider is responsible [3].

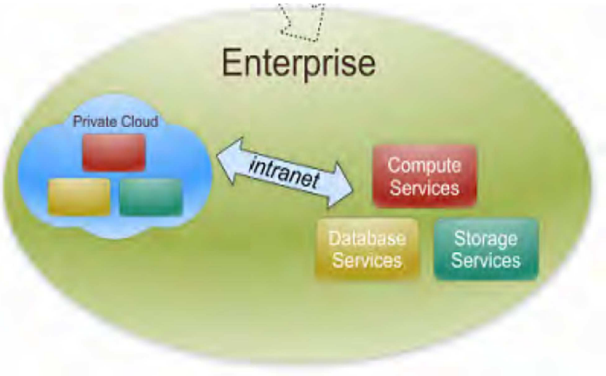

Figure 4a : Private Cloud [9]

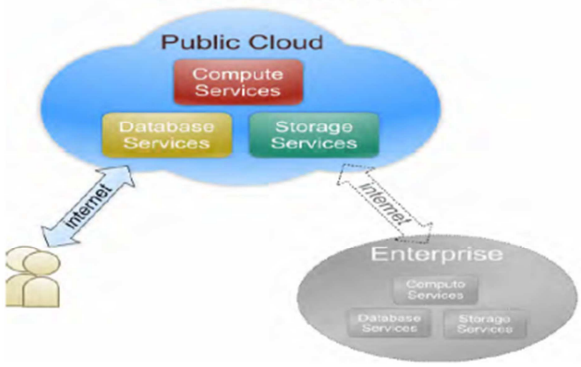

Figure 4b : Public Cloud [9]

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At the point when a gathering of associations has comparable Work System or comparative necessities like register force utilization, or information imparting, they may select a Community Cloud. (*See figure 4c below*). A third party organization may manage it on behalf of the community [8]. A model of deployment, which combines different clouds, for example the private and public clouds is called a hybrid cloud (see figure 4d below). In this model the combined clouds retains their identities, but are bound together *"by standardized or proprietary technology"* [10]. The Hybrid Cloud model predicts that the infrastructure is a combination of two types cloud, such as private and public [3].

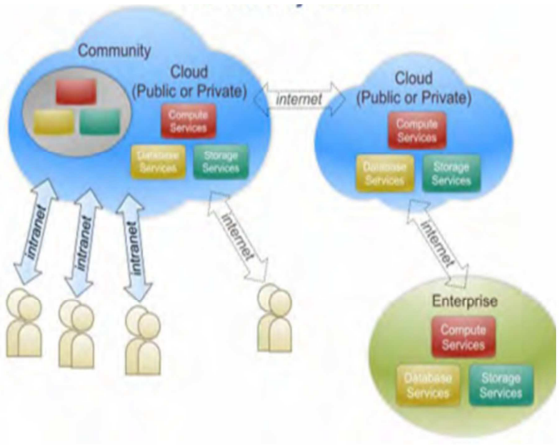

Figure 4c : Community Cloud [9]

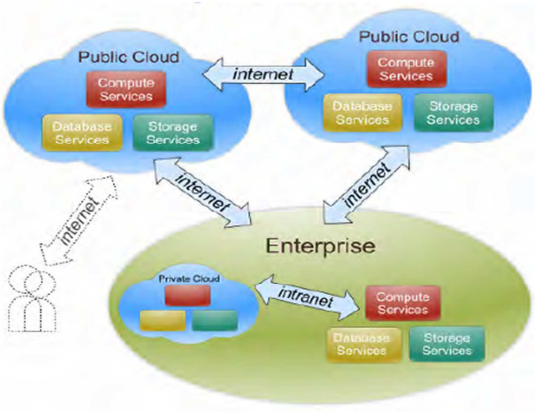

Figure 4d : Hybrid Cloud [9]

In adopting cloud technology to businesses and organization and also migrating existing information systems to cloud based technology, it is worthy of note that there are far much more advantages to be gained in this new technology [2]. In their research "Cloud Migration: A Case Study of Migrating an Enterprise IT System to IaaS" [11] stated that cloud computing is not just for startups. e.g. more cost effective, equally or perhaps more reliable, and highly scalable [12] [13] [14]. On the other hand, scalability in Cloud Computing is one of the main strength points and constitutes an important opportunity for companies. As these companies' requirements change, their infrastructure will be scaled up or down dynamically providing a high level of strategic flexibility [15]. It is in this regards that Cloud computing adaptation by SME's remain a major challenge.

2 CLOUD COMPUTING IN SME'S

The business world today is plagued with a lot of complexities, and these complexities are due largely to globalization, outsourcing and continuous innovations, leading to increase in competition [16]. In order to make profits and remain in competition, businesses have to continually apply innovative capabilities into their operations [16]. Small and Medium Scale Enterprises(SMEs) typically constrained human and budgetary assets to put resources into Information Systems because of their size and as a result of this they battle to addition aggressiveness and profit in the business sector. Exploration demonstrates that associations in the United Kingdom are rapidly moving to the Internet to handle potential business opportunities yet they differ to acknowledge e-business for correspondences and transactions [17] .As per the United Kingdom's National Computing Center (NCC), little associations can diminish the expense of responsibility for facilitated results. This is fortified in an overview directed by the Cloud supplier "Gooroo" which uncovered that little associations in the UK will acknowledge Cloud Computing keeping in mind the end goal to reduce expenses amid the financial downturn [18].

Like all technologies, Cloud Computing has its advantages and disadvantages. Moreover, the web service can also decrease the expenses of new servers, cooling, and server administration and management [19]. Cloud Computing can help because of the diminishment of gaming equipment, the quantity of operations once needed to keep up and oversee them would be

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fundamentally brought down [19]. Cloud computing services might be utilized by all business, particularly new companies and their appropriation will help associations pick up leeway over their adversaries, which can thusly expand business esteem [17] [19]

3. STRATEGIC ORGANIZATIONAL ADOPTION VARIABLES

The IT industry and the academic world have been enveloped in recent times with the various studies that borders around the perceived risks and potential benefits associated with Cloud computing adoption. With this in mind, a careful understanding and processing of the migration strategy into the cloud technology needs to be thoroughly investigated for adequate decision making. Notwithstanding, these studies have thought of various components that are pertinent in affecting distributed computing suitability and selection particularly in Small and Medium scale Enterprises.

According to a Perception Study on Cloud Computing at SME's Baghdad, Iraq conducted by [20] , the entire process of cloud adoption goes through a number of steps which is termed as phases and each phase has its own requirements and once the organization shows its willingness to adopt cloud then the various resources of the organization are analyzed and the suitable migration plan for the company is developing. In their study, [20] implicated four (4) independent factors representing each phase of their migration model and these factors are; Organization, Technology, Environment and Future Plan. According to [21], the present state of information technology resources in the enterprise is one of these factors and the determinants of the size of the IT resources of a company includes the following four (4) variables. They are a) The number of servers the company maintains in, its data centers b) The size of the customer base of the company c) The annual revenue from IT d) The number of countries across which the company is spread over.

Management Information Systems are a vital piece of present day organizations and firms are continually vigilant for approaches to incorporate their business forms into their current data framework applications in a manner to make synergistic operations, building web based innovations for transacting their organizations with their exchanging accomplices [22]. Creating a cloud computing ability is an essential undertaking on the grounds that it is not just quickly changing the way that ventures, purchase, offer, and arrangement with clients, yet it is additionally turning into a more basic part of undertakings' business strategies. A study on "Cloud Deployment Model Selection Assessment for SMEs" conducted by [23] developed a model (Figure 5 below) in which Factors Leading to Difficulties in Cloud Computing Adoption by SMEs were identified.

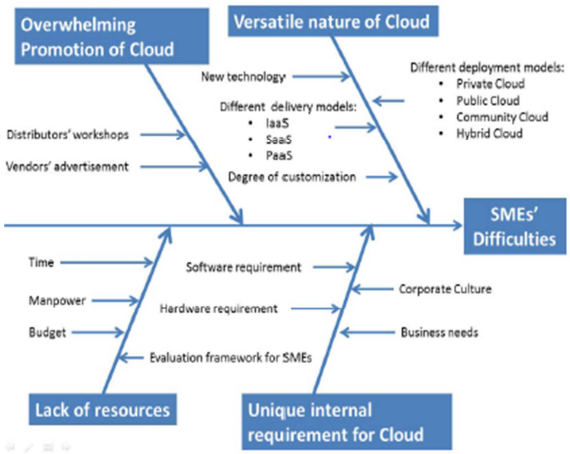

Figure 5 : Factors Leading To Difficulties In Cloud Computing Adoption By Smes [23]

[1] in their research "A Case Study of Migrating an Enterprise IT System to IaaS" The discoveries uncovered that distributed computing could be an essentially less expensive option to obtaining and keeping up framework foundation in-house. Then again, this study additionally demonstrated that there are some other imperative socio-specialized issues that need to be considered before associations could move their IT frameworks to the cloud. [6] proposes a holistic view in the visual display (Figure 6 below) to measure Information System success by combining key dimensions of Information System context and Information System characteristics in a model created which shows that an Information System works within a Work System. As a result a single model provides multiple views for different stakeholders to have a shared vision to inform migration decisions [6]

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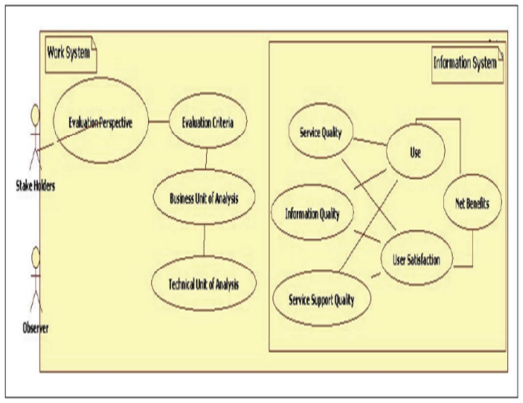

Figure 6 : Proposed – A Holistic Conceptual Model [6]

There are right now few detailed analyses that explore models that have been effectively executed for change and movement of Information frameworks and the estimation parameters in associations.The following subsection (2.4) below reviews success models associated with the successful implementation, measurement of Information Systems and Cloud technology are reviewed.

4. INFORMATION SYSTEM (IS) IMPLEMENTATION SUCCESS MODELS

An audit of papers from 22 years back proposes that early examinations of non-specialized execution focused on the state of mind, fulfillment and execution of clients and since this early research significantly all the more finely nitty gritty set of measures have been created. Research into users has continued with, for example, [24] developed a 52-item User Information Satisfaction Instrument (built on the work of [25]. [26] proposed a 32-item based organizational benefit measurement tool, [27] offered 30-items for measuring systems usage sub-metrics and [28] a 12-item tool for assessing individual impact. Arguably, it wasn't until [29] that a more comprehensive, multi-attribute model of post implementation success for a Computer Based Information System (CBIS) was proposed. Since then IS effectiveness has been explored by looking at the relationships between IS success variables [30].

Validation of the identified relationships between different variables led to the development of success measurement models Using citation analysis [31] it can be highlighted that these on-going success measurement research efforts can be categorized broadly into two streams based on IS characteristics for measuring IS success and the process of measuring IS success i.e. identifying purpose and context, etc. As an illustration first one is, the D&M [32] a work which is seen as a major contribution to knowledge synthesizing many of the extant success metrics at that point.Their model, which as of August 2012 has been cited almost 5000 times (Google Scholar), is itself based on adaptations of communication theory [33]. The D&M model provided a scheme for classifying the myriad success metrics into six categories using a "temporal and causal" model. In this model any Information System (IS) is blessed with certain framework and data qualities and utilized by clients coming about within the individual and hierarchical effects. They also proposed four categories of context (individual, group, organization and industry) along with a revised success dimensions (System Quality, Information Quality, Service Quality, Usage and Net Benefits.)

Although D&M focused on IS dimensions itself [34], argued that IS systems, measurement needed to be understood from a broader systems perspective where it is important to understand (a) who is measuring, (b) how to measure, (c) what has been measured (the unit of analysis) and (d) when it has been measured. Similarly, [35] proposed a two dimensional matrix for setting measurement processes. This matrix was based on stakeholder and system dimensions. Both the stakeholder (informed by [36] and system dimensions highlights the importance of understanding and measuring at various levels of analysis These traditional models were static like traditional IS, serving in a static context. Context can be defined as "any information that can be used to characterize the situation of an entity." [37]. As a result, observers used well defined metrics to measure success for a defined business and technical system boundary. As far as clouds, the connection is dynamic and relying upon the kind of organization and conveyance model, customer association may not be mindful of the nature, administration, communication with different administrations at run time, genuine administration supplier, figure process asset accessibility, system & administration access progress [6]. Application of System Thinking leads to an integrated model as "it is a framework for seeing interrelationships rather than things (individual system components)" [12].

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5. VIRTUALIZATION

Virtualization has moved beyond its humble mainframe origins [2]. Virtualization is playing an increasingly dominant role in enterprise and personal computing. It provides several benefits including increased efficiency and a reduction in physical resources [2].
Virtualization is a framework or methodology of dividing the resources of a computer into multiple execution environments, by applying one or more concepts or technologies such as hardware and software partitioning, time-sharing, partial or complete machine simulation, emulation, quality of service, and many others. Microsoft Virtual PC, VMware, and Xen are the dominant commercial virtualization products capable of emulating x86-based computers. VirtualBox and KVM are other available solutions most commonly associated with Linux environments. Virtualization products differentiate themselves by how they fertilize the environment.

These virtualized environments are being monitored and executed by a software component that manages all virtual machine executions known as the virtual machine monitor or hypervisor. The hypervisor is also commonly referred to as a *host* (or *dom0* of Xen nomenclature). The virtual machines (VM) are referred to as *guests* (or domU's for Xen, where U is an integer larger than 0, each referring to a different virtualized *guest*). Xen and VMware have integrated into their hypervisors the capability to monitor and manage the migrations for the cloud provider [2]. The technology was never intended to inform the guest due to the virtualization abstraction.

Recently, virtualization has enabled computing resources such that a single physical machine is able to function as a set of multiple logical VMs [38] A key benefit of VMs is the ability to host multiple operating system environments which are completely isolated from one another on the same physical machine is the capability to configure. For example, on a physical machine, one VM can be allocated 10%, while another can be allocated 20% of the processing power [39]. In particular, we need to investigate how VMs can be assigned various resource management policies catering to different user needs and demands to better support the implementation of SLA-oriented resource allocation for Data Centers and Clouds [40].

5.1 Virtualization Techniques

The following four techniques are available for virtualization;

5.1.a Full Virtualization: This technique fully virtualizes the main physical server to support applications and software to operate in a much similar way on virtualized divisions it creates an environment as if it is working on a unique server [39]. Full virtualization technique enables the administrators to run unchanged and entirely virtualized operating system [40].

5.1.b Virtual machines: Virtual machines are popularly known as VMs, imitate certain factual or illusory hardware requiring the valid resources from the host, which is nothing but the actual machine operating the VMs [40]. A virtual machine monitor (VMM) is used in certain cases where the CPU directives need extra privileges and may not be employed in user space [40].

5.1.c Para-Virtualization: This methodology clearly runs modified versions of operating systems. Only the software and programs are carried out in a precise manner to work for their exclusive websites without executing any kind of hardware simulation [38]

5.1.d Operating System level Virtualization: Operating system level virtualization is specially intended to grant the necessary security and separation to run manifold applications and replicas of the same operating system on the same server [40]. Isolating, segregating and providing a safe environment enables the easy running and sharing of machines of numerous applications operating on a single server [38]. This technique is used by Linux-VServer, FreeBSD Jails, OpenVZ, Solaris Zones and Virtuozzo.

6. CLOUD MIGRATION STRATEGIES AND METHODOLOGIES :

The difference between engineering and migrating a legacy system lies in the decision that needs to be made about how much and what can be migrated. The definition of migration is “to go from one place to another”. The best example in Computer Science and Software is moving from one version to another version With a minimum infrastructure cost and resource consumption to migrate to the cloud, enterprise is a challenging

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application, without disturbing its operations and providing stable services to the client. A number of factors are considered in developing methodologies and strategies.

6.1 Pricing and Monetization Strategies

For providing computing resources as a utility, the pricing and monetization of the cloud become a key problem for both service provider and customer. To keep the cloud product highly competitive in the market would be a centric view of the service provider. [41] in their study of "Customer Centric Cloud Service Model and a Case Study on Commerce as a Service" had proposed a cloud computing service model focusing on the customer business requirement. [42], propose a pay-as-you-consume pricing scheme based on machine learning prediction model to achieve pricing fairness. The study in [43] tries to bridge between distributed systems and economics by a pricing scheme that decouples users from cloud providers. Compared with that, [44] tries to find the generalized Nash equilibrium in price between SaaS service provider and IaaS service provider. Finally, [45] propose an adaptive pricing scheme in allowing resource reservation, which encourages users to use resources more carefully on the cloud consumer side, selecting cloud products with reasonable price can greatly lower the expenditures. Therefore, researchers consider both from performance requirements and the budget. [46] in their study on "Auto-Scaling to Minimize Cost and Meet Application Deadlines in Cloud Workflows" dynamically allocates or deallocates VMs and schedules tasks on the most cost-efficient instances, to ensure deadline requirements with minimum cost. To minimize the cost and meet the deadlines, the work of [47] studies the problem of resource allocation for real-time tasks. Review shows no studies were focused on lowering costs of constructing cloud service. Nonetheless, [48] proposes the minimization of the rental cost and transition cost for provisioning resource and reconfiguring resource for different applications.

6.2 Software Migration Methodologies and Strategies

It is a important study to assess the effort for migration of complex software systems and to have a strategy, methodology and guidelines in place to make the migration process efficient. [49] propose the "Chicken Little" migration methodology, which has eleven step strategy for migration of complex software systems, also known as legacy systems. The Butterfly migration strategy by [50] also provides a methodology and generic toolkit in the migration of legacy systems.Several frameworks to aid in the decision process of migrating legacy systems have been developed

6.2.1 Evolutionary Process Framework (EPF)

[51], developed the Evolutionary Process Framework (EPF), which is a descriptive process framework that aids in the analysis of legacy systems for all forms of evolution. The has five phases: (1) Issue Assessment; (2) Strategy Selection; (3) Solution Realization; (4) System Transition; and (5) Process Improvement. Each of these phases can be used to structure a project's evolution by identifying critical success factors, aiding planning, scheduling, and providing common nomenclature. Figure 7 below illustrates the Evolutionary Process Framework (EPF)

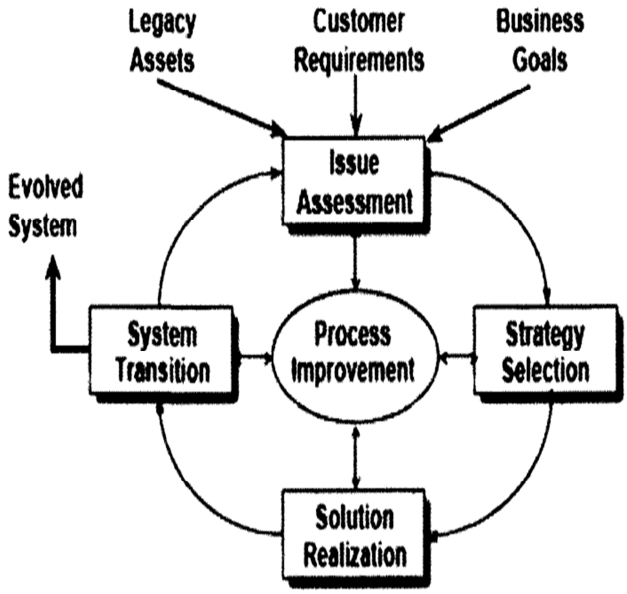

Figure 7 : Evolutionary Process Framework (EPF)[51]

6.2.2 Options Analysis for Reengineering (OAR) Framework

The Options Analysis for Reengineering (OAR) framework developed [52]

is specialized in re-engineering (a form of evolution). OAR framework was developed as a method for identifying the reusability (mining) of components in a large, complex system.. The concept of OAR was later applied to develop

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SOA Migration, Adoption, and Reuse Technique (SMART), which is a framework to aid in migration (another form of evolution), specifically aimed towards the migration of legacy components to SOA. SOA has gained a great deal of attention and momentum for its promised benefits of agility, flexibility, and reusability to organizations.

6.2.3 SOA Migration, Adoption, and Reuse Technique (SMART)

The SMART created by Carnegie Mellon's Software Engineering Institute (CMU/SEI) is a set of guidelines that help organizations make initial decisions about the feasibility of reusing legacy components as services within an SOA environment [53] [54] [55]. SMART consists of three elements: (1) the SMART process; (2) a questionnaire called the SMIG; and (3) a migration artifact list. The SMART process is a set of activities performed to collect information needed to make an informed decision and answer questions about migrating legacy components to services, analyze this information, and develop migration plan. It is an iterative process consisting of six activities. The six activities of the SMART process are shown in Figure 8 below

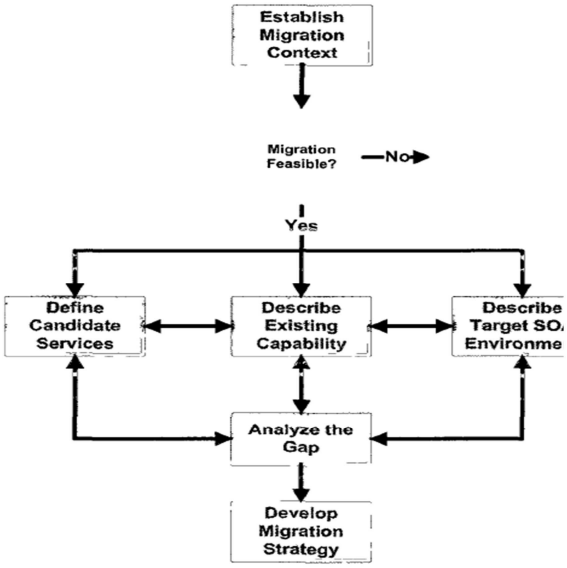

Figure 8 : Activities Of The SMART Process [56]

7.3 Hybrid Strategy : According to [57] migrations will not follow the historic approach advocated by the Microsoft BDD program (*see figure 9 below*), but will involve a mix of environments, including the following: Desktop application deployments, Server-based hosting solutions, Multiple virtualization environments, Multiple cloud solutions**.**

Figure 9 : Microsoft Business Desktop Deployment Program [58]

Many companies are already opting for a hybrid model in the virtualization area. Microsoft, Citrix, VMware and Symantec compete in providing the best offering, releasing new product features each quarter in response to customer demand [57].

Often, according to [57], a hybrid approach are not compatible with App-V, for example, while others cannot be virtualized with Symantec. In addition, organizations choose not to virtualize some applications at all; for instance, if an application is used rarely or only by a few people, the return on investment(ROI) of putting it into the cloud may be deemed too low. Therefore, organizations may choose to use some applications in a native format (EXE & MSI) alongside their virtualized applications [57].

7.4 Virtual Machine (VM) Migration Strategy

Virtual machine (VM) migration technique enables the migration of a virtual computing environment to another physical machine while keeping its execution state intact. Since virtualization decouples guest operating systems for hardware, organizations can enjoy a uniform computing environment on different platforms.

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Applications do not have to be changed since these applications are running on the top of guest operating systems, which are on the virtualization layer [59]. To migrate a virtual machine, it is necessary to provide functions for saving a snapshot of the virtual machine and restoring the migrated virtual machine status and a virtual disk [59], as illustrated in the Figure 10a

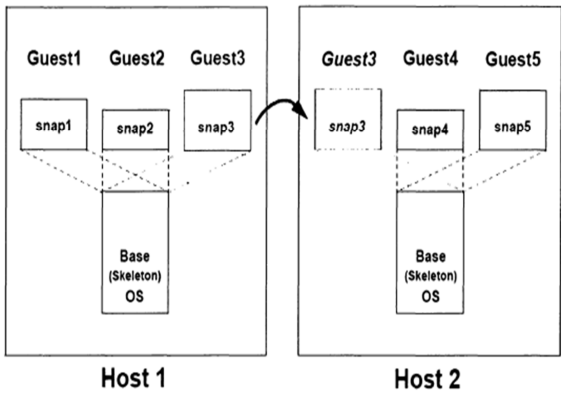

Figure 10a: Guest OS Snapshot Representation [59]

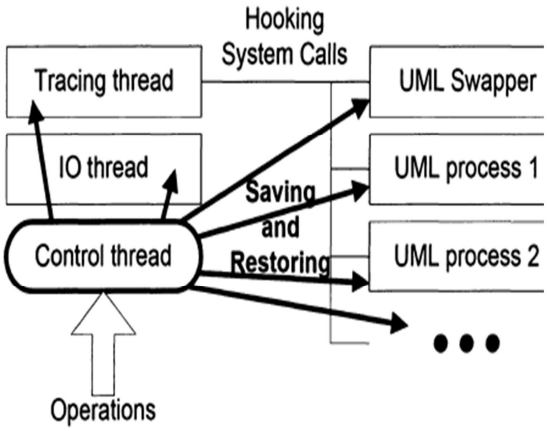

Figure 10b: SBUML Representation [59]

In open source projects, there is Xen Live migration in Xen and SBUML project in User Mode [59]. Scrapbook UML (SBUML) [59], an extension to UML, provides an operating system check pointing capability that is essential to the dynamic and autonomous migration framework. SBUML provides such capabilities for creates a snapshot, which can be resumed on the other host machine, as shown in Figure 10a and Figure 10b above. With modifications in SBUML interface programs and the SBUML kernel patch, it is seamlessly integrated into the autonomous migration framework

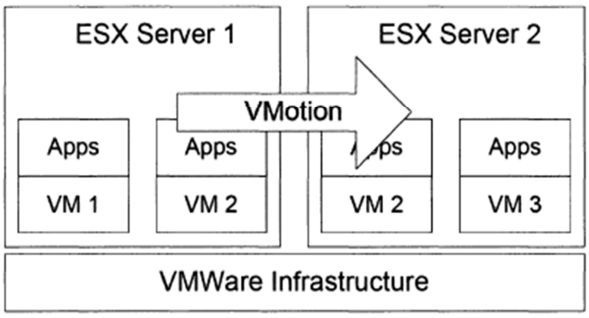

Figure 10c : VM Migration With Vmotion Technology In Vmware Infrastructure [59]

On the commercial side, VMware introduced VMotion functionality in the VMware infrastructure, as illustrated in Figure 10c above, and Microsoft proposed the Dynamic Initiative. Recently, VMware released VMware Distributed Resource Scheduler [59], which continuously monitors utilization across resource pools and allocates available resources among virtual machines according to business needs. VMware DRS (with DPM) [59], is included in VMware Infrastructure, Enterprise, and VMware VMotion are required to implement VMware DRS. DRS collects resource usage information for hosts and virtual machines and generates recommendations for virtual-machine placement.

7 OPEN RESEARCH ISSUES IDENTIFIED

The benefits associated with the utilization of cloud computing in business environment ensure that there are significant reductions in the cost of infrastructure and administration as well as in the improvement in deployment cycles [60]. However for many and small medium sized enterprises (SME's) there are various doubts with regards to the implications and issues pertaining to the adoption of cloud computing. It is not clear for many, as to how to go about transforming their information system towards migrating to the cloud based model [20]. On the other hand, while the functional requirements of a system to be migrated to cloud computing often remains the same, some new functional requirements can surface to satisfy business goals of migration to cloud infrastructure

The deployment and adaptation of cloud computing technologies into the systems and processes of Small and Medium Scale Enterprises has over the past years gained a considerable attention with various firms experimenting with

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this type of technology thereby creating varied types of interests amongst these firms. With these significant attention and interests being expressed, it is expected that there would be an increasing number of firms who would migrate their systems to cloud enabled infrastructures. However, it is important to note that there has not been much attention paid to provide sufficient process support and since migration projects are likely to encounter several kinds of challenges [61], and due to this, it is necessary therefore to identify and share the process and logistical requirements of migration projects in order to build a body of knowledge of appropriate process, methods, and tools necessary to assist the SME's in Iraq particularly as it regards transforming their information systems and businesses towards adopting the cloud based model

This in part being due to the challenges involved in the migration from the existing technologies and systems to the cloud computing models.

8. CONCLUSSIONS:

In this paper, the migration into the Cloud Computing idea, Architecture, and Services have been discussed briefly. A review of SMEs in the UK resulted in SMEs shown keen interest in cloud computing that empowers them to diminish expenses, enhance adaptability and versatility. These profits are seen by SMEs as key driving motivations to embrace Cloud Computing services. Different models for systems, applications and infrastructure, with a perspective view to focus on the potential opportunities existing for the adoption of Cloud Technology. To characterize target applications and infrastructure architecture, and audit guides for the distinctive activities scrutinized to help migration to the Cloud Technology. Nonetheless, the rapid increase in corporate information, placed in the cloud, has raised issues concerning security, vendor lock-in, and complications with the privacy of information and information protection. Thus, this brought about the moderate development of adopting cloud computing. Therefore, with a specific end goal to persuade more SMEs to adopt cloud computing, these issues need to be tended to be addressed. The security challenge of cloud-based programming architects, requests the outline of a service in a way that security dangers is diminished, whilst guaranteeing lawful compliance. To provide cloud service, safety of data ought to be set at the front and focus on the configuration procedures.

In line with the findings of this study, it is therefore recommended that Cloud suppliers ought to execute regulatory compliances that cover operations and security as that client may have worries about. Propositions compliances would enhance the security by having cloud vendors and clients to be secured certified. It would likewise decrease the concerns of interoperability and convenience. Cloud vendors ought to give details of of their security to incorporate risk management, access control, system security, physical security, and reinforce system recuperation. They ought to additionally give subtle details of how clients' systems would be isolated from others in a multitenant environment. On the other hand, frequently cloud vendors tend not to uncover more insights about their systems and server centers, claiming in doing so would compromise their security. To harvest the benefits in adopting cloud computing as it is a winsome wonder for SMEs, the client should be having a good business sense and steps keeping in mind the end goal. Organizations should figure out how to rationalize their business needs and priorities, business applications, and their own premise information, and after that merge their framework accordingly.

The limitations of this study includes that there was single-source bias, as the collection of information was from secondary sources only. Also the study has more of a judgemental conclusion as there is no post data assessment. of *Halal* logistics on supply chain resilience

It is recommended for future researchers to conduct a field survey by collecting primary data and conducting statistical tests on the study variables test the varibles implicated in the findinsg of this study

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