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A Systematic Review of the Benefits and Challenges Associated with the Hybrid Collaboration of Cloud with Specific Reference to Small and Medium Businesses (SMB'S)

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Abstract- There has been an Upsurge in the use of Cloud Services in Businesses and Small and Medium Sized Enterprises are using Software Services as well as Infrastructure Services Provided by Professional Information Service Companies. These Companies Provide the Msmes (Micro, Small and Medium Scale Enterprises) with Services Such as Data Storage, Document Sharing, E-Mail Domains and Other Computer as well as Management Information Systems as Public Resources in Order to Support their Business Processes Management. However, There is a Limitation in the Services One Vendor can Supply, and Thus These Businesses Need to Simultaneously use Services from Different it Platforms and Conduct their Business. Cloud, Called as The 'Future of Information Technology', Plays a Crucial Role in this Regard. Hybrid Collaboration of Cloud, In Simple Words can be Explained as the Integration of Public and Private Cloud Services. The Purpose of this Study is to Summarize with a Systematic Review, The Previous Researches on Hybrid Collaborations in Cloud and How Msmes use these Applications for their Benefit.

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I. Introduction

Cloud computing has become a hugely popular phenomenon that has mostly eradicated the use of ledgers, booking registers, expense reports as well as has revolutionized the communication businesses have with their clients as well as partners [1]. The emergence of cloud has revolutionized the way services are invented, provided, developed and maintained for the customers by the companies. It has enabled companies to cut down on paper transactions, as it eliminates the need to prepare spreadsheets, expense reports, proposals and plans online [2]. There is a great paradox in computing though, where on one side the computers and their technology are on the rise with technology becoming more powerful and the cost per unit computer decreasing, and on the other side the complexity of this technology due to its pervasiveness increasing the cost of the services that are being provided through this platform [3]. The cloud computing facilities have provided a diverse functionality portfolio of services, and have decreased the cost of transactions manifold. However, the increased cost of deploying these services has deterred many organizations from using these cutting-edge technologies in their day to day routines [4].

Cloud computing today represents the confluence of the two major trends that can be seen in IT- and those trends are efficiency of information systems where computers are more efficient in utilizing the resources that have been provided in terms of hardware and software, and the dexterity by which this efficiency is being used to provide a competitive product/service for increased productivity, processing and analysis [5]. The efficiency of cloud computing enables the businesses to increase their development process, processing of orders, perfecting business and sales analytics as well as customizing interaction with clients for a more customizable relationship with better communication, feedback and reviews. The concept also helps the companies adopt the idea of green computing where the resources are used efficiently as well as having the advantage of accessing data from remote places, without the compulsion of being rooted in one office of a particular geographical area [2].

Thus, computing through cloud, and hybridizing various cloud computing software for ensuring the achievement of business needs of the MSMEs has become a great way to conduct financial another transactions. Even though cloud computing is not a very new concept, however it has been catching up in the business models for the past decade [6]. Due to the proliferation of internet and social media, the use of services through cloud in computers, mobile devices and tablets have increased. This can also be attributed to the fact that there is an improved service in relation to bandwidth and speed. However, it has also been noticed that some MSMEs are still hesitant while opting for these services since it involves sharing a public server [7]. These enterprises may opt for cloud computing and hybridization by keeping in mind the cost reduction, convenience, sharing ease, reliability and increased security, but are also hesitant as they

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encounter security hacks, lack of connectivity in remote areas, lack of acceptance within the organization or society as well as increased cost for accessing these services [7], [8].

II. Aim of the Study

The aim of this study is to assess the benefits and challenges of using hybrid collaboration of cloud in small and medium businesses (SMBs), and to address the challenges and provide recommendations for improving the use of cloud computing.

III. Literature Review

The main benefit of using cloud services is that it helps the enterprises to improve their resource utilization, as the enterprises have to pay for only those services that they use. This model is known as subscription model, and it combines with the business through resource pooling to help bring down the cost of services to an affordable price. The firms can customize plans according to their needs, and pay for what they use, thus increasing the frequency of small and medium enterprises to save huge costs [9]. The services also provide first month free service with cancellation at any time without any added costs, motivating small and medium business enterprises to subscribe to the services that they want and benefit from [10].

The cloud service providers have increased their encryption levels to save the end users from theft, data loss risk and decreased espionage. The cloud services are linked to the mail, and the person can change the way other employees can view the information. For example, Google Docs has the option of 'can view' and 'can edit', and also an option that lets the person who has the link view the content [11]. Also, there has been initiatives where the site sends One Time Password to the e-mail or phone number registers when one tries to access the content [12]. The cloud computing lets the businesses store sensitive information online, decreasing the risk of spread of sensitive information through paper theft, photocopying, or memorization by negative elements.

The increased complexity of technology has had an inverse effect on geographical boundaries. The complex web of internet has simplified transactions, communication and availability across geographical borders [6]. Use of cloud computing has led business had the ease of accessibility from around the world. The businesses need not have a formal office space, as employees can have the liberty to work from home [9]. The increased access enhances the chances of adaptability of the services. Businesses can employ freelance workers as well as interns for work, while employers can oversee the progress of the employees without having to keep a team leader or manager and increasing the workforce [13]. The services that have increased adaptability include online financial operations, data accessibility, increased communication and decreased use of physical space [14].

Inversely, the main challenge of cloud computing is the lack of control of the business in question, as the main control is in the hands of the cloud service provider or the vendor. The business managers cannot be assured of the prices or the quality of the cloud services in the future [9]. The vendor might increase rates, and the business manager may need to comply if the company relies heavily on their service. Also, the lack of control in accessing own information in terms of fault in payment keeps the small and medium businesses from choosing these services. Protection and control of data is a major concern for the MSMEs, because once the cloud service providers get hold of company data, then the MSME may not have control over their own assets and entities [15].

According to the State of the Cloud report from RightScale [16], the lack of resources and expertise has become a new and top challenge that looms over the cloud computing services for small and medium enterprises. The study surveyed 1,600 technical professionals, and the results showed that around 32% of those professionals were of the opinion that lack of resources presented a big challenge in cloud computing services, surpassing security issues [16]. This challenge is serious as the cloud services are being taken up by many companies, and the service providers are lagging behind in developing their skill set to take care of the increased demand. This lack of expertise and resources is risky, especially as cloud adoption increases. Contract management in hybrid cloud deployment models involve interaction with third party cloud providers, and required skills of handling increased demand and supply orders [17]. Thus, the service providers need to invest more to reap better profits and increased progress in the future.

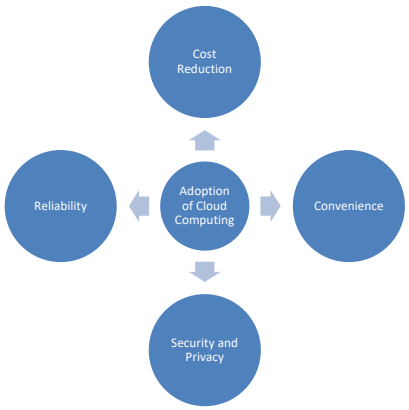
The internal challenge of introduction of cloud services are not less, as organizations might have to convince their own employees of going online. The employees as well as managers of the company might have cultural or technological barriers and inhibitions to try an online service for work purposes [18]. The main benefits of hybrid cloud services occur when the process is centralized, and the business that perceives itself as a distinct entity with different IT requirements may find it hard to adopt these services. Also, the employees might not be able to trust a service developed and maintained by a third party easily. Also, some stakeholders might adopt the service without sufficient knowledge and diligence, and might find it hard in the future to adapt well in the new technological sphere [12].

Another challenge that enterprises face through hybrid cloud computing is the execution management of transition of data to cloud. Many MSMEs have their

plans, proposals, and transactions done in paper, and transitioning it into a digital format may require time and energy. If the enterprise is old, the employees may need to put in more efforts to streamline the process. Also, the businesses that have digitalized their transactions might face compatibility issues in the software of their existing files and the updated versions that are available on the cloud format, creating a problem while transitioning the data [17]. Thus, all the benefits and challenges need to be analyzed thoroughly to understand the effect of hybrid cloud computing on the small and medium business enterprises, so that the transition into an online business does not become a serious problem.

IV. Methodology and Discussion

The conceptual framework has been developed by reviewing the literature and the factors are grouped as independent and dependent variables, which have been analyzed for this research study. Adoption of hybrid cloud computing by small and medium businesses (SMEs) leads to cost reduction (in terms of economical cost saving by employing digitalization of data storage); low capital expenditure for scalability and management of resources; convenience (as cloud computing makes the businesses technology savvy and helps them increase their accessibility and availability across geographical borders for more customer visits); reliability, as the cloud services provide backup and least outage when the company requires, as well as decreased risk of data loss through theft or unnatural disaster; Sharing and collaboration, as the companies can create, manage and distribute promotional content easily; and Security and privacy as the content of the company is secured through encryption and cannot be accessed without relevant credentials.



Collaboration with private and public cloud computing services has become need of the hour as there are many services that a company needs, but all services may not be provided by the same cloud service provider. The ability of a product or service to be flexible and customized according to the need and demand of the customer is desirable, and the company needs to find solutions that help cater to the market opportunities and the changing business requirements of the ever changing dynamic of the market. To innovate and develop products and services with agility and speed, the companies do need to use different services, and collaboration of cloud comes into the picture.

There are different cloud solutions for predicting customer demand, responding to that demand, identifying market opportunities, understanding and responding to the regulatory needs, and being aware of competitor moves[14]. These solutions come from many sources, and the SMEs need to understand the rules and regulations, clauses and benefits and limitations of each to cohesively tie it for the progression of the company[19]. To understand and move according to the market dynamics, there is a need for SMEs to collaborate with their organization managers as well as with the ecosystem partners to cost-effectively address the rapidly shifting business requirements. The advent of social media and mobile devices has increased the level of collaborations startups and small companies have with their employees and customers [20]. The use of cloud computing allows these companies to allow the stakeholders of the company to share information and data over the internet in a fast and secure way. The services include emails, shared web-links, instant messengers etc. [13]. Cloud services like Google Apps, Dropbox and Jive are good examples where sharing and collaborating has become easier for small and medium enterprises. These all hybrid cloud technologies are enabled via the cloud [21]. However, this type of openness due to collaboration of cloud computing services increases risks of data loss to the SMEs, which is a serious matter.

[15] identifies that cloud computing and its collaboration helps business growth of an SME by leveraging a correct amount of business with the balance of cost control, efficiency, agility and new business capabilities with unparalleled levels of collaboration. In terms of cost control, service providers have reduced the cost of entry for small and medium enterprises that want to use business analytics [15], and can be seen from the 70% cost reduction by Amazon Web Services, which acts as the cloud vendor for small businesses [14]. It has also been noted by [22]that AWS has decreased their cost of service even though there is no competition involved. European SMEs have used this as an opportunity to grow as they are observed to be less risk averse that their American counterparts, which has resulted in lowering the entry barrier for these SMEs into the large enterprise categories [23]. Also, [24] cites the example of Salesforce.com which has provided a per use revenue models of small and medium business enterprises that has helped them afford the application of Customer Relationship Management. This comes at a time when the trend has started to see software as a hardware commodity, and lack of a good open source

software package. The decreased pricing for cloud services as a resultant of good competition has allowed the small businesses a chance to adopt services at an affordable cost [25], resulting in a widespread use of cloud computing. Startups and small and medium sized enterprises have started to buy services like ERP (Enterprise Resource Planning), CRM (Customer Relationship Management), SFA (Sales Force Automation) and SCM (Supply Chain Management) due to economical fees [26].

According to [27], cloud collaboration is also seen to improve business agility and allows the SMEs to rapidly adapt to changing business conditions through on demand, self-service and elastic access to information technology (IT) resources. The employees of small business routinely work away from the actual office location, and need a software that can increase the ease of access to the data. Thus, this need of employees to have remote access necessitated the use of services such as cloud storage, online transactions and instant communication software [9], [13] from either a public or a private cloud storage provider. Here,[20] observes that the only limitation is the risk of IT shadowing or loss of control due to finance problems between SME users and service providers. Further, [28]observed that Canadian SMEs are moving from a PC based accounting system to a cloud based one, decreasing the need of continuous updates of software and hardware, and also decreasing the need of constant maintenance of many machines in the office, but this trend needs to be followed with care as the collaboration sometimes increases risk of loss of information or technical defaults.

Collaboration of cloud computing software enables the user to innovate by using different types of solution according to the need, and also lets the companies introduce new products through new line of marketing, thus enabling the formation of new markets for these upcoming organizations[29]. Cloud collaboration has the benefit of changing the traditional way of business processes, includes better collaboration chances with partners and customers, increases efficiency in collaborating with all the stakeholders involved and scale up IT services according to the need of the company[30]. On the other side, however, there is a great risk to security and compliance as the adopted cloud services have a variety of suppliers which frequently include public cloud service providers. The risks that the SMEs face the most are the implications of sharing scarce resources with unknown collaborators, non-compliance with regulations that a market or a country may have for the particular service rented, lack of control in terms of the data procurement and storage[31]. Out of all, the major risk that an SME faces is lack of control of resources and data, as these are the only factors that can lead to the company's success.

The lack of control leads to serious implication for SMEs. The security of data using the public cloud at standard services can be a great risk, as the companies do not have enough funds to afford a premium service [32]. The availability of increased encryption can reduce the security risk for the SMEs, and increases the reliability of the online system. A reliable software system is a system with reliable security [33], [34] in a highly secure cloud system is very important. IT shadowing is another problem through cloud collaboration, as employees as well as employers can access the public cloud center to access key documents without having to gain access from the in-house IT staff [9], [35].

V. Conclusion

The paper has focused in detail all the variables that can affect the small and medium business enterprises in terms of hybrid cloud computing. This study analyzed the importance of cost reduction in terms of cloud computing in small and medium enterprises, and found it to be an important factor. The reduction of cost has increased the frequency of small and medium businesses, and is one of the three most crucial factors for initiating the move of SBE and MBE into using the cloud service. Apart from cost reduction, the other two main important factors are security and privacy of the present solutions offered by the cloud, and the ease of use and convenience in using the cloud. The providers of this cloud services need to focus on improving the reliability of their solutions, and this would result in a better and secure cloud environment for people to conduct business. The factor of sharing and collaboration has been observed to have a slight negative impact on adoption of hybrid cloud services as the stakeholders of SMEs hold it as a negative cause of security. The players that are in the industry to provide these hybrid computing services need to focus on a secure and highly functioning cloud service, as they need to make cloud and online services as a default choice for startups to work on. This may help the small and medium sized enterprises rely on cloud services for normal business exchanges, rather than just in cases of emergency and disaster. The future of cloud services being adopted relies heavily on hoe the service providers build the faith, trust and belief of these startups and SMEs so that they may be confident in using the reliable tools of these services.

There is no doubt that small and medium sized enterprises are experimenting with hybrid cloud computing, and using these tools to build their business strategies and strengthen their customer base. However, these companies are also quite wary with the offers the service providers are providing. Also, the small and medium enterprises of different geographies have different perceptions towards hybrid cloud computing,

as the ease of use and convenience weighs heavily on the decision of adopting the services of cloud. Thus, it can be said that even though the SMEs are finding hybrid collaboration of cloud an easy and convenient method of doing business, they also have their reservations in terms of privacy when sharing and collaboration is concerned.

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