# A Systematic Literature Review of Factors Affecting Cloud Computing Adoption Internationally

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*Abstract*
*Context: The adoption of cloud computing in small and medium size organisations has become a significant trend in today's information technology. Therefore, there is a requirement to identify possible security challengesand guidelines for the researchers based on the adoption. Keeping in view of these elements, a systematic literature review (SLR) of cloud computing adoption in businesses and organisations was conducted.*

*Goal: The main purpose of this research is to identify the possible opportunities, challenges, factors and guidelines for the evaluation and adoption of cloud computing (CC) for organisations intending to adopt or already using CC.*

*Method: ASLR is conducted to achieve the above goals.The search process of this literature review used quality scholarly databases such as ACM Digital Library, IEEE Xplore, Inspec, Springer, Google Scholar, Researchgate, Google Books and Wolverhampton University Online Library(8 types of databases) along with open-access journals for relevant articles.*

*Results: A total of 561articles were found of which 85articles met the included criteria. Ninedifferent categorieswere identified securingCCadoption in organisation, namely (1) CC adoption (n=30); (2) CC security (n=18); (3) CC overview / Objective (n=8); (4) CC adoption challenges (n=7); (5) CC adoption factor influencing (n=7); (6) CC adoption factor affecting (n=6); (7) CC future forecast (n=4); (8) CC adoption decision (n=3); (9) CC adoption & implementation (n=2);*

*Conclusion:The basis of this SLRcan help the development of guidelines to support newcomer companies whether to adopt and migrate to CC, the evaluation of relationship between nine factors and the selection of providers.*

**Keywords -** *cloud computing security, cloud computing adoption*

## I. INTRODUCTION

A SLR of cloud based enterprise solutions was conducted with respect to their adoption. The primary goal was to identify the factors and challenges from existing literature, which influence the adoption process of CC services in organisations and areas that have been researched with respect to the adoption processes [16]. In enterprises the adoption of CC is considered as cost effective and secure use of information and communication technologies. The objectives of organisations are to improve the cooperation and co-ordination, the quality of business services, and to reduce the cost of different types of IT services at the same time, by using CC more effectively and securely [3, p.34-37, 90].

Literature reviewing is an imperative process of research, which facilitates the identification of areas and their respective issues in which more research is needed [163]. So the review process has been followed using the fundamental guidelines for conducting a successful literature review within certain boundaries [163, 164, 169]. However there are considerable issues that really need to be addressed before they can use the services of CC [166].
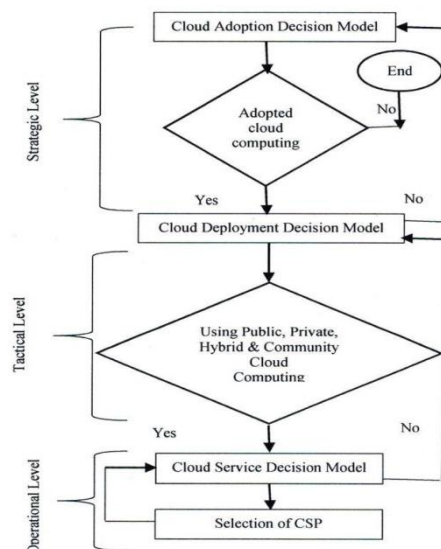


**Figure 1: Flow Chart of Cloud Adoption Decision Model.**

The main features that differentiate a SLR from a traditional literature review are:

- SLR addresses the specified research questions by defining a review protocol.
- Systematic review defines the search strategy that aims to detect as much of the relevant literature as possible.
- Systematic reviews require inclusion and exclusion criteria to assess each potential primary study.

The guidelines and systematic process in this research workwere adopted [113]. The systematic review was conducted mainly in three phases:
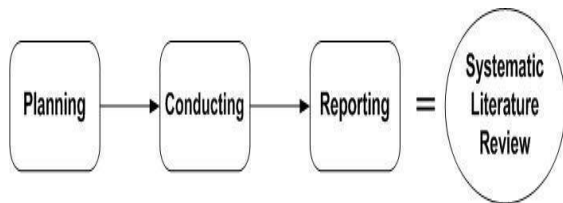


**Figure 2: Systematic review phases.**

- **Planning the review:** Associated with identification of the need for a review and developing the review protocol.
- **Conducting the review:** Associated with selection of primary studies, quality assessment, data extraction and data synthesis.
- **Reporting the review:** Associated with reporting the results and documenting the process.

The appropriate use of Information and Communication Technologies (ICT) helps businesses and organisation to become more efficient [40]. CC facilitates the organisations by delivering resources and respective services by a user-pay system through the Internet [176]. CCmainly offers a new business solution, which enables the organisations to rent the required information technology (IT) infrastructure, which includes respective platforms, the software through positioning their business applications and their data storage in the cloud environment. There are many well-known cloud examples which include Amazon, Google and Microsoft (Department of Finance and Deregulation (DFD), [174].

Many challenges are faced by the organisations and businesses according to their size and structure. In comparison to large firms, small firms have less cost tolerance and risk of adopting new innovations. In any organisationIT investment comprises different types of costs such as fixed costs, operation costs & training costs. In some cases the actual cost of a project goes higher than the initial estimates [41]**.**

Unsurprisingly, opportunities and savings have attracted strong market growth in such services. [175] The worldwide public cloud services market is projected to grow 17.3 percent in 2019 to total $206.2 billion, up from $175.8 billion in 2018, according to Gartner, Inc. In 2018, Gartner forecasts that the market will grow 21 percent, up from $145.3 billion in 2017. The fastest-growing segment of the market is cloud system infrastructure services (infrastructure as a service or IaaS), which is forecast to grow 27.6 percent in 2019 to reach $39.5 billion, up from $31 billion in 2018 (see Table 1).

**Table 1. Gartner Forecasts Worldwide Public Cloud Revenue to Grow 17.3 Percent in 2019.**

| | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|
| Cloud Business Process Services (BPaaS) | 42.2 | 46.6 | 50.3 | 54.1 | 58.1 |
| Cloud Application Infrastructure Services (PaaS) | 11.9 | 15.2 | 18.8 | 23.0 | 27.7 |
| Cloud Application Services (SaaS) | 58.8 | 72.2 | 85.1 | 98.9 | 113.1 |
| Cloud Management and Security Services | 8.7 | 10.7 | 12.5 | 14.4 | 16.3 |
| Cloud System Infrastructure Services (IaaS) | 23.6 | 31.0 | 39.5 | 49.9 | 63.0 |
| **Total Market** | **145.3** | **175.8** | **206.2** | **240.3** | **278.3** |

Note: Totals may not add up due to rounding.

## II. GUIDELINES FOR SYSTEMATIC LITERATURE REVIEW

The guidelines for performing SLR in this particular related subject area [113] were followed for technology related issues. After include/exclude criteria and quality assessment criteria were identified, a chosen set of articles were available for the data extraction process. The reviewed articles were categorised according to the research methods used in them to specifically determine the extent of CC adoption research [170, 171, 165]. Particularly focusing on the research methods applied in the reviewed articles included journal, articles, case studies, surveys, research papers, conceptual papers, press releases, workshops, PhD theses, conference publications and books chapter (11 types of articles) in related areas. Some related articles did not have any sort of methodology section, but they reflect on some concepts in relation to CC (e.g., cost, security, performance, etc.) or they adopt theories without empirical testing. These types of papers are labelled as a conceptual papers.

Classification of the 85 selected articles in manufacturing, health, education, warehousing, engineering, telecommunication, construction and research sectors involved using a thorough and theoretical analysis of the relevant topic as suggested by [172, 173]. Therefore, the process of classification resulted in 11 corresponding variables (i.e., external

support, competitive pressure, seniormanagement support, employees cloud knowledge, adequate resources, information intensity, relative advantage, complexity, compatibility, security / privacy and cost effectiveness). Finally, selective coding was applied to integrate and refine the 4 main categories (environmental, human, organisational and technological) and their 11 respective variables to develop relationships between them [172, 173].

Without clearly defined regulations, some countries also restrictedtheir enterprises to store their particular valuable data in a CC infrastructure within their respective national borders [11]. For instance, the EU's privacy laws clearly prohibit the give-and-take of personal information outside the user's jurisdiction [13]. As the Cloud Service Provider's (CSP) which operate outside of their home country must act in accordance with the host country's regulations and government surveillance, a ruling that some of enterprises may find very difficult to follow [14, 114, 144]. Multi-jurisdictional politics is an example that can have adverse impact on the adoption of CC in the USA Patriot Act, which have a doubt for dealing with US-based CSP's for the countries, especially those within the EU [115, 162]. However some CSP's have solved this particular issue by permitting enterprises to set up their IT resources on physical servers, which are located within the EU region [115].

Keystones towards the adoption of CC is the IT knowledge, competence, and capability that seniormanagement needs to contribute for creating a suitable organisational environment. Such environments must offer sufficient budgets, adequate human and IT resources, and more time [116, 117, 118, 119]. This involves:

1) Understanding CC and its architecture, service models, & strategic values [120, 121, 122, 123, 124, 125];
2) Identifying an enterprise's business needs & aligning IT decisions with business strategies [13, 126 ];
3) Evaluating the readiness of the existing IT infrastructure, IT knowledge, and human resource skills, available resources, and culture [124, 121, 117, 122]; and
4) Steering towards CC adoption (e.g. deciding on an adoption strategy, governance of integration, implementation, and evaluation of CC services after use) with the guidance of external regulatory & professional bodies [127, 13].

The significant influence of the perceived factors and their related variables to the adoption of CC services [118, 128]. This perspective is especially with the finding of literature review that found the management's perceptions towards security and

privacy, cost evaluation, and adequate resources to have a substantial impact on the decision to adopt CC [129]. These benefits comprise cost savings, agility, flexibility, ease of use, scalability, the ease of cooperation between business partners, based on less operational effort on the part of CIO's, and increased productivity [117, 130, 116, 132, 131, 126, 133]. However, by proofing the concept of CC services, the enterprises are capable to identify risks and benefits so they can decide whether or not to adopt CC. The identified risks in this review include [134, 11, 132, 131, 135, 128, 115]:

- *Organizational risks*, which cover the risk of vendor lock-in as well as the loss of governance within the enterprise.
- *Technical risks*, which include data leakage, loss of data, downtime, data bottlenecks, and cyber-attacks.
- *Legal risks*, which include data protection regulations and licensing issues.
- *Nontechnical risks*, which refer to the misuse of cloud services and natural disasters.
- *Performance risks*, which primarily result from the moving of huge amounts of data to cloud servers. This movement can take a long time and when moving further in the adoption, it may require increasing bandwidth and connectivity, which is costly [127].
- *Security risks,* some of these risks are linked to weakcloud securitymeasures of the services. Storing data without encryption and lack of multi-factor authentication for access can lead to loss of intellectual property, loss of management control, exposure to malware, compliance violations, contractual breaches with customers and partners and ultimately loss of customer trust and loss of revenue [200].

### III. METHODS

A SLRrequires a comprehensive and fair analysis of particular searched literature. It maximises the extent of particular searched literature that identifies some of the most possible used alternative words or concepts and synonyms in the particular research. [165]. Firstly, the manual search is conducted in the related areas such as Computer science and businesses. The search process of this literature review used the 8 quality scholarly selected types of databases. These databases facilitated to cover more broad scope, open-access which lead to Information System (IS) and11 types of articles in the relevant areas [164]. Whereas, online databases are the proper and practical sources for the reviewing of literature about modern day phenomenon such as CC [167].

The year of publication cannot be restricted, since cloud computing adoption was proposed only in the

last ten years (i.e. 2009 to September 2018). The search criteria was limited to the 11 types of articles in order to ensure their relevance. After the general study of related areas, the language was limited to English. Furthermore, the search strings terms that are used for searching all the 8types of databases were CC in combination with *adopt\** and other respective related terms, such as *accept\*, cost\*, diffuse\*, security\*, secure\*, evaluation\*,* and *guidelines\*.*

The initial search string in all the mentioned databases resulted in 561articles. In order to focus on the most relevant literature, the process of practical screening was conducted.Primary evaluation involved the reading of abstract and their table of contents of selected articles to decide whether or not they are relevant to this review [169, 168]. Hence, the evaluation is based on the criteria specified in Table 2. On the other hand, the criteria of filtering involved the exclusion of recurring papers, research-inprogress papersand non-English language papers. These particularly focussed on individuals and periodical articles published by news websites, trade journals, and magazines. The independent criteria of inclusion was applied for each particular author to select the relevant articles and books. This helpedto delimit the sample of articlesso that the literature review is practically manageable [168]. Through this process of evaluation 85articleswere selected for thorough study and classification of articles was included in the reference list.

| Include criteria | Exclude criteria |
|---|---|
| • Directly or indirectly related to both businesses and cloud technology.<br>• Cloud-based businesses frameworks design.<br>• Cloud computing solutions applied in businesses.<br>• Security and privacy mechanisms of businesses data in cloud.<br>• Written in English. | • Irrelevant to study of the cloud or businesses.<br>• Conceptual methods or cognitive introductions.<br>• Review papers.<br>• Business analysis reports.<br>• Not written in English. |

**Table 2:Selected articles related to the criteria based on search Databases.**

| Database | Total No. of Research | No. of Excluded Studies | No. of Selected Studies | Per % of Selected Studies |
|---|---|---|---|---|
| ACM Digital Library | 64 | 52 | 12 | 18.75% |
| IEEE Xplore | 83 | 70 | 13 | 15.66% |
| Inspec | 45 | 34 | 11 | 24.44% |
| Springer Link | 101 | 87 | 14 | 13.86% |
| Google Scholar | 81 | 71 | 10 | 12.35% |
| Google Books | 35 | 33 | 2 | 5.71% |
| Researchgate | 65 | 51 | 14 | 21.54% |
| Wolverhampton University Online Library | 87 | 78 | 9 | 10.34% |
| **Total -->** | 561 | 476 | 85 | 15.15% |

## IV. CONTINENT WISE PUBLICATIONS

The geographical classification of the publications across five Continents highlights that the Asian Continent has the highest number in research with 40% of the articles. In second position Europe Continent has 30.59% of the articles. In third position American Continent has 20% of the articles. At fourth position African Continent has 5.88% of the articles and finally the Oceania Continent has 3.53% of the articles. Table 3 reflects the picture of the research articles published Continent-wise, which shows that Asia, Europe and America have a significant share in research, whereas Africa and Oceania both have a proportionally lower portion of share in the research.

**Table 3: Continent wise publications.**

| Continents | No. of Articles | Per % |
|---|---|---|
| Asia | 34 | 40.00% |
| Europe | 26 | 30.59% |
| America | 17 | 20.00% |
| Africa | 5 | 5.88% |
| Oceania | 3 | 3.53% |
|  |  |  |
| Total --> | 85 | 100.00% |

As shown in the Table 4 Asiahas overall 40% contribution of the total articles. Within Asia,India is top on the list with 38.24%, followed by Malaysia with 35.29% and Taiwan in third position with 5.88%. Whereas, Bangladesh, China, Jordan, Pakistan, Saudi Arabia, Singapore and Vietnam with 2.94% each one published articles respectively.

### A. Asian Continent

**Table 4: Asian Continent publications count.**

| Countries | No of Articles | Per % |
|---|---|---|
| India | 13 | 38.24% |
| Malaysia | 12 | 35.29% |
| Taiwan | 2 | 5.88% |
| Bangladesh | 1 | 2.94% |
| China | 1 | 2.94% |
| Jordan | 1 | 2.94% |
| Pakistan | 1 | 2.94% |
| Saudi Arabia | 1 | 2.94% |
| Singapore | 1 | 2.94% |
| Vietnam | 1 | 2.94% |
|  |  |  |
| Total --> | 34 | 100.00% |

Europe has 30.59% contribution with second on the table of articles publication internationally. As shown in Table 5UK is on top with 30.77%, surprisingly Ireland is on second position with 11.54%. France,

Portugal, Austria and Germany with 7.69% each one on third position in article publications showing their interest in Cloud Computing. Whereas, Finland, Italy, Lativa, Norway, Romania, Scotland and Slovenia play a secondary role by contributing with 3.85% each one in the publication for our analysis.

### B. Europe Continent

**Table 5: Europe Continent publications count.**

| Countries | No of Articles | Per % |
|---|---|---|
| UK | 8 | 30.77% |
| Ireland | 3 | 11.54% |
| Austria | 2 | 7.69% |
| France | 2 | 7.69% |
| Germany | 2 | 7.69% |
| Portugal | 2 | 7.69% |
| Finland | 1 | 3.85% |
| Italy | 1 | 3.85% |
| Lativa | 1 | 3.85% |
| Norway | 1 | 3.85% |
| Romania | 1 | 3.85% |
| Scotland | 1 | 3.85% |
| Slovenia | 1 | 3.85% |
|  |  |  |
| Total --> | 26 | 100.00% |

Table 6 shows that American Continent has a 20% contribution internationally. The U.S. dominates in the research with 94.12% of the articles and a very marginal role of Canada with 5.88%.

### C. American Continent

**Table 6: American Continent publications count.**

| Countries | No of Articles | Per % |
|---|---|---|
| USA | 16 | 94.12% |
| Canada | 1 | 5.88% |
|  |  |  |
| Total --> | 17 | 100.00% |

Table 7 represents that African Continent has a 5.88% share on the publication of articles internationally. The top on the list is Kenya with 40% followed by Ghana, Nigeria and South Africa playing a secondary role by contributing with 20.00% each one with the publication.

### D. African Continent

**Table 7: African Continent publications count.**

| Countries | No of Articles | Per % |
|---|---|---|
| Kenya | 2 | 40.00% |
| Ghana | 1 | 20.00% |
| Nigeria | 1 | 20.00% |
| South Africa | 1 | 20.00% |
|  |  |  |
| Total --> | 5 | 100.00% |

Table 8 shows that Oceania Continent is on the bottom of the table with 3.53% contribution of publication internationally. Australia is the only Country which contributed in this continent that published 3 articles.

### E. Oceania Continent

**Table 8: Oceania Continent publications count.**

| Country | No of Articles | Per % |
|---|---|---|
| Australia | 3 | 100.00% |
|  |  |  |
| Total --> | 3 | 100.00% |

## V. PUBLICATION YEAR DISTRIBUTION

Table 9 shows data on yearly basis of the selected primary articles. As we have time restriction applied on the study, we found no significant articles published before 2009. The Cloud Computing term was coined in year 2006 and at the end of 2008 mostly researchers started to widely consider this important topic. Therefore, we do limit the year of articles considered in our research range from 2009 to first three quarters of September 2018.

The study cover the ten years of the period, interestingly the up and down flow of the data is encouraging, which reflects that this research area is still going on positively. Closely focusing at the publication year distribution, out of all the selected articles, we found only 2 articles (2.35%) which were published in 2009, 3 articles (3.53%) in 2010, more interest of the research started from 2011 when 7 articles (8.24%) were published, then 11 articles (12.94%) were published simultaneously in 2012, 2013 and 2014. In 2015 publications dropped to 7 articles (8.24%), but from 2016 trend of publication started going up with 9 articles (10.59%), 10 articles (11.76%) were published in 2017 and finally 14 articles (16.47%) were published in the first three quarters (i.e. up to month of September) of 2018.

Surprisingly this shows good increasing in number of the publications each year, which clearly suggests a quiet good number of growing interest in CC adoption. It also shows that trust is developing on CC environment and more companies are confidently using or intend to use this technology in near future.

**Year Wise No. Of Articles Selected**

**Table 9:Number of articles across the years.**

| Years | No. of Articles | Per % |
|---|---|---|
| 2018 | 14 | 16.47% |
| 2017 | 10 | 11.76% |
| 2016 | 9 | 10.59% |
| 2015 | 7 | 8.24% |
| 2014 | 11 | 12.94% |

| 2013 | 11 | 12.94% |
|------|------|--------|
| 2012 | 11 | 12.94% |
| 2011 | 7 | 8.24% |
| 2010 | 3 | 3.53% |
| 2009 | 2 | 2.35% |
| | | |
| Total --> | 85 | 100.00% |

## VI. PUBLICATION CHANNEL

Table 10 shows the selected articles of different types of publications. In this study publication type means the channel where the selected articles has been published. Variety of publication types included in this study for instance, conferences, journal, articles, conceptual papers, research papers, surveys, case study, press release, PhD theses, publication, workshop and book chapter also to cover every aspect of the study regarding the CC adoption. Interestingly majority of the articles were published in conferences 33 (38.82%), the journals are second 23 (27.06%) publications, third position is hold by articles 15 (17.65%) publications.Whereas, conceptual and research papers were 3(3.53%) each one published accordingly. The rest of the selected articles published are not encouraging in numbers, such as surveys 2 (2.35%) publications and case study, press release, PhD theses, publication, book chapter and workshop selected 1 (1.18%) each published accordingly.

**Table 10: Selected articles with publication types.**

| Publication Type | Publication Type Description | No of Articles | Per % |
|------------------|------------------------------|----------------|-------|
| CON | Conferences | 33 | 38.82% |
| JOR | Journals | 23 | 27.06% |
| ART | Articles | 15 | 17.65% |
| CP | Conceptual Papers | 3 | 3.53% |
| RP | Research Papers | 3 | 3.53% |
| SUR | Surveys | 2 | 2.35% |
| BK | Books | 1 | 1.18% |
| CS | Case Study | 1 | 1.18% |
| PRL | Press Release | 1 | 1.18% |
| PTH | PhD Theses | 1 | 1.18% |
| PUB | Publications | 1 | 1.18% |
| WRK | Workshop | 1 | 1.18% |
| | | | |
| **Total articles selected -->** | | **85** | 100.00% |

## VII. CLASSIFICATION OF THE RELEVANT ARTICLES

Table 11 presents the classification of the relevant selected primary articles for this study. After carefully reading all the relevant selected articles and creating the different classifications based on the facts findings in accordance with the CC adoption. We identified that the majority of the relevant selected articles were related to the CC adoption (such as 30 with 35.39%). This shows that still more and more businesses are interested in adoption of CC instead of traditional IT. In addition study also identified that the importance of the CC security (such as 18 with 21.18%) is still in businesses priority, therefore security is an essential aspect of the CC for the safer environment. A substantial part of the articles on security highlighting a series of some new adoption problems. The third factor considered by the businesses is the CC overview / objectives (such as 8 with 9.41%), which reflects that they are keen to know the pros and cons before adoption. Surprisingly the CC challenges and factor influencing (such as 7 with 8.24%) each are both at same priority while considering the CC adoption respectively for the safer utilisation of platform. This showing that researchers still have interest in the challenges and factor influencing in the CC adoption consideration.Another important part of the study is the CC adoption factor affecting also been considered (such as 6 with 7.06%) is not ignorable in the consideration of CC adoption for the smooth running of business environment and still need attention for researcher. The CC future forecast is also another factor considered by the researcher (such as 4 with 4.71%) to keep eyes on the trend of this new technology. The CC adoption decision is been considered marginally low (i.e. 3 with 3.53%) as research on this side not properly focused on this factor. Finally CC adoption & implementation is still need attention for the researcher to address this issue as (2 with 2.35%) work is done on this area.

**Table 11:Selected studies relevant to the articles.**

| Selected relevant articles for articles. | No. of Articles | Per % |
|------------------------------------------|-----------------|-------|
| CC Adoption. | 30 | 35.29% |
| CC Security. | 18 | 21.18% |
| CC Overview / Objective. | 8 | 9.41% |
| CC Adoption Challenges. | 7 | 8.24% |
| CCA Factor Influencing. | 7 | 8.24% |
| CCA Factor Affecting. | 6 | 7.06% |
| CC Future Forecast. | 4 | 4.71% |
| CC Adoption Decision. | 3 | 3.53% |
| CCA & Implementation. | 2 | 2.35% |
| | | |
| Total --> | 85 | 100.00% |

*CC = Cloud Computing.

## VIII. RESULTS

The results of our SLR reflect in four ways such as Continent wise, Countries wise, Year wise and details of their different mode of articles. After the searching steps, the evaluation and alternate reviews, finally selected 85 articles from the total reviewed of 561 articles, which were found in the first search. The selected 85 articles mostly cover the basic primary view of the studied area of CC adoption with organisation requirements. Hence, the organisation and CC areas have potential in future, therefore study

results can offer the researchers up-to-date aspects for their research.

The above discussed empirical findings based on the four factors (such as, environmental, human, organisational and technological) and their respective 11 variables are outcome from our SLR. Methodological and theoretical findings indicate that few number of qualitative studies have contributed toward the understanding of CC adoption factors as compared with quantitative studies. Whereas, in some articles, several methods are used [142, 137, 117, 138]. Furthermore, factors and their respective variables regarding the adoption of CC are extensively addressed in certain articles. In general, processes of cloud adoption, such as external support, competitive pressure, senior management support, employees cloud knowledge, adequate resources, information intensity, relative advantage, complexity, compatibility, security / privacy and cost effectiveness are not adequately addressed, except for the proof of concept process.

In the study phase we found 30 countries where different types of research articles were published on CC enterprise (See Table 12 review articles classifications and Table 13 based on the type and references). The criteria based on all the selected searched articles, which are published from 2009, and this may specify that the research in CC for different types of businesses is still an emerging area. The number of articles which are *published across years* in our searched results are shown in Table 9.

**Table 12. Countries conducting cloud-based business researches.**

| Country | No. of articles | References |
|---|---|---|
| USA | 16 | 10,15,25,81,95,114,126,129, 130,135,136, 156, 158, 175, 191,196 |
| India | 13 | 2,6,14,18,89,109,116,123, 124,125, 128, 197, 198 |
| Malaysia | 12 | 133,144,151,154,155,179, 180,185,188,189,194,199 |
| UK | 8 | 4,118,119,120,152,186,187, 195 |
| Australia | 3 | 157,176,193 |
| Ireland | 3 | 13,127,145 |
| France | 2 | 117,142 |
| Portugal | 2 | 122,150 |
| Taiwan | 2 | 131,140 |
| Austria | 2 | 66,181 |
| Germany | 2 | 9,11 |
| Kenya | 2 | 26,183 |
| Bangladesh | 1 | 7 |
| Canada | 1 | 143 |
| China | 1 | 92 |
| Finland | 1 | 121 |
| Ghana | 1 | 146 |
| Italy | 1 | 192 |
| Jordan | 1 | 177 |
| Latvia | 1 | 182 |

| Nigeria | 1 | 134 |
|---|---|---|
| Norway | 1 | 16 |
| Pakistan | 1 | 8 |
| Romania | 1 | 115 |
| Saudi Arabia | 1 | 184 |
| Scotland | 1 | 82 |
| Singapore | 1 | 28 |
| Slovenia | 1 | 190 |
| South Africa | 1 | 138 |
| Vietnam | 1 | 132 |

**Table 13. Types of Articles with References.**

| Types of Article | No of Articles | References |
|---|---|---|
| CON | 33 | 9, 11, 14, 16, 26, 28, 66, 109, 114, 115, 116, 117, 119, 120, 121, 122,  124, 127, 128, 129, 130, 132, 134, 135, 138, 142, 145, 157, 185, 187, 194, 195, 198 |
| JOR | 23 | 2, 7, 8, 18, 25, 89, 92, 131, 133, 140, 144, 146, 150, 151, 154, 156, 177, 179, 180, 181, 183, 184, 197 |
| ART | 15 | 81, 118, 123, 125, 126, 136, 143, 155, 176, 182, 186, 188, 189, 193, 199 |
| CP | 3 | 4, 15, 158 |
| RP | 3 | 95, 190, 196 |
| SUR | 2 | 191, 192 |
| BK | 1 | 10 |
| WRK | 1 | 152 |
| PUB | 1 | 6 |
| CS | 1 | 13 |
| PTH | 1 | 82 |
| PRL | 1 | 175 |
|  |  |  |
| **Total** | **85** |  |

## IX. CONCLUSION AND LIMITATIONS

The CC is a technology for providing different types of IT services which contain rental resources located in the cloud. The most common task present is increasingly conducted online for instance; checking of the emails, social media communication, editing and writing different types of documents, collaboration, watching videos and creating images. The study particularly focus on the trend of research on CC adoption internationally. Therefore, this study mainly aimed at identifying the different factors for the CC adoption by organizations in different sectors internationally. CC is increasingly being adopted, especially by many manufacturing, health, education, warehousing, engineering, telecommunication, construction and research sectors. In our analysis we have found that almost all the articles, even in different sectors of CC adoption, have at least addressed issues related to the adoption. Study findings particularly revealed that the utilisations of CC by companies is still an ongoing process in different sectors. Indeed, it was also clear that there is a different level of CC adoption by the companies in SME"s type's enterprises. Our findings have shown that internationally CC adoption is still an on-going

process at different level in the companies, because some organisations have almost limited resources and financial capabilities to invest in IT. However, still there are significant security, factor influencing / affecting and challenging issues.These issues are analysed in most cases,which need to be tackledbefore CC services are effectively used by organizations internationally. Even though the literature review could not completely declare to be comprehensive, it still offers suitable awareness and allows the amount of research in the CC Adoption in SMEs.

Relevant on the effective use of CC, that might be a quiet strategic element in the future competition of the organisations, is still insufficient. Whereas, standard are lacking, such as unified Application Programming Interface (APIs) and interoperability of various system, which is so far not granted. Therefore, the analysis of business impact looks at an early stage and for the assessment of benefits is not yet properly mature.

### A. Research Gaps

This SLR has several limitations, because the review only analysed the 11 type of articles published in the period of 2009 to the first three quarters of 2018 in last ten years, those were generated based on a keyword search of *"Cloud Computing Security" and "Cloud Computing Adoption"*. Hence it is only limited in keyword search methodology of the articles which mentioned the CC security and CC adoption. Whereas, the search criterion was limited to article title only; however, including abstracts as a criterion would have revealed more insightful articles. The literature only found from the 11 types of articles from 8types of databases from the internet. There must be other online databases containing more number of academic journal, articles, case studies, surveys, research papers, conceptual papers, press release, workshop, PhD theses, conference publications and book chapters in this particular subject, which might be able to give even a bigger exhaustive review of the 11 types of articles associated to the Adoption of CC in SMEs. On the other hand the only English publications were considered for the study of literatures. There must be publications in other foreign languages which may give a wider scope to further study.

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