

Original Article

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 organizations has become a significant trend in today's information technology. Therefore, there is a requirement to identify possible security challenges and guidelines for the researchers based on the adoption. Because of these elements, a systematic literature review (SLR) of cloud computing adoption in businesses and organizations.

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 organizations 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 561 articles were found of which 85 articles met the included criteria. Nine different categories were identified securing CC adoption 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 SLR can help develop guidelines to support newcomer companies on whether to adopt and migrate to CC, the evaluation of the relationship between nine factors, and the selection of providers.

Keywords - cloud computing security, cloud computing adoption

I. INTRODUCTION

An SLR of cloud-based enterprise solutions was conducted concerning their adoption. The primary goal was to identify the factors and challenges from existing literature that influence the adoption process of CC services in organizations and areas researched concerning the adoption processes [16]. In enterprises, the adoption of CC is considered a cost-effective and secure use of information and communication technologies. The objectives of organizations are to improve the cooperation and coordination, 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 need to be addressed before they can use the services of CC [166].



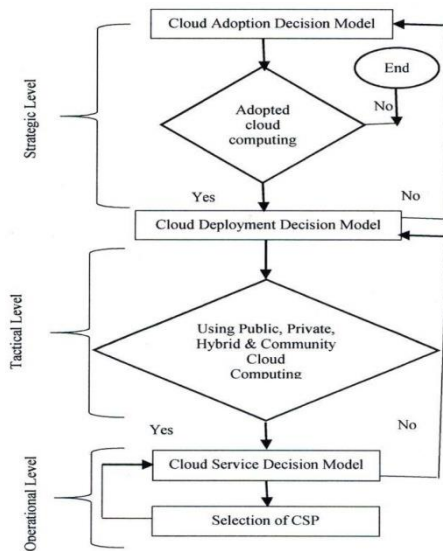


Fig. 1 Flow Chart of Cloud Adoption Decision Model.

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

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

This research work's guidelines and systematic process were adopted [113]. The systematic review was conducted mainly in three phases:

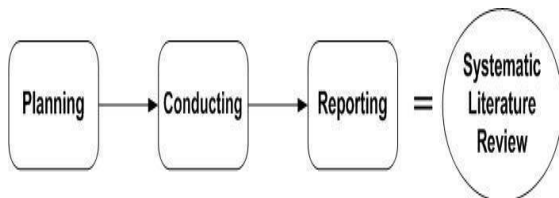


Fig. 2 Systematic review phases.

- **Planning the review:** Associated with identifying the need for a review and developing the review protocol.
- **Conducting the review:** Associated with selecting 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) help businesses and organizations to become more efficient [40]. CC facilitates the organizations by delivering resources and respective services through a user-pay system on the internet [176]. Mainly offers a new business

solution, which enables the organizations 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].

Organizations and businesses face many challenges according to their size and structure. Small firms have less cost tolerance and risk of adopting innovations than large firms. In any organization's IT, investment comprises different 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] According to Gartner, Inc, 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. In 2018, Gartner forecasted that the market would grow 21 percent, up from \$145.3 billion in 2017. The fastest-growing market segment 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 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 categorized according to the research methods to determine the extent of CC adoption research [170, 171, 165]. Particularly focusing on the research methods applied in the reviewed articles included journals, case studies, surveys, research papers,

conceptual papers, press releases, workshops, Ph.D. theses, conference publications, and books chapter (11 types of articles) in related areas. Some related articles did not have any methodology section. Still, they reflect on some concepts related to CC (e.g., cost, security, performance, etc.) or adopt theories without empirical testing. These types of papers are labeled conceptual papers.

Classification of the 85 selected articles in manufacturing, health, education, warehousing, engineering, telecommunication, construction, and research sectors involved a thorough and theoretical analysis of the relevant topic as suggested by [172, 173]. Therefore, the classification process resulted in 11 corresponding variables (i.e., external support, competitive pressure, senior management support, employee's 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, organizational, and technological) and their 11 respective variables to develop relationships [172, 173].

Some countries restrict their enterprises from storing their particular valuable data in a CC infrastructure within their respective national borders [11]. For instance, the EU's privacy laws prohibit the give-and-take of personal information outside the user's jurisdiction [13] as the Cloud Service Providers (CSP) which operate outside of their home country must act following the host country's regulations and government surveillance, a ruling that some of the enterprises may find very difficult to follow [14, 114, 144]. Multi-jurisdictional politics is an example that can harm the adoption of CC in the USA Patriot Act, which doubts 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 adopting CC are the IT knowledge, competence, and capability that senior management needs to contribute to creating a suitable organizational 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, 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 external regulatory & professional bodies [127, 13].

The significant influence of the perceived factors and their related variables on the adoption of CC services [118, 128]. This perspective is especially with the finding of literature review that found the management's perceptions of security and privacy, cost evaluation, and adequate resources to impact the decision to adopt CC [129] substantially. 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 of identifying 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** cover the risk of vendor lock-in and the loss of governance within the enterprise.
- **Technical risks** include data leakage, loss, downtime, data bottlenecks, and cyber-attacks.
- **Legal risks** include data protection regulations and licensing issues.
- **Nontechnical risks** refer to the misuse of cloud services and natural disasters.
- **Performance risks** primarily result from moving 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].
- Some of these risks are linked to weak cloud security measures 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

An SLR requires a comprehensive and fair analysis of particular searched literature. It maximizes 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 a broader scope and open access, which led to Information systems (IS) and 11 types of articles in the relevant areas [164]. At the same time, online databases are the proper and practical sources for reviewing literature about modern-day phenomena 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 were limited to the 11 types of articles to ensure their relevance. After the general study of related areas, the language was limited to English. Furthermore, the search string terms used for searching all the 8 types of databases were CC in combination with *adopting** and other related terms, such as *accept**, *cost**, *diffuse**, *security**, *secure**, *evaluation**, and *guidelines**.

The initial search string in all the mentioned databases resulted in 561 articles. To focus on the most relevant literature, the process of practical screening was conducted. The primary evaluation involved reading the abstract and the 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 filtering criteria included excluding recurring papers, research-in-progress papers, and non-English language papers. These focused on individuals and periodical articles published by news websites, trade journals, and magazines. The independent inclusion criteria were applied to select the relevant articles and books for each author. This helped delimit the sample of articles that the literature review is practically manageable [168]. Through this evaluation process, 85 articles were selected for thorough study, and the classification of articles was included in the reference list.

Include criteria	Exclude criteria
<ul style="list-style-type: none"> • Directly or indirectly related to both businesses and cloud technology. • Cloud-based business frameworks design. • Cloud computing solutions are applied in businesses. • Security and privacy mechanisms of businesses data in the cloud. • Written in English. 	<ul style="list-style-type: none"> • Irrelevant to study of the cloud or businesses. • Conceptual methods or cognitive introductions. • Review papers. • Business analysis reports. • Not written in English.

Table 2. Selected articles related to the criteria based on

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%

search Databases.

Result: A Statistical Analysis

IV. CONTINENT WISE PUBLICATIONS

The geographical classification of the publications across five Continents highlights that the Asian Continent has the highest number of research with 40% of the articles. In second position Europe Continent has 30.59% of the articles. In the third position, American Continent has 20% of the articles. In the 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 of research. In contrast, Africa and Oceania both have a proportionally lower share of 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 Table 4, Asia has an overall 40% contribution of the total articles. India is top on the list in Asia with 38.24%, Malaysia with 35.29%, and Taiwan in the third position with 5.88%. Bangladesh, China, Jordan, Pakistan, Saudi Arabia, Singapore, and Vietnam with 2.94% of published articles.

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 a 30.59% contribution with second on the table of articles published internationally. Table 5 UK is on top with 30.77%; surprisingly, Ireland is in the second position with 11.54%. France, Portugal, Austria, and Germany with 7.69% in the third position in article publications showing their interest in Cloud Computing. Whereas Finland, Italy, Latvia, Norway, Romania, Scotland, and Slovenia play a secondary role by contributing 3.85% each 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 US 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 in 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 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 at the bottom of the table with a 3.53% contribution of publication internationally. Australia is the only country that contributed to this Continent by publishing 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 every year of the selected primary articles. As we have time restrictions applied to the study, we found no significant articles published before 2009. The Cloud Computing term was coined in 2006, and at the end of 2008, most researchers started to consider this an important topic widely. Therefore, we do limit the year of articles considered in our research range from 2009 to the first three quarters of September 2018.

The study covers the ten years of the period; interestingly, the up and down flow of the data is encouraging, reflecting that this research area is still going on positively. Closely focusing on the publication year distribution, out of all the selected articles, we found only 2 articles (2.35%) that were published in 2009, 3 articles (3.53%) in 2010, and more interest in the research started in 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 publications started going up with 9 articles (10.59%), and 10 articles (11.76%) were published in 2017. Finally, 14 articles (16.47%) were published in the first three quarters (i.e., up to September) of 2018.

Surprisingly this shows a good increase in the number of publications each year, suggesting a good growing interest in CC adoption. It also shows that trust is developing in the CC environment and more

companies are confidently using or intend to use this technology shortly.

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 from different types of publications. In this study, publication type means the channel where the selected articles have been published. A variety of publication types are included in this study, for instance, conferences, journals, articles, conceptual papers, research papers, surveys, case studies, press releases, Ph.D. theses, publications, workshops, and book chapters, also to cover every aspect of the study regarding the CC adoption. Interestingly the majority of the articles were published in conferences 33 (38.82%), the journals are second 23 (27.06%) publications, and the third position is held by articles 15 (17.65%) publications. Whereas conceptual and research papers were 3(3.53%), each one published accordingly. The other selected articles published are not encouraging in numbers, such as surveys 2 (2.35%) publications and case studies, press releases, Ph.D. theses, publications, book chapter, and workshops 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 and findings following the CC adoption. We identified that most of the relevant selected articles were related to the CC adoption (such as 30 with 35.39%). This shows that more and more businesses are still interested in the adoption of CC instead of traditional IT. In addition, the study also identified that the importance of the CC security (such as 18 with 21.18%) is still in business priority. Therefore security is an essential aspect of the CC for a safer environment. A substantial part of the articles on security highlights some new adoption problems. The third factor the businesses consider 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 the same priority while considering the CC adoption respectively for the safer utilization of the platform. This shows that researchers still are interested in the challenges and factors influencing 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 consideration of CC adoption for the smooth running of the business environment and still needs attention for the researcher. The CC future forecast is also another factor considered by the researcher (such as 4 with 4.71%) to keep an eye on the trend of this new technology. The CC adoption decision has been considered marginally low (i.e., 3 with 3.53%) as research on this site is not properly focused on this factor. Finally, CC adoption & implementation still need attention for the researcher to address this issue as (2 with 2.35%) work is done in 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 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 review of 561 articles found in the first search. The selected 85 articles cover the basic primary view of the studied area of CC adoption with organization requirements. Hence, the organization and CC areas have potential in the future. Therefore study results can offer the researchers up-to-date aspects of their research.

The above discussed empirical findings are based on the four factors (such, environmental, human, organizational, and technological), and they are respective

11 variables are outcome from our SLR. Methodological and theoretical findings indicate that a few qualitative studies have contributed toward the understanding of CC adoption factors as compared with quantitative studies. 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, cloud adoption processes, such as external support, competitive pressure, senior management support, employee's 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 research articles were published on CC enterprise (See Table 12 review articles classifications and Table 13 based on the type and references). The criteria are based on all the selected searched articles published in 2009. This may specify that the research in CC for different types of businesses is still an emerging area. The number of articles *published across years* in our searched results is shown in Table 9.

Table 12. Countries conducting cloud-based business research.

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 IT services that contain rental resources located in the cloud. The most common task present is increasingly conducted online, such as checking emails, social media communication, editing and writing different types of documents, collaborating, watching videos, and creating images. The study particularly focuses on the trend of research on CC adoption internationally. Therefore, this study mainly aimed to identify the different factors for the CC adoption by organizations in different sectors internationally. CC is increasingly being adopted, especially in 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 utilization 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 SMEs' enterprises. Our findings have shown that CC adoption is still an ongoing process at different companies because some organizations have almost limited resources and financial capabilities to invest in IT. However, still, there are significant security factors influencing/affecting and challenging issues. These issues are analyzed in most cases, which need to be tackled before CC services are effectively used by organizations internationally. Even though the literature review could not be completely declared comprehensive, it still offers suitable awareness and allows the amount of research on CC Adoption in SMEs.

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

A. Research Gaps

This SLR has several limitations because the review only analyzed the 11 types of articles published from 2009 to the first three quarters of 2018 in the last ten years; those were generated based on a keyword search of "Cloud Computing Security" and "Cloud Computing Adoption." Hence it is only limited to the 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 was only found from the 11 types of articles from 8 types of databases on the internet. There must be other online databases containing more academic journals, articles, case studies, surveys, research papers, conceptual papers, press releases, workshops, Ph.D. theses, conference publications, and book chapters on 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, only English publications were considered for the literature study. There must be publications in other foreign languages, which may give a wider scope to study further.

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