TECHNOLOGY ADOPTION AND CONTINUANCE OF MOOCS: A SYSTEMATIC LITERATURE REVIEW, SYNTHESIS AND FUTURE RESEARCH AGENDA

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ABSTRACT

Massive Open Online Courses (MOOCs) have garnered a lot of attention and interest from academia and industry. The proliferation of MOOC platforms has opened up immense opportunities for fulfilling learner needs and improve the education landscape. It is important to understand the drivers of MOOC adoption to ensure its complete utilization. Research on MOOC adoption, acceptance, usage and continuance has increased over a period of time. With this regard, the purpose of this study was to review and synthesize the research on MOOC adoption using a structured and domain-based approach in order to understand its state-of-the-art literature. Seventy empirical articles indexed in Scopus or Web of Science were identified and reviewed systematically using the Theories, Context, Characteristics, and Methods (TCCM) framework. Systematic mapping of studies was taken place to determine the year-wise publications, journal quality, citations, widely used theories, the context in terms of MOOC platforms and country of research, characteristics in terms of widely used constructs, and hypothesized relationships. The systematic literature review highlights Technology Acceptance Model is the dominant model applied in the MOOC adoption research. Further research on MOOC adoption is seen majorly in Asian economies with narrow focus on developed economies. Although several review studies have taken place on MOOC, their focus has been on the quality, pedagogical or user perspective. This study is the first effort in synthesizing the state-of-the-art literature on MOOC adoption. Future avenues of research are suggested in terms of Theories, Context, Characteristics and Methods to further the theoretical and practical knowledge on MOOC adoption.

Keywords: Adoption, Continuance, Intention, MOOC, Systematic Literature Review.

1. INTRODUCTION

Massive Open Online Courses (MOOCs) have democratized education globally. MOOCs are courses on demand from internationally renowned universities with learning opportunity available for everyone. Platforms like edX, Coursera, Future Learning, Udacity, and others function as course aggregators to connect millions of students, thousands of courses, and hundreds of universities in a common thread to access higher education. MOOCs offer students from diverse backgrounds an opportunity to interact with learners from different parts of the world. It overcomes the challenges posed by traditional classroom setups like high fees, credit requirements, entry barriers, and limited enrolment capacity. MOOCs are characterized by low or no fees, no credit requirement, no entry-exit barrier, and massive enrolment capacity. Over the years, it has transitioned from being an altruistic, non-profit and open

course format to a flourishing industry with successful business model having paid courses.

Introduced in 2008, MOOCs have seen an exponential growth with steep rise in the number of learner enrolments and partnering universities (Class Central, 2020). Most users undertake MOOCs with a motive of skill acquisition (Yousef et al., 2015), certifications (Reparaz et al., 2020), knowledge enhancement (Ma & Lee, 2019), career progression (Alraimi et al., 2015), professional development (Deng et al., 2019), preference for a specific faculty (Dejoux Lirsa & Charrière-Grillon, 2016), preference for a high-ranking university course (Nemer & O'Neill, 2019) or to fulfill one's curiosity **(**Deng et al., 2020). Despite the growing demand MOOCs have encountered few challenges such as high attrition rate (Chen et al., 2018), unethical learner behaviour in assessment (Trehan et al., 2017; Yang & Su, 2017), lack of motivation, and learner engagement (Terras & Ramsay, 2015; Hew & Cheung, 2014; Ma & Lee, 2019), low language proficiency (Zhao et al., 2020), suitable only for self-regulated learners (Albelbisi, 2019), inadequate IT infrastructure (Castillo & Wagner, 2015), lack of industry or academia accreditation (Pundak et al., 2014), and high learner to teacher ratio (Suen, 2014).

MOOC-related research started in 2008 and saw a rising trend since 2012 (Liyanagunawardena et al., 2013). Focusing on the pedagogical aspects, prior research on MOOC was primarily scattered and qualitative in nature. There were hardly any studies prior 2015 that focused on factors influencing the adoption, acceptance or usage of MOOC. Post 2015, the majority of MOOC adoption studies were conducted using various theoretical models from the Information Systems domain like Technology Acceptance Model (TAM), Unified Theory of Acceptance and User Technology (UTAUT), Expectancy Confirmation Model (ECM), Social Cognitive Theory (SCT), and Information System Success (ISS) Model. Examining past literature on MOOC research highlights the lack of a systematic review of how the research on MOOC adoption has evolved over the years. The systematic literature review (SLR) for a topic gives deeper understanding of the state of the literature of that area (Palmatier et al., 2018). SLR studies advance knowledge of a particular field by showcasing significant milestones of theoretical enhancement (Hallinger, 2013) and the future avenues for research (Paul & Criado, 2020). Therefore, the current study undertook a systematic literature review approach to address this gap and synthesize the literature on MOOC adoption to provide direction for future research.

The thematic focus of this study is on a review of MOOC adoption research with a goal orientation to understand the nature of relationships and factors influencing MOOC usage. An SLR enables better understanding of the emerging research areas, how various theories and contexts are applied, and highlights the areas for future research. Accordingly, the purpose of this study was to examine and synthesize the literature on MOOC adoption using a SLR approach. To fulfill the above objectives, this study reviewed journal articles published between 2015 to 2021 for understanding MOOC adoption and the leading factors and drivers for MOOC acceptance from an Information System perspective.

The research questions were what is known about the MOOC adoption research, how it is known, and the areas for research in the future. The first research question was answered by going through the relevant studies, theories, latent variables, sample characteristics, and methodologies. For the second question, publications were analyzed in terms of indexing, year of publishing, country of origin, and the most cited ones. The third question was addressed with the areas of future studies on MOOC adoption and its implications. The study covered a comprehensive list of articles for review to answer the above questions.

The SLR on MOOC adoption can give various insights to MOOC platform providers, universities, facilitators in several ways. Firstly, through a structured, systematic review analysis, this research connects the context of MOOCs with the Information Systems domain. Secondly, it provides a detailed understanding of MOOC adoption relationships and influences within the IS domain. Thirdly, the study provides directions for future research by highlighting the gaps arising from existing theoretical models,

context, characteristics, and methods using the TCCM framework (Paul & Rosado-Serrano, 2019). Fourthly, it is a valuable guide for decision-making to theorists, practitioners, and policymakers by describing and demarcating the knowledge development of a particular field (Kraus et al., 2020).

2. LITERATURE REVIEW ON MOOC RESEARCH

A preliminary reading of MOOC literature paved the way for understanding existing literature, determining potential gaps, selecting, and finalizing topics. Gap analysis and topic selection are essential components of any systematic literature review study. An SLR based on a specific topic should provide unique insights and should not have been published in the recent past (Paul & Criado, 2020). There should be a significant number of studies that justify employing SLR for a particular topic. Using the Google scholar database, the past systematic literature reviews on MOOCs were examined. Such content analysis of past studies and reviews familiarizes the researcher with past findings and enables groundwork for further efforts (Hallinger, 2013). Table 1 exhibits the past systematic literature review on MOOCs. Most of these reviews focused on different aspects of MOOCs like the pedagogical, motivation, self-regulation, and assessments. Some other reviews on MOOCs covered year-wise publication for a particular period. Despite the growing literature on applying the models from the Information Systems domain in MOOC, there was no specific study to provide state-of-the-art MOOC adoption literature.

The first review on MOOCs by Liyanagunawardena et al. (2013) taking 45 articles from leading educational technology journals between 2008 and 2012 to determine the state-of-the-art literature on MOOCs. Saadatdoost et al. (2015) reviewed 32 papers on MOOC from an Information Systems perspective and highlighted the various definitions, theories, and themes of MOOC studies. Bozkurt et al. (2016) analyzed 51 dissertations based on MOOCs from 2008 to 2015 to determine the MOOC research trends.

Veletsianos and Shepherdson, (2016) reviewed 183 studies from 2013 to 2015 and found that most MOOC studies were quantitative with a minimal focus on qualitative studies. Sanchez-Gordon and Luján-Mora, (2018) examined the issues of MOOC accessibility by analysing 40 articles from 2008 to 2016. Albelbisi et al. (2018) reviewed 102 studies between 2012 to 2016 for synthesizing success factors influencing MOOCs. Lee et al. (2019) reviewed 21 articles from 2008 to 2016 on MOOCs from a self-regulated learning perspective. Babori et al. (2019) reviewed 65 articles from five educational technology journals published between 2012 to 2018, where the focus of the review was on the learning process, its determinants, and interactions in MOOCs. Albelbisi and Yusop, (2020) took a geographical perspective for their review by focusing on 25 studies from 2014 to 2018 to understand MOOCs' growth and challenges in Malaysia. Wei et al. (2021) reviewed 65 articles between 2017 to 2019 to understand cognitive, behavioural, and affective learning outcomes and assessment characteristics of MOOC.

Table 1: Past SLR on MOOCs

Sr. No.	Reference	No. of studies	Years covered
1	(Liyanagunawardena et al., 2013)	45	2008 to 2012
2	(Saadatdoost et al., 2015)	32	Not specified
3	(Bozkurt et al., 2016)	51	2008 to 2015
4	(Veletsianos & Shepherdson, 2016)	183	2013 to 2015
5	(Gordon & Mora, 2018)	40	2008 to 2016
6	(Albelbisi et al., 2018)	102	2012 to 2016
7	(Lee et al., 2019)	21	2008 to 2016
8	(Babore et al., 2019)	65	2012 to 2018
9	(Rasheed et al., 2019)	311	2009 to 2018
10	(Albelbisi & Yusop, 2020)	25	2014 to 2018
11	(Wei et al., 2021)	65	2017 to 2019
12	(Gamage et al., 2021)	136	2014 to 2020
13	(Liu et al., 2021)	1078	2008 to 2019

Source: Author's Calculation

Gamage et al. (2021) reviewed 136 articles from 2014 to 2020 on peer assessments in MOOC. Liu et al. (2021) have conducted a bibliometric analysis on 1078 peer-reviewed papers on MOOC from 2008 to 2019 to further the understanding of MOOC research.

3. METHODOLOGY

An SLR is an improvement over narrative review as it provides in-depth coverage of the area under study with limited sample selection bias. It is a valuable technique for studying the current literature to determine its status quo, research gaps, and areas of further studies. Using predetermined search, extraction, and screening parameters, the SLRs collect studies by offering a comprehensive view of the research under consideration. An SLR determines what has been done by consolidating a domain's scattered literature, identifying theoretical underpinnings and essential contributions, and determining the scope for future studies. According to Paul and Criado, (2020), an SLR can be further divided into domain-based (Gupta et al., 2020), theory-based (Gilal et al., 2019), and method-based (Ji et al., 2019). Out of these, domain-based reviews are widely used in the management field (Paul & Criado, 2020).

A domain-specific SLR could be framework development (Paul & Mas, 2020), hybrid-narrative (Paul et al., 2017), theory development (Pansari & Kumar, 2017), bibliometric (Liu et al., 2020), meta-analysis (Maseeh et al., 2021), structure-based (Paul & Feliciano Cestero, 2020) or framework (Batra et al., 2021). Out of these, a structured, systematic literature review involves an in-depth summary and synthesis of the past studies from a specific domain based on the theories, research methodology, and constructs (Paul & Criado, 2020). They are based on predetermined parameters and can be replicated again in a scientific manner. Thus, making the structured reviews a preferred, effective, and reliable method for conducting a systematic literature review. Structured systematic literature reviews could be an author or theme-centric, in which the former is a less accepted and less popular method as it involves chronological presentation of research based on authors (Linnenluecke et al., 2020). Whereas the theme centric reviews focus on the growth and development of a research theme irrespective of various author contributions

Therefore, on account of these reasons, the current study undertakes a domain-based, structured, and theme-based approach for determining the state-of-the-art literature on MOOC adoption by using the processes and procedures of a systematic literature review. According to Palmatier et al. (2018), the study determined a search protocol with a detailed procedure. SLR studies generally adopt procedures like gap analysis, topic selection, searching, filtering, extraction, synthesizing, and reporting the results (Akter et al., 2021).

Toorajipour et al. (2021) have used five phases for SLR for understanding the application of Artificial Intelligence in Supply Chain Management. The five phases are pilot search, locating the studies, study selection, and evaluation, analysis, synthesis, and reporting the results. Xi & Hamari, (2021) have used the steps laid down by Petticrew and Roberts, (2005) that consist of determining the research questions, curating the literature, filtering them, examining the appropriateness of the balance studies, extraction of literature, critical examination, and synthesis of the studies. This study follows a combination of the process followed by these two studies for conducting the SLR on MOOC adoption. Figure 1 explains the various phases of the systematic literature review employed in this study.

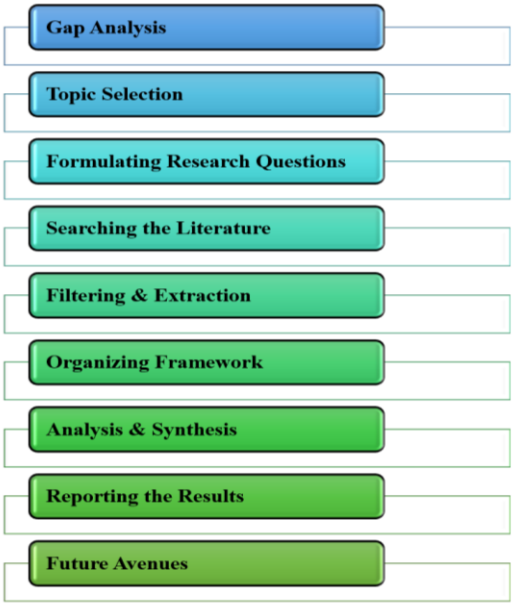


Fig. 1: The research process of systematic literature review.

3.1 Gap Analysis and Topic selection

Although most recent studies on MOOC review provide an insightful understanding of MOOC literature, they do not synthesize the articles in terms of a theoretical framework and domain perspective. For example, Rasheed et al. (2019) reviewed 311 empirical studies on MOOCs from 2009 to 2018 and highlighted that a high number of the research on MOOCs focused on MOOC dropouts or completion rates. There have been several reviews published since 2019; however, their scope was limited to geographic area (Albelbisi & Yusop, 2020), learning process (Babore et al., 2019), self-regulated (Lee et al., 2019), learning outcomes (Wei et al., 2021) and peer assessments (Gamage et al., 2021). Through the content analysis on MOOC research, it was found that there is hardly any study that consolidates the research on MOOC adoption from Information Systems domain. Therefore, the current study focused on doing a SLR for understanding the MOOC usage from a technology adoption perspective.

The next step for conducting the SLR was to determine the scope of the study. The definition of MOOC adoption was adapted from the Information Systems domain. Initial use, adoption, and post-adoption usage are the various stages of technology adoption as per the Information Systems research. On those lines, MOOC adoption is defined as acceptance, initial, or continued usage of the MOOC systems. Majority research on MOOC adoption is based on factors influencing MOOC usage using various theoretical models from IS and integrating it with other domains. There is a need to synthesize studies covering various constructs and theories to understand MOOC adoption better. Therefore, for this purpose, SLR on MOOC adoption was scoped as the focus of the study.

3.2 Research Questions

Research questions are very crucial to guide and shape the nature of the study. Thorough gap analysis in the existing literature on a topic can help in determining the research questions. They are critical for the research design and determine the further course of study. From the above gap analysis and topic finalization, the following were the research questions for our study:

1. How is research on MOOC adoption developed over the years?
2. In which journals are research on MOOC adoption published, and which are the most cited studies?
3. What are the various theories, contexts, characteristics and methods employed in research in MOOC adoption?
4. What are the future avenues for MOOC adoption research?

3.3 Search strategy

This section explains the database selection, keyword, and inclusion-exclusion criteria in detail. These were designed to keep in line with the research questions and collect high-quality information. The search strategy started with deciding the databases for this study. The past SLR on MOOCs had used seven-eight databases for searching the literature. Accordingly, the following databases were chosen for this study: i) Scopus, ii) Web of Science, iii) Google Scholar, iv) EBSCO, v) JSTOR, vi) ProQuest, vii) Taylor & Francis, viii) IEEE Access, ix) Springer, x) Wiley Online Library, xi) Emerald, and xii) ScienceDirect. This was done to ensure the inclusion of relevant papers for the study under consideration.

The search period for these articles was from April 15, 2021, to April 30, 2021. The search was conducted on these databases using the BOOLEAN terms in the title, abstract, and keywords. Based on the research questions and analysis of extant literature on MOOC, the frequent keywords in the studies were analyzed. Accordingly, the most commonly used keywords in the past studies were MOOCs, adoption, acceptance, intention, and continuance. Therefore, this study used the following search strings on the above databases for obtaining the most relevant research articles: "MOOC Adoption," "MOOC Acceptance," "MOOC Intention," and "MOOC Continuance." After the database and keyword finalization, in the initial search, relevant papers were downloaded using these search strings in the title, abstract, keywords, etc. Table two gives details of the paper extraction from various databases using different keywords.

Table 2: Paper Extraction from various Databases

Keywords	Scopus	Web of Science	Google Scholar	EBSCO	JSTOR	ProQuest	Taylor & Francis	IEEE Access	Springer	Wiley Online	Emerald	Science Direct
MOOC Adoption	20	17	286	1	5	16	13	3	14	4	14	7
MOOC Acceptance	2	4	43	6	1	8	2	1	5	0	1	4
MOOC Continuance	7	7	115	1	12	17	5	1	3	0	23	7
MOOC Intention	2	1	17	6	0	4	1	0	3	0	1	1
Total	31	29	461	14	18	37	21	5	25	4	39	19

Source: Author's Calculation

The next step undertaken was to determine the thematic fit and match the inclusion/exclusion criteria for shortlisting the research articles for the study. These inclusion/exclusion criteria were consistent with various past studies in the MOOC and IS fields. Accordingly, research articles that were in the a) peer-reviewed journal b) scholarly publication c) domain of MOOC adoption d) indexed in Scopus List (Q1 to Q4) or Web of Science e) written in English were included in the review. Practitioner notes, book chapters, and conference papers were not considered. Figure two elucidates the search strategy using the inclusion-exclusion criteria. Using the above keywords, a total of 699 articles were accessed from various databases as mentioned above. Maximum papers were available with the keyword's MOOC adoption and MOOC continuance.

From the pool of 699 articles, a total of 360 duplicate papers were removed. After that, 339 papers were left and were assessed for further processing. Out of these, it was found that sixty-eight were not journal articles and hence were removed from the pool of articles. Eighty-four papers from the balance 271 studies were from non-peer-reviewed journals and hence were removed. The filtering focus was to retain the peer-reviewed journal articles to provide relevant and authentic information for review purposes (Webster and Watson, 2002). Out of the remaining pool of 187 papers, 90 papers that did not fall under the Information System domain were excluded, and this led to a balance of 97 papers for further review. Taking into account the inclusion-exclusion criteria and quality guidelines, 27 papers were removed. The study considered only those journal articles indexed in either Scopus or Web of Science bibliometric databases to maintain the quality of articles undertaken for review. MOOC adoption field has evolved over a while, with most studies quantitative in nature. Accordingly, only quantitative studies were taken for this SLR as research on this domain has transitioned from theory development to testing (Kraus et al., 2020). The qualitative, case-based, or conceptual studies were excluded from this study. Finally, 70 empirical articles were considered for the SLR that were written in English, belonged to 40 journals between 2015 to 2021. In terms of the number of articles for review, this SLR followed the thumb rule put forth by Paul & Criado (2020), where the articles for SLR could be from 40-50 to 500.

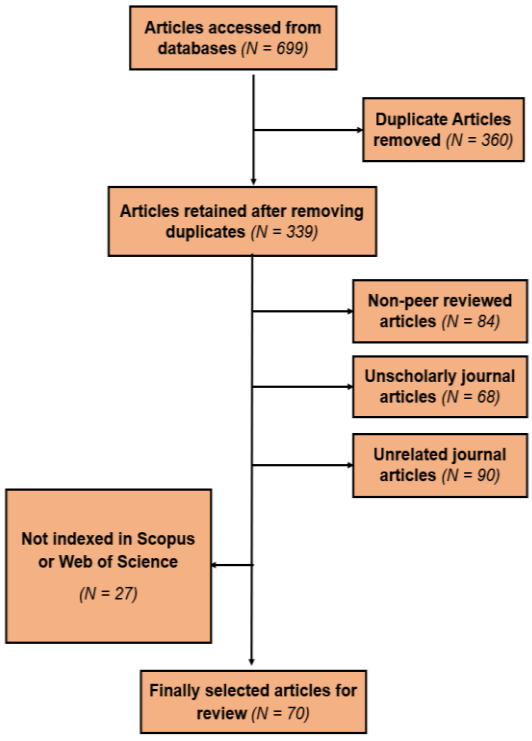


Fig. 2: Literature search strategy

3.4 Organizing framework

An SLR with a robust framework either developed by authors or adapted from previous studies provides a definite structure to the study. In the current study, the Theory, Characteristics, Context, and Method (TCCM) framework as conceptualised by Paul and Rosado-Serrano, (2019) was used for synthesizing the MOOC adoption literature. It is a prevalent and well-accepted technique for synthesizing literature (Singh & Dhir, 2019).

4. FINDINGS, ANALYSIS & SYNTHESIS

Accordingly, after extracting and filtering the articles based on the above criteria, the descriptive analysis and synthesis of the studies were done. Thematic analysis was employed to interpret, and present insights on MOOC adoption as discussed in the past literature. Synthesis was done using the TCCM framework for answering the research questions. Following details were extracted from each article like author details, variables, hypothesized relationships, research methods, theories, findings, and future directions on an Excel spreadsheet. These articles were analysed for answering the research questions of the study using the TCCM framework.

The findings of the SLR can be divided into progression of MOOC adoption research over the years and the TCCM framework. Development of MOOC adoption research is highlighted in terms of year-wise publication, journal quality and citations. The TCCM framework covers the widely used theories, context in terms of MOOC platforms and country of research, characteristics in terms of widely used constructs and hypothesized relationships and finally the methods used in MOOC adoption research.

4.1 Development of MOOC Adoption research over the years

4.1.1 Year-Wise Publications

The first article on MOOC adoption was published in 2015, and so we consider 2015 as the starting point for this systematic literature review. Figure three presents year-wise publication trends from 2015 to 2021. In 2015 and 2016, there was only one publication each year. After that, in 2017, it went up to five. Thereafter, in 2018, there was a rise in publication with fourteen articles, and in 2019 it went to eighteen. In 2020, the number of published articles went up to twenty-six, and in 2021 it was five.

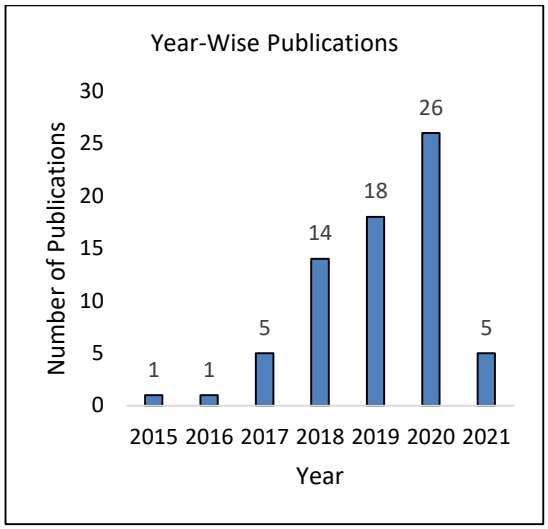


Figure 3: Year-wise Publications

4.2 Journals of publication and its Indexing

Table three presents the details of the journals considered for this review. It is seen that MOOC adoption research was published in forty academic journals indexed in WoS or Scopus Q1 to Q4. Additionally, this table also provides information on the JCR Impact factor and ABDC listing of journals. As seen from the table, thirty-seven journals are indexed in the Web of Science whereas twenty-one, nine, six, and two are indexed in the Scopus Q1, Q2, Q3, and Q4 respectively. Twenty-Three journals from this list are JCR-impact factor journals. There are three papers in the A* and A category each, five in B and two in C category as per the Australian Business Dean Council list of journal quality.

Interactive Learning Environments and Computers & Education are the two journals that published the highest number of papers, i.e., nine and eight respectively. It was also found that MOOC adoption research was published in reputed journals like the Academy of Management Learning & Education (Razmerita et al., 2020), Information and Management (Aparicio et al., 2019), International Journal of Information Management (Huang et al., 2017), Computers in Human Behavior et al, 2020; Li et al., 2018; Wu & Chen, 2017), Behaviour & Information Technology (Gupta & Maurya, 2020), Internet Research (Shao, 2018). The majority of the papers considered for this SLR were published in information systems journals.

Table 3: Journals, Indexing and number of publications

Sr. No.	Journal Title	No.	References	WoS/ SSCI indexed	Scopus indexed				ABDC Listing	JCR Impact Factor
					Q1	Q2	Q3	Q4		
1	Interactive Learning Environments	9	(Al-Rahmi et al., 2019; Hsu et al., 2018; Pozón-López et al., 2020; Qi et al., 2020; Romero-Frías et al., 2020; Tao et al., 2019; Tseng et al., 2019; Teo & Dai 2019; Virani et al., 2020)	□	□					3.928
2	Computers & Education	8	(Alraimi et al., 2015; Dai et al., 2020; Joo et al., 2018; Kim et al., 2021; Lung-Guang, 2019; Tsai et al., 2018; Zhou 2016; Zhao et al., 2020;	□	□					8.538
3	Education and Information Technologies	6	(Al-Adwan, 2020; Albelbisi, 2019; Albelbisi, 2020; Mohan et al., 2020; Abdullatif & Velázquez-Iturbide, 2020; Youssef 2019)	□	□					2.917
4	Computers in Human Behavior	3	(Dai et al., 2020); Li et al., 2018; Wu & Chen, 2017)	□	□				A	6.829
5	International Journal of Emerging Technologies in Learning	3	(Altalhi 2021; Persada et al., 2019; Wong & Goh, 2019)	□		□				
6	Telematics and Informatics	2	(Fang et al., 2019; Khan et al., 2018)	□	□				C	6.182
7	IEEE Access	2	(Al Abdullatif & Velazquez-Iturbide, 2020; Tawafak, et al., 2018)	□	□					3.367
8	International Review of Research in Open and Distributed Learning	2	Lee et al., (2020; Yang & Su, (2017)	□	□					2.747
10	International Journal of Educational Management	2	(Gupta, 2021; Pillai, & Sivathanu, 2019)	□		□			B	
11	Journal of Advanced Research in Dynamical and Control Systems	2	(Al-Shami et al., 2018; Razami & Ibrahim, 2020)				□			
12	NMIMS Management Review	2	(Mulik et al., 2019; Mulik et al., 2018)	□						
13	Information and Management	1	(Aparicio et al., 2019)	□	□				A*	7.555
14	Academy of Management Learning and Education	1	(Razmerita et al., 2020)	□	□				A*	4.373
15	Internet Research	1	(Shao, 2018)	□	□				A	6.773

Sr. No.	Journal Title	No.	References	WoS/ SSCI indexed	Scopus indexed				ABDC Listing	JCR Impact Factor
					Q1	Q2	Q3	Q4		
16	Behaviour & Information Technology	1	(Gupta & Maurya, 2020)	□	□				A	3.086
17	Journal of Electronic Commerce Research	1	(Lu et al., 2019)	□	□				B	2.861
18	Online Information Review	1	(Ma & Lee, 2020)	□	□				B	2.325
19	International Journal of Accounting & Information Management	1	(Liu & Liu, 2020)	□	□				B	
20	Journal of Marketing Education	1	(Dikcius et al., 2020)	□	□				B	
21	Journal of International Education in Business	1	(Mulik et al., 2019)	□		□			C	
22	Sustainability	1	(Li et al., 2021)	□		□				3.251
23	Educational Technology Research and Development	1	(Yang et al., 2017)	□	□					3.565
24	Nurse Education Today	1	(Padilha et al., 2021)	□	□					3.442
25	Journal of Computer Assisted Learning	1	(Ma & Lee, 2019)	□	□					3.862
26	Australasian Journal of Educational Technology	1	(Zhang et al., 2017)	□	□					3.067
27	Universal Access in the Information Society	1	(Orehovački et al., 2019)	□		□				3.078
28	Library Hi Tech	1	(Chen et al., 2018)	□		□				2.357
29	Computer Applications in Engineering Education	1	(Wang et al., 2020)	□	□					1.532
30	Asia pacific education review	1	(Shahzad et al., 2020)	□		□				1.573
31	Journal of Universal Computer Science	1	(Chan et al., 2018)	□		□				1.139
32	Iranian Journal of Management Studies	1	(Tamjidyamcholo et al., 2020)		□					
33	Knowledge Management & E-Learning	1	(Daneji et al., 2019)			□				

Sr. No.	Journal Title	No.	References	WoS/ SSCI indexed	Scopus indexed				ABDC Listing	JCR Impact Factor
					Q1	Q2	Q3	Q4		
34	KSII Transactions on Internet and Information Systems	1	(Jo, 2018)	□			□			
35	Education Sciences	1	(Fianu et al., 2018)	□			□			
36	International Journal of Supply Chain Management	1	(Mohamad & Rahim, 2018)	□			□			
37	Turkish Online Journal of Distance Education	1	(Albelbisi & Yusop, 2019)	□			□			
38	Education + Training	1	(Fianu et al., 2020)	□			□			
39	Universal Journal of Educational Research	1	(Sidek et al., 2020)					□		
40	International Journal of Learning, Teaching and Educational Research	1	(Panagiotarou et al., 2020)	□				□		
Note: Journals are arranged as per the descending order of the number of publications										

4.3 Citations

Table four shows the ten most cited studies under this review. The research article by Wu & Chen, (2017) was cited the highest with 501 citations, followed by the Alraimi, et al., (2015) article with 496 citations.

The article by Wu & Chen, (2017) had the highest average citations per year with 125.25 on an average per year, followed by article of Alraimi et al., (2015) with 82.66 average citations per year. Appendix one gives citations of all the seventy articles reviewed under this study.

Table 4: Ten most cited studies

Rank	Study	Journal	Citations[1]	Average citations per year[2]
1	(Wu, & Chen, 2017)	Computers in Human Behavior	584	146
2	(Alraimi et al., 2015)	Computers & Education	545	90.83
3	(Zhou, 2016)	Computers & Education	236	47.2
4	(Aparicio et al., 2019)	Information & Management	167	84.5
5	(Joo et al., 2018)	Computers & Education	171	57
6	(Yang et al., 2017)	Educational Technology Research and Development	133	33.25
7	(Khan et al., 2018)	Telematics and Informatics	127	42.33
8	(Tsai et al., 2018)	Computers & Education	107	35.66
9	(Huang, et al., 2017)	International Journal of Information Management	70	17.5
10	(Persada, et al., 2019)	International Journal of Emerging Technologies in Learning	68	34

[1]Based on Google Scholar (24/11/2021)
[2] Average Citations = Total citations/ No. of years after publications

4.4 TCCM Framework

4.4.1 Theories

Table five shows that the Technology Acceptance Model (Davis, 1989), Expectancy Confirmation Model (Bhattacherjee, 2001; Bhattacherjee & Premkumar, 2004), Social Cognitive Theory (Bandura, 1982, 1989; Compeau & Higgins, 1995), Unified Theory of Acceptance and User Technology (Venkatesh et al., 2003) and Information System Success Model (DeLone & McLean, 1992 & 2003) are the most widely used theories in MOOC adoption research. Apart from these theories, some studies have applied the Big Five Personality Model (Gupta, 2021), Innovation Diffusion Theory (Shahzad et al., 2020), Social Interdependence Theory (Razmerita, et al., 2020) and Use and Gratification theory (Chen, et al., 2018).

Table 5: Widely used theories used in MOOC Adoption

Theory	Articles	Sample References
Technology Acceptance Model (TAM)	24	(Al-Adwan, 2020; Teo & Dai, 2019)
Expectancy Confirmation Model (ECM)	15	(Alraimi et al., 2015; Daneji et al., 2019)
Social Cognitive Theory (SCT)	8	(Lee et al., 2020; Shao, 2018)
Information System Success Model (ISS)	8	(Albelbisi, 2020; Aparicio et al., 2019)
Unified Theory of Acceptance and User Technology (UTAUT)	7	(Altalhi, 2020; Chen et al., 2018)
Self-Determination Theory (SDT)	5	(Abdullatif & Velázquez-Iturbide, 2020; Khan et al., 2018)
Theory of Planned Behaviour (TPB)	5	(Lung-Guang, 2019; Yang & Su, 2017)
Self-regulated learning (SRL) /Self-directed Learning	5	(Albelbisi, 2019; Kim et al., 2021)
TUE- Technology User Environment	4	(Gupta & Maurya, 2020; Ma & Lee, 2020)
Task Technology Fit (TTF)	4	(Jo, 2018; Wu & Chen, 2017)

The following subsection explains some of these theories in detail:

Technology Acceptance Model (TAM)

TAM is considered one of the most widely validated, hypothesized, and diagnostic models for technology acceptance. Developed in 1989 by Davis, TAM represents the causal linkages of a system's design characteristics to its acceptance and usage. According to the model, usage is a direct function of behavioural intention, which is influenced by perceived usefulness and perceived ease of use. In the area of MOOC adoption research, TAM has been used in twenty-four studies (Zhang et al., 2017). Several studies have also extended TAM with various contextual variables like learning tradition and self-regulated learning (Al-Adwan, 2020), perception of time (Teo & Dai, 2019), individual factors like self-efficacy, self-enjoyment, and self-development (Shao, 2018), etc. Some other studies have combined other theoretical models with TAM like Task Technology Fit (Huang et al., 2017; Wu & Chen, 2017), Innovation Diffusion Theory (Al-Rahmi et al., 2019), Technology User Environment (Ma & Lee, 2019), etc.

Expectancy Confirmation Model (ECM)

Bhattacherjee, (2001) developed a model called ECM by creating a scale measuring continued intention for technology adoption. It explains the repurchase intention of the consumers by examining the cognitive beliefs and affect. According to this theory, consumer expectation and the perceived performance of the technology determine the confirmation or disconfirmation, which in turn determines the satisfaction or dissatisfaction of consumers and the intending repurchase intentions. This theory highlights that post-adoption expectation plays an essential role in determining a user's satisfaction which in turn is a leading cause for a consumers repurchase. In MOOC adoption research, the ECM has been used partially or fully in fifteen studies (Alraimi et al., 2015; Daneji et al., 2019).

Social Cognitive Theory (SCT)

Developed by Albert Bandura in 1986 by evolving the social learning theory, the SCT is based on how social environment influences

learning. SCT comprises outcome expectations, self-efficacy, modeling, and combined commonalities to explain behaviour. Self-efficacy determines an individual's confidence to do a task that one draws from their past experiences. The concept of self-efficacy on outcome expectations has been operationalized in the Information System domain by Compeau and Higgins, (1995). Higher the self-efficacy of an individual, the higher the chances of completing the task. In the context of MOOC adoption, self-efficacy has been studied in eight studies (Gupta & Maurya, 2020; Shao, 2018; Zhang et al., 2017).

Unified Theory of Acceptance and User Technology (UTAUT)

In the landmark article on technology adoption, Venkatesh & et al. (2003) have conceptually and empirically compared eight competing models based on their similarities and differences in technology acceptance and designed and validated a theory that combines these models. UTAUT is an extension of TAM that has been widely used to study initial adoption and limited use for post-adoption technology. It comprises four core determinants four determinants that are performance expectancy, effort expectancy, social influence, and facilitating conditions, behavioural intention with mediating role and actual usage as final dependent variable. The four moderators are age, gender, experience, and voluntariness of use. UTAUT2 (Venkatesh et al., 2012) is an extension of UTAUT with three constructs like hedonic motivation, price value, and habit. UTAUT2 also has more explanatory power when compared to the original UTAUT (Venkatesh et al., 2016). In the context of MOOC adoption research, UTAUT has been used in seven studies by extending it with external variables (Altalhi, 2020; Chen et al., 2018; Fianu et al., 2020). UTAUT2 has been used only in one study (Mohan et al., 2020).

Information System Success Model

Developed by DeLone & McLean in 1992 and later updated in 2003, the Information System Success Model is a popular framework for measuring the success and effectiveness of the technology. In the original model (DeLone & McLean, 1992), system use and user satisfaction were influenced by system quality and information quality System use and satisfaction influenced each other reciprocally in both models. These constructs influenced the individual impact, which influenced the organization's impact in the earlier model. In the updated model (DeLone & McLean, 2003), service quality was added to influence use and satisfaction and the individual impact and organization impact were combined to form Net Benefits. In terms of MOOC adoption research, this model has been used in eight studies. Aparicio et al. (2019) was the first study to use the entire model for MOOC success. They extended the ISS model with the addition of gamification as a construct. Yang et al. (2017) combined ISS with TAM to study MOOC continuance.

4.4.2 Context

The context for MOOC adoption research is explained in the form of platforms and countries as given below:

MOOC Platforms

Table six represents the various MOOC platforms that were studied in the MOOC adoption research. Coursera and edX were studied in ten studies each thereafter Icourse163 was studied in eight studies. Most studies have studied MOOC usage behaviour of respondents in general and not with a speicific platform in focus. Each of these platforms have a different business model and have varying functionalities. Studies which focus the usage behaviour of a specific MOOC platform is a promising gap that can be filled in future.

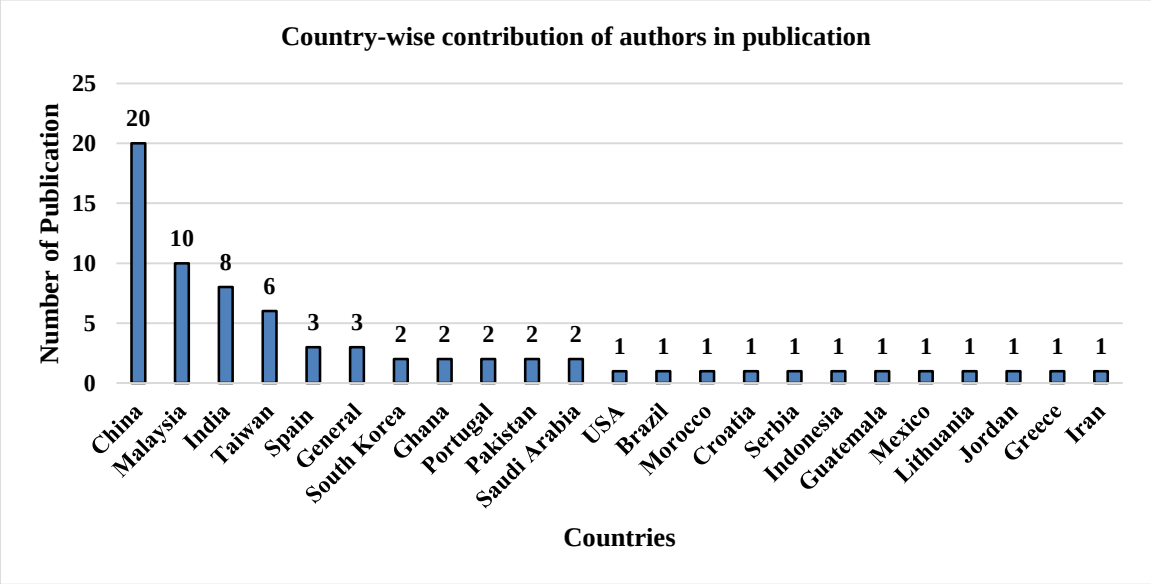
Table 6: MOOC Platforms

Platform	No. of Studies	Sample References
Coursera	10	(Altalhi, 2020; Zhang et al., 2017)
edX	10	(Gupta & Maurya, 2020; Lee et al., 2020)
Icourse163	8	(Shao, 2018; Zhang et al., 2017)
Udacity	4	(Alraimi et al., 2015; Wu & Chen, 2017)
OpenLearning	4	(Albelbisi & Yusop, 2019; Mohamad & Rahim, 2018)
XuetangX	4	(Fang et al., 2019; Teo & Dai, 2019)

FutureLearn	3	(Mulik et al., 2018, 2020)
MIT	2	(Khan et al., 2018; Wu & Chen, 2017)
ZhiHuiShu	1	(Li et al., 2018)
Sharecourse	1	(Yang & Su, 2017)
Imooc	1	(Fang et al., 2019)
NPTEL	1	(Altalhi, 2020)
Abierta-UGR	1	(Romero-Frías et al., 2020)
Doroob Edx	1	(Abdullatif & Velazquez-Iturbide, 2020)
Balance Studies did not specify the MOOC platform.		

Widely used Independent and Dependent Variables

Table seven exhibits the variables that were most commonly used in MOOC Adoption research. In terms of independent variables, perceived usefulness and perceived ease of use were highly studied with thirty-two and twenty-six publications, respectively. After that, attitude and self-efficacy were studied in fifteen and fourteen articles, respectively. Behavioral intention, attitude, and satisfaction were widely used mediators with nine, eight, and five studies respectively. Behavioral intention and continued intention were highly used dependent variables with twenty-five and twenty-one studies respectively.



Source: Author calculations

Figure 4: Country-wise publications

Country-Wise Publications

Figure four represents the distribution of the year-wise and country-wise number of publications. Asian countries account for leading publications and then the European countries during the period of 2015-2021. In terms of country, China leads the research output with twenty studies, followed by Malaysia with ten and India with eight studies. There are only two studies that have undertaken cross-country research (Alraimi et al., 2015; Lee et al., 2020).

4.4.3 Characteristics

This section describes the widely used constructs and the hypothesized relationships in MOOC adoption research.

Widely used hypothesized relationships.

Table eight represents the commonly studied hypothesized relationships in the MOOC adoption research. In sixteen studies, perceived ease of use impacting the perceived usefulness for MOOCs was studied. Perceived usefulness influencing behavioral intention was studied in fourteen articles.

Thereafter, attitude influencing behavioral intention and perceived ease of use influencing attitude were studied in ten articles.

Table 7: Widely used Independent and Dependent Variables

Independent Variables	No. of studies	Sample References
Perceived Usefulness	32	(Jo, 2018; Padilha et al., 2021)
Perceived Ease of Use	26	(Al-Rahmi et al., 2019; Teo & Dai, 2019)
Attitude	15	(Albelbisi & Yusop, 2019; Lung-Guang, 2019)
Self-Efficacy	14	(Gupta & Maurya, 2020; Shao, 2018)
Social Influence	12	(Mulik et al., 2018; Persada et al., 2019)
Satisfaction	11	(Alraimi et al., 2015; Aparicio et al., 2019)
Facilitating Conditions	10	(Chan et al., 2018; Tamjidyamcholo et al., 2020)
Performance Expectancy	8	(Mohan et al., 2020; Persada et al., 2019)
Perceived Enjoyment	8	(Tao et al., 2019; Tsai et al., 2018)
Effort Expectancy	7	(Altalhi, 2020; Fianu et al., 2020)
System Quality	7	(Albelbisi, 2020; M. Yang et al., 2017)
Course Quality	7	(Li et al., 2021; Pozón-López et al., 2020)
Service Quality	6	(Albelbisi, 2019; Yang et al., 2017)
Interactivity	6	(Ma & Lee, 2019; Zhao et al., 2020)
Confirmation	6	(Dai et al., 2020; Daneji et al., 2019)
Subjective Norms	5	(Yang & Su, 2017; Zhou, 2016)
Mediators	**No. of studies**	**Sample References**
Behavioral Intention	9	(Khan et al., 2018; Panagiotarou et al., 2020)
Attitude	8	(Razami & Ibrahim, 2020; Virani et al., 2020)
Satisfaction	5	(Joo et al., 2018; Lu et al., 2019)
Dependent Variable	**No. of studies**	**Sample References**
Behavioral Intention	25	(Al-Shami et al., 2018; Wong et al., 2019)
Continued Intention	21	(Mohamad & Rahim, 2018; Orehovački et al., 2019)
Usage	6	(Fianu et al., 2020; Tseng et al., 2019)

Table 8: Widely used hypothesized relationships

Hypothesized Relationships	No. of studies	Sample References
PEOU-PU	16	(Al-Adwan, 2020; Al-Rahmi, et al., 2019)
PU-BI	14	(Teo & Dai, 2019; Ma & Lee, 2019)
ATT-BI	10	(Zhou, 2016; Yang & Su, 2017)
PEOU-ATT	10	(Chan et al., 2018; Wu & Chen, 2017)
SI-BI	9	(Mohan et al., 2020; Tseng et al., 2019)
PE-BI	8	(Altalhi, 2021; Wong & Goh, 2019)
PU-SAT	8	(Daneji et al., 2019; Alraimi et al., 2015)
PU-CI	8	(Shao, 2018; Jo, 2018)
SAT-CI	7	(Joo et al., 2018; Chen et al., 2018)
EE-BI	7	(Fianu et al., 2020; Persada et al., 2019)
PEOU-BI	7	(Tao et al., 2019); Zhang et al., 2017)
PU-ATT	7	(Hsu et al., 2018; Virani et al., 2020)
BI-AU	7	(Panagiotarou et al., 2020; Tamjidyamcholo et al., 2020)
FC-BI	6	(Mulik et al., 2018; Wong & Goh, 2019)
CONF-SAT	5	(Dai et al., 2020; Lu et al., 2019)

PU – Perceived Usefulness, PEOU – Perceived Ease of Use, ATT – Attitude, BI- Behavioural Intention, EE – Effort Expectancy, PE – Performance Expectancy, SI – Social Influence, FC – Facilitating Conditions, SAT – Satisfaction, CI – Continued Intention, CONF – Confirmation, AU – Actual Usage

4.4.4 Methods

This section describes the sampling plan, nature of research design and the statistical techniques applied for data analysis. Table nine represents the sampling method and the sample type. Thirteen studies have applied convenience sampling, and only three studies have used random sampling. Few studies have not specified the sampling type. In terms of the sample type, students as respondents were studied in sixty-four studies, professionals in twenty-eight studies, and teachers in nine studies. Four studies did not specify the sample type. Several studies included students, professionals, and teachers as combined and generalised sample type (Dai et al., 2020; Li et al., 2021; Yang & Su, 2017).

Table 9: Sampling and Sample Type

Sampling Type	Frequency in Studies	Sample Reference	Sample Type	Frequency in Studies	Sample Reference
Convenient Sampling	13	(Liu & Liu, 2020)	Students	64	(Mohamad & Rahim, 2018)
Purposive Sampling	4	(Alraimi et al., 2015)	Professionals	28	(Wu & Chen, 2017)
Snowball Sampling	3	(Mulik et al., 2020)	Teachers	9	(Tseng et al., 2019)
Random Sampling	3	(Virani et al., 2020)	General	4	(Li et al., 2021)
Stratified Systematic Sampling	1	(Wong et al., 2019)			

Out of the seventy studies, only two of them used the Longitudinal approach (Gupta & Maurya, 2020; Razmerita et al., 2020), whereas all other studies had a cross-sectional approach for data collection (Mulik et al., 2019; Wang et al., 2020). In terms of data analysis, fifty-eight studies have used structural equation modelling, out of which thirty-eight have used PLS (Liu & Liu, 2020; Orehovački et al., 2019; Zhao et al., 2020), nineteen studies have used AMOS (Al Abdullatif & Velazquez-Iturbide, 2020; Pozón-López et al., 2020; Virani et al., 2020) and one study has used PLS-SEM in R programming (Li et al., 2018) as the data processing software. Multi-Group Analysis has been used for structural model assessment in three studies (Gupta, 2021; Teo & Dai, 2019; Wong et al., 2019). Romero-Frías et al. (2020) have conducted confirmatory factor analysis using LISREL and then applied cluster analysis to understand student motives for MOOCs. Dikcius et al. (2020) have used logistics regression to understand the role of social interactions and gamification on MOOC satisfaction. Seven studies have conducted multiple regression (Al-Shami et al., 2018; Ma & Lee, 2018). Padilha et al. (2021) have used Kruskal Wallis, exploratory factor analysis, and MANOVA for data analysis. Sidek et al. (2020) have used correlation and ANOVA for data analysis. Meriem & Youssef, (2019) have used exploratory factor analysis and correlation for determining the MOOC adoption by teachers.

5. FUTURE DIRECTION

One of the purposes for conducting this review was to propose the directions for future research of MOOC adoption. Table ten gives a snapshot for future directions picked from sevetny studies that were undertaken. The study has employed the Theory, Context, Characteristics, and Methods Framework (Paul & Rosado-Serrano, 2019) for identifying research gaps and avenues for further studies. The following sections explain the TCCM framework for future research:

Table 10: Future research directions proposed by extant literature

Sample References	Avenues for future research
(Kim et al., 2021; Mohan et al., 2020)	Analysing data on actual usage in terms of several site visits, navigation patterns, discussion forum engagements.
(Gupta, 2021; Shahzad et al.,	Integrate findings of the quantitative research with

2020)	qualitative studies.
(Pozón-López, et al., 2020)	Including marketing variables to understand the brand image, satisfaction, word of mouth, and loyalty for understanding the effectiveness of MOOC.
(Dai et al., 2020; Virani et al., 2020)	Testing and comparing different learner samples that influence the learning process for MOOC adoption.
(Aparicio et al., 2019)	Development of MOOC success model with a second-order formative construct.
(Tseng et al., 2019)	Investigation on different adoption stages of MOOCs.
(Fang et al., 2019)	Collection of panel data to study how social interaction affects MOOC learning engagement.
(Li et al., 2018; Joo et al., 2018)	Comparing user behaviour from different MOOC platforms.

5.1 Theory

This review presented that the TAM, ECM, SCT, UTAUT and ISS are the most frequently applied theories in MOOC adoption research. These and other theoretical frameworks studied in the extant literature help understand why, when, and whether users will accept MOOCs as an innovative learning technology. Apart from this, some different theories from other management domains could be applied for MOOC adoption research to give additional insights. Some of the theories that could be used in future for having a deeper understanding of MOOC adoption are Behavioural Response Theory (BRT), Technology Acceptance Model (TAM) 2 and 3, Hedonic Motivation System Adoption Model (HMSAM), Cognitive Load Theory, Technology Readiness Index (TRI), Innovation Resistance Theory (IRT). Some of these theories are explained below in understanding their future applications.

BRT posits the impact of 'reasons for and against' in determining the attitude, intention, and behavior (Westaby, 2005). The application of BRT is increasing in varying contexts over the last few years (Sahu et al., 2020). Since BRT is a context-driven theory, applying it for MOOC adoption can give a deeper understanding of reasons for and against MOOC adoption. MOOCs suffer from high user attrition, and BRT can explain the factors contributing to MOOC resistance that leads to high dropouts.

Apart from this, future studies could consider TAM 2 or TAM 3 for understanding MOOC usage. They extend the TAM and include external variables influencing the core determinants of perceived usefulness and ease of use. Such comprehensive application of external and core variables can be explored to provide more significant insights into MOOC adoption.

Future studies could also focus on integrating two or more theoretical models to form a unified theoretical framework like UTAUT2 and ISS Models. Such integrated models could capture the MOOC acceptance and success factors comprehensively and give an enhanced understanding of MOOC adoption.

5.2 Context

The findings of this SLR point that majority of MOOC adoption studies collected data from respondents belonging to Asian countries, whereas relatively few studies covered respondents from American and European countries. This shows that most studies were based from Asian countries with local MOOC platforms thus limiting the generalisability of these studies. Therefore, in further studies, more research on MOOC adoption should be focused on American and European countries by undertaking their cultural, geographic, and demographic contexts. Moreover, the majority of studies on MOOC adoption are for MOOCs in general and not with respect to any platform in specific. In other words, there is no specific emphasis on a particular MOOC platform that encapsulates its unique design and features. Future studies should undertake to unearth various features of different MOOC platforms and its impact on usage. A comparative study of various platforms could also be taken to understand the factors driving their usage. Few studies have also reiterated using actual behavioral data of MOOC users instead of self-reported use.

5.3 Characteristics

Further studies can examine the role of personal, group characteristics, and pedagogical factors for understanding the factors influencing MOOC adoption research.

Very few moderators like age, gender, education, etc. have been used in the past studies. Further studies could include the moderating role of demographic variables and personality characteristics like personal innovativeness, cognition, novelty-seeking traits for further analysis. Future studies could also include the role of learner experience in influencing the adoption of MOOCs. Including pedagogical or instructional design factors with technology, dimensions can be a promising study area for further studies.

5.4 METHODS

Future studies could focus on having a longitudinal research design for improving generalisability. All studies on MOOC adoption included in this review were quantitative in nature, where the survey method was used. Out of these, fifty-eight studies used the structural equation modeling technique for data analysis. For quantitative analysis, further studies could use other multi-variate analyses for a broader understanding of MOOC adoption like cluster analysis, discriminant analysis, MANOVA, logistics regression, etc. Future studies could also use mixed-method and qualitative research for unearthing deeper insights on dimensions influencing MOOC adoption. Qualitative research techniques could reveal deep underlying factors influencing MOOC adoption that the past studies have not yet captured. Experimental research designs can also be an area of future research.

6. ACADEMIC AND PRACTICAL IMPLICATIONS

The MOOC adoption literature was systematically studied and integrated to understand the development of the from 2015 onwards. This research has numerous academic and practical implications. Firstly, the study identified the highly cited work, the journals, and the country of origin thereafter, it highlights widely used theories and constructs in the area of MOOC adoption research. Secondly, the SLR provided a retrospective view of the research in MOOC adoption that could help researchers extend the line of the work. Thirdly the potential gaps highlighted in the study can be an area for future studies for scholars. This study has also suggested several areas for future research using varying theories and a combination of MOOC adoption. The proposed research avenues can help in furthering the knowledge and understanding of MOOC adoption.

In terms of practical implications, this review will be helpful for MOOC platform providers, universities, and facilitators for building, designing, and disseminating effective MOOCs. This study has identified several variables from the literature that contribute towards MOOC adoption research. This can help all the stakeholders to understand its relative significance. Such knowledge can help them imbibe into developing MOOCs and improve its adoption. Applying various theoretical models to understand MOOC adoption, as seen in this SLR, can enable practitioners to influence the usage of MOOCs.

7. LIMITATIONS

The present research has few limitations. Firstly, this study has considered only those articles published in the English language. Secondly, this study excludes the grey literature (Adams et al. 2017), that includes conference papers, thesis, book chapters, practitioner notes, trade articles, newsletters, working papers, company reports, etc. Thirdly, this SLR is limited to the search terms appearing in the abstract, title, or keywords applied in various databases. Since this is an emerging area, this study considered relatively few numbers of papers.

8. CONCLUSION

MOOC literature has been reviewed in the past with a primary focus on pedagogical aspects. There is hardly any review that has included the extant studies on MOOC adoption and hence, does not provide the updated state-of-the-art of MOOC adoption research. The current study is the first attempt in conducting an SLR on MOOC adoption as per the author's knowledge. This review has integrated studies on MOOC adoption by applying the TCCM framework and using a structured, systematic review of seventy research articles on MOOC adoption indexed in either WOS or Scopus list in the MOOC adoption research. This study identified research gaps and areas for further studies to advance MOOC adoption research. This SLR is a starting point for researchers, managers, and policymakers who might be interested in understanding more about MOOC adoption. The proposed future avenues can guide

research in new directions and expand the literature on MOOC adoption.

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Zhou, M. (2016). Chinese university students' acceptance of MOOCs: A self-determination perspective. *Computers and Education*, *92–93*, 194–203. https://doi.org/10.1016/j.compedu.2015.10.012

Appendix 1: 70 Articles included in this review

No.	Reference
1	Wu, & Chen, (2017)
2	Alraimi, et al., (2015)
3	Zhou, (2016)
4	Aparicio, et al., (2019)
5	Joo, et al., (2018)
6	Yang, et al., (2017)
7	Khan et al., (2018)
8	Tsai et al., (2018)
9	Huang, et al., (2017)
10	Persada, et al., (2019)
11	Yang & Su, (2017)
12	Ma, & Lee, (2019)
13	Al-Rahmi, et al., (2019)
14	Dai et al., (2020)
15	Shao, (2018)
16	Tawafak, et al., (2018)
17	Zhang, et al., (2017)
18	Fianu, et al. (2018)
19	Lung-Guang, (2019)
20	Hsu, et al., (2018)
21	Li, et al., (2018)
22	Fang, et al., (2019)
23	Zhao, et al., (2020)
24	Daneji, et al., (2019)
25	Lee, et al., (2020)
26	Albelbisi & Yusop, (2019)
27	Lu, et al., (2019)
28	Tao, et al., (2019)
29	Albelbisi, (2019)
30	Chen, et al., (2018)
31	Pozón-López, et al., (2020)
32	Tseng et al., (2019).
33	Al-Adwan, (2020)
34	Mulik, et al., (2018)
35	Dai, et al., (2020)
36	Ma, & Lee, (2020)
37	Jo, (2018)
38	Al-Shami, et al., (2018)
39	Teo, & Dai, (2019)
40	Shahzad, et al., (2020)
41	Albelbisi, (2020)
42	Pillai, & Sivathanu, (2019)
43	Mohan, et al., (2020)
44	Razmerita, et al., (2020)
45	Chan, et al., (2018)
46	Li, et al., (2021)
47	Fianu, et al., (2020)
48	Virani, et al., (2020)
49	Romero-Frías, et al., (2020)
50	Wong, & Goh (2019)
51	Sidek, et al., (2020)
52	Gupta, & Maurya, (2020)
53	Orehovački, et al., (2019)
54	Al Abdullatif & Velazquez-Iturbide, (2020)
55	Panagiotarou, et al., (2020)
56	Mulik, et al., (2019)
57	Tamjidyamcholo, et al., (2020)
58	Abdullatif & Velázquez-Iturbide, (2020)
59	Altalhi, (2020)
60	Gupta, (2021)
61	Wang, et al., (2020)
62	Meriem, & Youssef (2019)
63	Razami, & Ibrahim, (2020)
64	Padilha, et al., (2021)
65	Mulik, et al., (2019)
66	Liu & Liu, (2020)
67	Qi, et al., (2020)
68	Dikcius, et al., (2020)
69	Mohamad, & Rahim, (2018)
70	Kim et al., (2021)

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