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Review

Service Quality of Bus Performance in Asia: A Systematic Literature Review and Conceptual Framework

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Abstract: Bus services play a significant role as the main public transportation, especially in urban areas throughout the years. Since bus services compete greatly with other types of public transportation, such as e-hailing service and private vehicles, they have recently attracted scholars to conduct many relevant studies. However, most past research studies in the Asian region were not focused on engineering, social science, and Internet of Things (IOT). This present study concentrated on the service quality of bus services in Asia by using systematic literature review of articles. This study conducted a review based on previous studies, specifically on the service quality of performance. Several previous studies were selected by using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRIMSA) approach. SCOPUS and Science Direct were chosen as the main journal database. By using this method, 41 articles were selected for further analysis. This study was merely focused on three primary themes, such as study approach, stakeholder, and service quality attributes. Advanced analysis on these primary themes was used to formulate another 18 sub-themes. All themes and sub-themes which reflected the significant impacts of service quality towards bus services were discussed in detail. This study had addressed several qualities of bus services of bus performance towards improvement of urban transportation polices. Lastly, several recommendations that could provide necessary knowledge and information for future research were presented.

Keywords: urban transportation; public transportation; bus services; quality of services; systematic literature review.

1. Introduction

Over the last decade, developed and developing countries in the Asian region forecasted a tremendous growth in urbanization n due to a process which was called as people's migration from the rural to urban areas [1]. The new development of urban areas and increased living standard had escalated daily traffic volume [2-3]. According to the World Health Organization emphasized that global urbanization is a process that is changing the social and environmental settings on every continent as population migration occurs from rural to urban areas, causing a natural demographic growth [4-5]. To cater the huge population demand and reduce daily traffic densities on road and highways [6-7], public transportation in urban areas were critical challenges, especially in growing developing countries and should be accessible for user age groups as well [8-9]. The congestion level carries several challenges in the urban mobility systems [10]. Recently, the competition with other sources of transportation had increased; hence to ensure that bus service is the preferred mode of travel from one place to another, the service quality of bus services need to be quickly revised. Insufficient public transit system can be relieved by providing a flexible travel mode choice [11].

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In addition, some researchers emphasized that previously bus services had given a significant impact on human's life and there is demand for an effective public transportation system to accommodate people's movement. The lack of research in assessing the public transport network in urban areas and its implication for urban mobility was also less emphasized by researcher [12]. Therefore, it is essential to conduct an in-depth analysis specific target on bus performance by measuring all related angles of services provided by operators specifically in terms of quality and understanding the passenger and user perceptions and expectations towards the services [13]. Passenger and user perceptions should be an essential factor for operator and authority to create a significant implementation on bus services in urban area [14]. Positive perspective towards specific transport mode often results in a higher travel satisfaction towards that transport mode [15].

On another note, the level of service (LOS) rating is a significant global assessment of the transportation infrastructure to determine the service quality according to specific elements [16]. Passenger feedback can help to improve the LOS criteria, quality, and performance [17-18]. A good service quality is defined as a development key for trade and commercial boosting because good quality not only must contribute to decrease the environmental impact, but also support the population growth capacity of places. In addition, the quality service assessment process involves subjective and heterogeneous data [19], limitation of last-mile network [20-21] and accessibility provided by the operator [22]. There are definitive gaps between quality standards set by transport regulatory authority and what bus operators could provide based on their obligations [23]. How policymaker dealing with a variety of interest and objective that characterize bus stakeholder by providing a significant impact on policies to measure service quality of bus services [24]. How to address the tension between policy formulation and operator view as both have their specific purposes on public transport and mobility as a service (MaaS) [25]. This research has provided some essential systematic literature reviews, including several significant attributes towards transportation polices, particularly when considering that research related service quality of bus performance is lacking. Therefore, various attributes should be reviewed and rectified to upgrade the quality of services, specifically in bus performance.

1.1 The demand for a systematic literature study

Researcher had addressed that the use of systematic literature review could elucidate for both quantitative and qualitative approach in a literature study. This approach comprised identifying, evaluating, and combining all necessary and accessible data to produce and generate outcome by using significant methods to engage towards the research questions. A systematic review would offer certain advantages in contrast to the conventional approach of literature review. The review method can be enhanced through a correct and transparent retrieving technique of the literature review. On the other hand, research bias can be reduced by having eminent topics and increased research scope with a notable objective. Apart from that, a systematic review encourages authors to develop significant evidence and produce a quality discussion [26].

For a moment, a substantial number of systematic literature reviews that were linked to studies of service quality are found all over the world. Unfortunately, studies conducted on service quality of bus services in Asia region are insufficient. Most available literature studies were focused on developed countries in European and American regions. Literature studies were also specific on three different perspectives, namely engineering, social science and Internet of Things (IOT) [27]. Several problems on current situations have led researchers to understand the existing issues that arise from related service quality of bus services, such as inconsistency on planned programmed, issues raised by stakeholder and ability of bus operators to manage bus services. Therefore, this study attempts to perform a systematic literature review on the pertinent studies to fulfil the gap by analyzing the outcome on previous studies of the service quality of bus services in Asia. The study was affected by each attribute of service quality. The present study is vital because current studies would provide current issues and problems related to stakeholder

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concerns in determining the quality of services, specifically on bus performance. Besides, this review would explain in detail the related reviewing processes which were adopted in this study, such as identification of keywords, article screening, article eligibility, and database usage. This method would facilitate potential researchers from recreating investigations, approving the understanding, or analyzing the extent of information [28]. Furthermore, this study is important because the peer literature review provides information that can assist researchers to deliver the prospects and understand future attentions that are related to service quality which necessitate attention from researcher and scholar in the future.

In this study, the main research question which led to current systematic literature review development was "How does service quality affect the bus performance in urban areas?". The principal focus of research was previously produced. Specifically, further explanation must be addressed to each attribute as a fundamental issue that affect the whole service performance because each attribute was predicted to significantly influence bus services in urban areas due to the high expectation of passengers and users. Furthermore, the necessity for conducting a systematic literature review of services quality will also discuss details in this study. Meanwhile, the following section will present a suitable approach on how to answer the formulated research question of this study. The third section would explain the systematic literature review process and synthesizes of scientific methods of previous studies as to identify, determine, and assess the significance of study on the service quality of bus services in Asia region. In the last section, the outcome from this study will discuss the counter measures in improving service quality of bus services by implementing specific policies that could be addressed by the future policymakers, authority, and regulators.

2. Material and Method

In this section, the selected material and method are explained in detail, which comprise five sub sections, namely PRISMA, resources, inclusion and criteria, systematic review process and data abstraction and analyses.

2.1 PRISMA

PRISMA is also known as a preferred reporting item for systematic reviews and meta-analyses was a notable approach for conducting a systematic literature review study. The basic approach in developing the literature review analyses requisite all authors to collect all necessary information and research material for researchers and authors to generate and determine quality and diligence of the review study. Furthermore, PRIMSA had highlight on the review report which evaluate randomized examination and this method had employed as a based procedure in development of systematic reviews for other types of research [29]. Besides, researchers emphasized that the PRIMSA approach is also ideal for environmental management fields due to well justified research question towards the needs of a systematic literature review. In addition, PRISMA had also been applied in medical studies and along the process inclusion and exclusion could be identified simultaneously for specific study fields. Therefore, PRISMA can review a comprehensive scientific literature database at certain periods, which allow a systematic search of keywords and terms related to the literature review regarding the service quality of bus services in Asia regions. The use of PRIMA allows future researchers to identify all issues and problems that should be addressed as future concerns about public transportation in an urban area review.

2.2 Resources

The present study on systematic literature review was selected from two dominant databases, which were SCOPUS and Science Direct. These databases are known as the main sources of research data and consist of more than 250 fields of study, including transportation engineering studies. In addition, the SCOPUS database has indexed almost

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34,346 peer reviewed journals of top subject fields, such as life science, social science, physical science, and health science. Journals that were indexed in SCOPUS had been reviewed yearly according to numerical measure based on research quality for every title. Meanwhile, the Science Direct database contributes access to a significant number of scientific databases, including engineering, science and medical.

This database currently provides more than 4,000 academic journals which were grouped into few themes, such as engineering and physical science, health science, life science, humanities, and social sciences. Although both databases could provide significant research and academic paper, yet there are no databases which are perfect or comprehensive so far. Previous research emphasized that researcher should regulate literature study by using various sources as to increase the possibilities to gain pertinent literature output [30]. Therefore, this study would oversee the literature study by using manual searching approach for both sources, in which considering these sources were well known and consists of journal articles related to transportation study.

2.3 The systematic review process for selecting articles

2.3.1 Identification

Selecting articles for the systematic review process consisted of three primary phases. Identification would be the preliminary step in developing the systematic literature review process. In this step, relevant articles to this study were identified. Similar and related terms were subsequently searched from other reliable sources, such as encyclopedia, dictionaries, thesaurus and previous research studies. Therefore, the search string was deployed on SCOPUS and Science Direct in February 2021 (Table 1) after all relevant keywords were identified. A significant number of papers from SCOPUS and Science Direct were retrieved (3,280 articles). A total of 2,568 articles were selected during the preliminary process.

2.3.2 Screening

The second stage of data selection was screening process. This process was to check and remove duplication of selected articles. Therefore, three articles were excluded in the first stage of screening, while 491 were screened in the second stage based on a few inclusions and exclusion criteria. In this study as only research articles from journals were selected because journals are known as primary sources of empirical data. Therefore, research articles in form of review, systematic review, meta-synthesis, meta-analysis, book, book chapter, book series and conference proceeding were excluded. Besides, the study focused on published English articles. Research articles that were published in last five years (2021–2017) and were focused on Asia regions were selected. Articles published on engineering, social science, computer science and stream science were also chosen to increase the chances of retrieving more relevant research articles. At the end of this stage, 403 research articles were excluded according to these criteria (Table 2).

2.3.3 Eligibility

The third stage of data selection was eligibility. A total of 741 of research articles were examined. Titles, abstracts, and main content of all selected articles were reviewed in detail to verify that all selected articles had complied with the inclusion criteria and were suitable for review. Consequently, 700 research articles were excluded at this stage as they did not rely on empirical dataand were not focused on urban public transportation, service quality of bus services or related to Asia countries and territories. Therefore, a total of 41 of research articles were further analyzed.

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Table 1. The search strings.

Database	Search String
SCOPUS	TITLE-ABS-KEY((“urban” OR “town” OR “ city” OR “ transport’’ OR “urban transport” OR “city transport” OR “public transport”) AND (“bus*” OR “urban bus*” OR “town bus*” OR “city bus*” OR “bus* service*” OR “stage bus*” OR “transit bus” OR “rapid bus*”) AND (“servic*” OR “qualit*” OR “servic* qualit*” OR “S” OR “qualit* of servic*” OR “level* of servic*” OR “qualit* standard” OR “qualit* classif*” OR “servic* performance” OR “bus capacit*” OR “servic* attribut*”
Science Direct	TS = (("transport" OR "urban transport" OR "city transport" OR "public transport") AND ("bus" OR "urban bus" OR "city bus" OR "bus service") AND ("Service quality" OR "quality of service" OR “Level of Service" OR "service performance" OR "Bus capacity" OR "service Attribute"))

Table 2. The inclusion and exclusion criteria.

Criteria	Eligibility	Exclusion
Type of literature	Journal (research articles)	Journal (review), book series, book, book chapter, conference proceedings
Language	English	Non- English
Timeline	Between 2021 and 2017	<2017
Countries and Regions	Asian countries	Non-Asian countries
Subject area	Engineering, social science, computer science and environmental science	Other than Engineering, social science, computer science and environmental science

2.4 *Extraction of data and advances analysis*

The integration review approach on selected papers was conducted. It was a specific review approach which further analysed and synthesised a combination from various research designs, namely quantitative method, qualitative method and mix method. This approach could transform a single type of research paper into quantitising qualitative data and qualitising quantitative data [31]. All types of research design were then selected. Next, appropriate themes and sub-themes were developed based on thematic analysis of selected research articles. The first theme development steps were compilation of data, whereby 41 designated research articles were analysed in detail to extract the output and statement which answered the research questions. In the second step, the research articles were grouped via a coding approach based on the nature of data. These raw data were converted into applicable data through theme identifications, concept, and idea to identify the relevance of selected research paper [32-33]. Therefore, this approach developed of three main themes, namely study approach, stakeholder, and service quality attribute. Thereafter, the process in each of the created themes was resumed, whereby any theme, concept or idea which had identified the connection between each research paper within the same theme will produce a sub-theme. Therefore, 18 sub-themes were developed, and each theme were developed according to the finding of other co-authors within the extent of this study to maintain consistency of findings. Meanwhile, the entire data analysis process was recorded. Next, the results were also highlighted to address any inconsistencies in the theme development process. If the themes were inconsistent, further discussions were addressed accordingly. Lastly, several adjustments were made for the developed themes and sub-themes to ensure their coherence in this study. Two experts performed the expert review to corroborate the effectiveness of theme and sub-theme. One of the experts was a community development expert and other was a quantitative expert. This stage should be conducted to ensure the relevance, appropriateness and clarity of every

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theme and sub-themes. Adjustments were made based on the authors' feedback and comments.

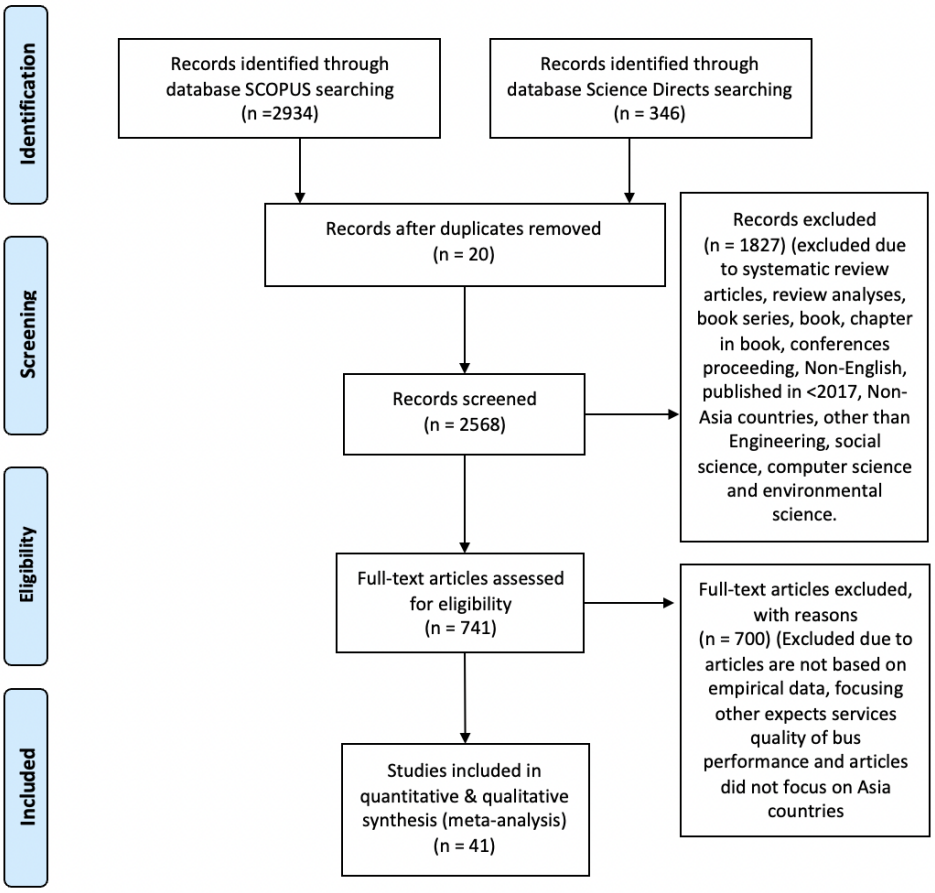

Figure 1. Flow diagram of adapted in this study.

3. Results

3.1 Background of the selected studies and general findings

The analysis produced three themes and 18 sub-themes related to service quality of bus performance. As presented in Table 3, the three themes were study approach (three sub-themes), stakeholder (two sub-themes) and service quality attributes (13 sub-themes).

More specifically, there were 19 previous studies which addressed the quality of services of bus performance in China, six studies examined the service quality in Malaysia and India. Meanwhile, three studies were conducted in Indonesia and two studies were found in Vietnam. Other studies included each from Jordon, Thailand, Japan, Turkey, and Iran (Shown in Figure 1). In the present study, about publication year, two articles were published in 2021, 15 articles were published in 2020), and nine articles were published in 2019. Next, seven articles were published in 2018, and eight articles were published in 2017. (Shown in Figure 2).

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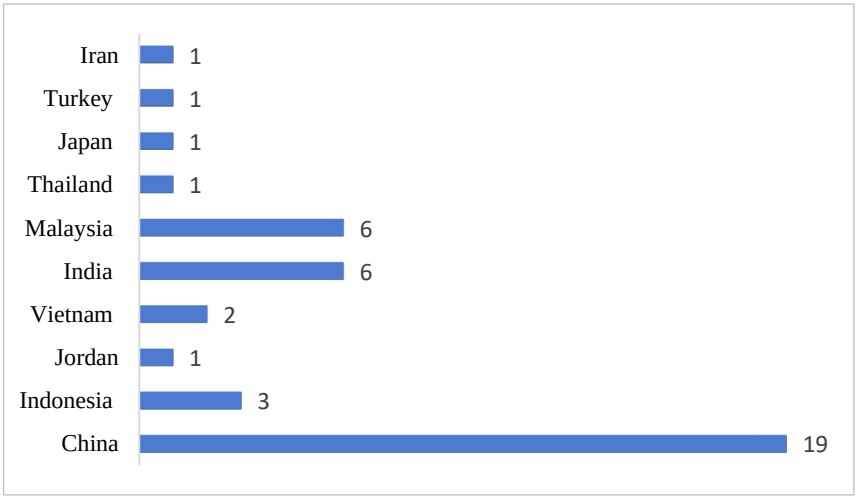

Figure 2. Countries where studies were conducted.

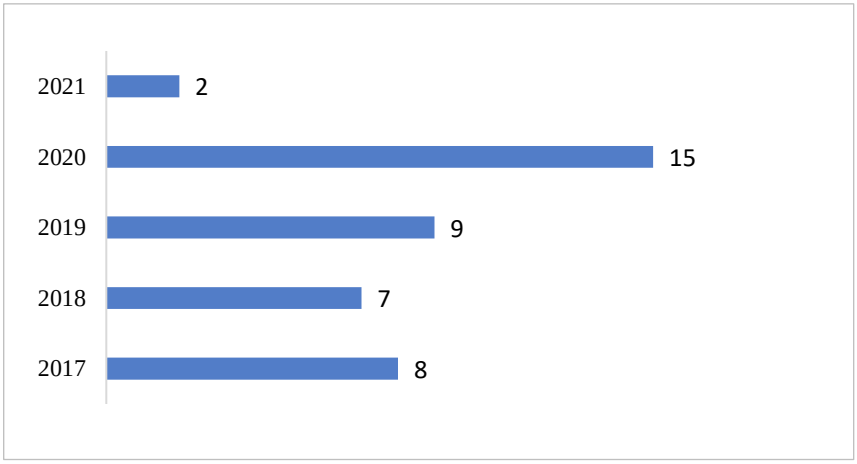

Figure 3. Year of publications.

3.2 Main findings

This section discusses in detail the study findings of the three main themes and 18 sub-themes. They comprised the study approach, stakeholder, and service quality attributes (Table 3).

3.2.1 Study approach

Study approach is one of the important steps to identify the types of pervious research studies that were related to service quality of bus performance. Though bus performance is part of engineering knowledge, specifically in transportation engineering, some parts of the service quality could also be considered as social science analysis. In this study, a total of 48 studies were selected. Generally, the studies were focused on service quality of bus performance in Asia. It should be specifically noted that engineering was under this theme (19 studies), followed by social science (21 studies) and Internet of Things (IOT) (20 studies).

3.2.1.1 Engineering approach

Service quality of bus performance is related to the engineering approach as several studies should be determined and measured by the engineering approach, for example, to measure the level of service (LOS) and determine the public services efficiency, especially in urban areas. The LOS criteria were developed by using service metrics, which classified each attribute into various classifications based on dissimilar thresholds. This quantitative LOS standards could be guidelines of transportation system, including bus

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services. LOS standards are very indispensable for every stage of transportation services and facilities evaluation, including preparation stages, design stages and operational stages. On the other hand, previous studies in China indicated that through the engineering approach, operators could decrease the waiting time and headway as the tremendous traffic volume was about 10 million trips per day. The tremendous traffic volume would cause traffic congestion and overloaded passengers, especially during peak hours in early morning and late afternoon. Pervious researchers had emphasized the importance of improving the efficiency of bus services because the improvement made could alleviate road congestion and decrease traffic volume, especially in urban and sub-urban areas and promote transportation mobility.

3.2.1.2 Social science

Social science approach was also partly used to determine bus performance by pursuing feedbacks and perceptions from customers and stakeholders. Bus performance should be continuously evaluated and assessed to ensure that the bus service could offer a significant movement for users and passengers, and thus could achieve their bus services satisfactory level. Previous research studies suggested the establishment of satisfaction matric from several social science perspectives [34]. The urbanization phenomena have increased the demand for transportation as people migrate rapidly from rural to urban areas [35]. In Asia, developing countries like Malaysia, Indonesia, and Vietnam, have densely populated urban areas and rely highly on public transportation. Previous studies justified that citizen choice behaviour should be considered when measuring possible attributes as variables (unobserved and observed) for bus performance. Unobserved factors such as identification of policy proposed by the authority, tolerance of systems and public apprehension should be added when assessing the service quality because these factors enhance psychological perceptions and mobility management actions in promoting the use of bus services.

Table 3. The main and sub- themes

Authors	**Studies Approach**			**Stakeholder**		**Service quality attributes**												
	E	SS	IOT	P	O	SF	SH	OT	PL	SC	HD	CV	RL	CF	SS	RT	SD	SP
Weng et al. (2018) (China) [36]		X		X	X			X			X	X	X	X	X	X	X	
Zhang et al. (2017) (China) [37]	X		X	X		X		X	X	X	X					X	X	
Saleh et al. (2019) (Indonesia) [38]		X		X						X						X		
Wang et al. (2017) (China) [39]	X		X	X	X	X				X	X					X		X
Li et al. (2020) (China) [40]	X				X	X		X	X							X	X	
Al-Hawari et al. (2020) (Jordon) [41]	X		X	X	X	X		X	X	X				X		X	X	X
Zuo etal. (2019) (China) [42]	X		X	X		X		X	X					X		X		
Abdullah et al. (2019) (Indonesia) [43]		X		X		X				X						X		
Liu et al. (2020) (China) [44]		X	X		X	X		X	X	X			X	X	X			X
Hou et al. (2020) (China) [45]		X	X	X	X			X	X		X		X					X
Tung & Hoang et al. (2019) (Vietnam) [46]	X		X		X	X					X		X	X				X
Basu et al. (2020) (India) [47]	X		X		X			X		X						X		

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Shukri et al. (2020) (Malaysia) [48]	X				X		X	X		X										X
Wu et al. (2020) (China) [49]	X		X		X				X	X								X		
Cheng et al. (2018) (China) [50]		X		X						X			X	X	X	X				
Huo et al. (2018) (China) [51]	X		X	X	X				X	X		X	X							X
Wang & Cao (2017) (China) [52]	X		X		X		X	X				X								
Wei at al. (2020) (China) [53]	X		X		X		X			X	X	X						X		
Zhao et al. (2017) (China) [54]	X		X		X		X			X								X		X
Zhou et al. (2020) (China) [55]	X		X		X		X					X						X		
Amrapala & Choocharukul (2019) (Thailand) [56]		X		X						X		X	X	X	X			X		
Ponrahono et al. (2017) (Malaysia) [57]		X		X			X	X		X										X
Minhans et al. (2020) (Malaysia) [58]		X		X			X				X	X	X	X	X	X		X	X	
Mou et al. (2020) (China) [59]	X		X	X			X		X	X		X		X	X			X		X
Wang et al. (2020) (Japan) [60]	X		X		X		X		X				X							X
Gogoi (2019) (India) [61]		X		X									X	X	X				X	
Cui et al. (2020) (China) [62]	X		X		X						X							X		
Ngadiman et al. (2020) (Malaysia) [63]		X		X	X								X	X	X			X	X	
Purba et al. (2017) (Indonesia) [64]		X		X			X							X	X	X				
Norhisham et al. (2019) (Malaysia) [65]		X			X		X	X	X	X	X	X						X		
Borhan et al. (2019) (Malaysia) [66]		X		X			X	X	X					X	X	X		X	X	
Canitez et al. (2018) (Turkey) [67]		X		X	X					X	X		X	X	X					
Li & Wang (2018) (China) [68]		X			X		X													
Zhao et al. (2020) (China) [69]	X		X		X		X			X		X						X		X
Suman et al. (2017) (India) [70]		X			X				X			X	X	X	X			X		
Sharma & Pandit (2021) (India) [71]		X		X			X	X		X		X			X					
Deb & Ahmed (2018) (India) [72]				X			X		X			X	X	X	X	X		X		X
Esmailpour et al. (2020) (Iran) [73]		X		X			X		X				X	X	X	X				X
Cheranchery & Maitra (2018) (India) [74]		X		X				X	X	X		X				X				
Nguyen-Phuoc et al. (2021) (Vietnam) [75]		X	X	X									X	X	X					
Wu et al. (2017) (China) [76]	X		X		X		X		X	X		X				X		X		

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Studies Approach	Stakeholder	Attribute of service quality			
E = Engineering	P = Passenger	SF = Service frequency	SC = Service coverage	CF = Comfort	SP = Speed
SS = Social Science	O = Operators	SH = Service hours	HD = Headway	SS = Safety & Security	
IOT = Internet of thing		OT = On time performance	CV = Convenience	RT = Route & Time travelled	
		PL = Passenger load	RL = Reliability	SD = Schedule	

3.2.1.3 Internet of Things (IOT)

Industrial Revolution (IR 4.0) leads every angle on people's life to relate to Internet of Things (IOT). IOT also plays a vital role in the bus system, especially in developed countries. In bus system IOT has many benefits, such as real-time information (RTI) which supports the passenger travel decision, optimization of bus schedule, designing a feeder transit to enhance the quality of service and measure the accessibility of bus services and many more. Demand for bus services by passenger could be increased due to technology improvement and IOT because passengers can obtain the routes and bus information about delays and expected trip durations, number of passengers and assists passengers to choose the optimum routes for their destination. Although the application of IOT would lead to additional cost for operators, but it is considered as a profitable move for a long-term period. On the other hand, IOT application could be applied in forecasting bus crowdedness level during peak hours as well as become a warning indicator for passengers and operators. Application of IOT should be optimised with engineering and social science to correlate with passenger and customer expectations and demands.

3.2.2 Stakeholder

Quality of service also describes the differentiation between service delivery and expectation of customer and users. Besides, to measure the quality of service is slightly difficult as compared to quality of product. Therefore, quality of service of bus performance should be measured based on stakeholders' perspective. Stakeholders have specific perceptions of service quality that they will typically use as a performance indicator that relates to bus services. The stakeholder perception level would affect the trustworthiness level towards bus services system. In this study, several studies which focused on stakeholder perception were identified and two sub-themes under the stakeholder themes were created, namely passenger (24 studies) and operator (24 studies).

3.2.2.1 Passenger

Satisfaction level with bus services plays a significant role in motivating users and customers towards bus services. Therefore, is it important to improve the quality of bus services regarding the satisfaction level of both urban and rural passengers. Passenger satisfaction towards bus services comprised several perspectives, such as perceptions, expectation, needs and demands of prospect customers within household income and social echelon. Besides, passengers commonly have direct involvement in good services delivery and operators would add several unexpected factors in delivering agood service. However, it is difficult to accommodate specific expectations and requirements for each passenger to reach their tolerance level for good quality of services. The diversity in demand and expectation towards bus services is subjective, which is greatly influenced by passenger travel behaviours, personality, and routine. The smoothness and effectiveness of services are factors that would develop trustworthiness towards bus services. Therefore, it is important to set specific guideline standards to measure and evaluate service quality of bus performance. Moreover, bus services had contributed a significant effort in attracting more passengers and users to use bus services.

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3.2.2.2 Operators

Bus service is usually operated by designated operators who are approved by the authorities and government. Operators would manage the daily operation of bus service parameters, including dwell time, headway, capacity, and driver's behaviours. The authorities have given right to operators for carrying the revenue and risk costs to operate bus services. Unfortunately, issues arise when less passengers use the bus services. This could cause a decrease in service quality because operators would receive their profit based on total number of passengers who have used their services. Without adequate number of passengers, private operators could not operate their business and provide a good service quality. Moreover, without the government funding and budget it will decrease the routes, service hours and daily frequency. Operators also should deliver a good service by providing well-trained drivers who would increase the efficiency of bus services. It should be highlighted that passenger and user trustworthiness and perceptions would increase by providing well-trained drivers. Drivers' good attitude and quality bus services by operators also affect the interaction inconsistent service delivery, which potentially result in unfavourable customer experiences and perceptions.

3.2.3 Service quality attribute

Service quality usually consists of specific elements or attributes. Each attribute will determine a different service quality parameter. In this study the services quality specifically on bus performance in Asia consisted of science and engineering attributes, as well as social science attributes, in which each attribute was addressed. Science and engineering would be measured based on quantitative transportation engineering measurement, while social science would be measured based on quantitative and qualitative studies about the passenger review and operator feedbacks. As previously mentioned, all selected studies would be differentiated based on specific sub-themes in service quality attributes, which resulted in 13 sub-themes, namely service frequency (26 studies), service hours (7 studies), on time performance (19 studies), passenger load (21 studies), service coverage (13 studies), headway (19 studies), convenience (11 studies), reliability (18 studies), comfort (19 studies), safety and security (11 studies), routes and time travel (24 studies), schedule (10 studies) and speed (13 studies).

3.2.3.1 Service frequency

Service frequency is considered as a very important factor which can influence passengers and users' decision. Service frequency of bus services is normally set up by service providers or operators, depending on level of demand by passenger and users. The frequency of bus services was directly proportionate to passenger transportation demand towards bus services as well as the location. Generally service frequency implementation was directly adopted to daily schedule and passenger expected the consistency of departure frequency by bus operators. Unfortunately, this expected should meet up the adequate number of demands by passenger. Therefore, the different and unbalanced distribution of passenger demand would affect the frequency for each route. Service frequency should determine how often potential passengers access the service transit. Several improvements were made to improve service frequency of bus services, such as optimisations model of bus frequency through algorithm solutions based on travel passenger and user demand. Providing adequate number of trips per day allow passengers and users to choose the optimum route to their destination. Service frequency should be added during peak hours in the morning as compared to evening because passengers and users are willingly to pay more to arrive at their workplace on time.

3.2.3.2 Service hours

Service hour is also known as duration of operations, which signifies to the total of hours of services daily, including day and night when the bus operated on the designated routes or segment from starting point until end of the designated routes. Besides, it also

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reports how passengers and users express their dissatisfaction towards service hours in the late afternoon and on public holiday due to less demand. Inadequate of bus service was also observed on the outside peak hour period, which affected the passengers and users who were employed for late shift. Besides, the longer hours of bus service should give passengers more flexibility in terms of their return trips, especially in urban areas and suburban areas. It is because many passengers and users would prefer to live in suburban and satellite town since the living cost in downtown areas is too expensive. Operators and the authority are highly suggested to continuously seek for feedbacks and perspectives from passengers.

3.2.3.3 On time performance

On time performance of bus services is also known as punctuality on services according to the schedule. Normally, one time departure will be considered if the bus departs between 0 – 5 min, as stated in the schedule. Besides, on time performance is defined as the number of on-time bus trips divided by all bus trips for the study systems. Many people refused to take bus services as their primary transport option due to the availability of the bus services when people needed the services especially outside peak hours period. Researchers suggested that small and medium cities have very little resources and less monitoring on the level of service as on time performance. For example, studies conducted at State of Assam, in India showed on time performance level with the level of service (LOS). Moreover, the optimal number of on time performance should reflect the satisfaction of passengers and users, while lack of on time performance will cause dissatisfaction in services.

3.2.3.4 Passenger load

Passenger load is an attribute that refer to number of passengers who managed to get a seat when boarding the bus and passenger load also addressed the level of crowdedness on the vehicle. Passenger load analysis is suggested to be conducted during peak hours, non-peak hours, weekdays, and weekends to analyse the number of passenger load, as well as the service provided by operators. Operators should try to utilise the maximum bus capacity while considering the constraints in number of seats and available buses. In addition, researcher also suggested an adjustable bus services by using optimisation model to increase the efficiency of bus services by implementing multitargeted stations, including passenger demands, bus capacity and transportation network. The capacity demand should be continuously assessed as demand reached the maximum, especially during peak hours. Therefore, operators are highly recommended to increase the frequency number because lack of bus capacity will increase passenger waiting time at stations and bus stops.

3.2.3.5 Service coverage

Bus operators are looking at expending their services and service coverage by adding new routes. The aim is to increase the number of customers and upgrade the company brand image by serving as many customers as they could. Surveys were conducted on stakeholder's perceptions towards bus services in Klang Valley area. The results showed that most participants voted for 'Good and Medium' feedback with 40% and 35% of respond, respectively. Internet of Things (IOT) application was suggested to be applied as to increase the service coverage of bus performance. For example, the index weight used to increase the accessibility and service effectiveness of bus services with data envelopment analysis (DEA) was determined by an optimisation model, which maximised the service coverage for disadvantaged customers (i.e., elderly, children, disabled). Good service coverage could be accessible with other transportation hubs (such as rail stations, airports, intra city stations), in which passengers and users can easily use for bus services. Previous studies on public perceptions were done in Johor Bahru, Malaysia based on

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user's travel behaviour, which reported that passengers and users were satisfied with the total service network coverage.

3.2.3.6 Headways

Headways was described as interval between two consecutive of bus departures or arrivals. Inconsistent of headway and bus bunching were frequently experiential in bus services, while holding control is one of the significant options to decrease bus bunching and improve service performance. The mean of bus headway was proven to have a positive linear relation with waiting time at the bus station. On the other hand, the implementation of quasi first depart first holds (FDFH) approach in schedule design and headway-based holding control allows over taking of headway and decrease of both waiting time and on-board travel time. However, the correct fleet size for each route should be used to serve passenger effectively by providing adequate headway and less waiting time at terminal and bus stops. Therefore, headway can be regarded as an indicator to evaluate the behavioural intention (transit passenger perceptions) and the elasticity of bus services quality. In addition, the average of headway for bus services demonstrated in Harbin, China was average of 12 minutes outside peak hours, and it was decreased to 8 minutes during peak hour periods (morning and afternoon) due to the high-volume of passenger and users.

3.2.3.7 Convenience

Convenience is also an attribute that focuses on passenger and user perspectives. A pervious study had identified a sub-component of convenience attributes which comprised frequency of bus services, convenience alighting and boarding, and seats availability. Most researcher addressed the facility convenience, travel convenience and information services classified in the second level indexes of convenience. As opposed by other researchers, convenience attributes should be concerned about transfer time and transfer distance for passenger. Even, the sub-attributes might be different between all studies on this attribute, but the feedback will still come from passengers and users who were customers for the bus services. Pervious researcher had conducted a study by using importance - performance analysis (IPA) approach showed that convenience attributes was received of 90% confidence level, and it can be classified in quadrant II of IPA analysis grid. A researcher from China addressed that the score of convenience to the overall satisfaction was 78.7% towards bus services in Beijing, which was determined by two important circumstances, namely routes and bus type. Convenience was also justified as perceived quality of bus services. Besides, convenience of bus services was part of the attributes that affect the bus passenger perception of service quality in developing countries.

3.2.3.8 Reliability

Reliability of service reflects the ability of transit to depart and arrive on time. Reliability of service is more to trustworthiness of passengers and users towards the bus services. Absolute value of the difference in arrival time is to compare the on-time performance with other public transportation modes. Meanwhile, reliability should refer as the actualization rate of scheduled trips. For example, the Government of Turkey through Istanbul Electricity, Tramway and Tunnel General Management (IETT) launched a policy throughout economic initiative for operators to encourage operators to maximise the users and passengers for every trip. However, the specific schedule regulated by IETT had clearly influenced the net income of operator. Besides, it is also important to highlight that the reliability of service would be an important factor to attract car users and it significantly affect individual perceptions, motivations, and context. Several factors were shown as reliability indicators, for example, line category, bus type and number of stops. Particularly, line category was the most significant factor towards reliability indictors on bus service [69]. A researcher had developed an optimisation model on measuring the reliability indictors and the results showed that service reliability was improved by decreasing

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the passenger and user waiting time. Besides, the variance of stop service interval had reduced and simultaneously improved the reliability of stop-skipping operation.

3.2.3.9 Comfort

Comfort is shown as a valuable attribute in determining service quality of bus performance. A study conducted in Indonesia showed that the comfort attribute was the most recommended aspect to improve customer satisfaction towards bus services in Yogyakarta, Indonesia. Generally, comfort should be assessed by total of halts, flexible to routes adjustment and waiting time. Besides, the study on comfort level of passengers and users in Delhi and Mumbai, India showed that public perception responses revealed the high comfort level towards bus services in Mumbai as compared to Delhi, which represented 1.266 and 1.534, respectively, of the relative like hood. The studies also addressed the enhancement of comfort level would generate the satisfaction feeling by passenger and users towards bus services. A study confirmed that the sub-attributes of comfort which were appointed by passengers and users were bus condition, comfortability of seat, cleanliness, and behaviour of staff. Therefore, it is necessary for operators to rectify all sub- attributes addressed by passengers and users.

3.2.3.10 Safety and Security

Selection of transportation mode would be based on the safety concern by passenger users. Implication of negative incident such as unprofessional behaviour of employees and punctuality could decrease customer trustworthiness towards the bus services. Studies that were done in India had justified that passenger were not fully satisfied with safety issues due to lack of safety information and guidelines in most buses. The urban bus safety can be increased by addressing the security concerned at the bus halts and in bus as well, in which some of the service aspects were not performed as per stakeholder expectation. Studies done in Tehran, Iran justified that 95% confidence level of satisfactory performance were raised by passengers and users had point out their security concern at the bus station and en route in the bus. On the other hand, studies done in India showed that safety and security of the city bus were classified as level of service (LOS) 3 or "C" which caused a bad perception towards bus services. Due to safety and security concern passengers and users would select the best daily transportation mode, especially amongst women passengers and users.

3.2.3.11 Routes and time travelled

Routes for bus services are normally proposed by operators and approved by authorities. Besides, it is impossible for operators to easily increase the potential of routes due to operational cost restriction and adequate number of passengers. The routes can also be evaluated by total distance travel, number of stops and time travelled for each journey. Moreover, passengers and users travelled time, which is known as access-egress time, is listed as essential factors to determine passengers' preference. The importance for operators to provide necessary information to passengers and users. They have developed a location tracking information system which allowed passengers and users to make a proper planning and estimate time to travel before their journey starts. Issues found that there were different demands by passengers and routes for a specific segment for each route, which presented the unbalanced distribution for the number of empty seats for the whole journey. Normally these issues happen on feeder route, high demand passenger but with less frequency. Therefore, it would decrease the efficiency of bus performance.

3.2.3.12 Schedule

Schedule for bus services is preliminary information provided by operators for passengers and users to plan their journey. Currently, some developed countries have developed the schedule together with real-time information. This latest improvement helps in travel planning. Studies had done in nine cities in Malaysia suggested a very weak

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significant value of bus speed service quality with R value of less than 0.20. A Survey session were conducted by Assam State Transport Corporation (ASTC), India mentioned that 95% of the respondents addressed the issues on availability of time schedule for running bus at bus stations and most of the buses did not depart as per predetermined time schedule. Unsatisfaction with the schedule provided by operators was also expressed by people in Johor Bahru, Johor. The schedule is considered as crucial information and it is important to attract people to use bus services. People would prefer to use other alternatives such as private transport, and e-hiling due to insufficient information provided by operators.

3.2.3.13 Speed

Speed of bus would be justified as attribute that represent driving behaviour of bus driver, which is ultimately observed through the movement of buses. The average travel speed was employed as a performance metrics and service characteristics for each route. Previous studies done in Malaysia found that the level of service for urban bus services in Malaysia was level C. which caused a small increase in traffic; hence, causing a substantial increase in approach delay, and thus the decrease in arterial speed and bus speed is also affected by the bus condition. The speed difference between two buses also causes reliability degradation. Previously, driving behaviour of bus drivers can only be analysed by seeking passenger and user perceptions. But today, operators and the authority can also monitor speed of buses by using global positing system (GPS) and development of web-based information system. A study in China had proposed bus rapid transit (BRT) fuzzy level of service (LOS) criteria for different passenger groups. The study applied user and passenger perceptions to revaluate the LOS of speed attribute for bus rapid transit (BRT) as a comparison with the existing guidelines.

4. Discussion

Systematic analyse had been conducted on the existing literature study of service quality of bus performance in this study. High volume of traffic users has caused major traffic congestions all over the world, especially in urban and sub-urban areas. It is important to capture all possible opportunities to decrease the number of traffic users by improving the bus performance in urban areas. A meticulous analyses sourced from both databases (SCOPUS and Web of Sciences (WOS)) had captured 41 research articles linked to service quality of bus performance. The systematic literature review findings demonstrated a collective set of case studies on transport policy, specifically on several attributes of bus performance in Asia regions. The review developed three themes and 18 sub-themes. Study approach, types of stakeholder and service quality attributes were three main themes selected in the study.

Service quality for bus services had been focused by many research studies for both developed and developing countries. Bus services play a significant role as a solution to mitigate traffic congestion in urban cities for developed and developing countries. As justified in the previous section, most researchers from developed countries, such as China and Japan were more focused on engineering and Internet of Things (IOT) approach. In contrast, researchers in developing countries, for instance, Malaysia, Iran were focused on social science studies. Yet, there were some social science studies that were also produced in developed countries and vice versa.

On the important note, research in government through public transport regulator in developed countries had moved forward in implementing specific policy to optimise engineering knowledge combined with technology and Internet of Things (IOT) approach to solve issues on service quality of bus performance. For example, a researcher from China had proposed the modelling of bus delay at bus stops by using three types of delay which can be estimated by using occupy-based delay, transfer delay and block-based delay. Similarly, a model had developed which can predict bus stop for each route using stop-skipping approach with capacity limitation. This model had used holding strategy as a control the gap of stop serving rather than bus headways by utilising genetic

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algorithm integrate with Monte Carlo simulation as to increase the stop services stability and reduce extricate passenger and user travel time. Comparably, researcher from Dalian, Japan also investigated the effect of customised bus application towards public transportation systems by using regression models and multinomial logit model. The results showed that these services significantly improved the travel experiences in all aspects. Another study was done by developing a system which incorporated all the necessary information, such as buses, assigning drivers, stops, schedules and trips [77].

Other than that, most researchers in developing countries have expressed the significant concerns about improving service quality on passenger and user perceptions for customer satisfaction towards bus services. Customer satisfaction is a key element to measure the success of any public services which acts as a core variable and influences bus services. Although passenger perception is more likely on social science study, it is important to be addressed in this study to attract more private vehicles users to switch and use the bus services. As to accommodate the high demand of passengers and users for bus services, the authority and operators should effectuate in depth a significant policy on bus services which focuses on specific attribute, namely convenience, safe, and informative bus service [78]. Researchers had added social science attribute in the analysis to measure service quality of bus performance, such as comfort, reliability, safety, security and convenience, routes, and schedule. The importance of investigating the relation between passenger's individual characteristic and service quality perceptions. A significant relation between the impact of expectation and perception of passenger satisfaction had affect the overall service quality of bus performance.

On the other note, each attribute plays substantial roles to enhance the overall quality level of bus performance. For example, operators should provide sufficient frequency of bus services, especially during peak hours to cater the huge number of passengers and should reflect their operational cost as well. Long service hours might affect the performance of bus services if there is only one driver provided by operators for each route because a different total of passengers is covered at dissimilar times daily, which comprise different volumes of passenger (morning, evening, and off-peak hours). Trustworthiness factors towards bus services by passengers and users obviously depend on punctuality of bus services because the existing passengers and users would switch their transportation mode if operators and drivers could not provide services on time. Density of passenger's load were measured consists of the number of passenger seats and number of passengers for whole journey (seated and standing). As to measure the efficient level of passenger load, it should be noted that deceasing of jeopardy passenger on their bus ride would increase the connivence and comfort level of passenger on their journey.

The other aspect observed by researcher in previous study had assumed of marginal walking distance to bus stop as preliminary factors to access service coverage quality. In addition, a study had justified those headways of bus must reflects consistency of bus departure time and high value of were represent the irregularity concern of bus headway such as long interval of bus departure or arrival and bus bunching. Convenience attributes were also justified as socioeconomic attributes to analyse passenger and user perspectives towards bus services as the results showed that convenience was the critical influential indicator of passenger satisfaction. The country socioeconomic situation strongly affects the use of bus services, and the governments must adequately develop a policy to address this influence [79]. Besides, it is also important to highlight that the reliability of service would be an essential consideration to attract new passenger and it highly affected by motivations, passenger perception and service context [80]. Passenger addressed the discomfort had found in facility at bus stations, such as number of toilets, social facilities, waiting area and not fully air conditioned should be addressed by the authority and government. In addition, development of new strategies should continue as priorities bus services over private transportation and retains potential to invite additional passenger since attributes were shown to influence. Otherwise, the demand for bus services will continuously reduce if the government is still focused on policies which encourage people to use private means of transportation indirectly.

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Generally, safety indicator is mainly affected by types of line and bus as the types of the line have the most significant influence on security. Security attribute in bus services should comprise security of waiting, boarding, traffic and emergency management. Journey and time travelled would be different based on routes. For instance, the journey and time travelled would increase if the route consists of high-volume passenger and traffic density. Study also emphasized that real-time information should be provided with expected delays and routes schedule and details of bus. On the other hand, there was a reduction of 20% of bus speed during rush hour in the morning and late afternoon due to excessive of traffic volume on the road and passengers tended to choose other public transport modes because of the decreasing of bus speed and irregularity of stoppage time and speed of bus.

5. Recommendation

The outcomes and process of systematic literature review of this study had led to a few recommendations and suggestions which may be considered by other researcher for future studies. Firstly, more studies are needed to review service quality of bus performance in Asian territories and segregate the reviews between developing and developed countries. The study results showed that service quality of bus performance in developed countries (e.g., China and Japan) was more focused on engineering, system development and Internet of Things (IOT). Meanwhile studies on developing countries (e.g., Malaysia, Indonesia, Thailand, India & Iran) were focused on social science and passenger satisfaction towards bus performance. The process of systematic literature review should be addressed by future scholars by carried out advanced studies on service quality studies of bus performance in other regions (e.g., European, northern America and Oceania) because in this study only focused on two developed countries. Therefore, further investigation should be conducted because most of the studies only focused on service quality of bus performance in developing countries.

Secondly, other quantitative and qualitative attributes of service quality need to be given attention in the future research to figure out the effect of each attribute towards the overall bus performance. Furthermore, it is important to examine which attribute is related to engineering, social science, and Internet of Things (IOT) aspects as such to enhances the services quality of bus performance. These attributes increase the positive perceptions towards bus performance by passengers and users. Therefore, it can increase of passenger volume and users for urban bus services and the volume of motor vehicles in urban areas could be reduced.

Thirdly, it is highly suggested that furtherance should be done on the flow diagram which was proposed in pervious study regarding the process of retrieving research articles for future studies on systematic literature review. The current study had experienced a problem, whereby many articles were retrieved through this approach. On the other hand, additional effort and time were needed to download all research articles. Therefore, it was highly recommended to recheck all the articles once the screening process was done as to avoid duplication of articles. This approach might facilitate the author in managing the excesses number of articles in removing any duplication of articles that were retrieved from various sources.

6. Conclusion

The recent literature on bus services quality in Asia reflected a basic understanding of how each service quality attribute responded towards bus performance. This study proposed various contributions towards improvement of conceptual framework and particle knowledge of service quality of bus services. Furthermore, three main themes that represented bus performance in Asia was classified according to systematic literature review analyzed in this study. Study approach had classified as introductory approach in this study as this theme were described as a type of studies in determining bus services quality, namely engineering, social science and Internet of Things (IOT). Secondly, the theme refers to types of stakeholders who are related to bus services in study, specifically

passengers and operators. Lastly, the theme refers to service quality attributes which were described in detail for each attribute to examine the impacts of service quality for bus services in Asia. Therefore, 13 attributes were selected in this study. The results offered scientific finding knowledge and passenger perceptions in determining the service quality of bus services. This study also presents a strong case why the quality services of bus performance should be improved to rectify the mobility as a service (MaaS) in urban area is highly suggested. Looking beyond Asia region, it is an opportunity to continuous the research in this topic as it represents empirical evidence to share with policymaker. In terms of particle implications, it is clear from this research as well as existing literature that having a complex empirical output can assist policy decision and bus operators to develop effective strategies to improve bus services quality, specifically in Asian region. Additionally, the study can be repeated to determine the appropriate service quality of bus services thresholds that can be replicated in developing nations.

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