A SYNTHESIS FOR CONTROL THE QUALITY OF PUBLIC TRANSPORT DRIVERS

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Abstract:

Public transport development has many different perspectives in the changing societal conditions. Many countries have set different standards, especially the behavioural attributes of quality public transport drivers who seek to reduce the number of accidents and restrictions while operating. Hence, related issues can be synthesized with the following objectives: 1) To search for issues related to the quality assessment of the public bus driver's performance and 2) to analyze and extract the quality assessment issues of public bus drivers. This research was conducted through the qualitative research method that focused on the documentary analysis. The database was based on a research article by Science Direct from 2017-2021. A total of 180 articles were displayed by the search term "Driver Behaviour Questionnaire". In the next step, the researcher performed a detailed synthesis and revealed in-depth articles that clearly highlight the point. The remaining 46 journals out of 180 journals founde valuation support issues, we discovered the main points that could be further developed as a tool for assessing the quality of public transport drivers in the future. However, there are many issues to consider about driving quality to promote safe driving which is necessary to prepare for an increase in public transport users in each country.

Keywords -Transport, Public Transport, Driver Behaviour, Quality of Public Transport Drivers, Driver Behaviour Literature.

I. INTRODUCTION

Publictransportdevelopmenthasmanydifferentperspectivesunderchangingconditionsintermsoft echnology, economy, environment and etc. Many countries have adopted criteria to set standards to improve the quality of public transport appropriately, to be consistent with the circumstance in each country that advocates policymaking guidelines to control and develop public transport administration and development including a view to reducing accidents and harmful air pollutants. It is essential to prepare for public transport service, as it is predicted that public transport will be an important alternative when travelling. The key resource is public bus drivers; therefore, complex driving behaviors must be understood to promote safe driving [1]. Public bus drivers are key to good service delivery. It requires a systemic concept of multi-sector cooperation to improve road safety [2]. Hence, to enhance the quality for operation and possession of driving licenses, all unusual behaviors must be prevented[3][4].Having an assessment to build reliability and accuracy demonstrates the structure's performance and stability. Also, it can boost public driver morale [5] by adopting control standards to improve the quality of public bus drivers. In many countries, vehicle driving behavior assessment standards have been created as a guideline [6].

Many countries have set different standards, especially the behavioral attributes of quality public transport drivers who seek to reduce the number of accidents and restrictions while driving.

After synthesizing issues for control, the tools to develop public bus drivers are not only providing services but various types of public transport can also lead to the development of strategic tools for public transportation services, and this article will be widely helpful for quality assurance of public bus drivers.

II. RESEARCH OBJECTIVES

1) To search for issues related to the quality assessment of the public bus driver's performance.

2) To analyze and extract the quality assessment issues of public bus drivers.

III. RESEARCH METHODS

This research is conducted through the qualitative research method that focused on the documentary analysis. The database was based on a research article by Science Direct from 2017-2021. A total of 180 articles were displayed by the search term "Driver Behaviour Questionnaire".The next step is to select specificcontentsbysynthesizing46 articles which clear issues and relevant factors can be obtained to develop new research ideas in a concrete way.

IV. RESEARCH RESULTS

By searching the search term "Driver Behaviour Questionnaire", a total of 180 articles were displayed. From the content synthesis, it was found that the research article showed 6results from Driver Behaviour Questionnaire [7][8][9].The six relevant questionnaires areDriverSafetyCultureQuestionnaire,PublicTransportDriverBehaviorQuestionnaire[10],Eyse nck Impulsiveness- Venture someness - Empathy Questionnaire[11], Questionnaire for Subjective Asses ment of Works [12],The Karolinska Sleep Questionnaire[12],and Stanford Sleeping Questionnaire[8].

After that, 46 research articles were further synthesized in detail, then 15 results were found as demonstrated in table 1.

The study showed the differences in road use of drivers which could be segmented as follows: Driving knowledge, Religion, Culture, Personality, Engagement, Driving purpose, Environmental conditions, Weather, Health condition, Overview, Area, Gender, Experience, Driver age, Driving style, Symbols and Impulsiveness.

The table (Table 1 Summary of the accepted studies) below can provide details about how to define factors in each tool as follows:

1. Risky Driving Behaviour Scale (RDBS: DBQ+BYNS)

It can be used as a tool to make a clear prediction of a young driver's involvement in a collision by exploiting the Driver Behavior Questionnaire (DBQ) together with Risky Driving Behavior Scale (BNYDS), and conducting an Exploratory Factor Analysis (EFA)

Table 1: **Summary of the accepted studies.**

	RDBS (DBQ+BYNS)	DC	IIPIP	PCA	ERI	DBQ	DCQ	PSQI	MDSI	BYNDS	DAX	IDBS	BFI	PADI	PDBQ	Other attitude,	Variable	Fatigue	Factor	DAS	DSI	etc.
Driving knowledge																						
[40]							✓															
Religion																						
[16]			✓			✓																
Culture																						
[42]									✓													
[18][19][49]						✓																
Personality																						
[15]		✓				✓								✓								
Engagement																						
[41]							✓															
[6][22][21]						✓																
Driving purpose																						
[44]																✓						
Environmental conditions																						
[49][35]																	✓					
Weather																						
[45]																	✓					
Health condition																						
[23]						✓																
[46]																	✓					
[14]		✓			✓	✓												✓				

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Overview																			
[1]								✓											
[24][26]				✓															
[25][27]																✓			
Area																			
[28][29]				✓													✓	✓	
[43]									✓										
[30]				✓													✓	✓	
Gender																			
[43]									✓							✓			
[30]				✓													✓	✓	
Experience																			
[47]																✓			
Driver age																			
[2]							✓												
[31][32][33][34]				✓															
[13]	✓																		
Driving style																			
[4]																			✓
[3][6][32][21][36][48][33][37][38]				✓															
[5]				✓						✓	✓								
[17]			✓	✓															
[43]									✓										
Symbols																			
[5]				✓															
Impulsiveness																			
[5]															✓				

[13] To examine the factor structure of the tool that can be used with young drivers within their countries. Keyword research of this tool: Transient Violations, Mood Driving, Speeding, Fatigue, Distracted Driving, Seatbelt Usage and Close Following.

2. Demand-Control Model (DC)

It can be used as a tool for stress and fatigue monitoring in conjunction with driver behavior questionnaires (DBQs) adjusted to the driver's behavior, which can discover the relationship between working conditions and driver stress in drivers with risky driving behaviors

[14].Keyword research of this tool: Control, Psychological demands, Job strain and social support.

3. International Personality Item Pool (IPIP)

It can be used as a tool to monitor the relationship between personality and socially aggressive driving behavior, aiming to mentor drivers to be more considerate of others and to discover increased aggressive driving habits to find ways to prevent possible consequences. This aims to develop effective measurements of driving behavior and pass on useful results to be guidance for drivers to have good public driving behavior in each road traffic [15].Keyword research of this tool: Anger Altruism and Sensation Seeking.

4. Principal Component Analysis (PCA)

It can be used as a tool to examine the link between lifestyle and irregular driving behaviour of drivers of different religions and cultures. In some countries, especially the Middle East, the behavioural results revealed apparent differences than those in Europe and the United States.

The findings, therefore, reflect important differences in the way of life and religion that affect driving behaviour. DBQ can be used to analyze by simulating Structural Equation Modelling (SEM) [16]. Keyword research of this tool: Religion, Morality, Car hobby, Culture and Amusement.

Additionally, it can be used in conjunction with "PCA" and "DBQ" together as a tool to explore aggression and difficulty in driving which require emotional control that can pose serious risks, lack of inhibition, perception and deliberate bias toward negative arousal. As a sequence, it causes erroneousness and thoughtlessness to violate traffic rules [17]. Keyword research of this tool: Anger and nervousness (PCA), Aggressive and insulting (PCA), Obstinacy and revengeful (PCA), Errors (DBQ), and Violations (DBQ).

5. Effort Reward Imbalance (ERI)

As mentioned in Item No.2 Demand-Control Model (DC), the tool that can create the Effort Reward Imbalance (ERI) mechanism increases risky driving, which in some research has not yet been able to find a definitive answer about the relationship between stress and risks affecting health conditions[14]. Keyword research of this tool: Effort, Reward and Effort reward imbalance.

6. Driver Behaviour Questionnaire (DBQ)

The application of Driver Behavior Questionnaire (DBQ) in the literature review found that there will be a wide range of applications on issues such as religion, culture, personality, engagement, health conditions, overview, area, driver age, driving style and symbols. It is found that DBQ was adopted most to know the driving style. It is used as a tool to evaluate and explore the quality of drivers, with four main factors: Lapses, Errors, Ordinary violations

and Aggressive violations, in which many researchers used additional and similar-meaning DBQ factors with different keywords as follows:

6.1 Religion: Lapses, Errors, Ordinary violations, Aggressive violations [16].

6.2 Culture: Lapses, violations, Slips, [18].Errors, violations [19].Errors, Ordinary violations, Aggressive violations [20].

6.3Personality: Lapses, Errors, Ordinary violations, Aggressive violations, Positive behaviour [15].

6.4Engagement: Errors, violations, Positive driving behaviours, Inattention errors [41].Lapses, Errors, Aggressive violations, violations [6][21][22].

6.5Health condition: Errors, Ordinary violations, Aggressive violations [23].Errors, violations, Slips [14].

6.6 Overview: Lapses, Ordinary violations, Aggressive violations, Inattention errors, Inexperience errors [24] Ordinary violations, Phone use, Drinking when driving, Considering morning BAC, Tyre checking[25] Lapses, Errors, Ordinary violations, Aggressive violations[26] Unlawful driving (HCV), Risky driving (HCV), Egoistic driving (HCV+DBQ), Aggressive driving (HCV+DBQ)[27].

6.7 Area: Lapses, Errors, Ordinary violations, Aggressive violations [28].Errors, violations [29].Error making, Speedy driving, Aggressive driving, Attitude, Accident involvement [30].

6.8 Driver age: Lapses, Errors, Ordinary violations, Aggressive violations, violations [31] Lapses, Errors, violations [32][33][34].

6.9 Driving style: Self-willed violations errors, Distracted violations, Risky violations errors [3].Lapses, Errors, Ordinary violations, Aggressive violations, Positive behaviour [5].Lapses, Errors, violations, Aggressive violations [6].Lapses, Errors, violations [32].Lapses, Errors, Ordinary violations, Aggressive violations, violations, Norm lessens, Rule obedience [35].Lapses, Errors, Ordinary violations, Aggressive violations, violations [33][21][36].Lapses, Errors, Ordinary violations [33].Lapses, Errors, Ordinary violations, Aggressive violations, Positive behaviour [37].Reactions under anger – provoking situations, Measures to prevent road rage [38].Lapses, Errors, violations, Anger and nervousness (PCA),Aggressive and insulting (PCA), Obstinacy and revengeful (PCA) [17].

6.10 Symbols: Lapses, Errors Lapses, Ordinary violations, Aggressive violations, Positive driver behaviours [39].

7. Driving Cognitions Questionnaire (DCQ)

It can be used as a tool to measure driving anxiety levels, used in conjunction with the Driving Situations Questionnaire (DSQ) and Driving Behavior Survey (DBS) to be able to evaluate the driver's understanding of individual operations, and to be able reduce the anxiety

of the driver [40].Keyword research of this tool: Accident- related Concerns and Social and panic-related Concerns.

8. Pittsburgh Sleep Quality Index (PSQI)

It can be used as a tool to monitor the effects of poor sleep quality and crash involvement to measure the sleep quality and risky driving behavior. The analysis can test hypothesized models with Amos.22.0 software, structural equation modeling (SEM). This tool can help formulate policies such as building rest area, controlling driver working hours, and reducing driving pressure to reduce the likelihood of traffic problems [41].Keyword research of this tool: Subjective sleep quality, Sleep latency, Sleep duration, Habitual sleep efficiency, Sleep disturbances and Use of sleeping medication.

9. Multidimensional Driving Style Inventory (MDSI)

It can be used as a tool to study behaviors from cultures with different traffic rules and driving styles by using the 8-factor structure to study. It raises interesting questions for future research on comparing cross-cultural driving behaviors in different countries by using the confirmatory factorial analysis (CFA) [42]. Keyword research of this tool: Anxious driving style, Angry driving style, Careful driving style, Risky driving style, Dissociative driving style, High-velocity driving style, Distress-reduction driving style and Patient driving styleAlso, it can also be used as a tool to study driving styles to promote safe driving as overall, which can help determine the correct measures, and help understand complex driving behaviors [1].Keyword research of this tool: Anxious, Angry, Careful, Reckless and Dissociative

10. Behaviour of Young Novice Drivers Scale (BYNDS)

It can be used as a study tool to determine the extent of improvement in road safety of young drivers, especially to know variability by advocating systemic thinking about cooperation from different sectors to build partnerships. To obtain comprehensive results, engineering information should be enforced [2]. Keyword research of this tool: Risky driving exposure, Transient rule violations, Miss Judgment, Driver mood, Overcrowding the vehicle, Personal seatbelt use and Substance consumption.

11. Driving Anger Expression Inventory (DAX)

It can be used as a tool to study gender roles related to driving behavior in each area. It is a tool to measure anger expression and endorsement of masculinity or feminine traits that show various characteristics of aggression in other circumstances related to crash involvement [43]. Keyword research of this tool: Adaptive Constructive Expression, Verbal Aggressive Expression, Use of Vehicle to Express Anger and Personal Physical Aggressive Expression.

12. Impulsive Driver Behaviour Scale (IDBS)

It can be used as a tool to study driving styles that have important impulses in irregular driving and involve in impulsive collisions. It also relates to acceptance and conscience in the

traffic environment of each country [5].Keyword research of this tool: Functional impulsivity, Urgency, Lack of perseverance and Lack of premeditation.

13. Big Five Inventory (BFI)

As mentioned in Impulsive Driver Behavior Scale (IDBS)Item 12,it is used in conjunction with the Big Five Inventory (BFI) which is the survey of driver behavior [5].Keyword research of this tool: the factor soft his tool:Extraversion ,Agreeableness, Conscientiousness, Neuroticism and Openness.

14. Prosocial and Aggressive Driving Inventory (PADI)

As mentioned in International Personality Item Pool (IPIP) item no. 3, Prosocial and Aggressive Driving Inventory (PADI) can also be used as a tool to explore dangerous driving behaviors and the impact on road traffic between personality and socially aggressive driving behaviors as well in order to guide drivers to have thoughtful driving behaviors [15]. Keyword research of this tool: Prosocial driving and Aggressive driving.

15. Positive Driver Behaviours Questionnaire (PDBQ)

As mentioned in Impulsive Driver Behavior Scale (IDBS) item no. 12 and Big Five Inventory (BFI) item no. 13, the Positive Driver Behaviors Questionnaire (PDBQ) uses the tools to study the impulsiveness that affects driving in each country's traffic environment [5]. Keyword research of this tool: Ordinary violations, Aggressive violations, Errors, lapses and positive behaviour.

V. DISCUSSIONS

After reviewing the literature, the connection of various tools for enhancing the quality of driving behavior can be summarized as shown in the figure below. After synthesizing articles, 15 tools were found as shown in the diagram. Each tool was connected to evaluate driver behavioural various aspects. The study showed the differences in road use of drivers which could be segmented as follows: 1) Religion 2) Culture 3) Personality 4) Gender 5) Experience 6) Environmental Conditions 7) Weather 8) Driving style 9) Driver age 10) Impulsiveness 11) Health Condition 12) Area 13) Symbols 14) Driving Purpose 15) Driving Knowledge 16) Engagement and 17) Overview As mentioned in Table. 1.

The results of the synthesis revealed that the quality improvement of public bus driver behaviour could benefit from the tools when requiring passenger's life safety and service quality in parallel, as [40] measured driving anxiety levels using three different tools: Driving Cognitions Questionnaire, Driving Situations Questionnaire and Driving Behaviour Survey New Zealand demonstrates the accuracy that results can be used to further research to be guidance for the design of psychological treatments. [14] Studied the relationship between stress-related working conditions of Bus Rapid Transport (BRT) drivers in Colombia using

Demand-Control Model and Effort Reward Imbalance developed into a modified driver behaviour questionnaire.
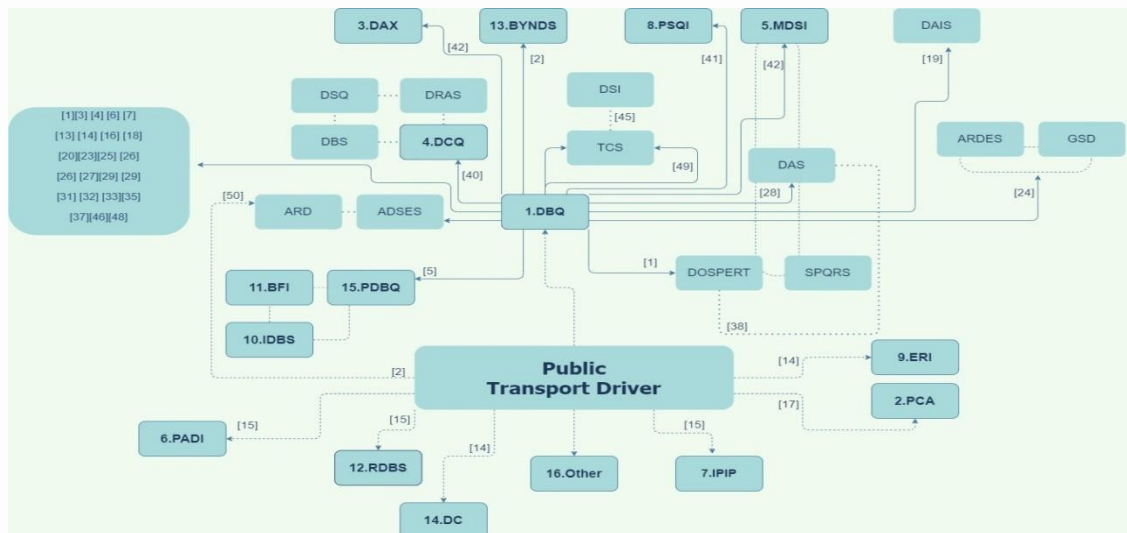

Fig. 1: Each tool was connected to evaluate driver behaviour in various aspects.

The findings can be useful in creating functional programs to reduce individual stress and fatigue, reducing risky driving behaviour and enhancing drivers' safety. [15] Examined the relationship between personality and socially aggressive driving behaviors using the International Personality Item Pool, Driver Behavior Questionnaire, and Pro social and Aggressive Driving Inventory, in China, which found that there was a different correlation between different personalities. [5] had evaluated the work morale of drivers, and it had a positive correlation with positive driver behaviour and some regular violations in China by using Driver Behaviour Questionnaire and Positive Driver Behaviours Questionnaire.

CONCLUSION

The synthesis of this topic helped to understand that the assessment of driver behavior can create a stronger safety strategy of public transport providers but could have a negative influence on road safety through higher awareness skills. Furthermore, it could be used as a precaution between drivers and pedestrians with irregular behaviors and could also be used to compare personality traits and driving behaviors in more than two countries as cross-cultural driving in different countries.

This synthesis facilitated the assessment of driver experience, increased driver safety knowledge, working environment improvement and sleep quality, unintentional error reduction and anger expression when driving.

Additionally, it can build confidence in relation to cognitive skills which can lead to different levels of assessment by taking part in driving practice in order to reduce driving mistakes and violations and to reduce traffic accidents as a basis for preparing for road use in conjunction with efficient professional driving.

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