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The National Public Transportation Driver Behavior Assessment Model

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ABSTRACT

Building a model for assessing the behavior and competence of national public transportation drivers taken from the competency standard for level 2 driver graduates based on the Indonesian National qualification framework, abbreviated as SKL. SKL has four competencies. The four competencies are called competency units. The first unit of competence is about attitudes and values, the second unit of competence is about ability in the field of work, the third unit of competence is about knowledge mastered and the fourth unit of competence is about rights and responsibilities. Each of these competency units has elements of competence and indicators for graduation. To design and build the model from SKL, code is given. Competency units are coded UK, competency elements are coded EK, graduation indicators are coded IK. The first competency unit is coded UK1, the second competency unit is coded UK2, the third competency unit is coded UK3, the fourth competency unit is coded UK4. From the SKL an assessment is carried out by the assessment team. The assessor team letter A indicates the assessment is carried out by passengers, the rater letter B indicates the assessment is carried out by e-learning, the rater letter C indicates the assessment is carried out by the coach, the rater letter D indicates the assessment is carried out by the supervisor. To assess by the assessment team using the Linkert scale. The Linkert scale uses statements strongly agree, agree, neutral, disagree, and strongly disagree. The statement strongly agrees is given a value of 5, the statement agrees is given a value of 4, the neutral statement is given a value of 3, the statement of disagreement is given a value of 2 and the statement strongly disagrees is given a value of 1. The model is designed using use case and class diagrams and implemented using PHP and Mysql.

Keywords: Driver, Competence, KKNI, SKL

1. INTRODUCTION

The background of the research is that the behavior of drivers in public transportation varies, some are good, polite and some are not. All driver behavior must have a standard of competence. Because whatever the various forms, the driver has a great potential to cause accidents, is not safe, is not orderly in traffic. The driver is a person who drives a motorized vehicle on roads that already have a driving license (Law No. 22 of 2009, article 1 paragraph 23) (Farooq et al., 2019).

The problems faced in the field are based on the results of a Focus Group Discussion (FGD) with the Indonesian Drivers' Family (KBPI) and the Greater Jakarta Drivers' Association (PPJR), on September 1, 2020. Drivers who drive their vehicles on the road face a lot of thuggery and unscrupulous people so that the driver spends a lot of money the additional payment for thugs and unscrupulous persons resulted in the income of the take-away driver being greatly reduced (Egeto et al., 2019).

The method used is to use a driver's assessment taken from the driver's competency standard level II, based on the KKNI, from the driver's competency standard which is assessed by the coach, supervisor and passengers. Drivers, supervisors, passengers answered using a Likert scale, namely to strongly agree was given a value of 5, agreed was given a value of 4, Neutral was given a value of 3, disagreed 2, strongly disagreed was given a value of 1. From the three raters, they are added up and the average is taken to get a score for each driver. After that, the Analytical Hirrachy Process (AHP) method is used to determine the ranking weight of the drivers based on the criteria used. The criteria used are taken from KKNI level II regarding driver competence. After that, use the recommender system to recommend drivers in terms of improving driver behavior and competence (Rosli & Hanan, 2018).

The purpose of this study is to identify what factors are needed to build a model for assessing the behavior and competence of national public transportation drivers, build a behavioral and competency assessment model for national public transportation drivers, adopt a model for assessing the behavior and competence of national public transportation drivers. , build system recommendations to improve driver behavior and competence (Cedex, 1996).

2. LITERATUR REVIEW.

A driver is a person who drives a motorized vehicle on a road with an obligation of having a driving license However, it is not yet efficient and effective to overcome the public transportation, as still occur in some underdeveloped areas where we can find drivers with high ego driving on the roads, plus with uneven mass transportation distribution, which this problem often occurs in the archipelago region. For this reason, the Ministry of Transportation is now developing 12 ports in the province of North Sumatra. The high use of private vehicles because the integration of the public transportation sectors is not built yet (Sundstro, 2020).

Lack of infrastructure and transportation facilities, there is no system that can break the use of private vehicles, while there is a number of services and facilities that pamper private vehicle users, the problem of air pollution, vibration pollution, noise pollution which cause the *conditions of public transport* poorly maintained, low level of driver awareness, lack of road's allocation management are the factor of traffic accidents (Markkula et al., n.d.).

Transportation problems in Indonesia are categorized into 4 categories, namely congestion, accidents, chaos, pollution There is a lot of thuggery, lack of government attention, many people on the road, not all drivers understand the traffic regulation, lack of attention to the driver's social security, people dress untidy, lack of personal hygiene, communication problem, carelessness of driving, even prone to harm passengers or others road users (Goudreau, 2019).

The number of traffic accidents involving public transport vehicles put the driver as the main cause. Taking this into account, road traffic safety should naturally become a national priority which needs to be improved urgently The results of the research showed that negligence in recognizing situations and negligence in making action taken decisions in driving were the dominant factors in human error (Zhang et al., 2019)

The results *of the research* showed that the variables related to safe driving practices were knowledge, attitudes, safety briefings, participation in safety driving training, and the role of supervisors, while the variables that were not related to safety driving practices were age, years of service, and the role of coworkers Based on daily phenomena, seen that many motorists violating the traffic signs. This behavior of violating traffic signs is an example of aggressive driving behavior that can *harm* other road users. The results *of the research* showed that there was a relationship between length of work, rest time, work schedule, and unsafe driving (Yan et al., 2020)

The model presented in this *research* shows that strategies to improve organizational safety culture can reduce the behavior of unskilled drivers and thus reduce the number of accidents. The results *of the research* showed that the main factors that influence driver performance that cause accidents are health, discipline, and driver competence (Yan et al., 2020).

The behavior of young male drivers in Saudi Arabia is classified into three categories: making mistakes, driving aggressively, and driving fast. Aggressive and fast driving behavior has a significant effect on accidents (Scott-parker & Oviedo-trespalacios, 2017).

Driving attitudes and skills are significant factors affecting driver accidents in China. The behavior of drivers in China can become safer if their skills can be improved and their attitudes towards traffic safety are changed (Oviedo-trespalacios et al., 2020).

Drivers in Norway demonstrate that there is a significant relationship between driver training, traffic safety attitudes, and driving behavior. There is a strong relationship between accident and exposure (measured as months of holding a license). The involvement of *new* young drivers is related to driving skills and safety attitudes and driver behavior (Yan et al., 2020).

This research aims to calculate the most significant driver behavior factors that have a critical impact on road safety. The well-proven Analytical Hierarchy Process (AHP) was applied to the 20 driver behavior factors examined in a three-level hierarchical structure. The predicted results suggested that road management authorities should focus on significant high-level driver behavior criteria to solve road safety problems for sustainable traffic safety (Manur et al., 2021).

Identifying and categorizing driver behavior using the Fuzzy Analytic Hierarchy Process (FAHP) can resolve the uncertainty of driver behavior. Test the driver behavior criteria that significantly affect safety for different traffic cultures such as in Hungary, Turkey, Pakistan,and China. The FAHP framework for comparing and measuring driver behavior criteria is designed on a three-level hierarchical structure (Zhou et al., 2020).

The proper description of driver behavior and evaluation with its context is a key factor for the efficient driving learning process. The results of the research showed that a series of patterns designed to evaluate the application of driving techniques can identify the wrong actions of the driver, so it can make recommendations to improve driver performance (Byun, 2020).

In this research, a hybrid of Discrete Wavelet Transformation (DWT) and Adaptive Neuro-Fuzzy Inference System (ANFIS) is used to identify overall driving behavior. These behaviors are classified into safe, semi-aggressive, and aggressive classes which are adopted by self-reported questionnaire results by the Driver Anger Scale (DAS) (Dobránsky & Pollák, 2021).

This research introduces a concept proposal to access driving behavior in public transport through Mobile Crowd Sensing (MCS), as part of a long-term research project on Advanced Public Transportation System (APTS). The proposed concept uses a mobile device accelerometer and a qualitative evaluation of passengers to identify aggressive driving behavior, which is believed to be a major factor in the occurrence of accidents and unnecessary fuel consumption (Suphavilai et al., 2021).

Conceptually, each qualification level in the IQF is composed of six main parameters, namely (a) science, (b) knowledge, (c) practical knowledge (know-how), (d) skills, (e) affection, and (f) competency. The six parameters contained in each level are arranged in the form of a description called Qualification Descriptors (Dhabi & Zaidy, 2021).

In the field of driving a motorized vehicle, there are several provisions that become references related to the preparation of SKL, namely. 1. Legislation of the Republic of Indonesia Number 22 of 2009 concerning Road Traffic and Transportation 2. National General Safety Plan (RUNK) 3. Presidential Instruction Number 4 of 2013 concerning the Road Safety Action Decade program 4. KAPOLRI Regulation Number 9 of 2012 concerning Letters of Driving Permit (Rehrl et al., 2014).

SKL is a qualification standard for graduation abilities that includes attitudes, knowledge, and skills as stipulated in Kepmendiknas Number 23 of 2006. This is important so that students who have received training truly gain competence as motorized vehicle drivers. The IQF-based Graduate Competency (Firat, 2018).

Standards are stated by three parameters, namely: 1. Competence: Competence is the accumulation of a person's ability to carry out a measurable job description through a structured, independent, and responsible assessment in the work environment (Khodadin & Pudaruth, 2020).

The Element of Competency: a detailed competency statement 3. Graduation indicators: elements as the parameter to measure the success of a graduated student whether is competent or not, for SKL competency standards are in table 1,2,3,4 (Series & Science, 2021).

3. TABLES AND FIGURES

Table 1,2,3,4 is the standard of competence of GRADUATES COMPETENCY STANDARDS BASED ON KKNI DRIVING PROFESSIONAL BEGINNERS LEVEL II and CURRICULUM OF MOTOR VEHICLE DRIVING COURSES AND TRAINING FOR BEGINNERS LEVEL II.

Competency standards for level II KKNI graduates consist of competency units, competency elements, and graduation indicators.

Table 1. regarding attitudes and values. consists of competency units, competency elements, and graduation indicators

Table 1 attitudes and values

Attitude and values (UK1)			
No	Competency Unit (UK)	Elements of Competence (EK)	Pass indicator (IK)
Attitude And Values	Building and shaping the character and personality of Indonesian people (Attitudes and Values)	Have faith in God Almighty	Always be alert in running the vehicle
		Have good morals, ethics, and personality in completing their duties	Polite in Vehicle
		Play a role in realizing good ethics and personality as citizens who are proud and love their homeland and support world peace	Does not cause harmful effects to passengers and other road users
		Able to work together and have high social sensitivity and concern for society and the environment	Comply with applicable traffic rules and regulations
		Appreciate cultural diversity, beliefs, and religious views and respect other people's original opinions/findings	Honest at work
		Uphold law enforcement and have the spirit to put the interests of the nation and the wider community first	Become a pioneer of road safety

Table 2. Regarding abilities in the field of work, consisting of competency units, competency elements, and graduation indicators

Table 2. Ability in the field of work

Ability in the field of work (UK2)			
No	COMPETENCE UNITS (UK)	Elements of Competence (EK)	Pass indicator (IK)
Ability in the field of work	Able to drive and control Motorized vehicle independently with Prioritize traffic safety and security (Ability in the Field of Work)	Identify the completeness of motor vehicle documents	Accuracy in identifying the completeness of motor vehicle documents
		Identify and use basic motor vehicle equipment	Accuracy in identifying and using basic motor vehicle equipment
		Identify and use vehicle cleaning tools and materials according to their designation	Accuracy in identifying and using vehicle cleaning tools and materials according to their designation
		Identify indicators and check engine feasibility components for motorized vehicles	Accuracy of identifying indicators and components of the feasibility of motor vehicle engine components (electrical and transmission instruments, oil, cooling water, air wipers, brake systems, and steering systems
		Identifying roadworthiness indicators on the outside of motorized vehicles	Identifying roadworthiness indicators on the outside of motorized vehicles

Table 3, Regarding Rights and Responsibilities, consisting of competency units, competency elements, and graduation indicators

Table 3 regarding Rights and Responsibilities

Rights and Responsibilities (UK4)			
No	COMPETENCE UNITS (UK)	Elements of Competence (EK)	Pass indicator (IK)
Rights and Responsibilities	Responsible as a driver in terms of the safety and security of drivers, passengers, and other road users and can be given the responsibility of guiding prospective novice drivers (Rights and Responsibilities)	Responsible for his work as a driver	Carry out the task of driving a motorized vehicle without any mistakes
			Caring for vehicles according to maintenance procedures
			Recording and communicating every important event in carrying out their duties
		Can be given the responsibility of guiding aspiring novice drivers	Explain safety standards and basic techniques for operating vehicles

Table 4, Regarding the knowledge mastered, consisting of competency units, competency elements, and graduation indicators

Table 4. Regarding the knowledge mastered

Mastered Knowledge (UK3)			
No	COMPETENCE UNITS (UK)	Elements of Competence (EK)	Pass indicator (IK)
Mastered Knowledge	Mastering procedural, factual knowledge principles of vehicles and light driving techniques (Knowledge mastered)	Mastering knowledge about driving etiquette	Implement traffic ethics in accordance with applicable rules
			Comply with traffic signs and signals properly
		Mastering the specifications, instruments, and indicators on the vehicle	Distinguishing vehicle specifications well
			Using instruments correctly
			Understand the indicators on the vehicle
		Understand the principles and techniques of operating motorized vehicles that are economical and environmentally friendly	Have knowledge of speed regulation, engine speed, wind pressure related to the principles and techniques of operating motorized vehicles that are economical and environmentally friendly
		Understand traffic rules and safety, occupational health and safety in driving	Implement traffic regulations and safety, occupational health and safety in driving
		Understand traffic rules and safety, occupational health and safety in driving	Carry out procedures and actions that are in accordance with the principles of service for children, pregnant women, parents, people with disabilities, and other passengers with special needs

The explanations from table 5 to table 8 are derived from tables 1 to 4 which are taken from GRADUATE COMPETENCE STANDARDS BASED ON KKNI PROFESSIONAL DRIVING BEGINNERS LEVEL II and CURRICULUM COURSES AND MOTOR VEHICLE DRIVING TRAINING FOR BEGINNERS LEVEL II.

Competency Standards of graduates based on KKNI for professional driving beginners level II, have a unit of competence. The 4 competencies are the first regarding the competence of attitudes and values. The second is about the ability in the field of work. The third is about the knowledge possessed, the fourth is about rights and responsibilities.

The competency unit consists of competency elements and graduation indicators. The abbreviation used for the competency unit is UK, the abbreviation for competency element is EK, and the abbreviation for graduate indicator is IK.

The first unit of competence regarding attitudes and values consists of 8 elements of competence and 6 indicators of graduation. The second unit of competence regarding the ability in the field of work consists of 27 elements of competence and 41 indicators of graduation.

The third competency unit regarding the knowledge mastered consists of 6 elements of competence and 11 indicators of graduation.

The fourth competency unit on rights and responsibilities has 2 elements of competence and 4 indicators of graduation.

The first competency unit regarding Attitudes and Values is coded Uk1, for competency elements it has 8 elements.

The first competency unit regarding attitudes and values is coded Uk1, for elements of competence having 8 elements of competence coded UK1EK1, UK1EK2, UK1EK3, UK1EK4, UK1EK5, UK1EK6, UK1EK7, and UK1EK8. For graduation indicators, 6 graduation indicators are coded UK1IK1, UK1EK2, UK1EK3, UK1EK4, UK1EK5, UK1Ek6. can be seen in table 5, colored dark blue.

The second unit of competence concerning the ability in the field of work for the second unit of competence is coded UK2, it has 27 elements of competence which are coded UK2EK1 to UK2EK27. has 41 indicators that have been coded UK2IK1 to UK2IK41.

The third competency unit regarding the knowledge mastered is coded UK3, which has 6 elements of competence, abbreviated as UK3EK1 to UK3EK6. Has 11 graduation indicators, abbreviated as UK3IK1 to UK3IK11.

The fourth competency unit regarding rights and responsibilities is coded UK4, having 2 elements of graduation coded UK4EK1, UK4IK2, and having 4 graduation indicators coded UK4IK1 to UK4IK1

Table 5 regarding attitudes and values, consists of 6 elements of competence and 6 elements of graduation indicators. for competency units coded UK1, for elements of competency coded UK1EK1 to UK1EK6. Graduation indicators are given UK1IK1 to UK1IK6

Table 5 Attitude and value (UK1)

No	Competency Unit (UK)	Code	Elements of Competence (EK)	Code	Pass indicator (IK)	Assessment
UK1	Building and shaping the character and personality of Indonesian people (Attitudes and Values)	UK1EK1	Have faith in God Almighty	UK1IK1	Always be alert in running the vehicle	D
		UK1EK2	Have good morals, ethics, and personality in completing their duties	UK1IK2	Polite in Vehicle	C, D
		UK1EK3	Play a role in realizing good ethics and personality as citizens who are proud and love their homeland and support world peace	UK1IK3	Does not cause harmful effects to passengers and other road users	D
		UK1EK4	Able to work together and have high social sensitivity and concern for society and the environment	UK1IK4	Comply with applicable traffic rules and regulations	C, D
		UK1EK5	Appreciate cultural diversity, beliefs, and religious views and respect other people's original opinions/ findings	UK1IK5	Honest at work	C, D
		UK1EK6	Uphold law enforcement and have the spirit to put the interests of the nation and the wider community first	UK1IK6	Become a pioneer of road safety	D

The 6th table regarding the ability in the field of work has 27 elements of competence and 41 elements of graduate indicators. for competency units coded UK2, for elements of graduate competency coded UK2EK1 to UK2EK41. The pass indicators are coded UK2IK1 to UK2IK41

Tabel 6. Ability in the field of work (UK2)

No	COMPETENCE UNITS (UK)	Code	Elements of Competence (EK)	code	Pass indicator (IK)	Assesesment
UK2	Able to drive and control Motorized vehicle independently with Prioritize traffic safety and security (Ability in the Field of Work)	UK2EK1	Identify the completeness of motor vehicle documents	UK2IK1	Accuracy in identifying the completeness of motor vehicle documents	D
		UK2EK2	Identify and use basic motor vehicle equipment	UK2IK2	Accuracy in identifying and using basic motor vehicle equipment	C, D
		UK2EK3	Identify and use vehicle cleaning tools and materials according to their designation	UK2IK3	Accuracy in identifying and using vehicle cleaning tools and materials according to their designation	C, D
		UK2EK4	Identify indicators and	UK2IK4	Accuracy of	B,C,D

			check engine feasibility components for motorized vehicles		identifying indicators and components of the feasibility of motor vehicle engine components (electrical and transmission instruments, oil, cooling water, air wipers, brake systems, and steering systems	
		UK2EK5	Identifying roadworthiness indicators on the outside of motorized vehicles	UK2IK5	Identifying roadworthiness indicators on the outside of motorized vehicles	C, D

Table 7, regarding the knowledge mastered, has six elements of competence and 11 indicators of graduation. Competency units are coded UK3, competency elements are coded UK3EK1 to UK3EK2, graduation indicators are coded UK3IK1 to UK3IK11

Table 7. Master Knowledge (UK3)

No	COMPETENCE UNITS (UK)	Code	Elements of Competence (EK)	code	Pass indicator (IK)	Assessment
UK3	Mastering procedural, factual knowledge principles of vehicles and light driving techniques (Knowledge mastered)	UK3EK1	Mastering knowledge about driving etiquette	UK3IK1	Implement traffic ethics in accordance with applicable rules	A,B,C
				UK3IK2	Comply with traffic signs and signals properly	A, B
		UK3EK2	Mastering the specifications, instruments, and indicators on the vehicle	UK3IK3	Distinguishing vehicle specifications well	B, D
				UK3IK4	Using instruments correctly	B, D
				UK3IK5	Understand the indicators on the vehicle	B, D
		UK3EK3	Understand the principles and techniques of operating motorized vehicles that are economical and environmentally friendly	UK3IK6	Have knowledge of speed regulation, engine speed, wind pressure related to the principles and techniques of operating motorized vehicles that are economical and environmentally friendly	B, D

		UK3EK4	Understand traffic rules and safety, occupational health and safety in driving	UK3IK7	Implement traffic regulations and safety, occupational health and safety in driving	B, D
		UK3EK5	Understand traffic rules and safety, occupational health and safety in driving	UK3IK8	Carry out procedures and actions that are in accordance with the principles of service for children, pregnant women, parents, people with disabilities, and other passengers with special needs	A,B,C

Table 8 regarding rights and responsibilities, has 2 elements of competence and 4 indicators of graduation. for competency units coded UK4, for competency elements coded UK4EK1, UK4EK2, for graduation indicators coded UK4IK1, UK4IK2, UK4IK3, UK4IK4

Table 8. Rights and Responsibilities (UK4)

No	COMPETENCE UNITS (UK)	Code	Elements of Competence (EK)	code	Pass indicator (IK)	Assessment
UK4	Responsible as a driver in terms of the safety and security of drivers, passengers, and other road users and can be given the responsibility of guiding prospective novice drivers (Rights and Responsibilities)	UK4EK1	Responsible for his work as a driver	UK4IK1	Carry out the task of driving a motorized vehicle without any mistakes	B, D
				UK4IK2	Caring for vehicles according to maintenance procedures	B, D
				UK4IK3	Recording and communicating every important event in carrying out their duties	B, D
		UK4EK2	Can be given the responsibility of guiding aspiring novice drivers	UK4IK4	Explain safety standards and basic techniques for operating vehicles	D

From tables 5,6,7,8 above, competency rules are made in the form of codes as in table 9. Information from competency codes is omitted, there are only codes from competency units, competency elements and graduation indicators. The symbol of the assessment consists of the letters A, B, C, D. The letter

A indicates the assessment is carried out by passengers, letter B is assessed by the e-learning system, letter C is assessed by the coach, letter D is assessed by the supervisor.

Table 9 Competency Rules in code form

No	Elements of Competence (EK)	Pass indicator (IK)	Asesment
UK1	UK1EK1	UK1IK1	D
	UK1EK2	UK1IK2	C,D
	UK1EK3	UK1IK3	D
	UK1EK4	UK1IK4	C,D
	UK1EK5	UK1IK5	C,D
	UK1EK6	UK1IK6	D
UK2	UK2EK1	UK2IK1	D
	UK2EK2	UK2IK2	C,D
	UK2EK3	UK2IK3	C,D
	UK2EK4	UK2IK4	B,C,D
	UK2EK5	UK2IK5	C,D
	UK2EK6	UK2IK6	A,D
	UK2EK7	UK2IK7	B,C,D
	UK2EK8	UK2IK8	A,B,C,D
		UK2IK9	D
		UK2IK10	A,B,C,D
	UK2EK9	UK2IK11	A,B,C,D
		UK2IK12	D
		UK2IK13	A,B,C,D
	UK2EK10	UK2IK14	A,B,C,D
		UK2IK15	A,D
	UK2EK11	UK2IK16	B,C,D
		UK2IK17	D
		UK2IK18	D
		UK2IK19	D
	UK2EK12	UK2IK20	D
	UK2EK13	UK2IK21	A,B,C
		UK2IK22	A,B,C,D
	UK2EK14	UK2IK23	D
		UK2IK24	D
	UK2EK15	UK2IK25	A,B,C,D
	UK2EK16	UK2IK26	A,B,C,D
	UK2EK17	UK2IK27	D
	UK2EK18	UK2IK28	D
	UK2EK19	UK2IK29	D
	UK2EK20	UK2IK30	D
	UK2EK21	UK2IK31	A,B,C,D
		UK2IK32	A,B,C,D
		UK2IK33	D
	UK2EK22	UK2IK34	D

	UK2EK23	UK2IK35	B, D
	UK2EK24	UK2IK36	B, D
	UK2EK25	UK2IK37	B, D
	UK2EK26	UK2IK38	B, D
	UK2EK27	UK2IK39	A,B,C
		UK2IK40	A,B,C
		UK2IK41	A,B,C
UK3	UK3EK1	UK3IK1	A,B,C
		UK3IK2	A,B
	UK3EK2	UK3IK3	B, D
		UK3IK4	B, D
		UK3IK5	B, D
	UK3EK3	UK3IK6	B, D
	UK3EK4	UK3IK7	B, D
	UK3EK5	UK3IK8	A,B,C
	UK3EK6	UK3IK9	D
		UK3IK10	D
UK4	UK4EK1	UK4IK1	B,D
		UK4IK2	B, D
		UK4IK3	B,D
	UK4EK2	UK4IK4	D

4.METHODOLOGY.

This research consists of 4 stages, the first stage is problem identification which consists of literature review, interviews, focus group discussions, questionnaires, and data collection. In identifying the problem, the research question is what factors are needed to build a model for assessing the behavior and competence of national public transport drivers?

The second stage is model design where the model is designed using use case diagrams and class diagrams, while the questions asked in the research design are "How to build a model for assessing the behavior and competence of national public transportation drivers?" The third stage is model adoption.

Adoption is done by carrying out implementation. Implementation of the model by creating an application program using PHP and Mysql. The fourth stage is system evaluation, system evaluation is done by Black box testing and White Box testing,

5. MAIN RESULT.

At this stage the researcher explains the proposed research model from Figure 1. are as follows: the model has 7 actors namely admin, passenger, coach, supervisor, driver, and community, has 3 databases, namely the driver database, the graduate competency standard database (SKL).

In the driver assessment database, there are 6 processes, namely the driver data input process and graduate competency standards (SKL), passenger assessment, assessment by coaches and supervisors, driver test, recommender system.

There is also a relationship between the processes as follows: 1) Admin inputs driver data and inputs graduate competency standards (SKL) 2) Admin input results for driver data are stored in the driver database and SKL input is stored in the graduate competency standard database 3) Passenger ratings, supervisor and coach ratings, driver tests are stored on the driver rating database.

The driver assessment database is two-way related to the driver input process and the SKL input, meaning that the results of the driver assessment database are processed to produce output by the admin 4) Driver database, SKL database, driver assessment database.

5) The recommendation system is processed from the driver database, driver assessment, and graduate competency standards (SKL).

The driver database is taken by the name of the driver. The driver rating database is assessed by supervisors, coaches, and passengers. Assessment is done by answering questions. Questions are obtained from the elements of the graduation indicator (IK)

contained in the SKL database. The assessment team answered the questions using the Linkert scale. The Linkert scale consists of five statements. The five statements on the Linkert scale are strongly agreed, agree, neutral, disagree, strongly disagree.

Of the five statements on the Linkert scale, namely the word strongly agree, it is given a value of 5 (five), for the statement of agreement, it is given a value of 4 (four), for the neutral statement, it is given a value of 3 (three), for the statement of disapproval, it is given a value of 2 (two) and for the statement strongly disagree is given a value of 1 (one).

From each assessment team, namely from supervisors, coaches, passengers to assess the driver. The assessments from each assessment team are added up and the average rating is taken. The results of the average assessment are used as a reference for the classification of drivers.

Results The driver classification consists of 3 classifications, namely the driver classification with the A plus (A+) category, the B plus driver classification (B plus), the C minus driver classification (C-). The driver category with the A-plus classification (A+) is a driver who has excellent behavior and competence. The B plus (B+) driver category is a driver who has good behavior and has good competence. The C minus(C-) driver category is a driver who has less behavior and has less competence

The database of graduate competency standards (SKL) is taken from 8 indicator elements (IK). The elements taken are selected as the most relevant and representative of the unit of competence (UK). Units of competence are attitudes and values (UK1), ability in the field of work (UK2), knowledge mastered (UK3), rights and responsibilities (UK4).

The recommendation system used is taken from the driver database, namely the driver's name. From the driver assessment database, the total scores made by supervisors, coaches, and passengers are taken. From the total value, they are classified into 3 categories of drivers. The category of drivers with A-plus classification (A+) are drivers who have excellent behavior and competence. The B plus (B+) driver category is a driver who has good behavior and has good competence. The C minus(C-) driver category is a driver who has less behavior and has less competence.

The results of the driver's recommendation with the A plus (A+) category are recommended to be maintained for what has been achieved, for the B plus (B+) category it is recommended to be maintained and upgraded to become the A plus(A+) classification. For the C minus (C-) classification, the driver is recommended to attend training in order to get recommendations in the B plus to A plus (A+) categories.

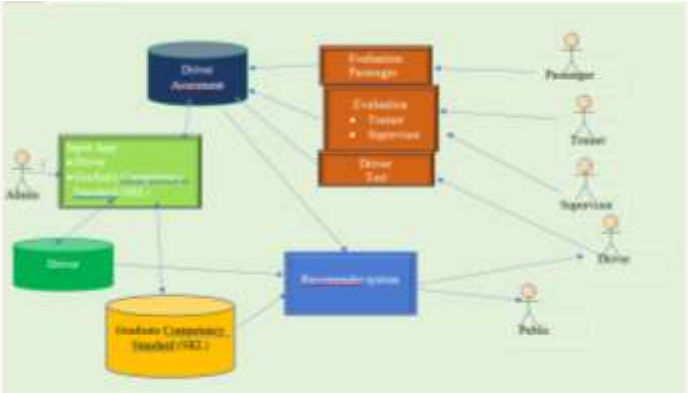

Figure 1. Driver's Competency and Assessment Model

To answer 2 research questions and adapted to model making. modeling describes the interrelationships between components, assessment, training, drivers, public transportation, on a national scale, recommendation system, passenger feedback, using the model, the model used is in Figure 1.

From the model in Figure 1, use case diagrams and Class Diagrams are described in Figures 2 to 5. The following will explain in detail the use case diagrams in Figures 2 to 5 Use case diagrams consist of 4 use cases, namely: driver management use case and SKL, passenger assessment use case, supervisor and coach assessment use case, driver test use case.

Based on the use case diagram in Figure 2 there are 3 actors, namely admin actors, drivers, and community actors, admin actors log in and additional use cases (extend) to registration, carry out the process of entering driver data with additional use cases to update driver data, admins enter graduate competency standard data (SKL) with additional use cases SKL data updates, driver actors relate to the recommender system), with the understanding that the results of the recommender system are known to the driver, community actors relate to the recommender system the results of the recommender system are known to the public.

The use case diagram in Figure 3 is a passenger assessment use case consisting of passenger actors, with the login process, registration process, and the process of entering driver assessment data

The use case in Figure 4 is the supervisor and trainer assessment use case consisting of supervisory actors, trainer actors with an additional registration use case login process, the process of entering driver assessment data by the coach with an additional use case of updating the driver assessment by the coach, the process of entering the driver's assessment by the supervisor with additional use case updates. driver's evaluation by the supervisor.

The use case of Figure 5 shows the driver being assessed by the coach and supervisor. The use case in Figure 5, the driver test use case consists of driver actors, with login, registration, and driver test processes.

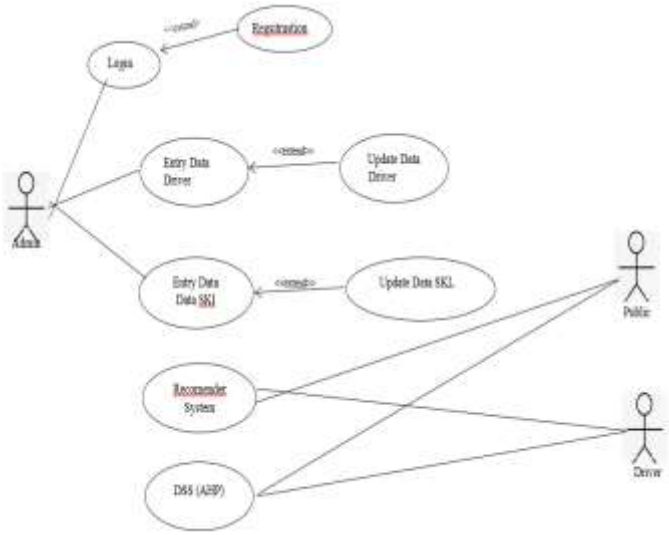

Figure 2 Usecase System SKL

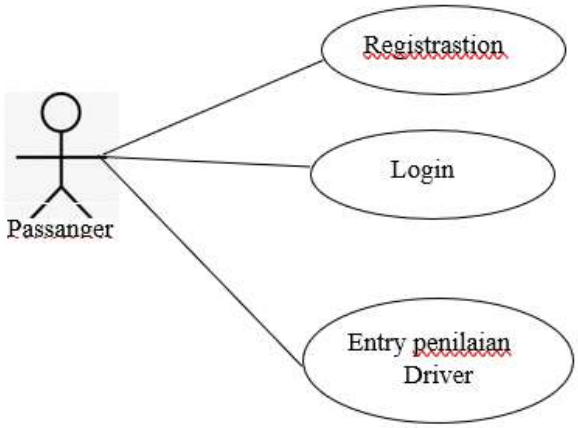

Figure 3 Use Case Passenger Assessment

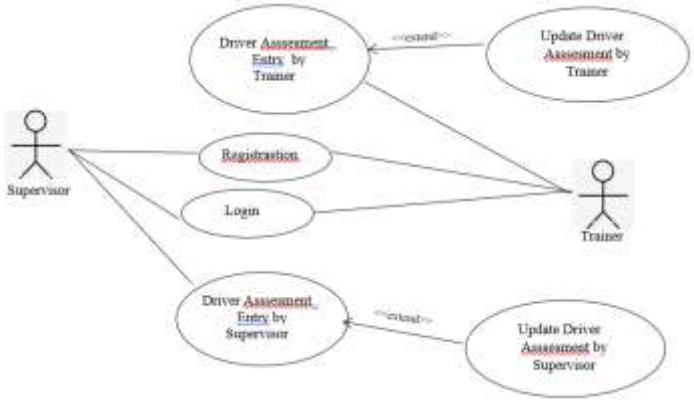

Figure 4 is the supervisor and trainer assessment

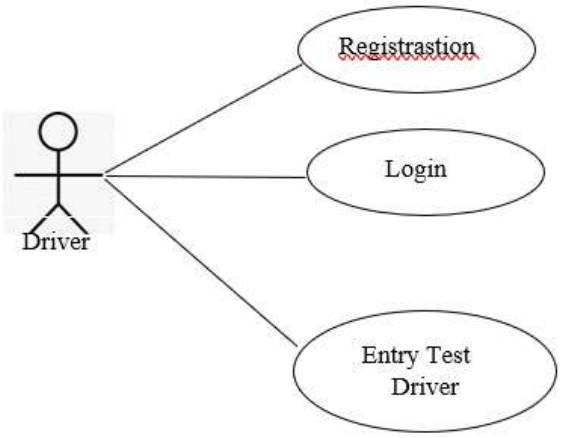

Figure 5 Driver test use case

The Graduate Competency Standards Class Diagram (SKL) in Figure 6 has 14 class diagrams, namely: Class diagram of Trainer, transtrainer, trainer's answer, SKL, Assessment, driver, Translearn, Learner's Answer, Supervisor, Transsupervisor, Supervisor's answer, Passenger, transpenum, Penum's answer.

The trainer has the trainerID attribute as the primary key (PK), name, email, password, name, gender, education, occupation, cellphone number. Transtrainer has the attribute IdTranspe trainer as PK, Transpetrain Date.

The trainer's answer has attributes: Trainer's Id, SKL Code, trainer's answer.

SKl has attributes: SKL code, UK code, UK name, EK code, EK code, Ik code, IK name. The assessment has the attributes of the SKL Code, the name of the assessor, the question.

The driver has the Driver ID attribute as PK, name, email, password, Place of Birth, Gender, address, RT/RW, village, Subdistrict, religion, occupation, Education, HP No.

Translearn has the attribute IdtransLearn as PK, Date of Translearn. Answer of Learn has attribute of IdTranslearn, Date of Translearn, Answer of Learn has attribute of idTranslearn, SKL Code, Answer of Learn.

Supervisors have attributes supervisor ID, name, email, gender, education, occupation, cellphone number. Supervisory Transsupervisor has the attributes IdTranssupervisor, tgltranssupervisor.

The supervisor's answer has the supervisor's Idtrans attribute as PK, SKL Code, Supervisor's Answer. Passengers have the attributes of Passenger Id, Name, email, password, Gender, Education. Transpenum has attributes Idtranspenum, date Transpenum, AnswerPenum, IdTranspenum, SKL Code, answerpenum.

The coach class has 1 to many relationships on the transcoach class meaning 1 coach can have multiple transactions for the coach. The Transcoach class has a 1 to many relationships on the driver class meaning that one coach can rate many drivers.

Coach's answer class meaning that many coach transactions have 1 answer for the driver. The coach's answer class is many to one on the grading class meaning that multiple coaches' assessments are conducted to assess the driver.

Grades of Assessment are many-to-one in the SKL class meaning that multiple assessments are carried out for SKL. Assessment Class corresponds to 1 most in the Supervisor's Answer Class, meaning that one assessment is determined by many supervisor answers.

The supervisory response class corresponds to many to one in the Transsupervisor Class, meaning that there are many supervisory answers to carry out a single transaction.

The Transsupervisor class is multi-to-one in the Superintendent class meaning that many supervisor transactions are carried out by 1 supervisor. The rating class is related 1 mostly to the full answer class, meaning that 1 driver is assessed by many passengers.

The PenumAnswer class is related to the first Transnum class, meaning that many passengers make 1 transaction. The Transpenum class is related to many passenger classes, meaning that many passenger transactions are carried out by one passenger.

The translearn class is related to many to one driver class, meaning that many transactions are carried out for 1 driver. The Translearn class has a 1-to-many relationship in the learnan

answer class, meaning that one transaction is carried out by many drivers.

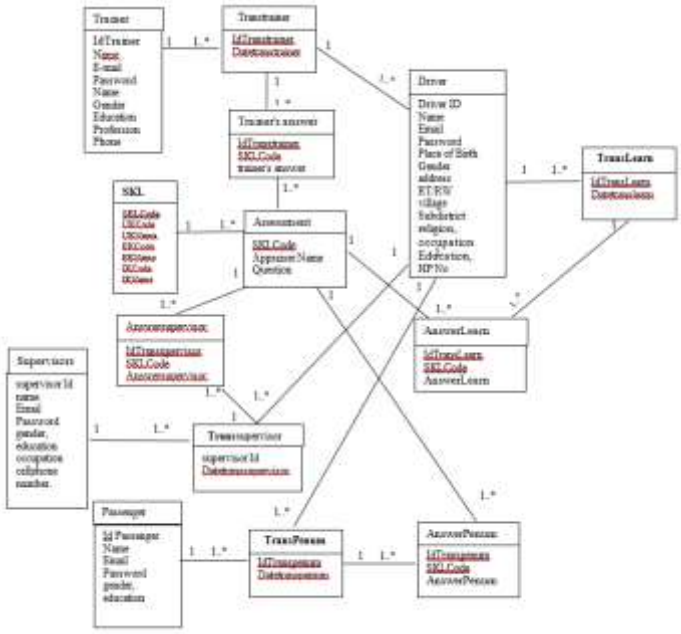

Figure 6. Class diagram SKL

6. CONCLUSION.

To answer the first and second research questions. The answer to the first research question is “what factors are needed to build a model for assessing the behavior and competence of national public transport drivers.

There are 4 factors needed to build a general national competency and behavioral assessment model. These 4 factors are called competency units, competency units consist of attitudes and values, abilities in the field of work, knowledge mastered, rights, and responsibilities. The four factors are taken from the competency standard for level II driver graduates based on the Indonesian National Qualifications Framework (KKNI).

Each of these factors consists of a unit of competence, elements of competence, and indicators of graduation. The attitude and value competency unit has 6 elements of competence, 6 elements of graduation indicators. The competency unit in the field of work has 27 elements of competence and 41 elements of graduation indicators. The unit of knowledge competency mastered has 6 elements of competence and 11 indicators of graduation.

The rights and responsibilities competency unit have 2 elements of competence and 4 indicators of graduation.

The answer to the second research question is "build a model that is made in the form of models, Use-case diagrams, and class diagrams". as depicted in Figures 1 to 6.

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