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PROCEEDING

International Conference on Green Technology and Design

"A Dissemination platform for supporting green energy, green building, green automation, green transportation and environmental sustainability"

BANDUNG 4 – 5, DECEMBER 2019

BALE DAYANG SUMBI
INSTITUT TEKNOLOGI NASIONAL BANDUNG
WEST JAVA - INDONESIA

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BOOK OF PROCEEDING

INTERNATIONAL CONFERENCE ON GREEN TECHNOLOGY AND DESIGN

Bandung, 4 – 5 December 2019

Bale Dayang Sumbi
Institut Teknologi Nasional Bandung
West Java - Indonesia

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RUNDOWN ICGTD

Day	Time	Description
Wednesday, December 4th 2019	*08.00 – 08.30*	*Registration*
	08.30 – 09.00	*Welcome speech:* ***ICGTD Chair, Rector of Itenas*** *and Opening*
	09.00 – 09.45	*Plenary Session: "Assessment of Solar PV Power Potential over Asia Pacific Region with Remote Sensing and GIS"* ***Jeark A. Principe, Ph.D (Philipine)***
	09.45 – 10.30	*Plenary Session: "Emissions and Mitigation Scenarios for Residential Combustion of Solid Fuels in Developing Countries"* ***Dr. Ekbordin Winijkul (Thailand)***
	10.30 – 10.45	*Coffee Break*
	10.45 – 11.30	*Plenary Session: "Water Resource Management Framework For West Java Province, Indonesia"* ***Iwan Juwana Ph.D (Indonesia)***
	11.30 – 12.30	*Ishoma Break*
	12.30 – 16.45	*Parallel Sessions – as attached*
	16.45 – 19.00	*Closing*

PRESENTATION SCHEDULE

No.	Name	Institution	Paper Topic	Presentation Time	Place
1	Niken Syafitri	Institut Teknologi Nasional Bandung	Green Automation	13.00	GSG Bale Dayang Sumbi Lt 1 (A)
2	Febrian Hadiatna	Institut Teknologi Nasional Bandung	Green Automation	13.15	
3	Florentinus budi setiawan	Soegijapranata catholic university	Green Automation	13.30	
4	Waluyo	Institut Teknologi Nasional Bandung	Green Automation	13.45	
5	Priyo Agus Setiawan	Politeknik Perkapalan Negeri Surabaya	Green Energy	14.00	
6	Lita Lidyawati	Institut Teknologi Nasional Bandung	Green Energy	14.15	
7	Bagus Rizky Pratama Budiajih	Institute Technologi Sepuluh Nopember	Green Energy	14.30	
8	Vibianti Dwi Pratiwi	Institut Teknologi Nasional Bandung	Green Energy	14.45	
9	Rachmad Ramadhan Yogaswara	Universitas Pembangunan Nasional (UPN) "Veteran"	Green Energy	15.00	
10	Lisa Kristiana	Institut Teknologi Nasional Bandung	Green IT	15.15	
11	Achmad Hizazi	Universitas Jambi	Green IT	15.30	
12	Dewi Rosmala	Institut Teknologi Nasional Bandung	Green IT	15.45	
13	Diki Ismail Permana	Institut Teknologi Nasional Bandung	Green Energy	16.00	
14	Yusup Miftahuddin	Institut Teknologi Nasional Bandung	Green IT	16.15	
15	Yudi Widiawan	Institut Teknologi Nasional Bandung	Green IT	16.30	
16	Rifqi Finaldy	Institut Teknologi Nasional Bandung	Green IT	16.45	
17	Hafidz Dayu Aditya	Institut Teknologi Nasional Bandung	Green IT	17.15	
18	Agus Hermanto	Institut Teknologi Nasional Bandung	Green Energy	17.30	
19	Meilinda Nurbanasari	Institut Teknologi Nasional Bandung	Green Energy	17.45	
20	Alfan Ekajati Latief	Institut Teknologi Nasional Bandung	Green Energy	18.00	
21	Lakshmanan Gurusamy	Universiti Malaysia Sarawak (UNIMAS)	Green IT	18.15	

No.	Name	Institution	Paper Topic	Presentation Time	Place
22	Abu Arif Jalaluddin	Universiti Malaysia Sarawak (UNIMAS)	Green IT	18.30	
23	Yanuar Z. Arief	Universiti Malaysia Sarawak (UNIMAS)	Green IT	18.45	
24	Nur Laela Latifah	Institut Teknologi Nasional Bandung	Green Building	13.00	GSG Bale Dayang Sumbi Lt 2 B
25	Riny Yolandha Parapat	Technische Universität Berlin (TU-Berlin), Berlin, Germany	Green Transportation	13.15	
26	Erwin Yuniar Rahadian	Institut Teknologi Nasional Bandung	Green Building	13.30	
27	Ardhiana Muhsin Machdi	Institut Teknologi Nasional Bandung	Green Building	13.45	
28	Tiara Anantika	Institut Teknologi Nasional Bandung	Green Building	14.00	
29	Wahyudi	Institut Teknologi Nasional Bandung	Green Building	14.15	
30	Dwi Prasetyanto	Institut Teknologi Nasional Bandung	Green Transportation	14.30	
31	Fred Soritua Rudiyanto Manurung	Institut Teknologi Bandung	Green Transportation	14.45	
32	Tarsisius Kristyadi	Institut Teknologi Nasional Bandung	Green Transportation	15.00	
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35	Hendro Prasetiyo	Institut Teknologi Nasional Bandung	Green Building	15.45	
36	Ratna Agustina	Institut Teknologi Nasional Bandung	Green Transportation	16.00	
37	Jatmiko Wahyudi	Regional Development Planning Agency	Suistanability Environment	13.00	GSG Bale Dayang Sumbi Lt 1 (B)
38	Desti Santi Pratiwi	Institut Teknologi Nasional Bandung	Suistanability Environment	13.15	
39	Nguyen Thi Kim Oanh	Asian Institute of Technology (AIT)	Suistanability Environment	13.30	
40	Agung Pramudya Wijaya	Institut Teknologi Nasional Bandung	Suistanability Environment	13.45	
41	Edi Wahyu Wibowo	Politeknik LP3I Jakarta	Suistanability Environment	14.00	

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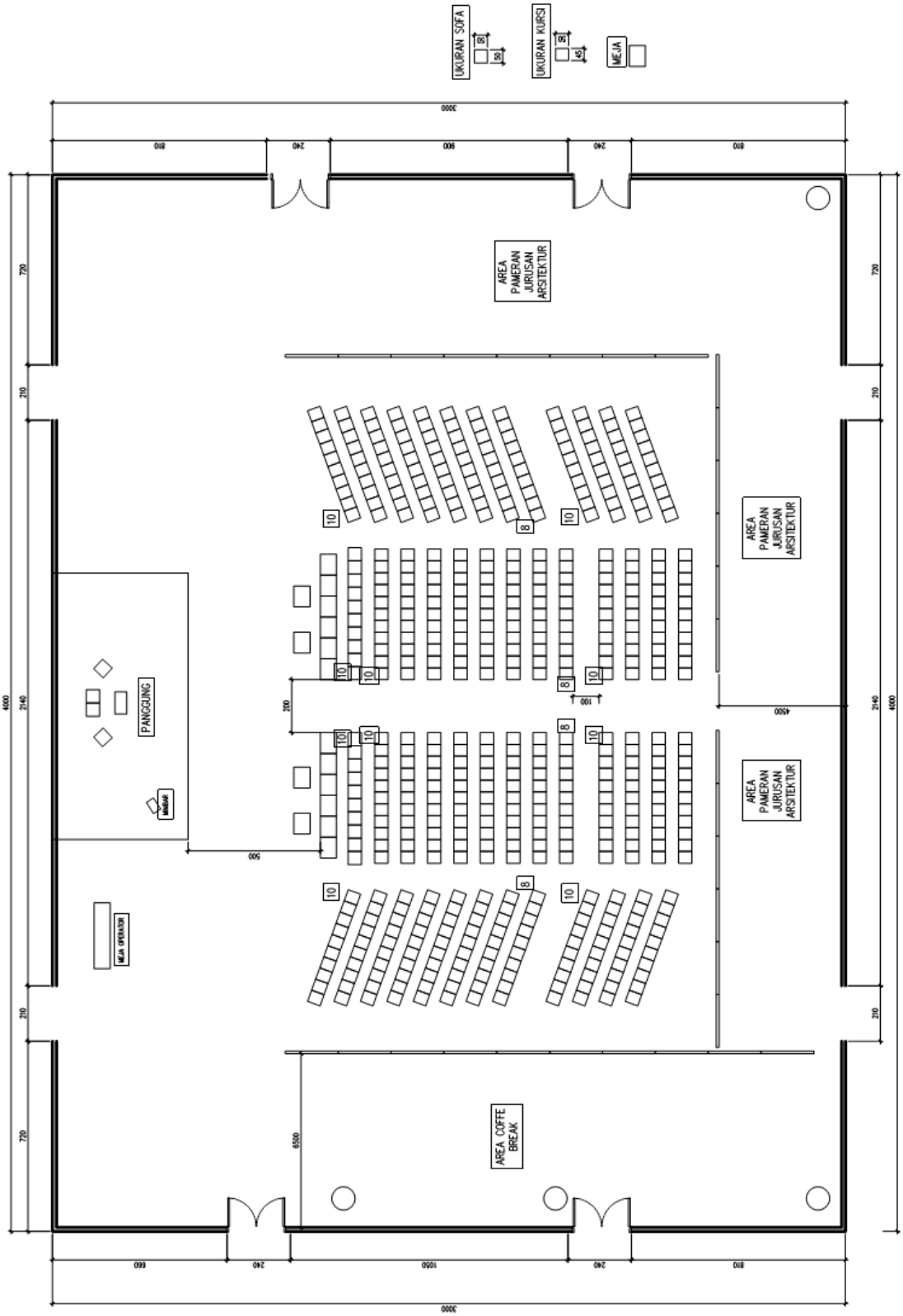
42	Taufan Hidjaz	Institut Teknologi Nasional Bandung	Suistanability Environment	14.15	
43	Elvira Rizqita Utami	Institut Teknologi Nasional Bandung	Suistanability Environment	14.30	
44	Farah Fauzia Raihana	Institut Teknologi Nasional Bandung	Suistanability Environment	14.45	
45	Byna Kameswara	Institut Teknologi Nasional Bandung	Suistanability Environment	15.00	
46	Ajeng Alya Hidrijanti	Institut Teknologi Nasional Bandung	Suistanability Environment	15.15	
47	Fenty Wastika Sari	Institut Teknologi Nasional Bandung	Suistanability Environment	15.30	
48	Yudi Adi Pratama	Institut Teknologi Nasional Bandung	Suistanability Environment	15.45	
49	Jono Suhartono	Institut Teknologi Nasional Bandung	Suistanability Environment	16.00	
50	Iredo Bettie Puspita	Institut Teknologi Nasional Bandung	Suistanability Environment	16.15	
51	Ronny Kurniawan	Institut Teknologi Nasional Bandung	Suistanability Environment	16.30	
52	Yulianti Pratama	Institut Teknologi Nasional Bandung	Suistanability Environment	16.45	
53	Maya Ramadianti Musadi	Institut Teknologi Nasional Bandung	Suistanability Environment	17.00	
54	Maya Ramadianti Musadi	Institut Teknologi Nasional Bandung	Suistanability Environment	17.00	
55	Soni Darmawan	Institut Teknologi Nasional Bandung	Suistanability Environment	17.15	
56	Soni Darmawan	Institut Teknologi Nasional Bandung	Suistanability Environment	17.30	
57	Rika Hernawati	Institut Teknologi Nasional Bandung	Suistanability Environment	17.45	
58	Ida Wati	Institut Teknologi Nasional Bandung	Suistanability Environment	18.00	
59	Caecilia Sri Wahyuning	Institut Teknologi Nasional Bandung	Suistanability Environment	18.15	
60	Fifi Herni Mustofa	Institut Teknologi Nasional Bandung	Suistanability Environment	18.30	
61	Enni Lindia Mayona	Institut Teknologi Nasional Bandung	Suistanability Environment	18.45	
62	Maharani Dian Permanasari, M. Ds., PhD.	Institut Teknologi Nasional Bandung	Green Design	13.00	GSG Bale Dayang

No.	Name	Institution	Paper Topic	Presentation Time	Place
63	Ibrahim Hermawan	Institut Teknologi Nasional Bandung	Green Design	13.15	Sumbi Lt 2 A
64	Maugina Rizki Havier	Institut Teknologi Nasional Bandung	Green Design	13.30	
65	Dwi Novirani	Institut Teknologi Nasional Bandung	Green Design	13.45	
66	Mohamad Arif Waskito	Institut Teknologi Nasional Bandung	Green Design	14.00	
67	Edi Setiadi Putra	Institut Teknologi Nasional Bandung	Green Design	14.15	
68	Sulistyo Setiawan	Institut Teknologi Nasional Bandung	Green Design	14.30	
69	Edwin Widia	Institut Teknologi Nasional Bandung	Green Design	14.45	
70	Agung Pramudya Wijaya	Institut Teknologi Nasional Bandung	Green Design	15.00	
71	Gita Permata Liansari	Institut Teknologi Nasional Bandung	Green Design	15.15	
72	M. Djalu Djatmiko	Institut Teknologi Nasional Bandung	Green Design	15.30	
73	Detty Fitriany	Institut Teknologi Nasional Bandung	Green Design	15.45	
74	Andri Masri	Institut Teknologi Nasional Bandung	Green Design	16.00	
75	Aditya Januarsa	Institut Teknologi Nasional Bandung	Green Design	16.15	
76	Bambang Arief Ruby,	Institut Teknologi Nasional Bandung	Green Design	16.30	


UKURAN SOFA
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PANGGUNG
MEJA OPERATOR
AREA COFFE BREAK

FOREWARD

Welcome to the 1st International Conference on Green Technology and Design. This conference takes place in Bandung, 4th December 2019 and become our first international conference in green technology and design.

It is our responsibility to contribute in the national development and sustainability, the Institut Teknologi Nasional (Itenas) Bandung through its Lembaga Penelitian dan Pengabdian kepada Masyarakat (LP2M) conducts this conference and draws upon the expertise of wide range of knowledge.

The ICGTD 2019 conference aims to promote research in the field of Green Energy, Green Building Green Automation, Green Transportation, Sustainability Environment, Green IT and Green Design, and to facilitate the exchange of new ideas in these fields among academicians, engineers, junior and senior researchers, scientists and practitioners. It also includes the plenary, keynote and invited speakers.

On behalf of Organizing Committee, it is a great pleasure to welcome you in Itenas Bandung and look forward to meeting you at ICGTD2019.

Warm regards,

Chair
Dr. Ir. Nurtati Soewarno M.T.

TABLE OF CONTENT

Suistanability Environment

Green Design

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Prioritization of Road Accident Factors in Indonesia Using Combination of Delphi Method And Analytical Hierarchy Process

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***Abstract*—Traffic accidents are a significant cause of deaths and injuries in Indonesia happened from many factors, such as human or driver factor, vehicle, road design, and environment. Information is obtained from the questionnaire through discussion with expert respondents through Delphi method. The Delphi method is based on structural surveys and makes use of the available intuitive information of the expert participants to selected the criteria. Criteria and sub-criteria adapted from literature and accident data based. These primary factors are human behaviour, vehicle, road and environment will become the primary criterion in priority setting using Analytical Hierarchy Process (AHP) method. From AHP Analysis, the most priority road safety factor is that human behaviour takes 66% to total, with most priority sub-criteria is criteria with the percentage of 43%.**

Keywords—human behaviour, vehicle, road, environment.

I. INTRODUCTION

It was well known that traffic accidents are of high importance to the public health in the world. Moreover, in developing countries such as Indonesia, the fatalities rates from road traffic accidents are rather high compared to other countries in this region. Statistic reports reveal that Indonesia's road accidents are very high, compared to other developing countries. For example in Bandung, one of the biggest city in Indonesia, the number of traffic accident decreases but the number of people dying increases gradually as the population and the number of vehicles registered an increase. This increase has led to an increase in fatality rates per 100,000 population from 3.4 in 2016 to 6.3 in 2017 and from 0.5 per 10,000 vehicles registered to 0.9 in 2017 (Government 2018).

The accidents can be the result of the interaction of four elements, as shown in Fig. 1(Tighe, Falls et al. 2001). The diagram shows the relationship between four road safety factors. Also, there is interaction related to these four factors as shown by the overlap areas between the factors. Figure 1, shows the four elements that affect traffic safety namely; driver behaviour, vehicle condition, road condition and environment as well as the interaction between the factors represented by the overlap areas. Overlap area for example shown single vehicle accidents can occur as a result of mechanical failure and driver distraction or slippery wet conditions of the road.

In driver terms, humans make an erroneous while they are driving (Horrey, Lesch et al. 2015). It happened because of gaps between perception and reality about driver decision-making and behaviour performance and safety. In Indonesia shown that human error was contributing to 87 % of the total. In contrast, only 4.2% were due solely to a mechanical fault, and 6.8% were caused only by road environmental factors. (Djaja, Widyastuti et al. 2016).

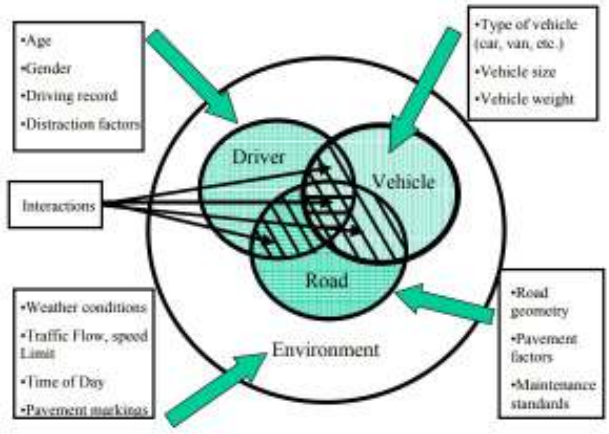

Fig 1. Road safety factors and interactions.

Road safety factors described such as driver behaviour, construction and condition of the vehicle and condition of infrastructure (Komackoca and Poliak 2016). Another road safety analytical instrument is described to facilitate the identification of human factors, vehicle and equipment factors and environmental factors, related to road accidents, by phases in time of the event (Goniewicz, Goniewicz et al. 2016). It will use to improving road traffic safety and reduce the number and severity of injuries. Other tools can provide tools to assess driving behaviour indicator that represented by speeds and accelerations (Eboli, Mazzulla et al. 2018). Especially in Indonesia, only limited research that discussed

road safety in Indonesia in this ten years. There is a strong relationship between road-based transport user's preferences such as negative experience, service importance and dissatisfaction and improvement policies along with fare adjustment (Joewono, Tarigan et al. 2016).

Highway patrol to speeding is a top priority of speed management (Roibafi, Sulistio et al. 2018). This research will enrich the discussion about road safety, specifically about road accident factor in Bandung City, Indonesia.

II. RESEARCH METHOD

In this study, Delphi method and Analytic Hierarchy Process (AHP) are used by experts to prioritise the importance of accident factors, which can prevent and reduce accident rates. AHP analysis for accident influence factors are in the following order: drive factor, road and environmental factors (Xi, Zhao et al. 2016).

The Delphi method is used (Mbakwe, Saka et al. 2016) that relies on the knowledge of experts in the fields of transportation and highway traffic safety. An agreement made in Delphi method is an expert survey in two or more 'rounds' in which in the second and later rounds of the survey the results of the previous round are given as feedback. Therefore, the experts answer from the second round on under the influence of their colleagues' opinions. Theoretically, the Delphi process can be continuously iterated until a consensus is determined to have been achieved (Hsu and Sandford 2007).

AHP method develops priority for criteria, in terms of achievement objective that derives the priority on each criterion, based on pair-wise assessments using judgments, or ratios of measurements from a scale (Kanuganti, Agarwala et al. 2017). Table 1 presents Saaty's scale of preferences in the pair-wise comparison process.

TABLE 1. AHP scale of preferences in the pair-wise comparison process

Numerical Ratings	preferences between alternatives i and j
I	i is equally preferred to j
3	i is slightly more preferred than j
5	i is strongly more preferred than j
7	i is very strongly more preferred than j
9	i is extremely more preferred than j
2,4,6,8	Intermediate value

In this research, experts coming from the government side, highway association and academician. The Initial contributions from the experts were collected in the form of answers to their questionnaires and comments on this answer through the Focus Group Discussion (FGD). Facilitators who will facilitate expert responses coordinate FGD's. In the first phase of the discussion through FGD that discusses what factors are influential in traffic accidents. This main factors that are the driver, vehicle, road, environment, traffic and land use will become the primary criterion in priority setting using the AHP method. As the beginning of the discussion, the initial questionnaire is formed from the secondary data, so that the discussion can be more focused and can give more optimal results.

The facilitator will provide a questionnaire to the experts and asked to fill out and present it. Responses are collected and analysed, conflicting points of view are identified. If consensus is not reached, the process continues through theses and antithesis, to gradually work toward synthesis, and build consensus.

Using the Cut-Off method of FGD I, then the questionnaire was designed for sub-criteria on every criterion. In the same way, several FGDs are conducted to agree on the criteria and sub-criteria of traffic accident factors. If the criteria and sub-criteria have been agreed upon, then the design of the pairwise comparison questionnaire between criteria and sub-criteria to be filled by experts, that shown in Table 2 - 6. AHP method supports multi-criteria decision making, by deriving ratio scales from paired comparisons of criteria. As a result of Delphi Methods, the main traffic accident factors are human, vehicle, road and environment.

TABLE 2. Pairwise Comparison on Criteria Factor

No.	Criteria A	Scale 9	7	5	3	1	3	5	7	9	Criteria B
1.	Human										Vehicle
2.	Human										Road
3.	Human										Environment
4.	Vehicle										Road
5.	Vehicle										Environment
6.	Road										Environment

TABLE 3. Pairwise Comparison on Sub Criteria Human Factor

No.	Criteria A	Scale 9	7	5	3	1	3	5	7	9	Criteria B
1.	Undisciplined										Unskilled
2.	Undisciplined										Tired
3.	Undisciplined										Careless
4.	Undisciplined										Speeding
5.	Undisciplined										Sleepy
6.	Unskilled										Tired
7.	Unskilled										Careless
8.	Unskilled										Speeding
9.	Unskilled										Sleepy
10.	Tired										Careless
11.	Tired										Speeding
12.	Tired										Sleepy
13.	Careless										Speeding
14.	Careless										Sleepy
15.	Speeding										Sleepy

TABLE 4. Pairwise Comparison on Sub Criteria Vehicle Factor

No.	Criteria A	Scale 9	7	5	3	1	3	Scale 5	7	9	Criteria B
1.	Brake Defect										Tire Failure
2.	Brake Defect										Improper Wheel Alignment
3.	Brake Defect										Overloading
4.	Tire Failure										Improper Wheel Alignment
5.	Tire Failure										Overloading
6.	Improper Wheel Alignment										Overloading

TABLE 5. Pairwise Comparison of Sub Criteria Road Factor

No.	Criteria A	Scale 9	7	5	3	1	3	Scale 5	7	9	Criteria B
1.	Pothole										Slippery
2.	Pothole										Horizontal Alignment
3.	Pothole										Vertical Alignment
4.	Pothole										Corrugation
5.	Slippery										Horizontal Alignment
6.	Slippery										Vertical Alignment
7.	Slippery										Corrugation
8.	Horizontal Alignment										Vertical Alignment
9.	Horizontal Alignment										Corrugation
10.	Vertical Alignment										Corrugation

TABLE 6. Pairwise Comparison on Sub Criteria Environment Factor

No.	Criteria A	Scale 9	7	5	3	1	3	Scale 5	7	9	Criteria B
1.	Dark										Rain
2.	Dark										Fog/Smoke
3.	Dark										Glare
4	Rain										Fog/Smoke
5.	Rain										Glare
6.	Fog/Smoke										Glare

III. RESULT AND DISCUSSION

Having the study goal on prioritised accident factor, with multi-criteria and multi-sub-criteria, AHP help to derive priorities, as shown in Fig. 2. From the analysis of questionnaire survey using AHP and result of an expert discussion, it is found that in overall human factor gets the critical factor in the expert's viewpoint, while the least important factor affecting road accidents is the environment. Table 7 shows the prioritise criterion, with the percentage of each factor.

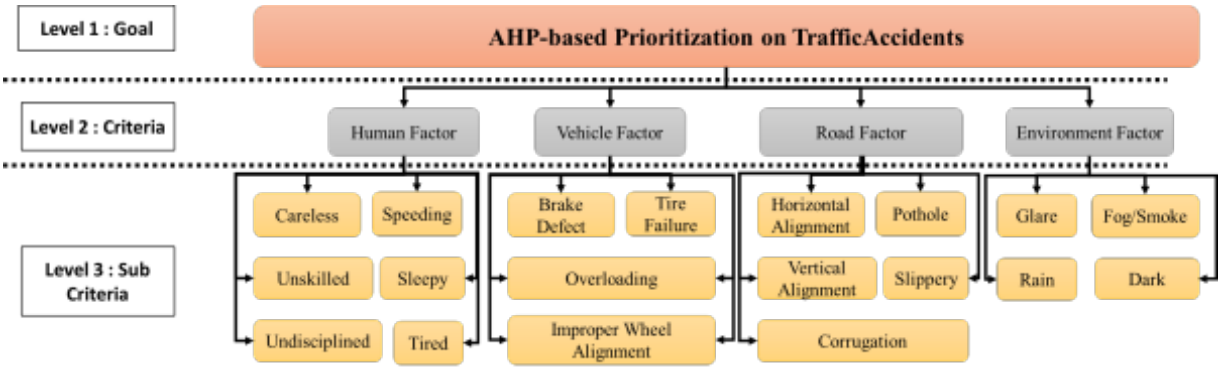

Fig 2. AHP-based Prioritization on road accidents factors with criteria and sub-criteria.

TABLE 7. Prioritize Criterion and Percentage of Each Factor

	Human	Vehicle	Road	Environment
Percentage (%)	66	13	16	5
Priority	1	3	2	4

The final step to determine the rank of each factor is to get the value of Consistency Index (CI) which is result as: λ_{max} = 4.171, CI = 0.057, RI = 0.9, and Consistency Ratio (CR) value 0.063 < 0,10. After calculation CR is less than 0.1 so the calculation and ranking are consistent, this value shows that the expert's answer is consistent, so the calculation can proceed to determine the priority of the traffic accident causing criterion.

The results showed that human behaviour factor was the most significant cause of traffic accident (66%), followed by road factor (15.6%), vehicle factor (13.2%), and environmental factor (5.2%). This human behaviour factor is a significant factor, and it is possible that the cause of traffic accidents is a combination of these factors can be seen in Table 8.

TABLE 8. Prioritise Sub-Criterion of Human and Percentage of Each Factor

	Undisciplined	Unskilled	Tired	Careless	Speeding	Sleepy
Percentage	26	7	11	43	8	5
Priority	2	5	3	1	4	6

Based on Table 8 obtained the maximum eigenvalues (λ_{max}) 6,411, and Consistency Index (CI) 0.01. We are using

Ratio Index (RI) 1.24 obtained value of Consistency Ratio (CR) equal to 0,009. CR value less than 0.1 indicates that the assessment of some of the expert respondents is consistent.

Expert opinion and results in the field show that traffic accident is more caused by human error factor (Human error). The sequence of human error factors are based on prioritising is the factor of careless (43.4%), undisciplined (26.3%), tired (10.6%), speeding (7.9%), unskilled (7.1%), and drowsiness when driving (4.9%) can be seen in Table 9.

TABLE 9. Prioritise Sub-Criterion of Vehicle and Percentage of Each Factor

	Brake Defect	Tire Failure	Overloading	Improper wheel alignment
Percentage	20	21	27	32
Priority	4	3	2	1

The maximum eigenvalue (λ_{max}) for the sub-criteria of the vehicle is 4.335, and the Consistency Index (CI) obtained is 0.089. Using Ratio Index (RI) 0.90 obtained value of Consistency Ratio (CR) 0,099. CR values smaller than 0.1 suggest that the assessment of some of the expert respondents was consistent. Table 9 shown that improper wheel alignment 32% was a priority then followed by overloading 27%, tire failure 21% and brake defect 20% can be seen in Table 10.

TABLE 10. Prioritise Sub-Criterion of Road and Percentage of Each Factor

	Horizontal alignment	Vertical alignment	Pothole	Slippery	Corrugation
Percentage	31	40	5	15	9
Priority	2	1	5	3	4

λ_{max}= 5,634, CI = 0,106, RI = 1,12. CI = 0,094 < 0,10. CR values smaller than 0.1 suggest that the assessment of some of the expert respondents was consistent.

The findings of the vertical alignment factor were the major causes of traffic accidents (40.3%), followed by horizontal alignment factor (31.5%), slippery surface factor (14.5%), corrugation road factor (9.1 %), and potholes (4.6%). Similar to accident-causing criteria, the traffic accident factor is a significant factor, and it is possible that the cause of traffic accidents is a combination of these factors can be seen in Table 11.

TABLE 11. Prioritise Sub-Criterion of Environment and Percentage of Each Factor

	Glare	Fog or Smoke	Rain	Dark
Percentage	17	45	22	17
Priority	3	1	2	4

λ_{max} = 4,537,CI = 0,0789, RI = 0,90. CR = 0,087 < 0,10, this shows that the expert's answer is consistent, so the calculation can proceed to determine the priority of the road criteria sub-criteria as the cause of the traffic accident. Fog or smoke was associated with the occurrence of the accidents cited by 45% of the experts, rain 22%, glare 17%, and dark 17%.

IV. CONCLUSION

It was found that drivers accounted for the majority of traffic accidents and careless was accidents the most significant factor, in the following percentage of total are 66% and 43%.

All factors related to the road and vehicle are in the middle of the rank, therefore, analysed that have moderate prioritise, respectively 16% and 13%. It is worth noticing that all factors related to the environment, are considered as significant to other factors, only 5% to the total.

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Rural Vehicle for Agricultural Community Function in Information Society Era

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***Abstract*— Indonesian has been started to develop the rural vehicle. The Indonesian government presumably serious to develop the rural vehicle which often called *Mobil Desa* or Multipurpose Vehicle for Countryside. From the names, it is very clear that the vehicle developed to assist the movements of countryside community to bring their commodity or goods in rural areas. The vehicle design developed in the information society era as a function for industrial society related to the agriculture activity. The competition and competitiveness as a result of transformation technology become a reality for the rural vehicle design, and should be envisaging the insight of rural community, that have been transformed and coupled also grip to the information technology, and it caused the world society also connect to access the countryside in Indonesia along with the commodity that could be used for the world society. Now, comparing the Indonesian rural vehicle design with the rural vehicle from another country has not become hard things for countryside community or moreover to import the vehicle. The competition will be started soon, so Indonesian designer or car maker should be able to use the advantage of knowledge about local wisdom or local genuine corresponding to the activity appropriateness and local needs, as a distinguishing factor for success of the local design and brand.**

Keywords*— *comparing, countryside community, information society, local needs, rural vehicle, technology

I. INFORMATION SOCIETY

The development of human civilization felt so fast, to gain its purpose or need, primitive societies had to meet and exchange goods. Later as an agrarian society, the wide variety of necessary needs were planted and bred until they could be harvested, part of those needs were kept or worn alone and partly sold.

As a production or industrial society, the work of the farmers is no longer dependent on seasons, the farmer always works in time to maintain his or her life and work regularly. In industrial societies, technology was created to reduce job dependence on nature, watering systems were developed with the construction of water storage sites called reservoirs to be able to generate electrical energy and irrigate watering lands in the dry season, artificial rain technology was developed to decrease rain and wet crops beyond planting time and rainy season, fertilization technology was done to add harvest frequency and harvest quality.

The development of technology is constantly evolving, especially in the areas of information and electronic technology which occurs today, is the speed against information access through electronic equipment such as mobile phones, computers or other devices. The information flow becomes faster, making it easier for work or making decisions against everyday activities. The speed of technological development resulted in cultural change [1] (Mc Luhan, 2003). The development of internet technology creates, distributes, uses and utilizes information for interests in economics, politics and cultural activities [2] (Imran, 2012).

Technology such as radio, television, film and computers are parts of information technology that have a large role in life activities. Indonesia as an island nation and spread from east to west certainly has its own problems regarding information and technology access. Information technology, always starts from the center or Java Island and spreads to various islands in accordance with infrastructure developments.

At first information technology relied heavily on computers through internet stalls. The development of capable mobile phone technology is equivalent to a valuably cheap and affordable computer causing the object to be personally owned. From Symbian technology towards Android technology, it causes mobile phones to have varying application discretion. The use of Androids eventually spread to various corners of the archipelago supported by information service network providers such as Telkomsel, Indosat, XL, Smartfren or others. It's not a strange thing, when we find Android users in various corners of Indonesia, even though the coverage area has not been thoroughly at various corner points.

Based on the data from Asosiasi Penyelenggara Jasa Internet Indonesia (APJII) in 2017, penetration of Internet users based on cities/counties is concentrated in urban areas with a percentage of 72.41%, rural urban of 49.49% and rural of 48.25%, this is due to the availability of fiber optic networks and other infrastructures supporting that activities. Internet users in Indonesia grew about a hamper of 8% to 143.26 million inhabitants or 54.68 out of the total population of 262 million Indonesians. Rural-urban societies

or rural communities in Indonesia are already touched by information networks in the form of internet connections.

The advantage of internet use or excess is that the information authority acquired or sought to be on its personal self, in contrast to television or radio, that the information the audience or listener gets set up by a TV or radio station, as part of its broadcast program. The power over this information choice causes the choices that determined to be very varied and has no dependence on one party, such as a TV station or radio station, the ultimate dependence being on the content available on its preferred alternatives.

With information technology evolving today, the alternatives to content search also relies on people uploading and sharing content, it is much easier to do today compared to the times before Internet and android technology exist. Rural-urban societies or rural communities or which are often defined as rural societies must eventually be ready to adapt to internet technology and information. This is due to the incursion of technological products that flooded all over Indonesia and the world. The option only to have technology devices that can only be used for telephones is already getting more eroded today, the need for communication over mobile phones already fused with application technology in the form of androids, consisting of a wide variety of features, brands and prices. For example, the simple thing a farmer might do in a rural setting is to make a video call with his son who is in a city area, or with a collector.

These applications and features can only increase trust between farmers and collectors when performing buying and selling agricultural produce, by being able to see physical appearance, face, sound in the form of video images and being able to check the location and position of existence; compare to the previous period, when the display present is only in the form of written text or sound. Technology eventually provides added value to "certainty". Castells in Rahma [3] (Castells, 2014), says social change and various life joints of the community in the information field are the emergence of informational acquaintance that is deduced as a source of productivity and competitiveness rely on the support of science, information and processing technology that has, including within it management technology and technology management.

Seeing the birth of agricultural processing vehicles and commodities mobility and people produced by Land Rover in 1948 or 71 years ago that used the war-remaining materials[4] (Edwards, 2009). The vehicle was exhibited at the Amsterdam Show, with a backdrop of the Jeep Willy's design, with a steering position in the center and a tub in the rear that could transport people or goods, coupled with mechanical power output through axes connected with vehicle engines, so as to rotate the engine to plow and grind the ground for planting and farming activities. It is highly likely that designs such as the early stage Land Rover are what the current government wants to make a rural car.

II. COMMUNITY INFORMATION AND RURAL CARS

Fig 1. Broadband Internet Access Installation
Source: Cikadu Village

The above image is the installation activity of a satellite antenna in parabola shape and for broadband internet access, in Cikadu area, South Cianjur, West Java. The village will be empowered into a "great force" that will contribute to the sovereign, prosperous and dignified Indonesian mission [5] (Hariyanti, 2017). The integrated broadband village (IBV) development program is a government-provoked program in the framework of developing village potential through the utilization of information and communication technology, implemented by the Ministry of Information.

The program is reserved for fishing villages, agricultural villages, and inland villages to support and assist the activities of everyday local people. The program was also a government-flared internet penetration acceleration program, after Indonesia co-signed its declaration of "World Summit on Information Society" (WSIS) in 2003. The declaration stated that 50% of the world's population should have access to information (internet access).

FIg 2. A young man in Cikadu Village and his notebook
Source : Facebook

The above photo is the search result through the social media of a Facebook user based on a location search in Cikadu. The picture states that the village society that is already Internet-connected and understands computer technology is beginning to exchange and utilize information. The interaction resulted in an acceleration to know the circumstances and existence and activities carried out by the Cikadu village community.

Internet connections cause information regarding Cikadu to be accessible and known, for example, from frequent landslide disasters, minimal road infrastructure, coffee-producing areas and well-quality palm sugar. One thing that is very possible, at one time the area will be visited by coffee

seekers from various parts of the region to get the highest quality coffee.

Through the internet, a wide variety of parties can access regions in Indonesia that produce quality products, simply by inserting keywords on Google search engine. Information flows regarding regions that produce good quality coffee can be utilized by the capitalism states of world-class coffee shop rulers such as Starbuck and others.

The concept of cultural imperialism in the style of Schiller [6] (Birkinbine, 2018), leading the Cikadu people into the modern world system, could occur in the Cikadu, Cianjur and South Garut regions that produce coffee and brown sugar will someday be overrun by business capitalists moving in the world's large coffee franchises, so local people are forced to meet the world market consumption of the big brands of the coffee franchise.

Departing from Schiller's thought, developing countries such as Indonesia would become a major supplier part and become a market controlled by one large country, such as America with its multinational corporations. Global information rulers will take local production, dominate it, without the need to produce on their own land, then rewrap and sell it at a multiplied price, so as to produce a value that is more than the price offered in the producing country. People in the area will earn much of the income consumed in the form of vehicles, education and health. Such assumptions and predictions were at least taken into consideration when Indonesia began designing rural vehicles.

In contrast to the ones that Land Rover did in 71 years ago, Indonesian rural vehicle development was at a seamless state of global information society, and easy and fast access to information was obtained. Development of a rural vehicle or farm vehicle 71 years ago, certainly does not require thinking as it is today, technicians were thinking of producing a vehicle product based on the functions needed and the material available from the war. Products were well sold because there were no choices, or very limited choices; different from the current conditions that are full of various brand choices, functions, and even variants of shapes and colors.

The rural vehicle products to be designed by Indonesia would directly deal with multinational companies that had first manufactured rural vehicles or similar agricultural vehicles, such as the John Deere brand that produced petrol-fueled tractors in 1892 and was the first to produce plows with horsepower in 1858. The design will compete in terms of design, function, spare part availability, price and production quantity, financial capability and corporate development, even up to after-sale services, easy installment of product ownership even product rentals. All of these things can be done with media information from the site owned by John Deere and accessible from the inlands of Indonesia with the help of internet connectivity. Even to build its representative office, multinational company like John Deere takes only a few days to be able to present in Indonesia.

Competing with companies that have stood for more than one hundred years, have complete variants and worldwide sales services, certainly requires the proper strategies and planning. Distinguished factors and novelties must be affirmable. Speaking of technicality and experience in agricultural vehicle production, the long-standing company will be certainly far ahead, but the understanding of local culture in performing agricultural activities and rural activities may not be fully understood by those who should have designed rural vehicles and agricultural vehicles in Indonesia.

Activities due to demographic differences, local intelligence and different ways of dealing with nature led to different cultures that were certainly a factor of profit for local companies that develop and design agricultural vehicle or rural vehicle products. In recent years, the condition of rural society was at the point of confusion between leaning on traditional or ancestral knowledge or on the society in its neighborhood [7] (Rangaswamy, 2006) or leaning on knowledge and information obtained from the media, either television, radio, literature, or from internet technology.

A good design for Indonesian rural should explore or intersect the themes of traditional knowledge relating to their practices, innovations and experiences based on teaching and stories from generation to generation so that they become a way of life and a spirit of survival [8] (Rahayu, 2016). Based on traditional knowledge is the use of biological or natural materials for medical and agricultural medicine, the processes of production, design, literature, music, traditional ceremonies, arts and techniques, including in them intangible cultural values. A simple example is when President Soeharto gave the name “Gatot Kaca” to the N-250 IPTN (now PT. DI) craft.

Conflicts regarding the development of rural vehicles by utilizing traditional knowledge always arise and will always be dealing with modern knowledge and the latest technical technology. The conflict arose due to different starting points of understanding between the engineers’ team and the technicians’ team, the financiers, the founders and the originators of the idea of rural vehicles, the authorities and the design team along with the social research team.

Unlike the John Deere company that gave birth to rural vehicles and agricultural mechanical tools in 1837, as a blacksmith who worked on moving clean water to land and farmland in the Midwest. John Deere's experience formed through solutions to nature to perform agricultural activities over a hundred years; while rural vehicles developers in Indonesia have not necessarily experienced living together with rural communities and farmers as in the time John Deere lived and developed agricultural tools. The knowledge of rural vehicle developers in Indonesia is gained through the academic system and then applied to agriculture areas and rural areas without going through a process of experience.

Indonesian ancestral knowledge of farming also depends on growing seasons based on rainfall or season conditions. With the help of engineering and technology, the planting season can be done not only based on the rainy season, rice planting can be done more than twice in a year and can utilize not-so-extensive land. The ancestral understanding in farming is also minded to give the time off to the soil after planting, the soil is considered to have equality with the human body that also requires rest, and hopes to return to the initial conditions that are fresh and ready to be planted or ready to work. The understanding will certainly clash with methods that utilize technology with continuous planting systems without the time off.

The meeting point of this conflict is mutual learning and openness of ancestral thought and technological

development, so that the same understanding is obtained that good crop yield and soil conditioning would not damage the farmland. The position of a rural vehicle or agricultural vehicle is certainly at the meeting point between the two points of understanding. It could have been the dimension of agricultural rural vehicles present in Indonesia not as large and massive as in America, due to the different understanding of agricultural industrialization.

III. CULTURAL IDENTITY OF NATIONAL RURAL CAR VERSUS INTERNATIONAL IMPERRALISM

One's identity is determined by its membership within a person's various social unity is that it comes from a Bugis tribe with its Bugis culture, so it can be said he has a Bugis identity, and so on towards the Dani, Amukme, Tugutil, Java, Bali, Manggarai and others [9] (Brata, 2016).

The identity of Indonesian Rural Car vehicles is a vehicle from Indonesia among the various rural vehicles that exist in the world, it can be referred to as Indonesian rural vehicle because it is native to Indonesia. Herbert Schiller in [10] (Diansasi, 2016) says the phenomenon of 'cultural imperialism' as a Western dominance in a Western domination in terms of political economy interpreted in an informational framework. America's ability to dominate the release of this information cannot forget the superiority of American technological development itself which can be enjoyed by all people of the world today [11] (Schiller, 1979).

Rural vehicles or in America are referred to as Utility Task Vehicle (UTV) or side by side, some vehicles known from America among others: Artic Cat founded by Edgar Hetteen in 1960; Polaris founded by Edgar Hetteen, Allen Hetteen and David Johnson in 1954; Can Am which began the production of UTV in 1972 in Canada; and was originally a divisional part of Bombardier Recreational Products (BRP). John Deere, originally known as the tractor-making company, that stood in 1837 at Grand Detour. Bobcat was an agricultural and construction equipment company, standing in 1947 and was part of the Doosan Group. Bobcat was a manufacturer of UTVs producing for cargo needs with engines that are economical and reliable. Massimo Motor produced in 2009 in Texas, America and produced the cheapest UTV among American existing brands.

Bennche is a UTV manufacturer that produces and undertakes development in America and is known as a UTV provider for the Texas Ranger and is widely worn by farmers in Texas. Intimidator is an American UTV company known for its Off-road capabilities. Tomberlin is a manufacturer who leads the electric UTV market and is known for its futuristic design, paying attention to environmental issues as well as its user safety. Other brands are Bush Hog, Carter Brothers Mfg. known as the American manufacturer of go-kart Case IH known through its agricultural vehicles and produced in 1984 with help from Fiat Industrial.

Club Car which began production in 1958, is the largest employer related to electrical and gas-powered engines of small dimensions. Cub-Cadet, Eminent Motorsport International, EPIC EV, Texton specialized Vehicles, Heathen, Husqvarna, Land Pride, New Holland (great rival John Deere), Pitster Pro, Pug, Tomcar which has a unique history. In 1967, a pack of soldiers were trapped behind enemy lines, all their Jeep vehicles were destroyed, and their commander was able to repair two vehicles that were already destroyed and they could complete their tasks. 20 years later the soldiers founded Tomcar company [12] (UTVbuddy, 2016).

The dominance of rural vehicles by America is currently supported by information technologies created by America, with the goal of being able to dominate the rural vehicle market or UTV from its competitors, beating Japanese, Korean, and Chinese products. This dominance can also undermine a wide variety of rules limiting the sale of American production rural vehicles. When the luxury goods tax or large vehicle duty tax in some countries, the Americans get around that their UTVs do not require legality as highway vehicles and vehicle work areas they are in the internal environment of agriculture and plantations, but with the completeness and features of highway legal vehicles.

When the issue of expensive shipping cost arose for the Asian region, America through information technology produced UTV in countries such as China, Taiwan, Korea and India. America worked with India, to address the rural transport problem in the area, issued a license for an Indian company called Polaris Eicher. This method actually eliminated India in designing its rural vehicle, the cultural identity of Indian rural vehicles that should have been prefixed to its own needs to be half-extinguished, as it had to follow and adjust to the format of American-made vehicles.

The cultural identity of national rural vehicles can be developed based on Castell's thought, that is, identity can be defined as "a source of meaning and experience for people or the search for the meaning of individuals in conjunction with itself and society" [13] Castells M., 1997). This meaning can be obtained from the views of Indonesian people's life. The views of life of Indonesian society can be seen from the proverbs owned by Indonesian people spread across various tribes or islands.

As the proverb words in Sundanese language *"Jauh-jauh dijugjug, anggang-anggang diteang"* which means: far away still being addressed, far away also being picked up, deliberately come to meet even though the distance is far. The meaning of this proverb related to the design of rural vehicles in West Java is that long distance is not an issue, although sometimes to pick up a fortune we must travel far away but we must still do it. In relation to the meaning of the family, vehicles are also used to meet relatives far away. The reality of this proverb can be seen from the activities of people in West Java traveling a long distance; they go out of the village to meet relatives in other villages although they must travel up and down hills and deal with various obstacles from natural conditions. The concept of Sundanese people's life is cohesiveness; sadness will be shared equally, as well as they always get along and together in living their life [14] (Siska Pertiwi, 2013).

Indonesian and American vehicle differences are individual territory and collectivity. American-designed rural vehicles are made on a personal and individualistic basis that works on extensive agriculture completed with technology that only requires a small number of people to process it, which is very different from the collective conditions of agriculture in Indonesia. Rural vehicles or agricultural vehicles are not just to perform activities on farmland, but to

be a shared means in other daily activities, thus eliciting the term multifunction, which can be used to attend invitations together with family, buy fertilizer collectively, and prepare and buy food ingredients when there is a party event.

The use of local meanings and values is a response to the concern of western cultural imperialism that can lead to the decline of local values and loss of local lifestyle. The design of a rural vehicle based on local meanings and values mean learning local habits and activities that can be made as "advantage values" of a real vehicle. Indonesian people never feel ashamed to come together to attend a party event even though using a pickup vehicle, which is not the case in America. Americans will find it inappropriate to come and enter the city using a pickup truck. Sometimes there is a saying uttered by American urban communities, "Look, there are villagers who come to the city using pickups or trucks," so they feel the need to prepare several types of vehicles for their various activities.

IV. CONCLUSION

The development of rural vehicles in Indonesia is actually in a situation of "Challenge in the Age of Complexity". The design of a rural vehicle is to overcome the problems of industrial societies relating to agriculture and rural area that was in times of "information society", such as ants in elephant environments or David versus Goliath.

At birth, they have to deal with the giants of agricultural vehicles and rural vehicles that have been able to survive, thrive and are one hundred years old with tested experience. The decision made by the Indonesian Government on rural vehicles, within five minutes had reached the ears of the directors of multinational companies of agricultural vehicle and rural vehicle manufacturers in America. With alacrity they will soon give birth to strategic programs to be able to market their products in Indonesia through a wide variety of technology and information systems possessed. To avoid that, of course the government must have a counter strategy so as to carry out the ideal of building rural vehicles and local agriculture.

Building a solid team and able to work laterally as well as involving a variety of expert and competent parties is inevitable. Vehicles development does not only involve the technical side of engineering. The government should be able to see the village community as a market. Understanding by living together with village communities, avoiding monumental programs without seeing sustainability and opening cooperation with various vehicle manufacturer countries with the purpose of independence as well as full development carried out in Indonesia, cleverly conducting licenses and avoiding the monopoly of certain countries of one vehicle manufacturer country in Indonesia.

At this time Japan's dominance of transportation and mobility needs in Indonesia was enormous, leaving no division of technology transfers to Indonesia to be able to build local vehicles. Control of all vehicle development in full is still determined by the Japanese principal party and only makes Indonesia a manufacturing country capable of assembling without being able to build its own brand of vehicles, or even being able to compete.

After Korea, China is a country capable of building its national vehicles and began entering the international market. The time span difference between China and Indonesia is not very far away, but what China does is much more impactful and halting compared to Indonesia. It could be true according to the proverb "Seek knowledge even as far as China".

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