DEVELOPING TRAFFIC AND TRANSPORTATION PSYCHOLOGY IN INDONESIA: INTERDISCIPLINARY EXPERT'S PERSPECTIVE

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ABSTRACT

Indonesia is one of the most populous countries in the world. The development of the auto industry and the financial condition affects patterns of transportation in Indonesia. However, the transport situation in Indonesia is hard enough with fairly poor driver's behavior and lack of road safety awareness (Hanum, 2014). Therefore, the contribution of transport psychology in Indonesia is very important to participate in solving transportation problems such as involvement of psychologists transport in developing countries, such as Germany and some countries in Europe. In this study, 25 inter-disciplinary experts interviewed about the importance of the role of transport psychology and solution to the problems of transportation in Indonesia.

Keywords - transportation, traffic and transportation psychology

Introduction

Indonesia is an independent countrz consisting of more than 17,500 islands, spreading over 3,000 miles (from east to west), located between 06°08' North and 11°15' South latitude, and from 94°45' to 141°05' East longitude. Indonesia's economy is growing and relies on the oil, gas, small-scale industry, and tourism sectors. Since 2001, Indonesia has been divided administratively into 33 provinces, including four new provinces: Banten, Gorontalo, Kepulauan Bangka Belitung, and Maluku Utara. The climate is tropical (hot, humid, and rainy), with two distinct monsoon seasons: dry season (April-September) and rainy season (October-March) (Ministry of Transportation of Indonesia, 2006).

Indonesia covers a total area of 9.8 million square kilometers (km²). As an archipelago, it comprises a sea area of 7.9 million km² (including an exclusive economic zone), or 81% of the total area, and a land area of about 1.9 million km². It is also a country with many volcanoes and rivers. The total population of Indonesia, according to the 2004 Population Census is 227 million (Ministry of Transportation of Indonesia, 2006).

All road accidents are required to be reported and will involve the role of traffic police, but reporting is not always done. For example, minor accidents and those that occur in remote areas or that are settled by the parties involved are usually not reported. Police normally will record fatal or serious injury accidents or those involving serious traffic violations. Accident casualty data recorded by Indonesian National Police (INP) over the last 30 years. In the last 20 years, the number of accidents has decreased by 69%, in contrast with the 225% increase in the total number of vehicles. The decreased number of accidents resulted in an increase of 4% in fatalities. These data are suspect since no road safety improvement effort has been exerted. Further analysis and discussion indicate severe underreporting of cases (Ministry of Transportation of Indonesia, 2006).

As a typical developing country, motorization is still low with a majority of motorized vehicles being two-wheeled: 70 percent at the national level, 50 percent in the capital area of Jakarta. At national level, the vehicle ownership in 1989 was 48 vehicles per 1000 population (Sutomo, Dikun, & Tumewu, 1993).
As many other countries may recognize that there are three main causes of traffic accidents namely, human factors, vehicle factors, and road and environmental factors, Indonesia also has there. The human factor occupies the largest portion for the total number as well as categorized in their impacts, namely deaths, heavily injured and slightly injured that remain above 90%. It is, however, true that non-human factors in Indonesia have a greater percentage as compared to other countries’ figures, and implicitly indicate human errors too, such as ignorance of human to vehicle and road maintenance (Soehodho, 2009).

Accidents caused by human error or due to poor driving behavior on the road was a lot going on, but unfortunately these cases get a little portion in a study that the lack of reference that can be the basis of this study. Examine and analyze the phenomena of human error or human behavior on the road is one of the objectives of transport psychology.

In some countries, traffic and transportation psychology is developed enough to minimize accidents that occurred due to human error. The German Psychological Society has a traffic psychology division for over 35 years. In early 1982, the innovative volume of that subject was published (Klebelsberg, 1982 in Rothengatter, 1998). It should be noted that in the countries where there is a traffic psychology tradition, the term usually refers to a practice of diagnosis, testing and driver rehabilitation (Blasco, 1994 in Rothengatter, 1998).

**Theoretical Review**

Traffic and Transportation Psychology (TTP) is a young and expanding field in psychology. The roots of this discipline are the work of Hugo Münsterberg, a scholar of Wilhelm Wundt and the Psychological Institute of Leipzig University Germany (Temming, Reschke & Kranich, 2009). German traffic psychology, remarks subtly that where officially the main concerns are traffic safety and reduction of the impact of traffic on the environment, almost all of Germany's 600 traffic psychologists earn their daily bread in the testing practice (Kroj, 1997 in Rothengatter, 1998). Practice rather than research seems to determine whether psychologists working in the field of traffic are identified as traffic psychologists, and whether behavioral studies are identified as psychology (Rothengatter, 1998).

There is no single theoretical framework in TTP, but many specific models explaining, e.g., perceptual, attention, cognitive, social, motivational and emotional determinants of mobility and traffic behavior (Schlag & Schade, 2003). Traffic psychology is primarily related to “the study of the behavior of road users and the psychological processes underlying that behavior” (Rothengatter, 1997, in Temming, Reschke & Kranich, 2009) and to the relation between behavior and accidents (Temming, Reschke & Kranich, 2009).

There are six areas of traffic and transportation psychology which can be distinguished (Schlag, 1999):

1. Behavior and accident research

Particularly in relation to different groups of road users (age groups, modes of transport), but also in relation to road design and motor vehicles. Explaining and predicting road user behavior depends on the development of valid and reliable models about the role of human factors in mobility behavior and especially driver performance. Psychological traffic accident and behavior research deals with, e.g.

- analysis of the driving task, changing conceptually from a traditionally rather sensomotoric task to a task with high monitoring impact,
- perception, cognition and attentiveness when driving, driver information processing and expectations,
c. driver state, workload, alertness and fatigue,
d. driver personality, risk-taking, attitudes, motives for driving, arousal and emotion,
e. interactions and the social psychology of driving,
f. the relation between the personal and environmental background of behavior, overt behavior, emerging conflicts and accidents.

2. Accident prevention and improvement of traffic safety

Education and information, but overall following the “4 E’s”: enforcement, education, engineering, encouragement/economy. Main goal is promoting safety by influencing and modifying behavior with legal, educational, vehicle- and road-specific measures; driver training, driving-instructor education, information on traffic issues, campaign design and marketing, effective enforcement.

3. Research and counseling in questions of mobility, transport economy and engineering.

Main objective is user-oriented and best usable supply and design. This includes differentiation between transportation needs of special groups (elderly, handicapped, young people etc.). Main topics are:

a. mobility needs and travel demand, choice of means of transport,
b. travel behavior research, above all activity-based approaches,
c. altering mobility behavior and modal split, problems of habituation and resistance to change, car dependence,
d. design and acceptance of travel demand management, above all of pricing measures (Schade & Schlag, 2003),
e. psychological aspects in road design and traffic environment,
f. quality management, especially quality of service, usability and well-being.

4. Vehicle construction and design

Psychology in car manufacturing traditionally deals with questions of ergonomics, but since the 1980’s new in-car devices as well as related new infrastructure has emerged as a rapidly growing field. Advanced Driver Assistance Systems (ADAS) and new information systems are designed to support the driver in a suitable and user-oriented way. Based on analyses of driving tasks which drivers have to cope with, e.g. multiple tasks requiring divided attention, psychologists’ primary orientation in the design process is towards human needs defining the technical requirements, human-centered development, usability of ADAS, operability of human-machine interfaces, behavioral adaptation and risk compensation, acceptance of innovations, and social impacts.

5. Psychological assessment and counseling/rehabilitation

For drivers who have become conspicuous: driver selection, training and rehabilitation, above all for drivers with offences (driving while intoxicated, severe offences against traffic laws), aptitude assessment for driving, selection and training for professional drivers.

6. Rail and flight psychology

Parts of the mentioned domains not only apply to road traffic but also to rail and air transport. Nevertheless, rail and flight psychology have historically developed in part separately from the dominantly road-related traffic and transportation psychology. One major new direction in rail as well as in flight psychology is the focus shift from the professional operator (selection and training) to the customer perspective (quality of service, usability).

Moreover there are the basic concept of traffic and transportation psychology. They are:
1. Human Factors Science

2. Studies are analyzing human-machine (or human-systems) interactions in order to design machines and systems that are compatible with human capabilities and limitations.

3. As a Human Factors Sciences combines and applies knowledge about human senses (including vision, hearing and touch), cognition/thinking (such as memory and decision-making) and physiology (load bearing, force exerting capacity and so on) to maximize the human-machine fit.

The traffic and transportation psychology has been developed well enough in developed countries, especially in research. Using traffic and transportation psychology research is expected to grow in Indonesia, so it can play a role in efforts to reduce the rate of accidents on the road caused by human error.

**Research Methods**

Design of this study is mix-method research. This approach approaches associated with field methods such as observations and interviews (qualitative data) were combined with traditional surveys (quantitative data) (Sieber, 1973). 25 interdisciplinary experts (economists, psychologists, anthropologist, ministries, engineers, police officers, and private companies owner) from difference university in three cities (Jakarta, Semarang and Yogyakarta). It used questionnaire of A European Road Safety: Policy Orientations on Road Safety 2011-2020 which translated and modified in Bahasa Indonesia and also as interview protocol. The data analysis of this study used matrix (coding). Matrix is form on which can be recorded systematically particular features of multiple cases or instances that a qualitative data analyst needs to examine (Miles and Huberman, 1994 in Eagle, 1994).

**Results and Discussion**

We interviewed several experts from several disciplines, both from several universities, ministries and police. By interviewing experts from multiple disciplines field we got an overview of the problems of transportation in Indonesia, from several points of view of science, about the transportation psychologist needs and solutions to these problems.

In the interview process we have a form of a survey questionnaire. The results of the survey can be seen in table 1. The number of answers to the questions are given in total and percentage of the experts and policy makers.

**Table 1: Frequencies of survey**

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<th>No</th>
<th>Questions</th>
<th>Frequencies</th>
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<tr>
<td></td>
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<td>Yes (abs. &amp;%</td>
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<tr>
<td>1.</td>
<td>Have you ever heard about traffic and transportation psychology?</td>
<td>12</td>
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<tr>
<td>2.</td>
<td>What is the meaning and goal of traffic and transportation psychology?</td>
<td>11 of experts could describe with them own words the meaning and the goal of traffic and transportation psychology</td>
</tr>
</tbody>
</table>
3. Have your institution known/employed traffic and transportation psychology? 2

4. How important is traffic and transportation psychologist in your institution? 23 of 23 experts stated that traffic and transportation psychology is important.

5. Are there any studies relating the road safety management in your institution? 9

6. Have you adopted any measurement to protect vulnerable groups, such as cyclists or pedestrians, in the context of your road safety strategy? 7

7. Does your strategy include education and awareness of raising campaigns? 13

8. Does your strategy cover road infrastructure safety management? 7

9. Does your strategy include specific road safety enforcement measures or initiatives? 5

10. Does your strategy include actions or measures in the field of first aid assistance? 20

Interdisciplinary Experts

Psychologist

The results of the survey interview 9 psychologists who is also lecturers of various universities were not many of them are already familiar with the traffic and transport psychology. They have ever heard of this psychology, but not deeply and thoroughly. This shows that the traffic and transportation psychology has not been widely recognized by psychologist in Indonesia. The absence of any seminars or research on the theme of transport which are connected by the field of psychology make traffic and transportation psychology not yet developed, but from the psychologists themselves are aware that there is so many issues of transportation especially driving behavior problems in Indonesia. The results of this survey psychologists offer solutions that can be offered to resolve the transportation problems of the psychology of such a campaign, socialization and individual consultations. Knowledge of driving procedures, ethics and awareness is critical traffic applied since childhood so important to have traffic module manufacturing for children.

Economist

The results of the survey interview to 2 economic academics from various universities aims to look at transport phenomena from the economic side. Human behavior is not only influenced by the economic situation of a family but also on a country, mainly in Indonesia as a developing country that distribution of economic
development is uneven and high social inequalities. Economic pressures can affect driving behavior on the road and can cause loss of driving ethics against each other.

**Engineers**

Transport cannot be separated from the infrastructure of roads and infrastructure is the job of the engineer. We interviewed 3 engineers from several fields, namely civil engineering and urban planning and space engineering. The reason is a civil engineer knows how the infrastructure on a country road, how to set it up, the criteria and the regulation, while engineers from urban planning and space know how the characteristics of spatial structure in the city and even the country, can be the benchmark of how good the construction of the highway so that drivers can be comfortable driving and avoid accidents.

**Anthropologist**

We interviewed an anthropologist as his capacity as an expert who understands the culture and community characteristics. Human behavior is influenced by the cultures that exist in society, though not one hundred percent. As well as economic expert’s opinion, the driving behavior of people in Indonesia are heavily influenced by the state of their economy. For example, as was the case by public transport riders competing for customers while the number of public transport and the customer is not balanced, but if they do not get a lot of customers, they are also not able to get enough money for their family. In addition, to the differences between the poor and the rich is large enough, so a large social gap affects their behavior on the road as a form of imaging their identity on the highway.

**Police officers**

One of the unity in police of the republic of Indonesia is a traffic police. Their duty to enforce the regulations, provide penalties for violators and have full rights in granting a driving license. From interviews with 2 traffic police chief in the capital city (Jakarta) and the capital city of Central Java (Semarang), we get the information that the unity of the traffic police have driver clinics and there are psychologists who work there. Psychologists have task to assess whether a person is entitled to a driving license or not. Unfortunately not all cities office of traffic police have driver clinics, only in big cities and programs for road safety was not the same in every region. For example, a program conducted by the traffic police in Semarang as a specific form of road safety enforcement is Pre-emptive (socialization in school and society), Persuasive (Patrol) and Repressive (Law enforcement). The strategy is 4-4-2 or 40% of pre-emptive, 40% of persuasive, 20% of law enforcement, but in fact less effective, so it must be changed 8-1-1 or 80% of law enforcement, 10% of pre-emptive, 10% persuasive.

**Ministries**

We interviewed the ministries for this study, they were the Ministry of Public Work (responsible for road infrastructure), Ministry of Transportation (responsible for the operations of transportation between cities, provinces, and island), the Regional Transportation Organization (responsible for public transportation in a province) and the Ministry of Health (responsible for the handling of the accident and the accident victim healing). These ministries are the one who has the authority to make regulations relating to the transport and the drivers and in law enforcement will be under the authority of the police. From some of these ministries have noted many problems of transport in Indonesia, especially in big cities. Accidents which have occurred many factors, as does the lack of adequate infrastructure, inadequate drivers road safety instruments, lack of adherence to the drivers of traffic signs, and lack of drivers personal safety awareness and other drivers. Some of these ministries have done some research in collaboration with several universities in...
Indonesia to discover new innovations and new ways of handling that can be done to reduce the number of accidents on the highway. As performed by the Department of Transportation, they have a speed management system for drivers on the highway by setting maximum and minimum speed when passing through certain areas in the city or in the inter-provincial roads. Tools of speed management is the education/campaign, engineering (encouragement) and tools/infrastructure. The purpose of this speed management is for reducing accident.

**Private Company Owner**

We interviewed two private companies engaged in public transportation, bus. In any transport company must have rules or standards that must be adhered to in order to protect the driver and passengers to keep a license to operate from the Ministry of Transportation. From the both we get the data that is not much of traffic accidents happened by their drivers. Policy made by the company by doing a rigorous selection of the drivers who will join them with aim to prevent an accident caused by human error. In addition, driver evaluation program conducted by the company and the Ministry of Transportation as a place for drivers to submit comments and suggestions based on their experience of driving on the highway, such as invisible traffic signs on the roads and decayed infrastructure. As an appreciation for their work, every month, the company gave a gift to the best drivers of the month, so they can be motivated to always be a good driver on the highway.

The behavior of the road user (of which aggression is one aspect) needs to be considered within the framework of the social and psychological context in which it occurs. The view is expressed that the road user's behavior is seen as reflecting a balance between personal motives (for example, thrills, the desire for speed or position in the traffic stream) and the subjective risk of crash involvement (Grey et. al, 1989). This is in line with the opinion of Prof. Dr. Tohir as an anthropologist who argues that road is as an arena or area to express driver’s own interest. The driving behavior of people in Indonesia are heavily influenced by the status of their economy condition. The differences between the poor and the rich are large enough, so that a large social gap affects their behavior on the road as a form of imaging their identity on the highway.

The economists argue that economic development in Indonesia rapidly increases in short time after financial crisis in 1998. People is not ready enough for those changes. Hedonism culture began to abound in the people. Gap between rich and poor is even greater. Community groups that have a greater economic capability want to show their social status by buying goods that have luxurious symbol like cars or motorcycles. They drive it on the street often at high speed with the purpose of attracting attention or as an expression of freedom. It is also equally committed by the poor. They drive the vehicle at high speeds, not obey traffic regulations with the aim to express distress over the state of the economy. For example, it was the case by public transport drivers competing for customers while the number of public transport and the customer is not balanced, but if they do not get a lot of customers, they can’t earn enough money for their family.

From the explanation above can be explained the behavior of drivers in Indonesia, especially in the selected cities that including the big cities in Indonesia. Bad driving behavior can lead to an accident, although accidents that occurred in Indonesia cannot be said 100% caused by human error. The factors presented by Büschges (1993) are also presented by the experts. According to the experts, the present situation of infrastructure in Indonesia is yet inadequate. Traffic signs are less suitable placement can make drivers
confusing and decided to ignore these signs. Economic conditions in the cities in Indonesia also is not evenly good distributed, so the construction of road infrastructure to be less qualified. For example, the number of damaged roads can pose the risk of a single accident. In addition, in terms of economy, the purchasing power of the vehicle is still fairly poor, so the tendency to buy a vehicle with poor quality with a capacity of safety level is also not good. These things can lead to a lack of road safety awareness of drivers.

However, this situation is not problem without solution. Ministries, police and experts try to offer solution for this problem. Ministry as the government is obliged, prior to make a law for transportation traffic and road safety. Currently the ministry, police and experts are working together to make laws of road safety (Draft National Public Safety). Law enforcement duties will be on the Police. They do not make law but to enforce the law.

The description above, it can be concluded that the traffic and transportation psychology can be developed in Indonesia. Although currently not many psychologists, experts, ministries or police have heard about the traffic and transportation psychology, but they argue that traffic and transportation psychology is important to solve the problems of transportation in Indonesia. By providing the facilities like the law of the ministry about the convenience by the traffic and transportation, psychologist can participate in addressing the problem of transportation in Indonesia, especially in terms of personality of driver, behavior and health or fitness of driver.

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