

## Final Chair's Summary

### **Busworld Academy South-East Asia Conference (Making Bus Transport Systems Attractive, Efficient and Affordable in South East Asia)**

**20-22 March 2019**

**Venue: Hall B3 (First Floor), JI-EXPO, Jakarta, Indonesia.**

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#### **I. Introduction**

1. The South-East Asian region comprising of 11 countries is experiencing high economic growth on one side and facing critical problems of environmental sustainability on the other. The population increase in the South-East Asian region has caused rapid urbanization and the vast increase in the private vehicle ownership in line with economic growth that is eventually contributing to air pollution, traffic congestion and road accidents which are the major concerns for the sustainable urban development. Most of these countries do not strategically respond to these challenges of urban transport. The lack of public transport services causes a serious barrier for economic development and sustainable growth. Therefore, most countries in the region require systematic development of public transportation.
2. To reform the bus system, megacities in the South-East Asian region need to improve bus operations, facilities, vehicles, and culture. Bus stations and lanes should be repaired and substituted with exclusive lanes for a better environment for bus users. Old vehicles also need to replace with high-quality buses such as double decker buses, electricity buses, and online electricity vehicles (OLEVs). The government should manage private bus companies with performance and service evaluation systems. Accordingly, these megacities should have a high level of monitoring and enforcement systems for bus operation companies. In addition, a standard cost system needs to be built for the efficiency of bus companies. Finally, South-East Asian cities need to create a sustainable business model for private bus operations. The model should utilize the profit maximization motive of the private sector by relying on a free market system with limited public support. Thus, these cities should try commercial approaches to meet the needs of citizens so that they can make it possible to be less dependent on government subsidies in providing bus services.
3. The Busworld Academy South East Asia conference with a theme of “**Making Bus Transport Systems Attractive, Efficient and Affordable in South East Asia**” was held in Jakarta,

Indonesia from 20<sup>th</sup>-22<sup>nd</sup> March 2019. The key objective of the conference was to share global knowledge and experiences of public transport with South-East Asian member countries. The conference discussed business approaches for efficient running of BRT systems, introduction of electric busses and better safety and traffic management. The conference addressed the possible approaches to achieve the Sustainable Development Goals 2030, Paris Climate Agreement and the New Urban Agenda.

4. Jakarta is home of the world's longest BRT system, TransJakarta. A Bus Rapid Transit system of 251 km long. TransJakarta is the first and only Bus Rapid Transit (BRT) system in Indonesia. It started in 2004, by cooperating with a consortium of 5 bus companies that had at that time a crossing route with TransJakarta corridor. Now it consists of 155 routes and in the last three years it dramatically expanded from 41 routes in 2015 with 605 buses. In 2017 this number was increased up to 1500 buses. The fare has remained Rp 3,500 (22 Euro cents) per passenger since operations began. The service set a record in 2018 when it carried 730,000 passengers per day. Over the years, on average TransJakarta carried 663.000 passengers per day. About 1898 million passengers used the service of TransJakarta in 2018. TransJakarta is also the first public transportation system subsidized by the city government in Indonesia. In the past few years, TransJakarta has become the BRT system benchmark for cities in Indonesia, such as Semarang and Medan, and a symbol of road-based public transportation renewal in and outside Indonesia, by implementing a system that was more humane for the citizens.
5. The conference was attended by more than 200 participants comprising of high level government representatives and policy makers from relevant Ministries. The conference was also attended by several City Mayors/Local Government representatives, experts and international resource persons, including representatives of scientific and Research and Development (R&D) institutions, representatives of UN and international organizations, including international financial institutions, multilateral development banks and donor agencies, representatives of the private and business sector and NGOs etc. and other stakeholders from the South-East Asian countries.

## II. Opening Ceremony.

6. Welcoming all the dignitaries and the participants, Mr. Jan Deman, Director of Busworld Academy mentioned that the economic growth of the past decennium in most South East Asian countries has led to rapid and unprecedented growth in urbanization and motorization in cities. To sustain the pace of higher economic growth while ensuring social inclusion and avoiding adverse environmental impacts, countries –together with the industry- need to develop policies and technologies that can ensure a comprehensive and integrated approach for sustainable expansion where efficient and inclusive urban access and mobility is at the heart of sustainable development, poverty reduction and growth agendas. The Sustainable Development Goals, the New Urban Agenda as well as the Nationally Determined Commitments of several South East Asian countries provide a foundation for more inclusive and environmentally sound development of mobility solutions in the continent. Mr. Jan in his concluding sentences mentioned that there is one component, one key factor, in almost any evolution towards future oriented public transport. And this key factor it is the collectivization of transport: which means more efficient use of motor power and fuel, more efficient use of surface. This key factor holds no obstacles for immediate implementation. He also mentioned that the tools are exhibited in the Busworld exhibition, and will also be discussed in the Busworld Academy sessions.
7. Mr. Jerome Pourbaix, Senior Director- Global Growth, UITP Brussels mentioned that Jakarta is an excellent place to hold this conference on bus systems, and how to make them attractive, efficient and affordable in Indonesia and South East Asia. Public transport is growing worldwide, and particularly in Asia. He also mentioned that UITP is a network of public transport operators, regulators and suppliers, from all over the world. The purpose of UITP is to promote excellence within public transport, by supporting exchanges between professionals. UITP also aim to create a more supportive environment for public transport, by engaging with decision-makers. He mentioned that efficient public transport is a key factor of attractiveness and competitiveness of cities. It makes a significant contribution to the economy. In conclusion he mentioned that the economic benefits of public transport are 3 to 4 times higher than their costs.
8. Mr. Sommy Lumadjeng, Chairman of ASKARINDO welcomed all the delegates to the Busworld Academy conference. He expressed his sincere gratitude to Busworld Academy to organize a conference of a very high stature in Jakarta. He mentioned that public transport business is a characteristic that must be fought together. He said corporation is the key to achieve

sustainable mobility. Maintaining the corporate nature of everything in terms of design will lead us to progress and development.

9. Mr. Bhushan Tuladhar from UN Habitat spoke on the importance of clean transport. He mentioned that by the end of this year, electric buses will be displacing 270,000 barrels of diesel per day – three times as much as that by all other electric vehicles. This will have a huge impact on the environment as well as public health as diesel fume is a carcinogen according to WHO. He talked about the two defining trends or challenges faced by the world today vis-à-vis the natural world – Climate Change and in the Human World Urbanization. He mentioned that keeping in view the urbanization trends, the UN-Habitat is working closely with city governments, national governments and other partner organizations to promote sustainable mobility solutions.
10. Dr. Bernadia Irawati Tjandradewi, Secretary General of UCLG-ASPAC spoke about the current situation of urban mobility development in Asia and UCLG ASPAC activities in terms of Urban Mobility Development. She mentioned that as a region with strong economic growth, Asia Pacific has become a region of high level urbanization. UCLG- ASPAC have placed sustainable mobility as one of the core activities that range from advocacy, capacity building and training, cooperation and exchange of experiences between cities / regions. She also mentioned that in urban transportation, the problem of behavior change is very important for the transition to low carbon mobility. She deliberated the role of local governments to achieve the transition to sustainable structures and overcome the era of fossil fuels. Lastly, she emphasized on the importance of Jakarta Declaration on sustainable bus transport.
11. Ms. Nathalie Surmont, Trade and Investment Commissioner, Indonesia and East Timor, Embassy of Belgium mentioned that building railroads and subways are huge investment projects which require long term investment and huge budgets. So it is better that we use our resources as best as we can and with buses of today we can go places whether it is short distances in cities, long distances between cities, in a comfortable, and ever more sustainable way. Buses and coaches also mean business, not only for the operators, also for the maintenance, the bus builders, developers of technology and so on. She mentioned that Busworld is not only about hard sales but also about training, education and sharing information and this done by Busworld academy. Lastly, she expressed her gratitude to the representatives of Busworld Academy and their partners for organizing the conference.

12. Mr. Ahmad Yani, Director of Road Transport, Jakarta expressed his gratitude to all the dignitaries and the participants for attending this conference. In his speech, Mr. Yani spoke on the importance of a paradigm shift towards sustainable public transport. Being the Director of Road Transport in Jakarta, Mr. Yani plans to develop sustainable financial plans and models for public transport systems not only in Jakarta but for other cities in Indonesia as well.
13. Chairperson of the Indonesian Young Entrepreneurs Association (IPOMI), Mr. Kurnia Lesani Adnan mentioned the economic value of the bus transport will be achieved by using a bus level considering the number of passengers that can be transported. He acknowledged that non-level buses with high deck design also enables automotive companies to use them to transport goods such as packages in addition to transporting passengers. He said, the costs to be incurred by the autobus businessmen reached IDR 3.5 billion for the level bus while the non-level buses with high decks reached IDR3 billion.

### **III. Keynote Addresses**

14. Mr. C.R.C. Mohanty, Environment Program Coordinator, UNCRD Japan, spoke on how the bus transport system plays an important role in bridging disparities, in particular the connectivity between rural and urban areas. Bus transport is the cheapest form of public transport with large co-benefits – social, economic and environment. He mentioned that the 2030 Agenda for Sustainable Development, with 17 Sustainable Development Goals (SDGs) and 169 related targets at its core, represents a plan of action for people, planet and prosperity, and reflects national commitments to put the world on a more sustainable and resilient path. Through the adoption of this Agenda, member states have acknowledged the vital role of sustainable transport in achieving the SDGs. He also mentioned that the goals of biodiversity and ocean health also have significant intersections with the promotion of smart and sustainable transport practices across regions and across modes. Sustainable transport means that it should be safe, affordable, accessible, efficient, resilient, low carbon and with minimum environmental impact. In addition to rising number of mega-cities, recent decades have witnessed a rise of polycentric metropolitan regions consisting of a number of connected large urban areas, which pose a new set of challenges in transport planning and development. He deliberated that urbanization should take into account the entire population as a sizeable population. Mr. Mohanty spoke on the importance of first-mile and last-mile connectivity which are mutually reinforcing to enhance rural-urban connectivity. The first and last mile concepts interact because they enable goods

and services to reach the poorest communities and facilitate movement of agricultural produce from farms to market. While referring to The Bangkok 2020 Declaration (2010-2020) adopted at the UNCRD led Intergovernmental 5th Regional EST Forum in Asia (2010, Thailand), he mentioned that it aims to influence the decisions of governments and various transport stakeholders in the region over the decade (2010-2020) towards realization of safe, secure, affordable, efficient, people- and environment-friendly, and inclusive transport in rapidly urbanizing and modernizing Asia.

15. Dr. Bernadia Irawati Tjandradewi, Secretary General – UCLG ASPAC spoke on the importance of localization to help achieve the SDGs. LOCALISE stands for Leadership, Ownership and Capacities for Agenda 2030 Local Implementation and Stakeholders Empowerment with an objective to support the local implementation of the SDGs in Indonesia by strengthening the capacities of local governments and their associations to plan, implement and monitor the SDGs at local level. She spoke on the need of a paradigm shift to new urban governance to develop inclusive, responsive, and efficient urban management system. Working towards urban paradigm shift will re-address the way we plan, develop, govern, and manage cities and human settlements.

#### **IV. Mayor's Forum: Mobility Champions Community in South-East Asia**

16. The session highlighted the global trends in urban mobility and key action areas for decision-makers. Currently more than half of the world's population is living in cities but there are strong disparities between regions. It was deliberated that urban expansion is the key to the demographic structure of the population as it influences the segmentation of transport services. Public transport is a labour intensive activity. This makes the labour dimension a key challenge. Attracting the right talents and skills is a global challenge that is reflected in different manners according to the size and maturity of the public transport market. Though public transport is a local service, the employment market is increasing globally especially for qualified and skilled personnel. There is a need to revisit the traditional governance models. The development of on-demand transport services complementing conventional public transport offers the opportunity to serve more people with low cost solutions, making public transport more cost-efficient. By using smaller vehicles, public transport becomes more cost-efficient while growing its catchment. Hence, new mobility services may strengthen the social dimension of public transport without affecting its business ambition. The session highlighted the need of a

paradigm shift from moving cars to moving people. It suggested an extended network coverage of public transport by connecting last-mile and recommended integrated connectivity and e-mobility to enhance efficiency in public transport. It also briefly discussed on the world bus market. Recommendations were made for urban public transport policies keeping in view the revenue support for bus services, increased funding for local transport, and increased investment in local bus infrastructure, modal switch from car to sustainable transport and demand management measures to reduce traffic. The panel deliberated on critical governance challenges for Southeast Asian cities in integrating land-use planning and transport. Although, spatial planning is identified as key component for public transport policies, integrating a sound transportation system was considered extremely important for implementation of the policies. The panel felt the need to maintain a balance between land use and transport to reduce car dependency, improve accessibility to essential utilities, improve connectivity, improve walkability and cycling, improve resource efficiency and urban productivity, in order reduce air pollution and GHG emissions. In line with the theme of the conference, the panel discussed innovative financing mechanisms for the public transport sector. In this regard, public private partnership was identified as a key component for the success of free passenger buses system in Petaling Jaya city, Malaysia. High labour cost, inflation, lack of managerial capacity, poor performance, non-competitive business models were some of the key challenges identified for Phnom Penh city in Cambodia. As the role of local Government and authorities was identified as a major factor for success in the sustainable passenger transport sector, UITP and UCLG ASPAC introduced the participants to The Mobility Champions South East Asia program: a leadership program for the local mayors to express their support and commitment in moving together for a sustainable passenger transport system. The city mayors of Petaling Jaya city and Phnom Penh city expressed their support by signing the mobility championship certificates.

#### **V. Futuristic Transportation Solutions for South East Asia-Shaping Tomorrow's Public Transport in ASEAN countries.**

17. The session highlighted the complementarity of both BRT and MRT. The panel felt the need of a People Near Transit (PNT) centric development. With the Asian cities facing rapid urbanization, the management of cities are getting complex. Public transport should be considered as the solution to move people with the integration of payment and physical routes. The development of an Electric Bus Roadmap is a challenge, but one of the measures that TransJakarta taking is that its signing the memorandum of EV laboratory. Enhancing bus ridership through integration

and connectivity is the key to achieve zero air pollution, less road accidents and to avoid congestion. A paradigm shift is necessary that sets priority on non-motorized transport and public transport. While making urban transport policies, the Governments should consider moving people and not cars. Development should be initiated keeping a people centric view. The city planners of Seoul in South Korea has considered public transport as the topmost priority while designing urban transport policies. To make bus systems more attractive, smart bus stops should be considered and technologies such as installation of chip on the seat to enable passengers to choose the seat by application should be taken into account. Parking management is considered important, as parking spaces converted to green eMobility zones will enable people to use public transport. Promoting bus or inclusive mobility means to develop sidewalk expansion and bikeway network to ensure priority on public transport. Recommendations to achieve ZERO air pollution, accident and congestion are to do with integrations with strong human resource, budget and law. We have to adapt (a) cohesive network systems, (b) interchange integration, (c) information and operation integration, (d) unified fare and (e) better institutional arrangements. The panel felt the need to develop a holistic connectivity network rather than just developing public transport networks which could be then integrated with bus coaches. To attract people to shift from private to public transport, the panel felt the need to promote the public transport culture by expanding services and growing networks, developing affordable and efficient financial models, innovation and flexibility. From an industry perspective, the panel discussed that the futuristic transportation solution for South East Asia is electro-mobility. Making the right choices for having full electric, hybrid, modern diesel and high capacity buses is considered essential. Now in the era of transition, the key challenge identified is infrastructure for charging. The technology is available but we need tailor made solutions considering different climatic conditions for different places like in South East Asia, tropical weather is the main issue. The buses has to be set up with air conditioning systems that would need electricity in advance. The four megatrends that change human lives and have an impact on future mobility in an urban environment were identified as (a) urbanization, (b) digitization, (c) sustainability, and (d) individualism. The future mobility needs to consider a citizen centric development and e-mobility as the solution, taking into consideration more than just a bus. It requires an integrated operating system. Government together with operators and manufacturers has an important role to play for providing effective, efficient and affordable public transport.

**VI. Creating Uniform Regulatory and Policy Framework for ease of doing business including: (a) Safety and traffic management and (b) Emission and free fossil fuel energy.**

18. With over 2.4 million road deaths per year in the world, the aim to achieve zero road traffic accidents culture is very challenging. There were approximately 39,000 road deaths in Indonesia last year. The panel deliberated that serious road injuries have a significant impact on our society, resulting in jobs loss 70% of the time, income loss 72% of the time and divorce 21% of the time. From the perspective of bus operators, the appropriate initial driver training and annual training goes a long way to reducing road accidents. In addition, bus driver fatigue is considered as an important factor for having accidents, therefore giving drivers adequate rest and appropriate driving shift lengths is very important to ensure road safety. However, in an environment where there is a shortage of qualified bus drivers, this can be challenging. Other measures that help reduce road accidents are speed cameras and red light cameras and the black box technology. Another challenge that came up in the discussion for our bus industry is bus fires, therefore the introduction of fire suppression equipment is becoming extremely essential. Current and upcoming fire regulations (107) comes from UNECE regulations “United Nations Economic Commission for Europe” and many other countries around the world are adopting these regulations. It is recommended that all new buses need to be fitted with fire suppression equipment by 2021. Current alternatives to fire suppression are portable fire extinguishers kept in the cabin of a bus and the need to have hammers to smash windows in the event of a fire. The panel also deliberated on traffic Management and felt the need to give customers an advantage over car drivers. The Austrian Institute of Technology have undertaken a significant amount of work on the benefits of appropriate traffic management. It was found that the use of mobility surveys using smart phones is very effective in establishing customer behavior. From these surveys they are able to establish the four A’s of passenger needs: (a) Availability – existence of the service, (b) Affordability – Means to use service (c) Accessibility- ability to use service and (d) Acceptability - willingness to use a service. This information helps when city planners are designing a BRT service or developing appropriate traffic infrastructure. The panel mentioned that the establishment of crowd flows is critical when designing public transport services infrastructure to ensure an efficient running network. Smart phone based mobility surveys create a vital basis for capturing the mobility behaviors of the transport/bus-passengers. It is the basis for optimizing routes, pricing and policy decisions for transport operators or planners. Furthermore, understanding and considering the customer needs (4 A’s – Availability, Affordability, Accessibility and Acceptability) also is a core requirement for creating

uniform regulatory and policy framework. How to integrate safety measures during the planning or/and improvement process of BRT-systems was shown in two cases: (a) Vehicle layout optimization based on validated AIT passenger crowd flow simulation modules and (b) BRT/Bus-station and multimodal hub optimization based on validated AIT passenger crowd flow simulation modules.

## **VII. Development of Mass Transportation, BRT Systems and Supporting Infrastructure.**

19. This session highlighted the importance of integrating all mode of transport with public transport network and its infrastructure to support the development of public transportation. Integration public transport will be one of public transport concern in the future. Currently, the development of public transportation in Asia is underdeveloped and unattractive. Integrating the existing and proposed public transport route with other modes is the key to solve this problem. It can be reached by integrating the network and the ticketing. The integration also serves as the way to attract more passenger to use public transport. TransJakarta, a public transport from Indonesia, has developed Jak Lingko, an integrated payment for its bus system to integrate the trunk, feeder, and newly expanded microbuses. In cities with narrow streets, integrating the public transport network can be challenging because it cannot provide a bus lane. For this case, public transport development can use the direct-service system to travel on and off the BRT corridor. This way, it can widen their services. This session also highlighted the basis to choose the appropriate public transport system for a city. In some cases, the city chooses public transport technology over the need of the citizen. This choice can risk public transport development into failing because it does not capture the citizen needs. The development of public transport needs to consider the need and the desire of the citizen by analyzing the corridor density, desired form, and the character of the city. There are examples of public transport which consumes a big investment but serve only for a little demand. Some recommendations were made to develop mass transportation, such as MRT and LRT. Developing a new mass transportation system will need longer time than BRT. Developing mass transportation also consume more investment than BRT. As a transport option, mass transportation cannot stand alone, it needs to integrate with other modes. So, it is important for any city to understand its financial capacity and the readiness of the BRT and the microbuses system as the backbone of its public transport system. The microbuses are as important to support the public transport system in the city. The city also needs to improve bus operations, planning the bus network to adjust with the new mode option, preparing regulatory framework,

preparing quality insurance system, and monitoring. By choosing and planning the right public transport system that suits the condition of the city, the city will get the financial benefit from developing public transport.

### **VIII. Innovative Financing for BRT and Market Opportunities for Indonesian Bus Builders.**

20. This session highlighted the multimodal operation system, coach tourism, and public transport funding. Nowadays, the cities are going through a new era of digitalization. In terms of transportation, there must be a multimodal operating system to connect mobility of many transportation modes. In Europe, they already established a platform which give people an option of transport modes in the most efficient way. The features such as car sharing, driver search options, availability of parking, nearest public transportation station etc. are available for the public. Hence, mobility options can be stimulated to cities to provide optimal setups. The coach and the bus sector contribute to the economy and tourism and ensures sustainable mobility. It can reduce congestion; one coach can replace up to 30 cars while taking up the road capacity of only 3 cars. However, there are a lot of challenges faced by the bus and coach transportation. It is exemplified by no access and no parking space for coach. The infrastructure: pick up and drop off near to sightseeing area, technology, and efficient support team are still weak in many developing countries. A lot of research is needed for long term solutions. This session also highlighted the public transport funding priority by Asian Development Bank. ADB gives 25% of the fund to develop sustainable transport policies for member countries to help in development of transport infrastructure and services that contribute towards low carbon, safe, accessible, and affordable transport systems. Indonesia also have of a target of a paradigm shift to 60% sustainable transport by 2025. Besides providing fund and loan, the ADB also helps in knowledge sharing for sustainable mobility. The panel discussed about the electronic vehicle economy. EV has no direct combustion emissions (CO<sub>2</sub>, pollution). The recommended areas for actions for urban transport policy: EV as follows, focusing on one high demand vehicle that need to transform to EV. Incentive such as reduced fossil fuel subsidy, inclusion of non-financial incentives are considered necessary. Optimizing charging infrastructure and battery policy was also identified as a key enabler for a paradigm shift to sustainable mobility. Electric mobility serves as a solution for air pollution, but the used battery of EV after 10 years will be throw new challenges for sustainability.

## **IX. Development of Electric Bus and Trolley Bus Networks.**

21. The session highlighted the global trends in urban mobility and key action areas for urban planners. Currently more than half of the world's population is living in cities but there are strong disparities between regions. A comparative life cycle assessment of lithium-ion battery electric bus and diesel bus were investigated using GREET 2016 to investigate the impact of alternative vehicles on the environment. The GREET 2016 can evaluate energy cycle analysis lithium-ion battery of electric buses. According to the Intergovernmental Panel on Climate Change (IPCC) report released by the end of 2007 Greenhouse gas emissions increased by 70% between 1970 and 2004, and global warming is becoming a global problem. Investigations on the effective noise emissions of electric buses have sparsely been published so far. However, the integration of the results into the urban context and a reference to the actual bus line operations have so far only been made to a limited extent. Further, the growth in the number of automobiles in India leads to substantial growth in energy consumption. As per the study carried out by The Energy and Resources Institutes (TERI), the projection of growth in energy consumption by the transport sector in India shows that there will be a seven times growth in energy use in transport sector between 2012 and 2047 out of which more than 90% of the share would be only from road transport. In this session, it was also discussed that the growing impetus on greenhouse gas (GHG) emission regulations, drop in battery prices, and purchase subsidies on electric vehicles (EVs) are certain to accelerate the growth of electric buses across the globe. Battery-electric buses are expected to have a larger market share, followed by fuel cell electric buses, by 2025. Reducing total cost of ownership (TCO) of electric buses compared to diesel buses, coupled with the push for developing the charging infrastructure, will make electric buses a profitable option by 2025. The global electric bus market size was ~81,968 units in 2017. This number is expected to grow to ~148,080 units in 2025 with a compound annual growth rate (CAGR) of 7.7%. It was deliberated that the growth in the electric bus market is influenced by subsidies and incentives by national and local governments – a critical reason for China's supremacy in this market. Other key factors are the establishment of quick charging infrastructure and the development of highly capable batteries. The increasing need for reducing emissions, especially in highly-populated cities, will necessitate the adoption of electric buses in the intra-city passenger transport segment.

## **X. Operational Excellence and Digitalization for Sustainable Urban Bus Transport.**

22. The session highlighted the Digital Safety & Security Vision, Automation & Control Mobility and Innovation Systems & Policy. Sustainable mobility systems can be achieved through better transportation infrastructure technologies and dynamic transportation systems. The panel considered digitalization as the basis for new mobility solutions. Technologies such as big data storage and processing, new sensors, new intelligent infrastructure and automated vehicles have a key role to play in ensuring sustainable mobility. The Austrian Institute of Technology has designed mobility mode detection for public transport operators and system integrators. The autonomous ticketing application can attract more passengers to public transport systems as they don't have to worry about buying a ticket and think about operators and fares. By integrating digital means in public transit systems passengers can just use the transport infrastructure when- and however they want. The panel recommended to develop transparent and efficient means of communication with passengers and traffic participants to learn about the mobility behavior and needs of the passengers. It is also recommended to support new definition of passenger needs regarding upcoming blurred boundaries of future public and private transport. Policy makers need to develop strategies to encourage responsible use of transport services. Addressing the latest trends in the transport sector like autonomous freight ships by 2020, autonomous drones, autonomous high-speed trains in France by 2023, it was pointed out that digitalization is the basis for future mobility solutions. With the development and dissemination of smart phones everywhere in the world, the basis for Internet of Things (IoT) was created. Additional developments like big data storages, high speed data processing abilities as well as data and sensor fusion will play an important role, also in the bus transportation business. Smart phone based mobility detection systems already create the basis for mobility surveys but furthermore, they are an ideal solution for autonomous ticketing systems, where the smart phone automatically detects the entrance, exit and traveled time and distance in eight different transport modes including buses. As another example of the digitalization process in the bus industry, an autonomous bus project called "auto.Bus Seestadt" in the city of Vienna was presented. Besides creating and analyzing sensor based data, the understanding, consideration and scientific validation of the customer needs (4 A's – Availability, Affordability, Accessibility and Acceptability) will play a very important role in achieving a successful outcome of this project.

## **XI. International Best Practices in Operation, Maintenance and Management: Digital Technologies for BRT Systems.**

23. This session highlighted the potential technologies to improve public transportation services. It was identified that some major strategies to attract more people in using public transport is to provide good public transport infrastructures. Public transportation infrastructure is a lifetime investment. Basic infrastructure development and IT technologies also enhances the service of public transport like surveillance cameras, e-ticket, wifi-phone charging, and on board/station information based on real time. However the conventional systems are still there in public transport because not all passengers can use the facilities. Public education and advertisement also play an extremely essential role to attract more passengers. The idea to promote public transport is to encourage people to get benefits to use services of public transit. Another strategy is restriction of private vehicle use like parking restriction in the inner city. The case of Jak Lingko program was also highlighted in the session. Jak lingko is card integration payment for all transportation services such as LRT, MRT, minibuses, and short shipping trips to 1000 islands. Jak Lingko means Jakarta linkage which aims to make integration of all modes of transportation. By Jak Lingko, Transjakarta intend to increase their existing 20% public transit mode share. Jak Lingko also considers minibuses operator as their target integration because minibuses has important role in serving wide coverage area in a more flexible way. By implementing Jak Lingko and its revitalization program, Transjakarta makes service level agreements with the operators. Previously less than 5% of drivers had a proper driver license but nowadays after the Jak Lingko program, almost all of drivers have a license. The panel defined 3 categories as an important component for public transport improvement. The first is to make clean and efficient services such as lower fuel consumption or using electric vehicle. Second is safety and sharing mobility by asking citizen to shift to public transit. And, third is connected system in order to get better bus management, bus fleet, and bus operational. The panel also suggested that technology will bring more efficiency for operations and management in the future although it absorbs a high cost in the beginning of the service. The panel recommended that trips reconnecting is the way to provide a better transportation service. Moovel group provided a multimodal platform by integrating bus system, railway service, bikeshare, taxi, and car sharing. The multimodal platform aimed to strengthen public transport business. The platform assists the citizens to have an efficiency on planning their trip and make public transport use more interesting.

## **XII. Towards Sustainable & Client Friendly Public Transport in Indonesia; Appealing and Restructuring of Land Transport System towards a Better Infrastructure in Future.**

24. The session highlighted the public transport reforms in Jakarta. It discussed the major challenges faced by Indonesia in managing an ideal public transit like giving more priority to private cars, unsterile bus way and sidewalk, steep and slippery ramps etc. The unsafe walking environment from the neighborhood to access transit, cause more dependency on private vehicles like motorcycles. It was discussed that to plan a complete street giving priority to public transport, planners should start by mapping all the transits. The session deliberated on four factors to define the priorities while planning for a public transit system. These are (a) High Demand Transit Stations, (b) Public Participations (QLUE Apps), (c) Activity Places and (d) Priority Areas. The forum described **cities for all** as cities where people are a part of the process of planning & the implementation including routes planning and design audit for the elements. In order to attract more passengers using public transport, we need to improve the quality of service delivery. Firstly, we need to define and measure the quality of public transport by introducing Key Performance Indicators, so-called KPI's. Such Quality KPI's can become part of a Service Contract between a Transport Authority and the Bus Operator. Under the contract the bus operator is required to deliver service quality in line with the predefined standards. Subsidies to the operator could be linked to meeting KPI's targets for quality. Collaboration between Public Transport Operators and Public Transport Authorities is essential to improve the quality of public transport. Service contracts can help to achieve this but trust and cooperation between parties is an essential starting point. The use of public transport is often hampered by unsafe, unfriendly and inconvenient access of bus stops and stations. To make public transport more passenger friendly we need to pay systematic attention to the accessibility of the public transport system. Areas for improvement are safe pedestrian walking routes and crossings, reducing slopes of access ramps, minimizing gaps between platform and bus entrance, adequate lightning and appropriate signing and information. The session also discussed several Rollover Test Method of UN ECE-R66 keeping in view the safety of the passengers as on an average 10 - 15 people die from bus rollover accidents in Indonesia. CV Laskana's rollover test in both computer stimulation and real designing of buses was discussed in this session. Safety of bus transport remains an important topic in South-East Asia. Accidents often result in negative publicity and image of bus transport. Analysis of bus accidents has shown that the most deaths and injuries are related to the roll-over of buses during accidents.

Roll-over tests and computer simulations can greatly help to improve the construction of buses preventing deformation of the bus frame and ultimately will save lives.

### **XIII. Moving Towards High Valued Bus Transportation- Session on Safety, Passenger Comfort and Client Friendly Marketing & Sales.**

25. This session discussed the right approach of successful deployment of electric buses in a country. The key challenges in public transport buses were discussed. Some of the key challenges that were identified in this session are traffic congestion levels in cities that is constantly rising, vehicles accounting for more than 20% of all CO2 emissions, depletion of crude oil reserves at the rate of 4 billion tonne a year and the citizen demand for better comfort & convenience in public transport. To overcome these challenges and attract citizens to bus transport, we need clean, safe, comfortable and smart public transport at an affordable price. The need for a comprehensive approach for electric bus deployment in a city was regarded as highly essential. It was also discussed that traffic demand analysis will help 'Optimize the Routes'. This session also discussed about major urban issues and challenges in order to move towards a sustainable city so that the bus transportation could be improved to the high value. High valued bus services depends on various factors such as populations, culture, environment and economic situation. The panel recommended electric bus because it reduces pollution, helps in better scheduling, ensures advanced safety systems, real time tracking and it improves the safety of passengers. It also improves the quality of life for citizens and giving a superior ride experience to the passengers.

### **XIV. Closing Session and Remarks.**

26. Dr. Kulwant Singh, Advisor of Busworld Academy, expressed his sincere gratitude to all the participants for joining the first of its kind Busworld Academy conference and making it a huge success. He specially mentioned the key roles played by the partner organizations; UITP and UCLG-ASPAC in the success of the conference.
27. Mr. Didier Ramoudt, President of Busworld International, expressed his deep appreciation to the Government of Jakarta for their great hospitality and organization of the Busworld Academy South East Asia conference. He mentioned that development policies in the bus transport sector should be made with high passenger priority. He also mentioned that the three pillars of

Busworld; comfort, safety and sustainability are passenger centric. In conclusion, he thanked all the dignitaries and the participants for their support in making the conference a huge success.

28. Mr. C.R.C. Mohanty, Environment Programme Coordinator at UNCRD Japan in the valedictory speech, expressed his deep appreciation and gratitude towards Busworld Academy for organizing a conference of such stature. The Busworld exhibition and the conference will help to shape ideas at a ground level. He mentioned that transitioning to a circular economy is extremely essential for the sustainability of the bus transport sector. Lastly, Mr. Mohanty expressed his interest in partnering with Busworld Academy for the UNCRD EST conference in Vietnam.
29. Finally, Mr. Jan Deman, Director of Busworld Academy emphasized his expectation of further development of this conference to be able to share more information actively, not only on bus transport activities but also on a wider range of activities for the transition to a circular economy, and expressed his gratitude to the Government of Jakarta for all their hospitalities.

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