DAVAO BUS DRIVER TRAINING TECHNOLOGY PILOT, PROCUREMENT & FRAMEWORK

ENGAGEMENT REPORT

JULY 2022

ASEAN
AUSTRALIA
SMART CITIES
TRUST FUND

Asian Development Bank

Australian Government

Department of Foreign Affairs and Trade

ADB

RAMBOLL

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ABBREVIATIONS

AASCTF   ASEAN Australia Smart Cities Trust Fund
ADB   Asian Development Bank
DOTr   Department of Transportation (Philippines)
HPBS   High Priority Bus System
LTA   Land Transport Authority (Singapore)
LTO   Land Transportation Office (Philippines)
NC   National Certificate
PWD   person with disability
TESDA   Technical Education and Skills Development Authority

1 PROJECT OVERVIEW & OBJECTIVES

Source: Adobe Stock

1.1   PROJECT OVERVIEW

1.1.1   ASEAN Australia Smart Cities Trust Fund (AASCTF)

The ASEAN Australia Smart Cities Trust Fund, or AASCTF, is a five-year program financed by the Australian Government, managed by the Asian Development Bank (ADB), and implemented by Ramboll. The program's goal is to catalyze people-centric smart city transformation in Southeast Asia.
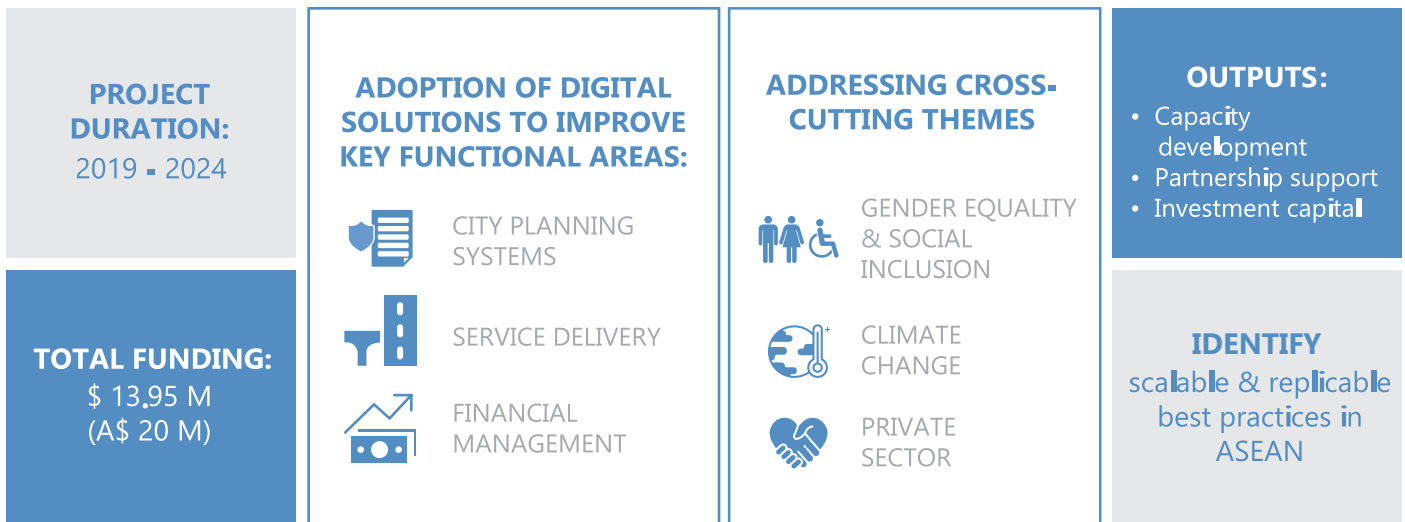
As of 2022, the Trust Fund has engaged with over 20 cities of varying sizes and smart city readiness across eight ASEAN countries. Engagement under the Trust Fund may come in different forms, depending on the needs, interests, and traction within the different participating cities.

The forms of engagement can span from awareness raising, knowledge sharing, and capacity building, to a diverse array of pilot-scale interventions at both the city and regional level.

Cutting across all activities under AASCTF lies the overarching aim to deliver impact within the Trust Fund's three key functional areas of planning systems, service delivery, and financial management. Crosscutting themes of gender equality and social inclusion, climate change, and private sector are furthermore embedded within the targets and monitoring framework of each trust fund activity and intervention.

Since its inception in November 2019, Ramboll has been engaged as the main implementing partner of ADB under a framework contract. Through the Trust Fund interventions at both city and regional level, Ramboll and ADB are working together to create proofs of concept that will allow the identification of replicable and scalable solutions to support cities across the ASEAN region to be become smarter and more livable.

Figure 1: Overview of the ASEAN Australia Smart Cities Trust Fund

PROJECT DURATION: 2019 - 2024	ADOPTION OF DIGITAL SOLUTIONS TO IMPROVE KEY FUNCTIONAL AREAS:	ADDRESSING CROSS-CUTTING THEMES	OUTPUTS: • Capacity development • Partnership support • Investment capital
TOTAL FUNDING: $ 13.95 M (A$ 20 M)	CITY PLANNING SYSTEMS SERVICE DELIVERY FINANCIAL MANAGEMENT	GENDER EQUALITY & SOCIAL INCLUSION CLIMATE CHANGE PRIVATE SECTOR	IDENTIFY scalable & replicable best practices in ASEAN

Catalyzing people-centric smart city transformation in Southeast Asia

1.1.2 Davao High Priority Bus System (HPBS)

Davao City is the third largest city in the Philippines, with a population of over 1.78 million in 2020. With the aim of becoming one of Asia's leading smart cities, Davao has announced ambitious projects to upgrade its Intelligent Transport Management System (ITMS) and Intelligent Operations Center (IOC) as part of its comprehensive transport roadmap. In 2022, an estimated 80% of trips are done using public transport. The population of Davao is estimated to exceed two million by the year 2028. Hence, the city's transportation system needs to support the large travel demands sustainably and safely.

As part of its transport roadmap, the City Government of Davao, financially supported by the ADB, is undertaking an exercise to modernize its mobility network. The plan includes replacing the jeepneys in the city with a public bus network under the Department of Transportation (DOTr)-led Davao Public Transport Modernization Project, or more commonly known as the HPBS Project. The project is highly ambitious and aims to incorporate the latest concepts, such as a centralized cashless payment system, bus detection at signals, and priority bus lanes. Arup, a British multinational consultancy services firm, was engaged as the consultants for the HPBS project. They are responsible for the specification and designing of vehicle procurement and civil works, including the physical development of a bus driver training school.

1.1.3 Davao Bus Driver Training – Technology Pilot, Procurement, and Framework

The new public bus network will require professional bus drivers who can meet the greater responsibility and demands of the public bus system. The drivers will have to adhere to stricter regulations and standards as opposed to jeepney drivers. Thus, this will require the establishment of a bus training school to facilitate the training of prospective public bus drivers which will also include former jeepney drivers. Traditional training programs focus on on-the-road training, which is an undoubtedly necessary component; however, technology could be used to streamline, ensure comprehensive training across varying conditions, and enable a culture of continual education and improvement.

Ramboll is tasked with identifying training technologies to upskill the workforce and prepare them for the unique conditions of driving a modern bus system in Davao City. The project includes user needs gathering, technology review, piloting a potential system, and the development of a training framework that identifies the modules that should be developed for the training program.

The use of technology in training is key because it prepares the staff for a modern transport network, enables the training to be scaled up in terms of the number of bus drivers, and could also shorten the duration of the training. As such, in training drivers for the modern public transport network, it is essential to leverage technologies.

One such example is the use of simulators and other Virtual Reality (VR), Augmented Reality (AR), or Mixed Reality (MR) and gamification technologies that can facilitate the training in a manner that can be easily customized, maintained, and updated by the local authorities and/or operators. If there are several operators in the city, a pooled training resource offers significant cost savings and the potential to ensure that core elements of the training are standardized across different operators.

The Davao Public Transport Modernization Project is poised to offer the rest of the country with benchmarks, not just in terms of systems and infrastructure, but also in the aspects of driver skills, competencies, and attitudes especially towards accessibility and inclusion.

1.2   PROJECT OBJECTIVES

The Trust Fund intends to conduct a study to determine the training needs of the drivers, undertake a market study of solutions, and make recommendations regarding an appropriate intervention and implementation arrangement (operational model) for the Davao Bus Training School.

The project aims to deliver the following as part of its fundamental value proposition:

- a 'Training Needs-oriented' selection of appropriate technologies,
- an independent review of driver training technologies, which is both impartial and outside of suppliers' undue influence,
- review on the existing practices of bus academies similar or can be applied to Philippine settings,
- a training program and resource base centered on 'pooled training technologies' to increase the utilization of the equipment, providing a greater return on investment, while reducing the barriers to entry for private operators,
- an ability to standardize core training content while providing flexibility for operators to bolt on their business-specific training,
- an operational model that can be managed and maintained in the long term by the local authority, if desired, and
- a training paradigm that actively supports the Sustainable Development Goals, particularly highlighting drivers' roles and attitudes that drive the achievement of accessibility targets.

The following are guiding questions to achieve the project objectives:

1. What are the technical and attitudinal training needs?
2. What are the solutions available in the market?
3. What are the procurement models and costs?
4. What are the operating models and costs?
5. Which vendor should be selected?
6. What trainings do the drivers need to take?

1.3   DOCUMENT OBJECTIVE

This engagement report documents the project activities to date; the outreach the AASCTF (Ramboll) team has conducted with key stakeholders, vendors, and experts; the engagement done through workshops; an overview of initial findings; and the team's next steps.

This constitutes the D2 deliverable, Engagement Report & Functional Requirements, in the project's work plan.

2 PROJECT WORK PLAN & STATUS

Source: Adobe Stock

This project will produce a recommendation for bus driver training procurement and a training framework that will identify the contents of the future training program. The work plan was meticulously tailored to ensure that the end product aligns with stakeholder needs to the extent possible. The plan includes workshops to gather and assess needs, research, and vendor engagement to identify and evaluate systems, and a pilot to demonstrate the capabilities and constraints of potential systems firsthand.

The overall work plan is displayed in Figure 2. The project culminates in a recommendation for system procurement to ADB. ADB will then include the training technology procurement in a separate task order. The associated deliverables are described in Table 1.

Figure 2: Task Order Methodology

Desktop Study   Peer Engagement   System Selection   Updated System Selection   Training Framework

Needs Assessment & Workshops   Vendor Engagement   Pilot   Procurement (by ADB)
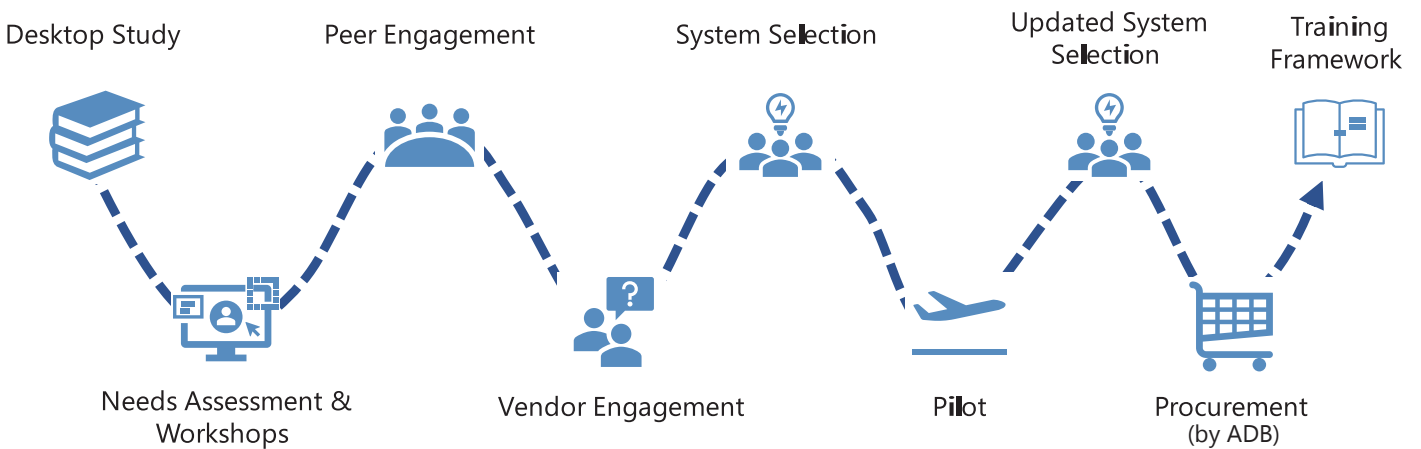
Table 1: Task Order Deliverables

Deliverables	
Stage 1 & 2: System Selection	Inception & Preliminary Findings Report
	Engagement Report & Functional Requirements
	Preliminary Evaluation & Shortlist
	System Selection Report
Stage 3: Pilot Implementation on Support & Training Program Framework	Pilot
	Procurement and Operations Recommendations & Revised Functional Requirements
	Holistic Training Framework

2.1   WORK PLAN PROGRESS & KEY MEETINGS

A summary of the project activities for each task is shown in Table 2. Green indicates that the task has been largely completed, yellow indicates that the task is in progress, and red means that the task has not yet started or that the task is in the planning stages.

Table 2: Task Activities

Task	Status	Project Activities to-Date
Desktop Study	🟢 (green)	• Research 30 vendors • Summary of capabilities • Shortlist of promising technologies
Needs Assessment & Workshops	🟢 (green)	• Workshop 1 – Key Stakeholders • Workshop 2 – Private Sector / End Users • Workshop 3 – Drivers • Workshop 4 – Key Stakeholder Follow up
Peer Engagement	🟡 (yellow)	• Reached out to Skanetrafiken – Sweden Public Transport Authority • Planned: Sweden Public Transport Operator • Planned: Singapore Land Transport Authority • Planned: SMRT (Singapore)
Vendor Engagement	🟡 (yellow)	• Email and phone correspondence with promising vendors • Planned: Inquiry regarding potential pilot
System Selection	🟡 (yellow)	• Reviewed: Initial long list of 30+ vendors. Reduced to shorter list of 10+ vendors during Stage 1 review • Engaged: Vendors in interviews and email questionnaires • Planned: Further shortlist to up to 3 vendors
Pilot	🔴 (red)	• Planning stages
Updated System Selection	🔴 (red)	• Planning stages
Training Framework	🔴 (red)	• Planning stages

3 STAKEHOLDER ENGAGEMENT

Source: Adobe Stock

3.1   RECAP OF FINDINGS PRESENTED IN THE INCEPTION REPORT

Engagement findings presented in the Inception Report is included here to let the report show all engagements conducted in the project so far. The sections are described in detail in the Inception Report and will only be recapped here.

3.2   WORKSHOP 1: KEY STAKEHOLDERS

A virtual workshop was held on 26 April 2022. The objectives of the workshop were to:

- validate short-term and long-term goals of the project,
- discuss and identify the baseline competencies required for driving under the HPBS, and
- understand any special considerations for HPBS operations that would impact the training program.

Figure 3: Feedback Word Cloud from MentiMeter Exercises – Drawbacks of Existing Jeepney System

The outcomes of the objectives are described below.

Validate Short- and Long-Term Objectives

Based on feedback during the workshops, the following objectives were identified for the short term:

- Seamless transition to HPBS for drivers and commuters
- Establishing and building the capabilities of authorities responsible for public buses
- Better work conditions for drivers
- Professional and accredited drivers by the Land Transportation Office (LTO) or the HPBS Driving School, focused on:
  - Basic bus handling and traffic compliance
  - Self-reliance and up-skills

In addition, the following objectives were identified for the long term:

- Modernization of the Philippines' public transport system
- Having reliable and efficient transportation
- Improvement in traffic conditions
- Strengthening disaster resilience
- Environmental and financial sustainability
- Accessibility and connectivity for all

Baseline Competencies

"Baseline competency" refers to a prerequisite necessary to drive for HPBS. These prerequisites are outside the scope of the HPBS training, as they should have been validated prior to taking part in the HPBS program.

- Valid, qualified driving license for the vehicle types to be used in HPBS
- Good physical health, including eyesight
- Acceptable driving record
- Relevant licensures from TESDA (Technical Education and Skills Development Authority)

Special Training Considerations

The following special considerations were identified for discussion and potential inclusion as a training requirement:

- Driver or professional courtesy
- Proper handling of persons with disabilities (PWD)
- Incident/Emergency response
- First aid/CPR
- Lessons learned and continual improvement
- Gender equality and social inclusion

3.3   PUBLIC TRANSPORT AUTHORITY INTERVIEW: SKÅNETRAFIKEN (SWEDEN)

Skånetrafiken is the public transport authority in southern Sweden, Skåne. The objective of this interview was to understand Skånetrafiken's baseline requirements and approach.

Prerequisites for Bus Drivers

Upon the completion of the bus driver training, the bus drivers are awarded the 'D driving licence' with an accessory professional competence certificate (YKB).

1. D Driving

   - You have a Swedish driving licence with a B rating.
   - You have a driver's license permit and passed a driving license test (knowledge test and driving test).
   - You are a permanent resident in Sweden or have been studying in the country for at least six months.
   - If you have a driver's license from another EEA country, you must exchange it.

2.   YKB – Proof of Professional Competence

- From 10 September 2015, all bus drivers who drive professional must have a professional competence certificate or YKB.
- Professional skills training is completed continuously by bus drivers over a five-year period, and upon completion and passing training, the driver receives a Certificate of Professional Competence (YKB).
- A certificate of professional competence is valid for five years and the driver must undergo a periodic training of 35 hours within the five-year period. The certificate of professional competence contributes to higher competence of drivers and increased road safety.

In addition, the transport companies also offer internal training for the following:

- Echo driving
- Service
- Customer service
- Technical training in all systems on the bus
- Road safety
- Accident and risk assessment
- Safety on board and in the vehicle

3.4   NEXT STEPS

Additional meetings will be scheduled with the following stakeholders:

- TESDA and/or LTO – To understand how the training program will relate to the existing training and certification processes
- Peer Engagement – Meetings with the Singapore Land Transport Authority (LTA), SMRT (a multimodal public transport operator in Singapore) and the transit operator in Sweden

Follow up workshops were planned and executed on 1 and 2 June 2022. The input has been collated, interpreted, and organized into themes and will be presented in the following section.

3.5   FINDINGS FROM WORKSHOPS 2, 3, AND 4

Three in-person workshops were facilitated on 1 and 2 June 2022 in Davao City. Representatives from Ramboll – Mr. Von Lopez-Levine and Ms. Simone Toftegaard – were present on-site and facilitated the two days, while the rest of the team were virtually present and facilitated the online discussions. Representatives from the national expert team, Mr. George Esguerra, Dr. Eden Sorupia, and Dr. Jojo Bascug, were also present and helped facilitate the discussions in the local language, as well as being the emcees during the two days. The first two workshops were facilitated workshops, so as to further enhance the team's understanding of system needs and the daily lives of the drivers, while the third workshop was a dialogue with key stakeholders regarding the progress of the project and next steps.

Feedback ranged in type and perspective, with some results not directly relating to training, but more on the system design. Gathering this diverse type of input will help to ensure that the training systems have considered all angles and is squarely focused on the end owners and users. Workshop results will inform the requirements of the future training technology. The feedback gathered was subsequently translated into functional requirements of the future system's capabilities, which ultimately will determine the type of system to be used. The resulting functional requirements are included in this report.

3.6   WORKSHOP 2: PRIVATE SECTOR AND INTEREST GROUPS

On 1 June 2022, the first of three in-person workshops were held in Davao City with key stakeholders from Davao City, DOTr, TESDA, LTO, and the private sector.

To ensure a high level of engagement and relevant, structured input from the participants, different methods of user involvement were utilized. The methods ranged from Mentimeter, (to gain quantitative insights) to manila papers on the walls (with inputs given on sticky notes) and mural boards to capture inputs from the virtual participants, as well as facilitated dialogues and presentations from participants.

Based on the findings from 'Workshop 1: Key Stakeholders', the team designed 'Workshop 2: Private Sector and Interest Groups' to focus on visions for and the challenges relating to the HPBS to understand the stakeholders' rationale or reasoning behind the project. The findings from the workshop will establish a baseline for what is expected of the bus drivers both during the transition and in the future, such as the competencies to fulfill the noted visions. This will provide a better understanding of what must be included in the Training Framework.

These intentions are captured in the two objectives developed for the workshop, as seen below:

The objectives of the workshop were to:

- Define the vision for Davao City's urban transport infrastructure and how the system will help obtain this vision
- Outline the challenges the new system could have for travelers and the bus drivers, and get validation of needed competencies, requirements for the bus drivers, and their needed competence improvement

The following six questions formed the basis for the discussions:

- What is the main purpose of the bus drivers?
- What vision do you have for Davao City's urban transport infrastructure and how will it benefit Davao?
- How should the system perform and improve the travelling experience for the people of Davao?
- What are your concerns about the new system in the future?
- In your opinion, what are the challenges that will be faced with the new bus system?
- What competencies do you foresee that the bus driver needs in the future?

The outcome of each objective is described in the following pages.

Define the vision for Davao City's urban transport infrastructure and how the system will help obtain this vision

- The purpose of the drivers is to transport passengers from point A to B in a timely, efficient, and predictable manner, and to transport passengers safely to their destinations.
- The vision for the urban transport infrastructure in Davao City is focused on creating a state-of-the-art public transport system, which is climate-resilient and sustainable.
- The hope is that it will create more job opportunities and boost the economy in Davao by providing a more stable income for the bus drivers and their families.
- Focus for the system is to provide a more comfortable, safe, and convenient transport option, also for persons with disability, the elderly, and pregnant women. Furthermore, the system should create a national standard for bus driver requirements and be anchored in a public transport driver training institute.

The total documented findings can be found in Appendix 1.

Below are supporting results from Mentimeter:

- When asked about the challenges facing the transition from jeepneys to HPBS, a number of participants highlighted acceptance from the drivers and the public, the culture and identity found in jeepneys, as well as the current infrastructure, primarily small roads, and the possibility to bring wet goods and luggage.
- Reliability, comfort, and efficiency were the main factors when asked what they look forward to the most, which is aligned with the visions for the HPBS.
- Accessible bus stops, real-time bus updates, service-minded and disciplined drivers, ramps, and high focus on safety were important requirements noted that will support the system in obtaining the vision.
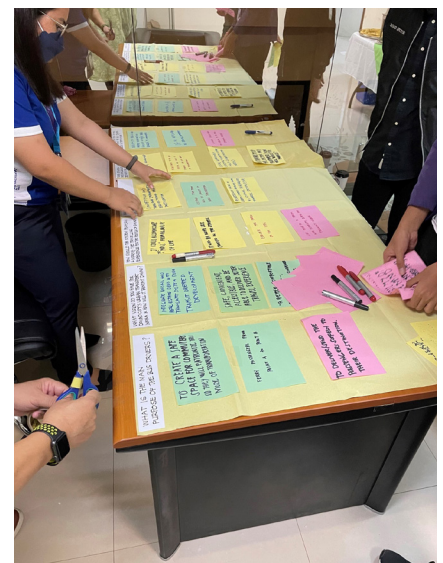
Outline the challenges the new system could have for travelers and the bus drivers, and get validation of needed competencies, requirements for the bus drivers, and their needed competence improvement

- Concerns regarding the transition to the new HPBS include an acceptance from the public and the drivers, adjustment to the new system (e.g., cashless payment, fixed routes and stops, new payment scheme, driver's license requirements, and general training requirements).
- In the transition period, the challenges that could occur include adjustments to and acceptance of the new system, new mode of payment, and new modes of transportation, as well as the transition from the old culture of transportation to the new. There could also be challenges regarding maintenance and how to support the drivers in IT operations.

The competencies needed include, but are not limited to, the following:

- ability to read and interpret information laid out in the dashboards (MS component),
- 18-m articulated bus driving competencies,
- customer service skills,
- ability to do basic emergency response,
- excellent understanding of traffic rules and following these traffic rules,
- professionalism,
- excellent knowledge of routes,
- gender responsive, and
- holder of National Certificate for Driving (Bus Driving) NC III.

Below are supporting results from Mentimeter:

- When asked which prerequisites are needed to register as a bus driver, the following were highlighted to be the most essential:
  - National Certificate for Driving (Bus Driving) NC III
  - Bus driving experience or bus driving TESDA certification
  - Trainings on customer care and gender and PWD sensitivity
  - Professional license
  - Has undergone health and safety training
  - Drug test, neuro test, physically fit

- The 4 most important skills among participants were:
  - Customer service (12)
  - Safety (emergency response training, anti-terrorist trainings, general safety, and security training) (10)
  - First aid training (5)
  - Proper handling of persons with disability (PWD sensitivity) (4)

Three additional focus areas emerged during the workshops:

- The transition to the new system needs to be communicated properly to the general public, in addition to the jeepney drivers, including the benefits and how to's of the system.
- Communication and training material focusing on the implications for bus drivers and their families should be considered. The transition will not only affect the drivers themselves but also their families and daily lives.
- Explanations regarding the bus drivers' responsibilities and what their job role is should be prioritized in the learning material.

The total documented findings can be found in Appendix 1.

3.7   WORKSHOP 3: DRIVER GROUPS

On 1 June 2022, the second of three in-person workshops were held in Davao City; this time targeting jeepney drivers that had agreed to transition as bus drivers. To ensure a high level of engagement and relevant, structured input from the participants, different methods of user involvements were used.

The methods ranged from Mentimeter (to gain quantitative insights) to manila papers on the walls (with inputs written on sticky notes) and dialogues facilitated by the local experts.

The team designed 'Workshop 3: Driver Groups' to showcase what a day in a jeepney driver's life looks like and what they see as challenges now and in the future, as well as what they value the most now and in the future. Together with the insights from Workshops 1 and 2, the team can map out where there might be gaps in understandings of responsibilities and competencies, which can help inform what must be included in the Training Framework to be developed.

In this workshop, the team took advantage of having access to the collected experiences of the jeepney drivers and focused on understanding their day, needs for competencies in the future, and what they see as the biggest challenges in transitioning from a jeepney driver to a bus driver.

The objectives of the workshop were to:

- Understand how a jeepney driver's work day looks like and gain insights into the experiences and challenges they have daily
- Gain insight into the challenges they will face during the transition from a jeepney driver to a bus driver, and what kind of needs must be supported in the transition

To start, jeepney drivers were asked to fill out a timeline describing their day:

Fill out the timeline in front of you. Describe as detailed as possible how morning, midday, and night look like:

- What do you experience?
- How are the interactions with clients?
- What challenges do you face?
- Add anything you can think of

The team then shifted to focus on the challenges and needs in the future:

- Expected challenges for driving a bus?
- Which competencies are needed to overcome these challenges?
- What should be included in a bus training program?
- Current challenges as a jeepney driver that you will face as a bus driver? What about new challenges?

The outcome of each objective is described below.

Understand how a jeepney driver's work day looks like and gain insights into the experiences and challenges they have daily

That jeepney drivers, both day and night drivers, have these commonalities:
- Responsible for checking the jeepney's mechanical functions (e.g., engine oil level, radiator/ coolant, brakes, tires, etc.) and will do so before each "shift".
- Flexibility in their day, both regarding start and end times, but also their breaks. Almost all highlighted that they will take between 1-2 hours for lunch break, during which they often drive home to eat with their family. It depends on the net income for the day.
- Ends their day by cleaning and washing the jeepney, pay rental to the operators, and count their daily income. They relax with the family and get ready for the next day.

The total documented findings can be found in Appendix 2.

Below are supporting results from Mentimeter:

- When asked which challenges they were facing when getting around Davao City, the heavy traffic and infrastructure (e.g., small roads and lack of proper bike lanes) were highlighted as the biggest challenges.
- The challenges drivers face daily are primarily focused on safety for themselves and their passengers. In addition, interaction with passengers can be challenging (and passengers also highlighted interactions with drivers as being difficult).

Gain insight into the challenges they will face during the transition from a jeepney driver to a bus driver, and what kind of needs must be supported in the transition

- The jeepney drivers were worried about the payment scheme and going from having a daily income to a biweekly or monthly income.
- There is a divide between what is expected from future bus drivers and what the jeepney drivers believe will be expected of them; for example, maintaining the bus, which is not something they will be asked to do, but most highlight this as something they want to be trained in.
- A lack of understanding of what it means to be a bus driver and how it will affect their life with their families.
- Eager to learn how to drive a bus, but foresee it as being challenging. They are willing to attend training to become a certified bus driver.
- An opportunity to offer different job roles in the HPBS as many express interests in becoming HPBS mechanics or other maintenance roles.
- A high interest in training focused on safety, traffic regulations, being able to abide to the schedule and keep a high level of service.

The total documented findings can be found in Appendix 2.

- The 4 most important skills among participants were:
  - Mechanics (6)
  - Electric training (3)
  - Driving bus training (2)
  - Customer service, PWD handling and first aid training (2)

The above skills differ significantly from what the participants in Workshop 2 highlighted as most important – with mechanics and electrical training not even included in the Workshop 2 Mentimeter results.

3.8 WORKSHOP 4: FOLLOW UP WITH KEY HPBS COUNTERPARTS

On 2 June 2022, the third and final workshop was held in Davao City with key stakeholders. The team spent the workshop focused on the engagements conducted so far and the questions that emerged from these.

Mr. Von Levine-Lopez opened the workshop by presenting the initiatives of the project, highlighting the ones that the team had completed and the ones still in progress. Afterwards, the findings from Workshop 1 and the reflections from Workshops 2 and 3 were presented, which led to open dialogues based on these key discussion topics:

- TESDA role
- Prioritization of modes
- Characteristics of buses
  - Brand
  - Fare collection system
  - Role of driver
  - Competencies beyond Commercial Driver's License (CDL) ("enhanced CDL?")
  - Rural vs urban – any differences
  - Fare payment system

The discussion topics were discussed in open dialogues and the insights gained from these will be used to feed into the requirements for the technical system as well as the Training Framework.

Next engagement activities

The additional engagement activities have been scheduled**:**

- Peer Engagement
  - LTA/SMRT
- System Organization and Structure
  - City of Davao and DOTr
  - TESDA
- Functional Requirements
  - Confirm requirements: Disseminated by email to key stakeholders
- Vendor Engagement
  - Initiate pilot for capable vendors

4 FUNCTIONAL REQUIREMENTS

Source: Adobe Stock

Based on all engagement activities, a deduction was made that led to the following functional requirement core themes:

- Safety & Core Competencies
- Functionality & Skills
- Accessibility
- Sustainability
- Software Capability
- Digital Learning

Within these six core themes, parent functional requirements were developed to address the primary themes within the category. The core themes and parent functional requirements are described in the figure in the next page.

Figure 4: Davao Bus Training Functional Requirements

Core Theme	**SAFETY & CORE COMPETENCY**	**FUNCTIONALITY & SKILLS**	**ACCESSIBILITY**

Workshop Inputs and Ideas

SAFETY & CORE COMPETENCY
- Good driving record
- Healthy and good vision
- Psychological / Neurological assessment
- TESDA National Certifications for driving and licensing (e.g., NC-III, NC-II)
- Minimum of 5 years of driving experience
- Basic emergency response training (e.g., how to handle fire, accidents, terrorism, disasters)
- Traffic regulations & safe driving techniques (e.g., pedestrian, zebra crossing, traffic light, stop signs)
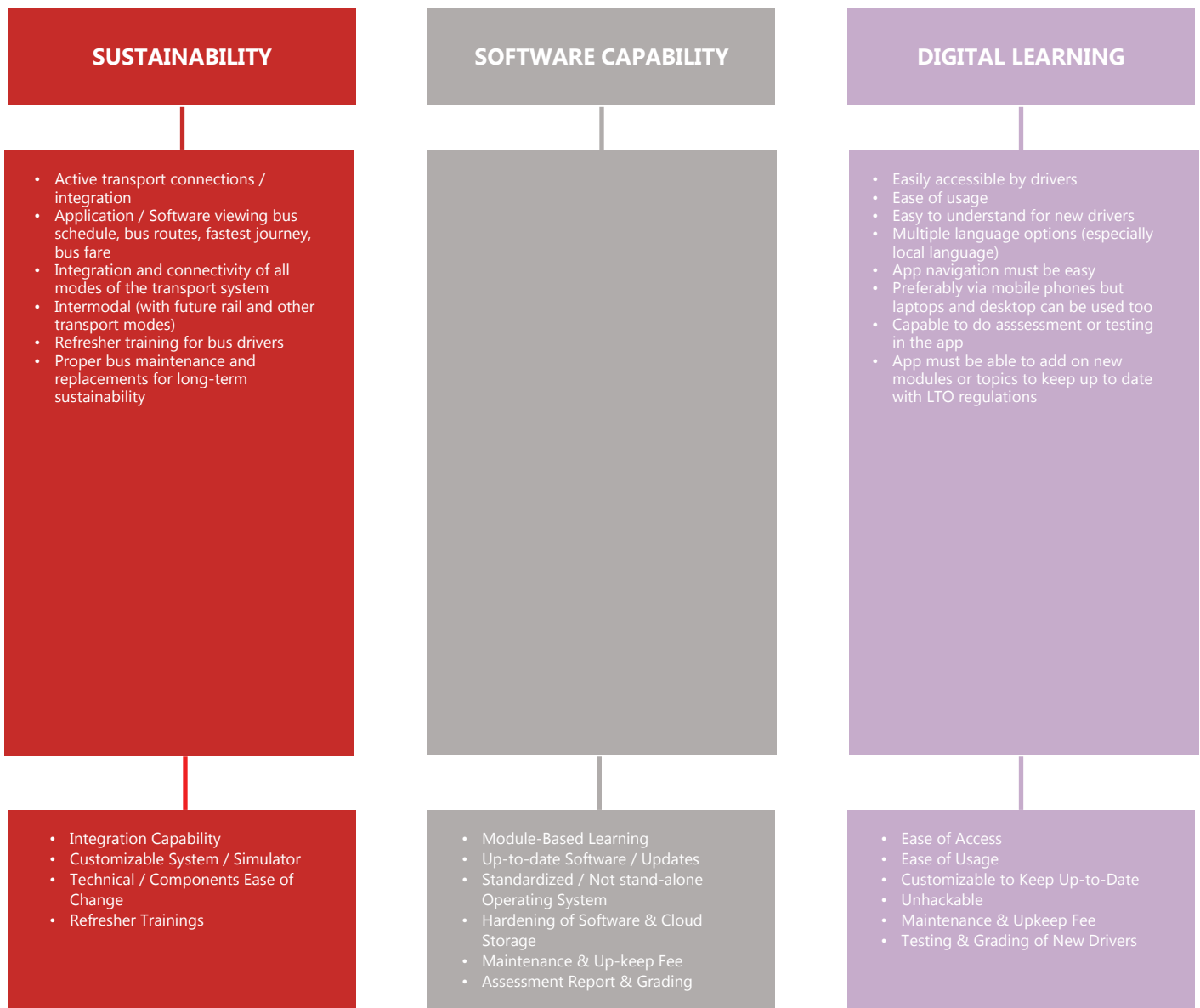- Understanding of the various policies and regulations for bus operations
- PWD handling & training
- Gender-responsive training
- Jaywalking
- Accident management & reporting
- Understanding traffic violations
- Basic first aid training
- CCTV
- Priority seatings / designated seatings for PWD
- Integrating traffic prioritization for emergency response vehicles and TSP
- Harassment & conflict situation handling

FUNCTIONALITY & SKILLS
- Basic emergency response training (e.g., how to handle fire, accidents, terrorism, disasters)
- PWD handling & training
- Reloading station on bus stops, top-up cards must be available on buses as well in case of lost cards
- WIFI
- Route familiarization
- Basic mechanical & electrical training
- Customer service & handling
- Emergency repair kits for the bus
- Designated & accessible sheltered bus stops
- Contactless payment
- Space for wide luggage or baggage and compartments for groceries
- Technical handling of bus components
- Liaising with control station

ACCESSIBILITY
- PWD-friendly, with ramp access
- Accessories for visually impaired individuals at bus stops and buses
- Application / Software viewing bus schedule, bus routes, fastest journey, bus fare
- PWD handling & training
- Reloading station on bus stops, top-up cards must be available on buses as well in case of lost cards
- Priority boarding & lane
- Information for bus fare and calculations

Parent Functional Requirement

SAFETY & CORE COMPETENCY
- Scenario-Based Learning
- Psychological / Neurological Judgment
- Traffic Regulations / Safe Driving Techniques
- Emergency Response

FUNCTIONALITY & SKILLS
- Familiarization of Controls / Components
- Understanding Bus Operations
- Payment System

ACCESSIBILITY
- PWD Handling
- Children with Special Needs Handling
- Bus Lanes Familiarization
- Different Roads Condition / Situation

SUSTAINABILITY	SOFTWARE CAPABILITY	DIGITAL LEARNING
• Active transport connections / integration • Application / Software viewing bus schedule, bus routes, fastest journey, bus fare • Integration and connectivity of all modes of the transport system • Intermodal (with future rail and other transport modes) • Refresher training for bus drivers • Proper bus maintenance and replacements for long-term sustainability		• Easily accessible by drivers • Ease of usage • Easy to understand for new drivers • Multiple language options (especially local language) • App navigation must be easy • Preferably via mobile phones but laptops and desktop can be used too • Capable to do asssessment or testing in the app • App must be able to add on new modules or topics to keep up to date with LTO regulations
• Integration Capability • Customizable System / Simulator • Technical / Components Ease of Change • Refresher Trainings	• Module-Based Learning • Up-to-date Software / Updates • Standardized / Not stand-alone Operating System • Hardening of Software & Cloud Storage • Maintenance & Up-keep Fee • Assessment Report & Grading	• Ease of Access • Ease of Usage • Customizable to Keep Up-to-Date • Unhackable • Maintenance & Upkeep Fee • Testing & Grading of New Drivers

The parent functional requirements were further developed to specific detailed requirements. Detailed requirements will be circulated to the vendors, who will be asked to indicate their conformance or non-conformance with the requirements. This process will form the basis of the final system selection. The detailed requirements are displayed below. The requirements are categorized by technology type—simulator and digital learning.

Table 3: Functional and Detailed Requirements for Simulator Technology

Functional Requirements	Detailed Requirements
1. Must be able to have Scenario-Based Learning	
Psychological / Neurological judgement & response	Test vision
	Evaluate reaction time
	Evaluate driving judgment
	Replicate core driving component failure (e.g., brakes, tires) on board
Emergency response & procedure	Incident response for non-bus related incidents
	Incident response for passenger issues
	Incident response to procedures of bus breakdown
	Incident response for incident involving bus and another car
	Incident response for incident involving bus and pedestrian
	Incident response for incident involving bus and cyclist
	Incident response to terrorism attack
	Incident response to natural disaster
Customizable scenarios / system with the ability to have future add-ons	Programmable to include customized future scenarios as required
	Open source programming of scenarios to enable basic IT personnel to develop the scenarios
	Ability to have local language input in scenarios

Functional Requirements	Detailed Requirements
2. Must be able to teach safe-driving techniques	
Simulating licensing requirements	Replicate practical driving components of TESDA NC-III
	Replicate practical driving components of LTO licensing certifications that are related to bus operations
Traffic regulations & adhering to road markings & signages assessment	Adhering to road markings and assessment (e.g., stop line, chevron markings, stay in lane, etc.)
	Adhering to road signages and assessment (e.g., stop sign, school zone, merging lane, etc.)
	Adhering to road discipline (e.g., giving way, situational awareness, speed control, etc.)
Different road conditions familiarization	Response to heavy traffic / light traffic
	Response to small roads / one-lane roads
	Response to tight corners and busy areas (e.g., jaywalkers, etc.)
	Response to uneven / poor road conditions
3. Must be able to teach bus operations, communications & network	
Line of communication between bus driver and controller desk training	Communication protocols / procedures during emergency situations
	Communication protocols / procedure during bus breakdown
	Liaising with control station on various bus operations requirement

Functional Requirements	Detailed Requirements
Passenger interaction	Passenger handling and response training
	Proper handling for children / adult with special needs (e.g., for entry / exit, dedicated seats, etc.)
	Understanding payment or free of charge (FOC) bus ride for special needs
	Replicate tools to maintain situational awareness inside and outside of bus
	Priority boarding procedure for PWD (applicable to varying bus manufacturers)
	Priority seating or wheelchair locking mechanism procedure for PWD (applicable to varying bus manufacturers)
	PWD alighting operations (applicable to varying bus manufacturers)
Onboard system operations	Automatic fare payment system standard procedures
	Driving discipline in and around interchanges
Standard bus operations	Bus stop approach and departure alignment
	Bus stop boarding and alighting procedures when bus is not properly aligned
	Adhering to bus lane rules and operations
Familiarization of bus controls and components	Introduction of parts of the bus (internally and externally)
	Familiarization of bus controls at driver seats (applicable to varying bus manufacturers)
	How to adjust the controls, mirrors, and other related controls (applicable to varying bus manufacturers)

Functional Requirements	Detailed Requirements
4. Ease of usage, non-complicated system	
Technical handling of simulators (components or parts are replaceable and easy to change)	Components can be changed with standard tools and without special expertise
	Parts and components are easily accessed and procured
5. Customizable & integrated system / simulator	
Able to change to different bus configurations and arrangement	Parts and components are easily replaceable for customization
	Bus cab is customizable to various bus configuration and models
	Replicate electric, diesel, and hybrid bus configurations
Up-to-date updates & integrated capability with future technology	Simulator system (bus cab) is able to be customized to local needs
	Simulator system should be upgradable with new features and capabilities
	Simulator system is capable of upgrading firmware / software remotely
6. System requirements & software fundamentals	
Standardized / Not standalone operating system	Software should use open source programming
	Software should be able to be maintained or handled by local contractors or sub-contractors
Cloud or physical data storage	System must have the option for both cloud and physical data storage
	Scalable data storage with off-the-shelf parts

Functional Requirements	Detailed Requirements
Hardening of software, system, and storage (unhackable)	Hardened software to protect against cyber attack
	Hardened software as 1 system or 3 separate entities: (i) storage, (ii) system, and (iii) software
Affordable and sustainable maintenance for both simulator & software	Lifespan of minimum 5 years
	Minimum 5 years maintenance of software and hardware included in purchase price
	Ongoing maintenance and upkeep should be able to be serviced locally
Capacity	System shall be capable of continual operation without interruption or pause
Procurement	Option for leasing multiple systems as part of procurement
7. Assessment & grading capable	
Must be able to automatically assess and grade trainees	System must be able to identify mistakes or non-compliance of roads, signages, and regulations
	System must be able to inform drivers of errors made with a live announcement
	System must be able to assess and grade trainees according to their driving capabilities and techniques
	System must be able to inform and advice drivers on errors made and rectify the problem with the correct technique
Able to extract historical report for future training purposes	Grading, results, and historical report must be able to be extracted for reference and scoring
	Data and report should be kept for future references or case study
Able to have refresher training module	System must be able to conduct refresher training module for seasoned drivers

Table 4: Functional and Detailed Requirements for Digital Learning Technology

Functional Requirements	Detailed Requirements
1. Ease of access	
Easy to access the application	Accessible via the web
	Accessible in offline mode
Must be able to access via mobile phone and computers	Accessible using standard smart phone devices
	Accessible via tablets, laptops, and computers
2. Ease of usage	
Easy to navigate the app (for all ages)	Simple user interface
Standard app page with simple options and graphics	
Standard login to access the app	Login must be made unique to each individual trainee
	Login must be verified by facial recognition or one-time password (OTP)
	Administrator authentication
3. Customizable to user needs	
Able to change in accordance to requirements by the training center	Customer must be allowed to change or edit modules without intervention from manufacturer
Ability to add-on and/or remove new modules or topics	Create and add new modules using simple non-proprietary coding language
Ability to teach handling of PWD, children with special needs, etc.	Must be able to create scenario on how to handle PWD, children with special needs

Functional Requirements	Detailed Requirements
4. App fundamentals	
Hardening of software, system, and storage (unhackable)	
Affordable maintenance / upkeep fee	
Input and feedback	Capable of multiple input / feedback mechanisms, including free form, multiple choice, and discrete choice scenarios
Capacity	No limit to the number of total users
	Minimum of 3,000 simultaneous active users
Format	Customizable to include operational and procedural manuals regarding bus operator employment and responsibilities
5. Assessment & grading capable	
Must be able to have assessments and tests for trainees	Automatic grading or assessment of each trainee is a must
Reporting capabilities	Able to extract data & historical report for future training purposes
Ongoing education	Track and repeat answers that drivers answer incorrectly

5 TECHNOLOGY RESEARCH STATUS

Source: Adobe Stock

5.1   VENDOR RESEARCH

A desktop study was conducted to understand:

(i)   what technologies exist on the market to support bus driver training,
(ii)   the features and characteristics of existing technologies, and
(iii)   the vendor information of the potential technologies.

Two types of technologies were investigated: physical simulation systems and digital learning platforms that could facilitate remote and continual education.

The end result was a list of vendors that provide training technologies that could be applied to this project. Further investigation will clarify the capabilities of the system, the implementation and operational costs, and the feasibility of implementing a pilot.

The comprehensive list of technologies researched is included in Appendix 3.

Figure 5: Technology Research Focus Areas

5.2   PRELIMINARY ANALYSIS

Based on multiple criteria of capabilities and functions, the selected list of vendors is further evaluated and shortlisted for engagement and consideration.

Figure 6: Simulator Vendors
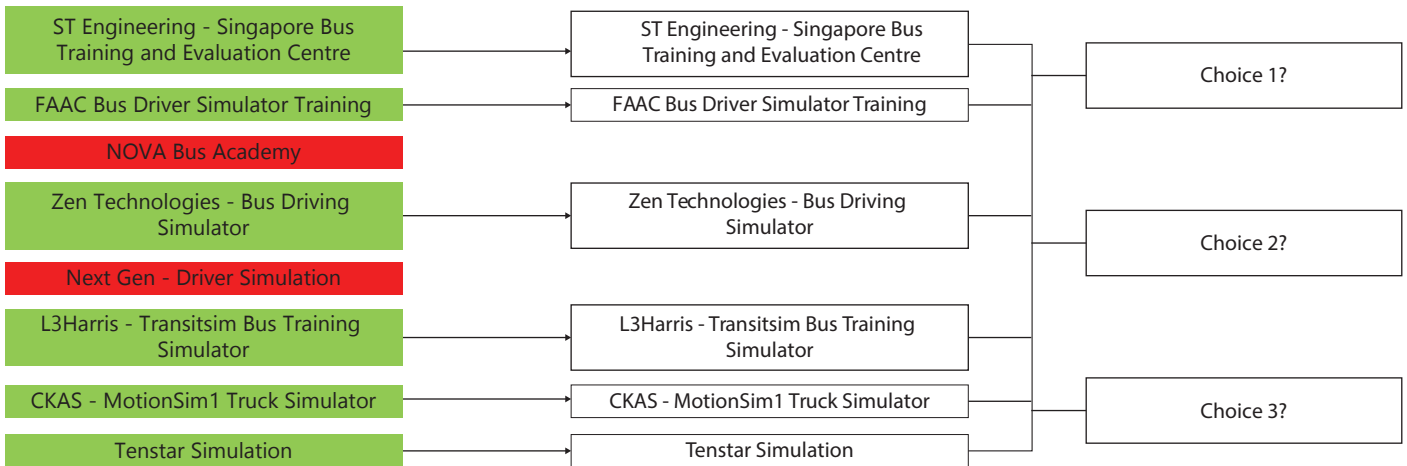
Figure 7: Digital Learning Vendors
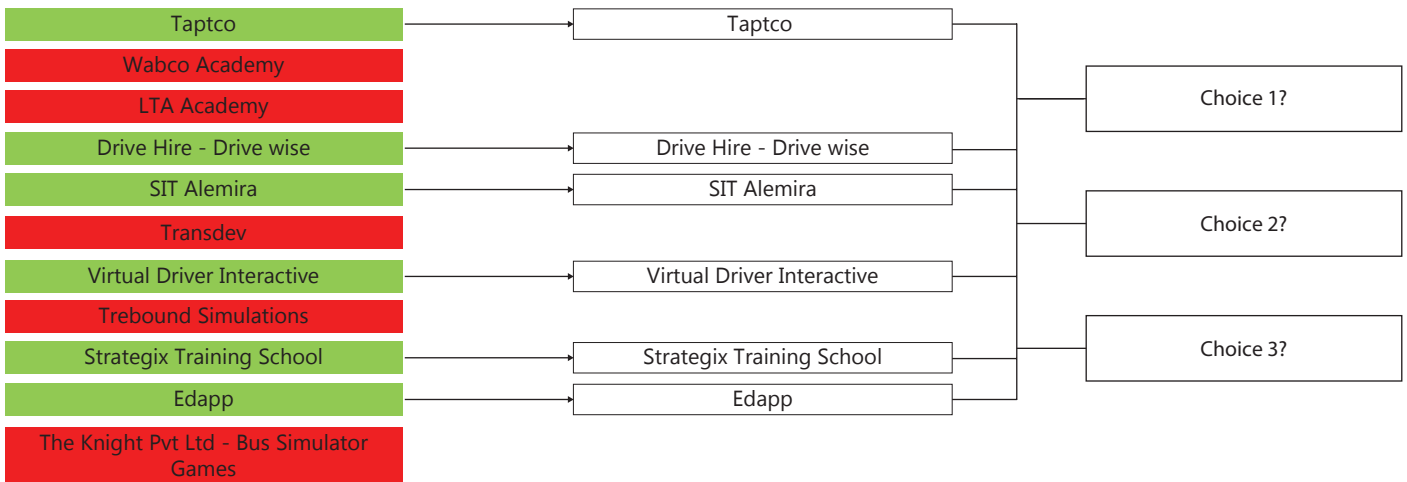
5.3   NEXT STEPS

User needs have been gathered from the stakeholders across the first three workshops (the fourth workshop was more on engagement). The needs were then translated to specific requirements for the future system which will be compared to the capabilities of the technologies researched, and a short list of technologies will be developed based on this. Outreach will continue with the vendors to determine the feasibility of a pilot and to further clarify the capabilities and constraints of the systems.

6 APPENDIX 1 | WORKSHOP 2: PRIVATE SECTOR & INTEREST GROUPS

Source: Adobe Stock

GROUP 1:

1. Main purpose of the bus drivers	2. What vision do you have for Davao City's urban transport infra and how will it benefit Davao?	3. How should the system perform and improve the traveling experience for the people of Davao?	4. What are your concerns about the new system in the future?	5. In your opinion, what challenges will be faced with the new bus system?	6. What competencies do bus drivers need in the future?
To create a safe space for commuters they will patronize this mode of transportation	Integrate housing and real estate development with transport system for a transit-oriented development	It should accommodate people from all walks of life	Competition, and therefore, improvement of services through private sector participation	Financial sustainability	Ability to read and interpret information laid out in the dashboard (ITS component)
Ferry passengers from point A to point B	Safe, convenient, accessible and be able to deliver better travel experience	It will be less chaotic in the streets	Acceptance that there will be changes in public transportation	Institutional management	18-meter articulate bus driving competency
To deliver/send passengers safely to their destination	A better, comfortable, and safe ride	Educate the public on the HPBS	Pedestrian infrastructure include green linear pathways towards bus stations/ Walkability towards stations/ stops	Adjustment to the new system, new mode of payments, and new mode of transportation	Customer service skills and ability to do basic everyday response
	It will be more convenient for the passengers	Give priority to persons with disability, the elderly, and pregnant women	Ignorance of people who are used to riding public utility jeepneys (PUJs)	Local workforce (existing academic offerings vs labor/ industry needs)	Well-disciplined and trained drivers
				Sustainability of the system and equipment – how well will it be managed?	
				How to adjust from the old culture of transportation, the income of the PUJ drivers	

GROUP 2:

1. Main purpose of the bus drivers	2. What vision do you have for Davao City's urban transport infra and how will it benefit Davao?	3. How should the system perform and improve the traveling experience for the people of Davao?	4. What are your concerns about the new system in the future?	5. In your opinion, what challenges will be faced with the new bus system?	6. What competencies do bus drivers need in the future?
Transporting passengers from one place to another safely and comfortably	Safe, efficient and comfortable public transport	To be effective, HPBS should be on time (efficient), consistent, safe, and comfortable	Sustainability	Acceptance	Obey and observe traffic rules
Transport passengers to different location and provide meaningful/ excellent experience	Modern transport or world-class infrastructure	Safe and timely	Inconsistencies	Confusion to new bus routes	Observe road health and safety procedure
Safely transport the passengers	Systematic transportation	On time/ predictable bus arrival		Adjustment to the new payment methods and rates	Service-oriented
	It has good impact in the economic activity of Davao City			Shortage of new bus due to the unanticipated number of commuters	Customer service skilled
				Acceptance	Excellent understanding of the traffic rules
				Resistance	Cleanliness
				Adjustment to the cashless payment	Gender-responsive
					NC-III holder

GROUP 3:

1. Main purpose of the bus drivers	2. What vision do you have for Davao City's urban transport infra and how will it benefit Davao?	3. How should the system perform and improve the traveling experience for the people of Davao?	4. What are your concerns about the new system in the future?	5. In your opinion, what challenges will be faced with the new bus system?	6. What competencies do bus drivers need in the future?
Acquire new competencies	Safe, smart, accessible, reliable, comfortable	Efficient	Sustainability of the system	Acceptability of the people	Professionalism
Employment	Sustainable mobility options	Easy transfer	Fare payment system	Acceptability from the stakeholders	Professional bus driving experience
Ferry passengers from origin to destination	State-of-the-art public transport	More mobility options	System maintenance	Financial and operational and institutional sustainability of the system	Commuter's service quality orientation
Job opportunity	Better/ complementing system for all types of mobility	Efficient transport system	IT operation integration	Technological innovation	Professionalism
To bring passengers safely to/from their destination	Gender-responsive/ inclusive public transport	Safe, reliable, comfortable public transport	Information and communication dissemination	Technology adaptation	Technology transfer to the drivers
	Patterned after other smart cities that feature bus lanes, bike lanes, pedestrians, islands/greenery, fully digital/ automatic	Climate resilient buses/public transport facilities	Needs that need to be properly communicated to the public: (i) benefits, and (ii) how to use	Effects of climate change	
	Public transport drivers training institute	On-time transportation		Poor infrastructure and poor road infrastructure planning	
		Safe for everyone		User guide for riding public	
		Good compensation for drivers etc equates to happy drivers/good service			

7 APPENDIX 2 | WORKSHOP 3: DRIVER GROUPS

Source: Adobe Stock

JEEPNEY DRIVERS' AVERAGE DAILY ROUTINE

Group 1 (Facilitated by Dr. Jojo Bascug)

MORNING	MID-DAY	NIGHT
Mangape, ligo, mamahaw, check-up asite sa unit, tubig, washing sa unit. Byahe kutob alas dose. (Have coffee, take a bath, have breakfast, check the jeepney's oil, radiator coolant/water, then wash the jeepney clean and tidy. Drive the route until 12 noon)	Pagka udto, lunch and relax. Magwalis sa sakyanan. agtrapo sa bangko. After that, mamasahero para maka kuha na ug arkila. (At noon, will have lunch and relax for a while. Then sweep the jeepney's floor for dust/ trash. Also includes wiping the passenger seats for sanitation. After that, drives again to transport passengers to reach the income quota to pay for the jeepney's day rental.)	Mo grahe at 8 pagka gabii, then mag washing, motubil, mohatud sa arkila sa tag-iya. After that, ibaba na ang trapal sa sakyanan. After than mo-uli na sa balay (Drives the jeepney route until 8:00 p.m. then wash/clean the unit. Have it fueled, usually the night before to be ready for the next day's routine. Pay the jeepney rental of the day to the owner/operator. Before going home, cover the jeepney's windows with roll-up canvas to prevent rainwater inside, in case it rains. Then go home bringing also the net income for the day.)
4:00 a.m. magluto ug kan-on, 5:00 a.m. maligo, magsu-ot ug uniform, 5:30 a.m. Mag cjeck sa oils sad yep, check sa ligid. 6:00 a.m. mo byahe na. (After waking up, cook rice for breakfast. At 5:00 a.m., take a bath and put on the driver's uniform. At 5:30 a.m., check the engine oil of the jeep and also check the tire conditions for air pressure. At 6:00 a.m., hit the road.)	Mani-udto, tulod kadali. 1:00 p.m. byahe na. alas 3 mag miryenda the byahe balik hangtud 9:00 p.m. Grahe dayon then palit sud-an pang panihapon. (Take a lunch break then have a short rest. By 1:00 p.m., back on the road driving. At 3:00 p.m., take a break for snacks then continue driving the route until 9:00 p.m. Go to the garage and park the jeepney. After paying the day's rental to the operator, the net income of the day will be brought home but will pass by the fast food or canteen to buy food for dinner at home.)	At 6:30 p.m. grahe na then remit sa arkila. Relax kadali. Kaon ug panihapon. 9:00 p.m. sleep na. (At 6:30 p.m., drive back to the garage then remit/pay the day's jeepney rental to the owner/ operator. Go home and relax for a while after dinner. Then sleep around 9:00 p.m. to gain energy for the next day's routine.)

MORNING	MID-DAY	NIGHT
4:00 a.m. ang pagmata dayon magluto, maligo, mag-ilis, mamainit, lakaw. Pag-abot sa grahe magtrapo sa sakyanan, mag pray before mo byahe. (Wake up at 4:00 a.m., prepare breakfast, take a bath, change into driver's uniform, have some coffee or bread for breakfast, then walk to the garage. Upon arriving at the garage, wipe clean the jeepney then pray for a safe drive before hitting the highway.)	12 noon, I go home for lunch. Then sleep at least 1 hour the drive again until 8PM. (At 12 noon, I go home for lunch. After having lunch, rest or sleep for at least 1 hour to recharge then go back driving the route until 8:00 p.m.)	I gave all my money to my wife then check my 2 children in their room and together dinner. But before that, we pray to our Lord for all the blessings for the day. (After the day's driving chores and paying rent of the jeepney, the net income will be given to my wife. I also check my two children in the room and have a family dinner together. At the dining table, the family prays together, thanking the Lord for all the blessing the family has on that day.)
Matulog pa sa buntag ug mo mata pagka alas 11:00 a.m. Usahay mo mata ug sayo mga alas 8:00 a.m. para motabang sa asawa pag limpyo sa balay. (Sleep until 11:00 a.m. but sometimes wake up earlier at 8:00 a.m. to help the wife with household chores) – *This is the case of a late-night driver.*	At 12 noon maligo na ug mag prepare until 2:00 p.m. apil check-up sa tubig, suga, battery, asete ug ligid. At 2:00 p.m. magbyahe na. (At 12 noon will take a shower and prepare everything until 2:00 pm. including checking the jeepney unit of its water/coolant, lights/lamps, battery, oil/gas, and tire pressure. By 2:00 p.m. should be on the road already.)	Mag byahe hangtud 12 midnight. Mag relax at 1:00 a.m. (Will drive the jeepney route until 12 midnight. Will rest and relax by 1:00 a.m. then drive by 11:00 a.m. the next day.) – *This is the case of a late-night route driver to cater passengers going home from work on night shifts or graveyard shifts.*

MORNING	MID-DAY	NIGHT
5:00 a.m. coffee time. 5:30 a.m. jogging. 6:00 a.m. shower, then after that, check my jeep for oil ug water. 6:30 a.m. pasada na ug good bye kiss my dear wife. PS. No breakfast. (I wake up at 5:00 a.m. and have morning coffee, and have some exercise by jogging for 30 minutes then take a shower at 6:00 a.m. After that, check the jeepney unit for the engine oil level and water level for its radiator/coolant. At 6:30 a.m., I start driving the jeepney after kissing my dear wife goodbye. Sometimes, I drive to the route even without breakfast yet.)	12 p.m. mokaon ug pani-udto. 1:00 pm. byahe nasad hangtud hapon sa alas 5:00 pm.. (12 noon will eat lunch. At 1:00 p.m., goes back driving the jeepney for the day's route until 5:00 pm.) – *Depends on hitting the net income of the day.*	Mag Facebook kadali. Watch TV. Shot gamay. Kiss sa anak ug asawa before matulog. (After the day's driving job, while relaxing after dinner, will check Facebook for social media information and news updates while also watching TV. Sometimes, will have some shots of wine or a glass of beer. Before going to sleep, kisses the kids and wife.)
Mata sa 4:00 a.m. Mag check sa unit, mag washing sa unit, maligo, mangape, ug byahe at 5:30 a.m. Human byahe sa buntag, mamahaw sa balay at 9:00 a.m. then relax, then byahe napud. (Wake up at 4:00 a.m. Check the jeepney unit includes oil, gas, water, breaks, tires, etc., then wash/clean the jeepney. Take a bath, have some coffee, and hit the route at 5:30 a.m. After the early rounds, go home at 9:00 a.m. for breakfast and a short rest, then back to driving for the rest of the day.)	Mani-udto at 12 noon. Relax/matulog up to 2:00 p.m. Byahe at 3:00 p.m. up to 6:30 p.m. Minsan magluto, minsan maglaba. (Will have lunch at 12 noon. Take a rest or nap up to 2:00 p.m. to recharge then drive again at 3:00 p.m. until around 6:30 p.m. On any given day, will also help wife at home to cook or wash clothes.)	At 6:00 p.m. magpa-washing sad dyep, pagka human mo grahe na. That's all! (By 6:00 p.m., drive the jeepney to the garage after cleaning and washing, then go home after that. That's it!)

Group 2 (Facilitated by Dr. Eden Sorupia)

MORNING	MID-DAY	NIGHT
Maligo, mamahaw, check-up sa unit byahe 6:30 a.m. (Take a bath, eat breakfast then check the jeepney unit. Start driving the route at 6:30 a.m.)	Maniudto Pahulay ug 30 minutes Byahe pagka 12:30 p.m. (Eat lunch, take a rest for 30 minutes then back on the road by 12:30 p.m.)	5:00 p.m. uli na. Pahulay na sa balay. Labing labing sa asawa ug anak (Go home at 5:00 p.m. Relax at home and spend time with wife and kids.)
Maligo, mamahaw, battery check, byahe 7:00 a.m. (Take a bath, eat breakfast, then check the jeepney unit's battery. Start driving the route at 7:00 a.m.)	Pahulay ug 1 hour Byahe nasad 2:00 p.m. (Rest and relax for 1 hour then back to driving the jeepney at 2:00 p.m.)	5:00 p.m. garahe na after car wash. (Park at the garage by 5:00 p.m. after washing/cleaning the jeepney unit)
Maligo Mag kape Mag kaon bago mag drive Mag drive 7:00 a.m. Mag grahe 5:00 p.m (Take a bath, have coffee, then eat breakfast before driving. Drive by 7:00 a.m. up to 7:00 p.m.)	Mag kain 12:00 p.m. Mag relax 1 hour Mag drive 2:00 p.m. (Eat lunch at 12 noon then relax for 1 hour. By 2:00 p.m., drive the route again.)	Mag grahe 5:00 p.m. Mag arkila sa operator Mag uwi na sa bahay Mag relax sa gabii (Park at the garage by 5:00 p.m., then pays the operator of the daily jeepney rental. After that, go home and rest for the night.)
Adto sa garahe i-check ang oil, gas, brake fluid sa jeep. (Go to the garage in the morning and check the engine oil, fuel, brake fluid, etc. of the jeepney.)	Uli sa balay para mag lunch kauban ang mga anak. (Go home for lunch with the kids/family.)	Arkela 600 Uli na, byahe pauli Magwashing sa sakyanan Ihatag sa regular ang 600 (Wash the jeepney clean and park at the garage. Regularly pay the daily jeepney rental of PHP600 then go home.)

EXPECTED CHALLENGES

Group 1 (Facilitated by Dr. Jojo Bascug)

Expected challenges for driving a bus?	Which competencies are needed to overcome these challenges?	What should be included in a bus training program?	Current challenges as jeepney driver that you will face as a bus driver? What new challenges?
Dili ko kabalo mo operate ug high-tech nga bus. Gusto ko makat-on. (I don't know how to operate a high-tech bus, HPBS. I want to learn.	Mo attend ug training kung naa e offer nga school para sa dugang kahibalo sa pamaagi sa electric bus. (Will attend trainings if there is a school that offers skills training for electric bus operations.	Gusto ko makabalo mo-accident rescue, CPR. Willing mo training as mechanic. (I want to learn about accident rescue, emergency response, medics, including CPR.)	Nabalaka ko sa pag adjust sa financial sa PUJ daily income kay ang bus 15-30 income na (sweldo). (I'm worried about financial adjustments from the jeepney daily income because as bus employee I will be receiving salary on a bimonthly to monthly basis.)
Nabalaka ko kay wala nay inadlaw nga income para sa akong pamilya. (I am worried because I won't be receiving a daily source of income for my family.)	Gusto ko ug training sa TESDA bus drivers. (I want to be trained by TESDA for bus drivers.)	Modugang ug training sa HPBS. (Add more trainings for the High Priority Bus System.)	Mag adjust na lang ko kay mabag-ohan ko sa akong pangwarta kay 15th to 1 month naman ang akong sweldo. (I will adjust to the new system to earn income since I would then be receiving salary on a monthly basis.)

Expected challenges for driving a bus?	Which competencies are needed to overcome these challenges?	What should be included in a bus training program?	Current challenges as jeepney driver that you will face as a bus driver? What new challenges?
Nabalaka ko kay dili ko kabalo mo drive ug high tech nga bus. (I am worried because I still don't know how to drive high tech modern buses)	Gusto ko maka tu-on ug maka drive ug high tech nga bus para dili nako mabalaka pag apply. (I want to learn to drive a high tech bus, so it won't be hard for me to apply for a job at HPBS.)	Gusto ko makat-on ug electric and automatic skills sa bus para magamit nako ug dili ko mabalaka pag mag trouble ang bus. (I want to learn how to operate electric and automatic buses so I could use that knowledge and not worry in case the unit would be in trouble, or needs repair.)	Gusto nako na programa ang bus. Ang importante benefits sa driver ug modernisasyon sa atong syudad. (I like the HPBS program. What is most important to us are the benefits or job security for the drivers and the modernization of the transport system of the City of Davao.)
Nabalaka ko kay basin dili nako maka hibalo kay automatic naman ang bus nga bag-o. I am worried because I don't know how to drive since the new buses are automatic/ electric.)	Kailangan mo training ug mechanic. (Need to be trained as an HPBS mechanic.)	Mag training pa para molambo pa ang akong matun-an sa training. (Willing to be trained to improve my skills better.)	Karon nga PUJ driver pako, ma problema ko sa rent ug tubil labi na karon nga mahal ang gasolina. (Now that I am still a jeepney driver I have problems on daily rental to pay the operator/owner, including the rising cost of fuel.)
Mabalaka ko kay dili ko kabalo mag drive ug electric. (I'm worried since I have no experience in driving electric buses.)	CPR training, mechanic training, paint training (Want to learn added skills on CPR training, mechanic training, paint training, etc.)	Training sa first aid. (Training for first aid.) – *Also emergency response*	How come kung mag bus driver, dili nako ma problema sa arkila? (Once I become an HPBS bus driver, should I not worry of vehicle rentals?)

Expected challenges for driving a bus?	Which competencies are needed to overcome these challenges?	What should be included in a bus training program?	Current challenges as jeepney driver that you will face as a bus driver? What new challenges?
Mabalaka ko kay pang gasto sa adlaw adlaw kung mag drive nako ug bus. (I would be worried where to get my daily expenses for the family once I'll be driving the bus.)	Malipay ko kay mag drive nako ug bus puhon. Dako kayo ang diperensya nga gikan sa multicab paingon sa bus. (I will be happy once I will be driving the HPBS bus soon. There is a big difference driving a multicab jeepney compared to the modern bus.)		Ang ako lang kay mabag-ohan ko sa pamaagi sa bus kay naan aa naman ang sariling loading ug unloading area. Layo napud sa violation ang driver. (My worries are on adapting to the new system, such as where to load and unload for the HPBS. Drivers' traffic violations would be lessened too.)
Mabalaka ko kung unsa pa mahitabo sa umaabot nga phase out (sa jeepney). (I would be worried on the impacts to the commuters once all jeepneys would be phased out.)			kay wala nakoy time sa akong mga anak. (I'm worried about the daily source of income for family daily expenses, since pay slips are on a monthly or bimonthly rate. Also, my time with my children would be minimized since I will be driving at least 8 hours a day.)

Group 2 (Facilitated by Dr. Eden Sorupia)

Expected challenges for driving a bus?	Which competencies are needed to overcome these challenges?	What should be included in a bus training program?	Current challenges as jeepney driver that you will face as a bus driver? What new challenges?
Manglimpyo na ang driver. Pa pogi na. (The driver will be neat and clean. Should look well-groomed and handsome.)	Dakop Violation (Apprehensions and traffic violations)	To attend trainings, seminars, orientation on traffic rules and regulations.	How to control crowd/chaos among passengers training
Relax ang driver Humot ang driver Pogi and driver (The driver will be more relaxed, smell good, and well-groomed/handsome-looking.)	Layo ta sa problema Dili ta mag huna-huna ug dautan Smile ta pirmi (Far from traffic-related problems and won't be thinking of bad things to happen while operating the bus. Always smile.)	Siminaron pud ang mga pasahero para makabalo pud sila sa ilang buhaton ug motuman sa loading area or yellow box ug ang mga mag bike moagi na sa bike lane. (Commuters/passengers should also be educated through seminars or information, education campaigns (IEC) so they would also understand the traffic management of the HPBS. This includes knowledge of passengers on where to embark and disembark on designated bus loading and unloading areas. Bikers would also follow the designated bike lanes.	Call 911 in case of emergency

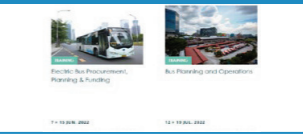| Expected challenges for driving a bus?	Which competencies are needed to overcome these challenges?	What should be included in a bus training program?	Current challenges as jeepney driver that you will face as a bus driver? What new challenges?
Big bus Excited Maligo Magpa humot (Expecting big buses around the city and excited for HPBS to become operational. Drivers must take a bath and smell good.)	Daghan sakay Layo sa dakop Madautan ang bus (Expected high volume of passengers/ commuters once HPBS is in operation. Drivers won't worry much about traffic violations as they would be well trained to follow road regulations already. The only concern is when the bus breaks down during the trip which could affect the schedule and passengers.)	Training for mechanics Contact number sa city bus. (The need for training of more HPBS mechanics. There should be visual access on the emergency contact numbers posted on each city bus.)	Trainings on how to use handsets. (This is about trainings on the use of electronic communications gadgets such as the 2-way transceiver radios, intercom and paging systems within the HPBS lines. NTC will also train and certify on use of radio frequencies.)
	How to treat passengers with lots of care.		Dapat posboton tanan para dali ang mekanik para magpara. (For passenger convenience, everything should be installed with push buttons.)

8 APPENDIX 3 | COMPREHENSIVE LIST OF VENDORS RESEARCHED

Source: Adobe Stock

MODULE 2 - ILLUSTRATIVE AGENDA

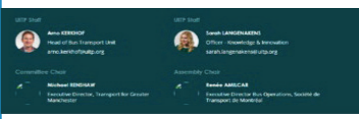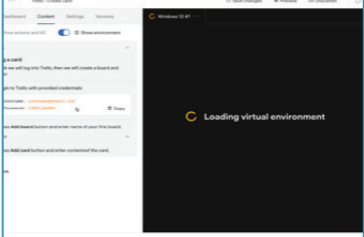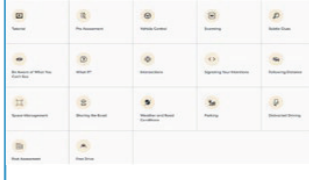| INPUT BY	SEQ	BUS TRAINING SYSTEM	ABOUT TRAINING SYSTEM / PLATFORM					TRAINING CAPACITY	TRAINER REQUIRED	
			SUPPLIER	FORM	HOW TO ACCESS	LOCATION	NUMBER OF MODULES			

Enoch	1	Singapore Bus Academy	SGBA in-house trainers, National Transport Workers' Union, SBS Transit and SMRT Buses, Devan Nair Instutite	Enhanced Vocational Licence Training Programme: Omnibus Driver's Vocational Licence (ODVL).		Devan Nair Institute for Employment and Employability80 Jurong East Street 21Singapore 609607
						
						Email: LTA_SGBA@lta.gov.sg
							• 6 Modules• Overview of the public transport industry
							• ODVL rules and regulation• Sectoral tripartism
							• Overview of new on-board bus equipment and common fleet management system
							• Service literacy•
							• Safe driving techniques
							  - Hazard awareness training and test
							  - Scenario-based simulator training
								?	Yes	

Enoch	2	Integrated Driving and Service Control Simuation System	ST Engineering & SMRT	Singapore Bus Trainingand Evalution Centre - Simulator training- Evidence and Scenario Training		Singapore BusTraining and Evalution Centre (SG BTEC)	4 - Bus Simulator Training - Full Cabin Simulator-Service Control Work - Instructor Operating Station	?	Yes	
Enoch	3	Taptco Transit and Paratransit Company	Taptco	DVD, Thumbdrive, Online Learning management System, Webinar	**Buy the Virtual/ Remote learning Program**	Ohio, Virtual	2:Transit 2020 Course&Paratransit 2020 Course	NA	NO	
Enoch	4	FAAC Bus Driver Simulation Training	TRANSIT Simulation Training	Virtual? and Physical?		Florida / Michigan	FAAC MB-1000 BUS SIMULATOR, FAAC MB-2000 BUS SIMULATOR	?	YES	

TRAINING DURATION	APPLICABLE BUS TYPES	ABOUT BUS			ABOUT TRAINING SYSTEM / PLATFORM			
		BUS SIZE	BUS CAPACITY	BUS SPEED	CUSTOMIZATION	PICTURE	LINK	OTHERS / COST
Five-day Enhanced Vocational Licence Training Programme	SBS, SMRT Busses	Various bus models	50-130pax	50-60kph	?		"https://e2i.com.sg/industry-info/trade-connectivity/public-bus/ https://www.lta.gov.sg/content/ltagov/en/industry_innovations/industry_transformation_map/academies/singapore_bus_academy.html	?
?	Replica of common bus models from: MAN, Alexander DennisLimited, Mercedes Benz and Volvo	Various bus models	50-130pax	50-60kph			https://www.stengg.com/media/1175957/idsc_bus_driving_simulator_brochure_2021.pd	
12 HOURS OF COURSE CONTENTPLATFORM RECOMMENDATION OF 23 HOURS TO DELIVER PROGRAM	?	?	?	?	?		https://taptco.com/bus-operator-training-products/transit-operator-development-course/ https://taptco.com/wp-content/uploads/taptco-todc-flyer-2020.pdf https://taptco.com/wp-content/uploads/transit-operator-development-syllabus.pdf https://taptco.com/wp-content/uploads/transit-operator-development-syllabus.pdf	USD$7,975
	FAAC MB-1000 BUS SIMULATOR, FAAC MB-2000 BUS SIMULATOR						HTTPS://WWW.FAAC.COM/SIMULATION-TRAINING/TRANSPORTATION/BUS-DRIVER-TRAINING/	

INPUT BY	SEQ	BUS TRAINING SYSTEM	ABOUT TRAINING SYSTEM / PLATFORM					TRAINING CAPACITY	TRAINER REQUIRED	
			SUPPLIER	FORM	HOW TO ACCESS	LOCATION	NUMBER OF MODULES			
Enoch	5	Nova Bus Academy	Novabus, Volvo group	On-Site Training	Jean-Nicolas Fournier 843-1631novacademy@volvo.com		List of training simulators : Multiplex Training Simulator Model 1Multiplex Training Simulator Model 2HVAC Training Simulator, Mobile Climate ControlHVAC Training Simulator, Thermo KingPneumatic Braking System mulatorPneumatic System SimulatorDiesel Engine and Transmission Training SimulatorDoor System Training SimulatorWheelchair Ramp Training SimulatorDestination Sign Training SimulatorFire Suppression Training SimulatorArticulation Training SimulatorHybrid Training SimulatorFront Axle Training SimulatorRear Axle Training SimulatorFront Caliper Axle Training SimulatorRear Caliper Axle Training SimulatorVirtual Pneumatic Simulator	?	Yes	
Drae	13	E-Learning Bus Electronic Systems	Wabco Academy (wabco-academy@zf.com)	E-learning, Physical for countries provided	**Log into their website to access e-learning content**		1.) Go.Learn! mobile app for on the go usersTop driver training programme, passenger car safety driving system, CZV Training Switzerland (excludes SEA)		NO	

TRAINING DURATION	APPLICABLE BUS TYPES	ABOUT BUS			ABOUT TRAINING SYSTEM / PLATFORM			
		BUS SIZE	BUS CAPACITY	BUS SPEED	CUSTOMIZATION	PICTURE	LINK	OTHERS / COST
?	Nova LFS DieselNova LFS Diesel Nova LFS ArticNova LFS Artic Nova LFS HEVNova LFS HEV Nova LFS CNGNova LFS CNG Nova LFSeNova LFSe Nova LFSe+Nova LFSe+	12-19m	40-60	?		Nova Bus Academy On-site training	https://novabus.com/parts_and_service/novacademy/	
	TARGETED FOR CAT B DRIVERS, MINI BUS						HTTPS://WWW.WABCO-ACADEMY.COM/HOME	

INPUT BY	SEQ	BUS TRAINING SYSTEM	ABOUT TRAINING SYSTEM / PLATFORM					TRAINING CAPACITY	TRAINER REQUIRED	
			SUPPLIER	FORM	HOW TO ACCESS	LOCATION	NUMBER OF MODULES			
Drae	14	E-Learning Bus Electronic Systems	UITP	Online course	https://www.uitp.org/search-tool?types=training&topics=bus&regions=asia-pacific&tags=&all=	Have trained with ShenZhen buses, catered to Asia-Pacific and Europe	1.) Bus Planning and Operations with LTA Academy		No	
Drae		E-Learning Bus Electronic Systems	LTA Academy		**https://www.lta.gov.sg/content/ltagov/en/industry_innovations/industry_transformation_map/academies/lta_academy.html**	71 Chai Chee StreetLTA Bedok Campus, Blk 5 Level 2Singapore 468981	1. POLICY PLANNING 2. TRANSPORT INFRASTRUCTURE 3. TRANSPORT AND INNOVATION SYSTEM			
DRAE	15	DRIVE WISE	DRIVE HIRE	E-LEARNING THROUGH ZOOM / TEAMS	HTTPS://WWW.DRIVERHIRE.CO.UK/TRAINING/DRIVEWISE-COURSES/E-LEARNING-MODULES/	UNITED KINGDOM			NO	
DRAE	16	A PLATFORM TO DELIVERING VIRTUAL SOFTWARE TRAINING	SIT ALEMIRA	HTTPS://ALEMIRA.COM/	https://alemira.com/	SCHAFFHAUSEN INSTITUTE OF TECHNOLOGY VORDERGASSE 59, 8200 SCHAFFAUSEN	MODULES NEED TO BE CREATED, THIS IS A PLATFORM TO DELIVER AND MONITOR THE MODULES		YES	
DRAE	17	VIRTUAL SOFTWARE / SIMULATOR TRAINING TOOL	TRANSDEV			AUSTRALIA, NZ, CHINA, EUROPE				
DRAE	18	BUS DRIVING SIMULATOR (BUSSIM)	ZEN TECHNOLOGIES LIMITED	HTTPS://WWW.ZENTECHNOLOGIES.COM/ZEN_BUS_DRIVING_SIMULATOR.HTML			DRIVING SIMULATOR-DRIVER APTITUDE TESTING (ZEN DATS)		NO	

| TRAINING DURATION | APPLICABLE BUS TYPES | ABOUT BUS | | | ABOUT TRAINING SYSTEM / PLATFORM | | | |
		BUS SIZE	BUS CAPACITY	BUS SPEED	CUSTOMIZATION	PICTURE	LINK	OTHERS / COST
8 sessions, 2 week timespan	Common bus model						asiapacific@uitp.org	
NA / COMMON DRIVING MODULES								
	MODULE CONTENT NEED TO BE CREATED FOR SPECIFIC BUS TYPE FROM A POOL OF TEMPLATES ON ALEMIRA							
	FLEET DRIVERS					HTTPS://YOUTU.BE/ X5NPOTOFTL4		

INPUT BY	SEQ	BUS TRAINING SYSTEM	ABOUT TRAINING SYSTEM / PLATFORM							
			SUPPLIER	FORM	HOW TO ACCESS	LOCATION	NUMBER OF MODULES	TRAINING CAPACITY	TRAINER REQUIRED	
DRAE	19	DRIVER SIMULATION	NEXT GEN			JACKSONVILLE, USA			YES	
DRAE	20	VIRTUAL DRIVING ESSENTIALS ADVANCED DRIVER SAFETY	Virtual Driver Interactive				VDE CONSISTS OF 16 LESSONS THAT TAKE ABOUT 3 HOURS TO COMPLETE. THE VIRTUAL DRIVER INTERACTIVE DEVELOPMENT TEAM HAS CREATED AN AMAZING "INTELLIGENT TRAFFIC" WORLD WHERE THE CARS AROUND YOU PRESENT CHALLENGING BEHAVIOR THAT IS NEVER THE SAME IN ANY TWO DRIVES. TAKE THE SAME LESSON AGAIN AND YOU'LL SEE ENTIRELY DIFFERENT TRAFFIC CONDITIONS			
		DRIVING ESSENTIAL XE	Virtual Driver Interactive	AVAILABLE ON GAMING CONSOLE XBOX ONE OR PS4						
DRAE	22	TRANSITSIM BUS TRAINING SIMULATOR	L3HARRIS			SINGAPORE, UK, US, JAPAN, AUS			ES	

| TRAINING DURATION | APPLICABLE BUS TYPES | ABOUT BUS | | | ABOUT TRAINING SYSTEM / PLATFORM | | | |
		BUS SIZE	BUS CAPACITY	BUS SPEED	CUSTOMIZATION	PICTURE	LINK	OTHERS / COST
	SCHOOBUS, COMMON BUS FLEET					HTTPS://YOUTU. BE/8DYAQNH4OP4		
	ENABLES TRAINING ON MULTIPLE VEHICLE CONFIGURATIONS, REGARDLESS OF AVAILABILITY OF REAL EQUIPMENT. TRANSIT BUSES				Yes			

INPUT BY	SEQ	BUS TRAINING SYSTEM	ABOUT TRAINING SYSTEM / PLATFORM					TRAINING CAPACITY	TRAINER REQUIRED	
			SUPPLIER	FORM	HOW TO ACCESS	LOCATION	NUMBER OF MODULES			
DRAE	23	MOTIONSIM1 TRUCK SIM	CKAS				FULL MOTION TRUCK AND BUS SIMULATORS FOR DRIVER TRAINING		YES	
DRAE	24	GAMIFIED SIMULATIONS OF COURSES TREBOUND	TREBOUND SIMULATIONS			INDIA				
DRAE	25	TENSTAR SIMULATION	TENSTAR							
REUBEN	26	BUS TRAINING ELECTIVE THAT IS PART OF A LARGER DRIVING OPERATION ACCREDITATION COURSE	STRATEGIX (TRAINING SCHOOL)	FACE TO FACE, SELF PACED, WORKPLACE		AUSTRALIA	5 (BUS ELECTIVE ONLY)		YES	
SIMONE	27	DIGITAL LEARNING PLATFORM	EDAPP	ONLINE LEARNING	WEBPAGE	SYDNEY, NEW YORK, LONDON	WE CAN CREATE OUR OWN MODULES AND CUSTOMISE EXISITNG MODULES FROM THEIR CATALOGUE	UNLIMITED	NO	
SIMONE	28	BUS SIMULATOR GAMES: BUS GAMES	THE KNIGHTS PVT LDT	GAME	DOWNLOAD ON YOUR COMPUTER OR MOBILE DEVICE	PAKISTAN			NO	
ABHI	29	HINO TOTAL SUPPORT CUSTOMER CEN HINO		ON-SITE TRAINING		KUALA LUMPUR	ENLARGE PICTURE		YES	

		ABOUT BUS			ABOUT TRAINING SYSTEM / PLATFORM			
TRAINING DURATION	APPLICABLE BUS TYPES	BUS SIZE	BUS CAPACITY	BUS SPEED	CUSTOMIZATION	PICTURE	LINK	OTHERS / COST
								https://www.ckas.com.au/contact_us_5.html
						HTTPS://WWW.TENSTARSIMULATION.COM/SIMULATORS/HARDWARE-CONFIGURATIONS	https://youtu.be/ySM2Hpno2S0	
BUS ELECTIVE ONLY: UNKNOWN OVERALL DRIVING OPERATIONS COURSE: 12 MONTHS							HTTPS://STRATEGIX.EDU.AU/COURSES/COURSE/CERTIFICATE-III-IN-DRIVING-OPERATIONS/?ID=72	AU$33 PER SUBJECT. TRAINING CENTRE HAS EXPERIENCE IN TEACHING FEMALE BUS DRIVERS FOR QUEENSLAND BUS SERVICE OPERATORS. INFO: HTTPS://QBIC.COM.AU/RESOURCES/PICTURES/BUS%20DRIVING%20ACADEMY%20V2(2).PDF
					YES		HTTPS://WWW.EDAPP.COM/INDUSTRY/TRANSPORT-INDUSTRY-TRAINING-SOLUTION	FREE - 2.95 USD PER ACTIVE USER
SMALLER INTERACTIVE GAMES					CUSTOMISATION AVAILABLE IN GAME		https://play.google.com/store/apps/details?id=com.gzl.drivebus.parking.game&hl=da&gl=US	FREE
UNKNOWN	HINO XZU720R - HKFRL1HINO RN8JSPAHINO RK8JSKAHINO RMIESKU	HINO BUSES					HTSCC - HINO	

ABOUT THE ASEAN AUSTRALIA SMART CITIES TRUST FUND

The ASEAN Australia Smart Cities Trust Fund (AASCTF) assists ASEAN cities in enhancing their planning systems, service delivery, and financial management by developing and testing appropriate digital urban solutions and systems. By working with cities, AASCTF facilitates their transformation to become more livable, resilient, and inclusive, while in the process identifying scalable best and next practices to be replicated across cities in Asia and the Pacific.

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Asian Development Bank

Australian Government

Department of Foreign Affairs and Trade

ADB