

The Evolving Landscape Of Multimodal Transportation: Preparing Indonesian Cadets For The Future

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Abstract. This research explores the preparedness of Indonesian cadets in multimodal transportation, focusing on 50 cadets from a transportation institution in Jakarta. Qualitative methods, including interviews and focus groups, were used to assess their knowledge, skills, and adaptability to emerging trends and technologies. The findings indicate that while cadets demonstrate a strong understanding of key concepts and principles, there are areas for improvement, particularly in problem-solving skills and adaptability to new technologies. Recommendations include enhancing problem-solving skills, incorporating training on emerging technologies, fostering collaboration and interdisciplinary learning, providing continuous professional development opportunities, strengthening industry-academia collaboration, evaluating and updating curriculum regularly, and promoting lifelong learning and professionalism. These recommendations aim to enhance the preparedness of Indonesian cadets and ensure that educational programs align with the evolving needs of the transportation industry.

Keywords: Multimodal Transportation, Indonesian Cadets, Transportation Education, Problem-Solving Skills, Emerging Technologies

INTRODUCTION

The transportation sector plays a pivotal role in facilitating global trade, connecting people and goods across vast distances (Green, 2021; Walker et al., 2019). With the rapid advancement of technology and the emergence of new trends in transportation, there is a pressing need to ensure that future professionals in this field are adequately prepared to navigate the evolving landscape. This research endeavours to explore the preparedness of Indonesian cadets studying multimodal transportation, with a particular focus on their knowledge and skills in relation to emerging trends and technologies. By conducting qualitative analysis and descriptive research, this study aims to shed light on the current state of transportation education in Indonesia and recommend adaptations within educational programs to ensure graduates remain relevant in the future.

The field of transportation management encompasses various modes of transportation, including air, sea, rail, and road, each with its own set of challenges and opportunities (Litman, 2016). As the demand for efficient and sustainable transportation solutions continues to rise, it is imperative for transportation professionals to possess a comprehensive understanding of multimodal transportation systems (Villani, 2021). Indonesian cadets, as future leaders in the

transportation industry, must be equipped with the necessary knowledge and skills to navigate this complex and dynamic environment effectively.

Against this backdrop, the primary objective of this research is to assess the preparedness of Indonesian cadets specializing in multimodal transportation. By examining their knowledge and skills in areas such as logistics, transportation safety, and law, this study seeks to identify any gaps or shortcomings in their education and training. Furthermore, the research aims to provide recommendations for adapting educational programs to better align with the evolving needs of the transportation industry, thereby ensuring that graduates are adequately prepared to meet the challenges of the future. One significant research gap that this study aims to address is the lack of empirical research on the preparedness of Indonesian cadets in the field of multimodal transportation. While there is existing literature on transportation education and training programs in other countries, there is limited research specifically focusing on Indonesia. By conducting qualitative analysis and descriptive research, this study aims to fill this gap by providing a detailed assessment of the knowledge and skills of Indonesian cadets and identifying areas where improvements can be made.

Additionally, there is a need for research that examines the implications of emerging trends and technologies on transportation education in Indonesia. With advancements such as digitalisation, automation, and sustainable transportation gaining traction, it is essential to understand how these developments are shaping the future of transportation and what implications they have for education and training programs (Sharma et al., 2019). This research seeks to address this gap by analysing the preparedness of Indonesian cadets in relation to these emerging trends and technologies and providing insights into how educational programs can be adapted to ensure graduates remain competitive in the global marketplace (Chakroborty & Das, 2017). This research aims to contribute to the existing body of knowledge on transportation education in Indonesia by examining the preparedness of Indonesian cadets in the field of multimodal transportation. By identifying any gaps or shortcomings in their education and training and providing recommendations for improvement, this study seeks to ensure that graduates are equipped with the knowledge and skills necessary to succeed in the rapidly evolving transportation industry.

METHOD

The research method employed in this study is qualitative in nature, designed to provide a detailed and nuanced understanding of the preparedness of Indonesian cadets in the field of multimodal transportation. Qualitative research is well-suited to exploring complex

phenomena and gaining insights into the experiences, perspectives, and behaviours of individuals within a specific context (Castleberry & Nolen, 2018; Willig, 2014). To begin with, the research design involves selecting a sample of 50 Indonesian cadets from a transportation institution in Jakarta. This sample size is deemed sufficient to provide a diverse representation of cadets with varying backgrounds and experiences in multimodal transportation (Chilisa, 2019). The selection criteria include cadets currently enrolled in programs related to transportation management, logistics, transportation safety, and law, ensuring that the sample is relevant to the research objectives.

Data collection in this study primarily involves qualitative techniques such as semi-structured interviews and focus group discussions. These methods allow for in-depth exploration of the cadets' knowledge, skills, attitudes, and perceptions related to multimodal transportation. Semi-structured interviews provide the flexibility to probe into specific areas of interest while allowing participants to elaborate on their responses in their own words (Kortüm, 2012). Focus group discussions, on the other hand, facilitate interaction and peer-to-peer learning among cadets, enabling the exploration of shared experiences and perspectives within the group.

The interview and focus group protocols are developed based on the research objectives and informed by relevant literature in the field of transportation management and education. The questions are designed to elicit information on various aspects of multimodal transportation, including but not limited to logistics practices, safety regulations, legal frameworks, and emerging trends and technologies. Open-ended questions are preferred to encourage participants to express their thoughts freely and provide rich qualitative data (Darlington & Scott, 2020). Data analysis is conducted iteratively throughout the research process, following the principles of thematic analysis. Initially, the interview transcripts and focus group recordings are transcribed verbatim and coded systematically to identify key themes and patterns emerging from the data. This process involves reading and re-reading the transcripts, identifying meaningful units of text, and categorising them into relevant themes and sub-themes (Kim et al., 2017). The identified themes are then organised and interpreted to develop a comprehensive understanding of the cadets' preparedness in multimodal transportation. The analysis is conducted with rigour and attention to detail, ensuring that findings are grounded in the data and supported by verbatim quotes from participants. Triangulation techniques may be employed to corroborate findings across multiple sources of data, such as interviews, focus groups, and document analysis.

Throughout the research process, measures are taken to ensure the trustworthiness and validity of the findings. This includes maintaining detailed records of the research process, engaging in reflexive practices to acknowledge and mitigate researcher biases, and seeking feedback from participants to confirm the accuracy and relevance of the findings. Additionally, member checking may be conducted to validate the interpretations of the data with participants, further enhancing the credibility of the research outcomes. The research method employed in this study is qualitative and involves the systematic collection, analysis, and interpretation of data to explore the preparedness of Indonesian cadets in multimodal transportation. Through semi-structured interviews, focus group discussions, and thematic analysis, this research aims to provide valuable insights into the knowledge and skills of cadets and inform recommendations for enhancing transportation education programs in Indonesia.

FINDINGS AND DISCUSSION

Findings

The findings of the research reveal valuable insights into the preparedness of Indonesian cadets in the field of multimodal transportation. The study focused on 50 cadets from a transportation institution in Jakarta, exploring their knowledge and skills in areas such as logistics, transportation safety, and law. The research employed qualitative methods, including semi-structured interviews and focus group discussions, to gather data, which was then analysed thematically. The findings are presented below, supported by comprehensive tables that provide a detailed overview of the cadets' preparedness.

Knowledge of Multimodal Transportation

The cadets demonstrated a strong understanding of the key concepts and principles of multimodal transportation. They were able to explain the various modes of transportation, their advantages and disadvantages, and the intermodal connections between them. The cadets also showed knowledge of relevant regulations and safety standards in multimodal transportation. Overall, their knowledge level was rated highly, with an average score of 8.5 out of 10.

Indicator	Valuation Technique	Value of Intensity of Importance	Score	Percentage (%)
Understanding of multimodal modes	Observation	High	9	90
Knowledge of intermodal connections	Interview	High	8	80
Familiarity with regulations	Focus Group	Medium	7	70

Skills in Multimodal Transportation

In terms of skills, the cadets demonstrated proficiency in several key areas. They were able to effectively plan and coordinate multimodal transportation operations, demonstrating good organisational skills. The cadets also showed strong communication skills, which are essential for coordinating activities across different modes of transportation. However, there were some areas where improvement is needed, such as problem-solving skills in challenging transportation scenarios.

Indicator	Valuation Technique	Value of Intensity of Importance	Score	Percentage (%)
Planning and coordination of transportation	Observation	High	8	80
Communication skills	Interview	High	9	90
Problem-solving in transportation scenarios	Focus Group	Medium	6	60

Adaptability to Emerging Trends and Technologies

The cadets showed a moderate level of adaptability to emerging trends and technologies in multimodal transportation. While they were aware of these developments, they expressed a need for further training and education to fully understand and utilise them. The cadets recognised the importance of continuous learning and professional development in keeping pace with the evolving transportation landscape.

Indicator	Valuation Technique	Value of Intensity of Importance	Score	Percentage (%)
Awareness of emerging trends	Observation	High	7	70
Ability to utilise new technologies	Interview	Medium	6	60
Willingness to learn and adapt	Focus Group	High	8	80

Overall Preparedness

Overall, the cadets demonstrated a high level of preparedness in multimodal transportation. They showed a strong foundation of knowledge and skills, coupled with a willingness to learn and adapt to emerging trends and technologies. However, there are areas where improvement is needed, particularly in problem-solving skills and the ability to utilise new technologies. The findings suggest the importance of continuous education and training to ensure that Indonesian cadets remain competitive in the global transportation industry.

Critical Analysis

The findings of the research highlight the strengths and weaknesses of Indonesian cadets in the field of multimodal transportation. The cadets demonstrated a strong understanding of key concepts and principles, indicating that the educational programs at the transportation institution in Jakarta are effective in imparting knowledge. However, there are areas where improvement is needed, particularly in problem-solving skills and the ability to utilise new technologies.

The research also revealed the importance of continuous learning and professional development in the transportation industry. The cadets recognised the need to stay abreast of emerging trends and technologies, highlighting the dynamic nature of the transportation landscape. This suggests that educational programs need to be adaptable and responsive to changes in the industry to ensure that graduates remain competitive. By identifying areas for improvement, the research contributes to the ongoing development of transportation education programs in Indonesia. It underscores the importance of equipping future professionals with the knowledge and skills needed to succeed in the rapidly evolving transportation industry.

Discussion

The findings of the research provide valuable insights into the preparedness of Indonesian cadets in the field of multimodal transportation. This discussion delves deeper into the implications of the findings, highlighting the strengths and weaknesses of the cadets and addressing the broader implications for transportation education in Indonesia.

The research revealed several strengths among Indonesian cadets, particularly in their knowledge and understanding of multimodal transportation. The cadets demonstrated a strong grasp of key concepts and principles, indicating that the educational programs at the transportation institution in Jakarta are effective in imparting foundational knowledge (Berg, 2013; Meyer, 2016). Their ability to explain the various modes of transportation, intermodal connections, and relevant regulations reflects a solid understanding of the complexities of multimodal transportation systems. This suggests that Indonesian cadets are well-equipped to navigate the diverse challenges of the transportation industry and contribute to its continued growth and development.

Furthermore, the cadets exhibited proficiency in certain skills essential for successful transportation management. Their ability to plan and coordinate transportation operations demonstrates a high level of organisational skills, which are crucial for ensuring the smooth flow of goods and passengers across different modes of transportation. Additionally, their strong communication skills enable effective collaboration and coordination among stakeholders, essential for the efficient operation of multimodal transportation systems. These strengths position Indonesian cadets favourably within the global transportation landscape, highlighting their potential to excel in various roles within the industry.

Despite their strengths, the research identified several areas where Indonesian cadets could improve their preparedness in multimodal transportation. One notable area is problem-solving skills, particularly in challenging transportation scenarios. While the cadets demonstrated proficiency in planning and coordination, they showed less confidence in their

ability to address unexpected challenges that may arise during transportation operations. This suggests a need for additional training and education to enhance their problem-solving abilities and better prepare them for real-world situations.

Additionally, the research highlighted a moderate level of adaptability to emerging trends and technologies among Indonesian cadets. While they were aware of these developments, they expressed a need for further training and education to fully understand and utilise them. In today's rapidly evolving transportation landscape, where digitalisation, automation, and sustainability are becoming increasingly important, it is essential for transportation professionals to stay abreast of emerging trends and technologies. Therefore, educational programs need to incorporate more comprehensive training on these topics to ensure that Indonesian cadets remain competitive in the global marketplace.

Implications for Transportation Education

The findings of the research have several implications for transportation education in Indonesia. Firstly, they underscore the importance of continuous education and professional development in the transportation industry. As the sector continues to evolve, it is essential for transportation professionals to engage in lifelong learning to stay abreast of emerging trends and technologies. Therefore, educational programs need to be adaptable and responsive to changes in the industry, providing opportunities for cadets to enhance their knowledge and skills throughout their careers.

Secondly, the research highlights the need for a more holistic approach to transportation education, encompassing not only technical knowledge but also critical thinking, problem-solving, and adaptability. While the cadets demonstrated proficiency in certain technical skills, such as planning and coordination, there is a need to foster a more robust set of competencies to prepare them for the diverse challenges of the transportation industry. This may involve incorporating more practical, hands-on training, as well as opportunities for interdisciplinary learning to foster creativity and innovation.

Finally, the findings suggest a need for closer collaboration between educational institutions, industry stakeholders, and government agencies to ensure that transportation education programs align with the needs of the industry. By working together, these stakeholders can identify emerging trends and technologies, anticipate future skills requirements, and develop educational programs that equip Indonesian cadets with the knowledge and skills needed to succeed in the rapidly evolving transportation landscape.

RECOMMENDATION

Based on the findings and discussion of the research, several suggestions and recommendations emerge to enhance the preparedness of Indonesian cadets in the field of multimodal transportation. These suggestions aim to address the identified areas for improvement and ensure that educational programs align with the evolving needs of the transportation industry.

1. Enhance Problem-Solving Skills

One of the key recommendations is to prioritise the development of problem-solving skills among Indonesian cadets. This can be achieved through the integration of practical, hands-on training exercises that simulate real-world transportation scenarios. These exercises should challenge cadets to think critically, analyse complex situations, and develop innovative solutions to address transportation challenges. Additionally, incorporating case studies and interactive learning activities can provide cadets with opportunities to apply theoretical knowledge to practical problems, further enhancing their problem-solving abilities.

2. Incorporate Training on Emerging Technologies

Given the increasing importance of emerging technologies in the transportation industry, it is essential to incorporate training on these topics into educational programs. This may involve introducing courses or modules on topics such as digitalisation, automation, and sustainable transportation practices. Additionally, providing access to state-of-the-art technology and simulation tools can allow cadets to gain hands-on experience with emerging technologies, preparing them for the realities of modern transportation operations.

3. Foster Collaboration and Interdisciplinary Learning

To prepare cadets for the diverse challenges of the transportation industry, educational programs should foster collaboration and interdisciplinary learning. This can be achieved by incorporating group projects, team-based assignments, and collaborative research initiatives that require cadets to work together across disciplines. By engaging with peers from different backgrounds, cadets can gain valuable insights and perspectives, developing their communication, teamwork, and leadership skills in the process.

4. Provide Continuous Professional Development Opportunities

To ensure that Indonesian cadets remain competitive in the global transportation industry, it is essential to provide continuous professional development opportunities throughout their careers. This may involve establishing partnerships with industry stakeholders to offer internships, apprenticeships, and mentorship programmes that provide cadets with practical experience and industry insights. Additionally, offering continuing education courses

and certifications can allow cadets to stay abreast of emerging trends and technologies, further enhancing their skills and knowledge.

5. Strengthen Industry-Academia Collaboration

Close collaboration between educational institutions, industry stakeholders, and government agencies is critical to ensuring that transportation education programs align with the needs of the industry. To strengthen these partnerships, educational institutions can establish advisory boards comprised of industry experts who provide guidance on curriculum development, industry trends, and skills requirements. Additionally, industry-academia collaboration can be facilitated through joint research projects, industry-sponsored scholarships, and guest lectures by industry professionals, providing cadets with valuable industry exposure and networking opportunities.

6. Evaluate and Update Curriculum Regularly

Educational programs should be regularly evaluated and updated to ensure that they remain relevant and responsive to changes in the transportation industry. This may involve conducting periodic reviews of curriculum content, instructional methods, and learning outcomes to identify areas for improvement and innovation. Additionally, soliciting feedback from cadets, alumni, industry partners, and other stakeholders can provide valuable insights into the effectiveness of educational programs and inform future curriculum revisions.

7. Promote Lifelong Learning and Professionalism

It is essential to instil a culture of lifelong learning and professionalism among Indonesian cadets. Educational programs should emphasise the importance of ongoing self-improvement, professional development, and ethical conduct in the transportation industry. This can be achieved through the incorporation of ethics training, professional development seminars, and opportunities for reflective practice that encourage cadets to continuously evaluate and refine their skills, knowledge, and professional values.

CONCLUSION

This research sheds light on the preparedness of Indonesian cadets in the field of multimodal transportation, highlighting both strengths and areas for improvement. The findings reveal that Indonesian cadets demonstrate a solid understanding of key concepts and principles in multimodal transportation, coupled with proficiency in certain skills such as planning and coordination. However, there are areas where improvement is needed, particularly in problem-solving skills and adaptability to emerging trends and technologies. These findings underscore the importance of continuous education and professional

development in the transportation industry, as well as the need for a more holistic approach to transportation education in Indonesia. Moving forward, it is essential to prioritise the development of problem-solving skills among cadets and incorporate training on emerging technologies into educational programs. Additionally, fostering collaboration and interdisciplinary learning, providing continuous professional development opportunities, strengthening industry-academia collaboration, evaluating and updating curriculum regularly, and promoting lifelong learning and professionalism are crucial steps towards enhancing the preparedness of Indonesian cadets. By implementing these recommendations, educational institutions can better prepare cadets for success in the dynamic and competitive global transportation industry, ultimately contributing to the continued growth and development of the transportation sector in Indonesia.

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