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Challenges of the Digital Adoption Gap in mobility Aspect Account Based Ticketing Program for Achieving Sustainable Transportation in Jakarta Metropolitan Area

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Abstract: This study is explore the digital adoption gap in implementing special trial Account-Based Ticketing in the JakLingko integrated public transport system in the Jakarta Metropolitan Area. This research seeks to identify the adoption gap in users, regulators, and public transport operators; formulate inclusion design strategies; and provide a plan for implementation supporting sustainable urban mobility. A qualitative case study research approach was used by employing literature review, document analysis, and semi-structured interviews with regulators, operators, transport specialists, advisory bodies, ex-operating executives, and users. The results indicate that the adoption gap was not due to the user's digital literacy or the application usability, but was largely caused by fragmented governance, operators, parallel ticketing programs, device acceptance, and lack of interoperability across different transport modes. In addition, evidence from the user group reveals that the account based ticketing would not be able to become the main access medium unless it is continuously accepted in services like MikroTrans and non-bus rapid transport systems Transjakarta. The study concludes that the special trial for Account Based Ticketing should be considered part of public mobility infrastructure which needs strong governance, hybrid access, interoperability, assisted adoption, and data privacy management.

Keywords: Account Based Ticketing, special trial, digital adoption gap, JakLingko system, integrated transport, sustainable mobility.

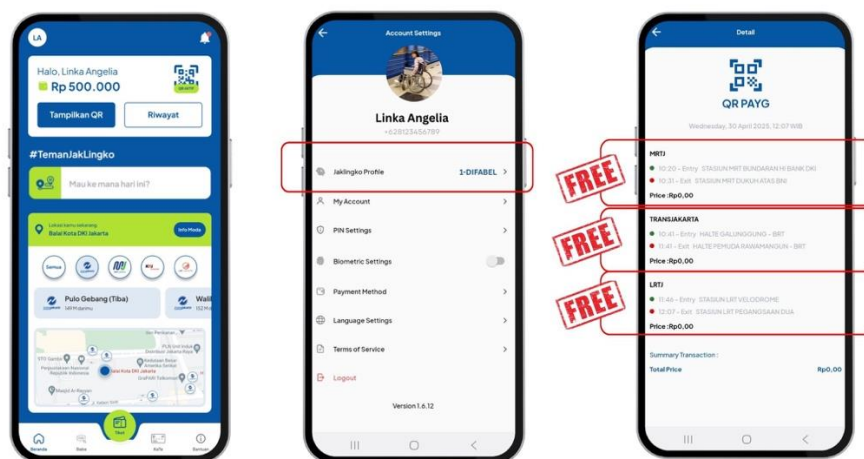
INTRODUCTION

Public transport digital transformation has emerged to be one of the critical issues in public transport reforms especially in big cities facing traffic jams, air pollution, high mobility demand, and need for more efficient service provision. In the Jakarta Metropolitan Area, public transport digitalization will bring improvements in terms of service quality, payment convenience, transparency, and evidence-based transport planning. Concerning liveability, Jakarta aims at becoming a sustainable and liveable city through the development of its infrastructure and the establishment of systems of sustainable mobility. There are some specific objectives concerning the reduction of congestion, pollution, and an efficient transportation

system (Ajie A. et al., 2024). Jakarta is implementing JakLingko transport ecosystem that integrates payment systems, fare systems, and data reconciliation across public transport operators. Some of the innovations include Account Based Ticketing (PT JakLingko Indonesia, 2025). Account Based Ticketing is an innovative solution that transforms access to public transport from physical card-based transactional model to account-based digital access . With this system, user identification, travel entitlement, fare information, transaction history, and subsidization qualification will be connected with verified user accounts.

It is important to note that Account Based Ticketing is relevant to the issue of integrated and sustainable urban mobility (Martínez GIL & Corbi VALLEJO, 2024). Integration of transport services means that the ticketing process is not only related to payments, but also to the connection between users, operators, lines, fare system, subsidization system, and mobility data. Integrated ticketing could help reduce transfer barriers, improve user convenience, subsidization targeting, and transport planning. It fits into the concept of integrated transport that involves five types of integration – modal, institutional, social, economical and environmental for the purpose of seamless public transport service provision (Potter & Skinner, 2000). Such an approach is in line with the architecture of the account based system of the UTP where information regarding travel rights, transactions, and fares regulations is stored at the back office side, rather than in the card itself or mobile application alone (UITP, 2020).

However, transition from card-based ticketing to account-based digital access creates policy-technology paradox. First, digitalization helps improve security, reduce frauds, increase accountability of subsidization, and transparency. On the other hand, fast migration to digital technologies poses some risks of exclusion for the population that are not prepared to use application-based services, like elderly people, people with disabilities, poor population, and fifteen groups of beneficiaries of free public transport services (García-Pardo et al., 2021). According to Technology Acceptance Model, the use of technology is associated with perception of its usefulness and ease-of-use (Davis, 1989). Besides, there are other factors like governance, operator alignment, interoperability, trust, infrastructure readiness, and public communication.



Source: Company Profile PT JakLingko Indonesia

Figure 1. Account Based Ticketing (ABT) User-Account for 15 Special Category Profile Interface on JakLingko Application

Table 1. Analytical constructs used in the article

Construct	Definition in this study	ABT relevance
Perceived Usefulness (PU)	The extent to which stakeholders believe ABT improves mobility, subsidy targeting, convenience, and data-driven planning.	Explains why users, regulators, and operators value ABT.
Perceived Ease of Use (PEOU)	The extent to which ABT is easy, fast, predictable, and supported at the point of travel.	Explains user reliance on QR speed, top-up clarity, balance display, and assistance.
System Integration Quality	Compatibility across operators, gates, readers, payment channels, settlement, and data standards.	Determines whether ABT is experienced as seamless or fragmented.
Governance Capability	Institutional authority to mandate, coordinate, finance, standardize, monitor, and enforce integration.	Explains why adoption depends on more than application design.
Inclusive Access	Ability of vulnerable users and beneficiary groups to use ABT without losing mobility rights.	Connects ABT to SDGs and the no-one-left-behind principle.
Trust and Risk Management	Confidence in data security, system reliability, disaster recovery, and public accountability.	Influences operators and users before large-scale migration.

The article explores the phenomenon of digital adoption gap within the implementation of the special trial Account Based Ticketing in the JakLingko ecosystem. The paper seeks to answer three research questions: What adoption gaps do emerge among users, regulators, and operators? How inclusive interventions can solve these gaps? What deployment strategy should be used?

METHOD

This research employs the qualitative case study research method to analyze the digital adoption gap in the implementation of Account Based Ticketing in the JakLingko public transport ecosystem in the Jakarta Metropolitan Area. The case study research method was employed owing to the complexity and multi-faceted nature of the research problem, which entails multiple actors and is impacted by technological, institutional, operational, and socio-cultural aspects (Maxwell, 2012). The research subjects also entailed the actors who are either directly or indirectly involved in Account Based Ticketing implementation. The informants included representatives of the government, public transport operators, transport experts, advisory organizations, ex-public transport operators' executives, and JakLingko Apps user. The perspective of the user included regular users and those who represent vulnerable or special beneficiary group. The research was performed in the Jakarta Metropolitan Area from December 2025 to July 2026.

Data were obtained using literature review, document analysis, and semi-structured interviews. The literature review was employed for developing a theoretical foundation based on integrated transport, digital adoption, sustainable mobility, and Technology Acceptance Model. Document analysis was performed using pertinent company documents, legislation, annual reports, and other documents pertaining to JakLingko, public transport integration, and Account Based Ticketing. Semi-structured interviews were used for gaining insight from stakeholders concerning adoption barriers, governance issues, user readiness, operator interoperability, risk management, and inclusive implementation strategies.

The primary research tool was an interview guideline developed on the basis of research questions and analytical framework. The research questions pertained to the digital mobility strategy, perceived usefulness, perceived ease of use, policy support, operator readiness, system integration, user experience, data security, and inclusive access. Collected data were analyzed using thematic analysis involving identification of patterns from stakeholder

perspectives. The results were then interpreted using Technology Acceptance Model, PESTLE analysis, root cause analysis, and change management rationale.

RESULTS AND DISCUSSION

In this section, the results of the study are presented based on thematic analysis of the stakeholder interviews, document review, and interpretation through the lens of Technology Acceptance Model (TAM), integrated transport theory, PESTLE analysis, root cause analysis and change management principles. TAM from an individual level acceptance theory to a public mobility ecosystem approach, where the perception of usefulness and perception of ease of use determine the acceptance of the users to adopt ABT technology, its usage will be dependent on the governance, inter-operability of the operators, infrastructure homogeneity, inclusivity, and trust in the systems. In the PESTLE analysis, the environmental factors influencing adoption will be identified, and through the Root Cause Analysis approach, observed problems by the users will be traced to the governance and inter-operability challenges. The Change Management approach will then be used to implement solutions. In line with the structure of the thesis, the discussion is organized according to empirical data profile, thematic findings, explanation of the adoption gap, solution proposal and research question answers. Empirical data suggest that the digital adoption gap in case of Account Based Ticketing is linked not only to user digital literacy, but also to governance, interoperability of operators, infrastructure readiness, user experience and trust to the system.

The empirical data was collected during the stakeholder interviews with different stakeholders in the JakLingko ecosystem. These included policy leadership perspective, regulatory perspective, public transport operators, transport experts, advisory institutions, previous executives of operators and users of the JakLingko app. The respondents provide an overall perspective of Account Based Ticketing implementation from the institutional, operational, technological and user perspectives. The main conclusion of the research is that Account Based Ticketing has a great strategic significance since it enables to introduce integrated fares, subsidization of selected trips, travel data management, accountability of subsidies and sustainable planning of transportation. However, these benefits are possible only in case of ecosystem-wide implementation.

Table 2. Participant Profiles

Code	Stakeholder Category	Position or Institutional Role	Relevance to ABT
R1	Regulator	Head of Jakarta Transportation Agency	Policy authority and system direction
O1	Operator	MRT Jakarta Operations Director	Public transport operator readiness for ABT implementation
E1	Expert	President of ITS Indonesia	Smart mobility and integration
A1	Advisory body	Chair of DTKJ	Public oversight and user advocacy
F1	Former executive	Former Governor of DKI Jakarta	Strategic public transport integration vision
F2	Former executive	Former President Director of TransJakarta	Governance and operator alignment
U1	User	Regular commuter	Application experience
U2	User/beneficiary	Special-beneficiary perspective	Inclusion and reader acceptance

Table 3. Summary Stakeholder Findings

No.	Respondent group	Role in ABT ecosystem	Key insight used in analysis
1	Former Governor of DKI Jakarta and team	Public transport vision and policy	Integration should cover route, physical, fare, subsidy, and governance dimensions; cards remain necessary during transition.
2	Head of Jakarta Transportation Agency	Regulator and policy leader	ABT is a public policy instrument for integrated, transparent, and data-driven mobility, technology must serve public policy.
3	MRT Jakarta Operations Director	Operator perspective	MRT commit to supports ABT multimodal but also plan develops its own single-mode ABT co-exist, concerning risks include data security, continuity, and need governance clarity on direction.
4	President of ITS Indonesia	Smart mobility expert	ABT should be a strategic integration layer, main challenge is institutional integration, not technology alone.
5	Chair of DTKJ	Public advisory and user advocacy	JakLingko integrated needs stronger institutional authority, user socialization also creative marketing for user acceptance, and full Jabodetabek integration entity are essential (for agglomeration).
6	Former President Director of TransJakarta	Former operator executive	JakLingko and ABT require governance, ownership, buy-in, and reduction of sectoral ego across operators.
7	ABT user - regular commuter	Direct user experience	ABT QR is easy, fast, and practical when working, but when QR loading, balance display, and top-up limited Source of Fund can affect repeated use.
8	ABT user – special categories beneficiary perspective (15 golongan)	Direct user experience	ABT QR is useful as an alternative, but meet inconsistent reader acceptance in TJ Non-BRT and MikroTrans services creates hesitation to use.



Source: Company Profile PT JakLingko Indonesia

Figure 2. Ticket validation through JakLingko's Integrated fare infrastructure at MRT Jakarta

However, perceived ease of use is relatively low because of QR speed, top-up process from Source of Fund (SoF), balance display, device compatibility, and availability of the service. To put it simply, considering the TAM model, the results mean that the perception of ease of use is low in case of Account Based Ticketing while the perception of usefulness is relatively high. In this way, the current study contributes to the development of the theory as it suggests that in case of public transportation technology adoption and acceptance is an

ecosystem issue, which includes user perception, operator alignment, regulatory/policy frameworks, readiness of the infrastructure, trust, and governance.

The PESTLE analysis confirms the above-mentioned conclusions since it proves that there are many factors related to the adoption of Account Based Ticketing technology, which include political, economic, social, technological, legal, and environmental aspects. Politically, it will require strong leadership and mandate of adoption. Economically, it will help to target subsidies and will require investment into infrastructure, cybersecurity, and assistance. Socially vulnerable users will require assisted onboarding and accessibility of communication in public transport. Technologically, the system will have to provide high QR performance, compatibility of the readers, availability of the service, and data integration. Legally, the technology will have to ensure the protection of personal identity of the passenger, payment data, trips, and subsidizes. Environmentally, it will help to increase sustainable mobility in Jakarta only if it enhances the attractiveness and the modal shift to public transport.

Root-cause analysis proves that the fragmented governance is an upstream cause for the adoption gap. Technology performance can be improved via product development, while user literacy can be increased via socialization. However, interoperability, standards, and data sharing are issues related to the authority, and hence, the solution to the problem lies in governance reform through the means of operator interoperability, user-oriented design, assisted onboarding, cybersecurity, and performance monitoring.

Thus, in connection to the above-mentioned conclusions and based on the findings of the current research, the present paper proposes a new Inclusive Account Based Ticketing Adoption and Governance Framework including the following seven pillars: regulator-led mandate, integrator authority, single account layer with hybrid access, interoperability by design, privacy and cybersecurity governance, assisted adoption and public communication, and performance dashboard linked to sustainable mobility outcomes. The framework provides the answers to the three research questions of this paper as it helps to diagnose the gap, suggest interventions, and adopt the deployment strategy.

To conclude, it can be stated that the results of the current research answer to the problem statement of this article. Firstly, the digital adoption gap exists on the level of users, operators, system, and governance. Secondly, it can be solved with the help of hybrid access, assisted onboarding, simplification of the design of the application, tokenized account-based card, interoperability standards, and enhanced governance. Finally, the best way of adopting Account Based Ticketing is the phased, regulator-led, hybrid, and account-based strategy, which involves the prerequisites of management buy-in, common standards, risk mitigation, data protection, and continuous public communication. Thus, digital Account Based Ticketing in Jakarta should be regarded as public mobility infrastructure, not technology.

CONCLUSION

In conclusion, the adoption gap in the case of implementation of special trial Account Based Ticketing in the JakLingko ecosystem cannot be analyzed solely through the lens of users' digital literacy and app. As it is specified in the title of the article, the issue that is discussed herein concerns how Account Based Ticketing can be adopted in an inclusive way in order to ensure sustainable transport in the Jakarta Metropolitan Area. According to the research, there is an adoption gap on such levels as users, public transport operators, system infrastructure, and institutional governance. In terms of users, the adoption gap is expressed in practical aspects related to loading of the QR code, display of the balance, way to topping up, use of the device, and use of a physical card. The adoption gap occurs because of different of priority, interests, old systems, readiness, and parallel ticketing initiatives. On the institutional governance level, the adoption gap is related to fragmented authority, incomplete interoperability, and inadequate mandate for integration.

It can be said that the current research responds to the first research question since the problem of adoption gap is identified as institutional, rather than technical. Even though users would adopt the Account Based Ticketing system if it were quick and reliable and always accepted, in reality, the rate of adoption is low due to devices reader providing inconsistency different experiences to users. The second research question is answered by giving some recommendations concerning the design of a solution, such as hybrid account-based model, assisted onboarding, simplicity of application flow, tokenized access to a card, and public communication. The third research question is answered by suggesting a phased and regulated deployment of the solution with the help of operator alignment, interoperability standards, data security, risk management, and performance monitoring.

The contribution of the current study is in the broadening of the analysis of digital adoption in relation to public transport from the users' perspective to the ecosystem perspective. Account Based Ticketing should be considered not as a digital payment system, but as public mobility infrastructure. The success of this infrastructure will be determined by the problems of shared governance, operator commitment, technology, inclusiveness and accessibility, and public trust. Regarding Jakarta, the digital transformation of this city should be helpful to its users and contribute to subsidy accountability, fare integration, data governance, and sustainable transport planning (Samirin, W. 2026). Thus, the proposed improvement of the current situation is JakLingko as an integration platform for federated Account Based Ticketing ecosystem.

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