

# Governance Network Approach: Tackling Abandoned Vehicles by Local Governments in Klang Valley, Malaysia

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## Abstract

End-of-life vehicle (ELV) management is increasingly vital as the expanding automotive industry faces rising global demand, leading to a growth in ELVs. Malaysia faces a significant issue with abandoned vehicles (AVs) due to the lack of legislation regulating ELV waste management. Countries like Japan and those in the EU have well-established ELV management policies. ELV recycling systems are a growing research area, particularly in Korea, Taiwan, and China. This paper extends the existing literature on governance networks by applying an interpretative framework to analyze the role of local governments in managing AVs, particularly ELVs, in Malaysia. This study delves deeper into governance network theory by exploring local authorities' practical challenges, such as insufficient legal frameworks, unclear policies, and low public awareness, rather than focusing solely on broad stakeholder coordination. By addressing the gap between theoretical governance models and the real-world experiences of local governments, this research offers a more nuanced and context-specific approach to ELV management. The findings contribute to developing a comprehensive governance framework that enhances policy coordination, improves stakeholder collaboration, and offers actionable solutions to the growing challenges of ELV disposal in Malaysia. This research advances governance network theory and provides practical insights for improving ELV management in developing countries.

**Keywords:** Local Governments, Governance Network, Abandoned Vehicle, End-of-Life Vehicles (ELV), Sustainable Management

## Introduction

Disposing of ELVs poses significant environmental challenges, as the recycling and disposal release pollutants. These pollutants, including heavy metals, contribute to climate change, resource depletion, and other environmental issues (Wang et al., 2024). Malaysia

currently lacks comprehensive legislation and formal recycling policies for managing ELVs, leaving the management of ELVs underdeveloped (Jamaluddin et al., 2022; Mohamad-Ali et al., 2024). In contrast, countries like Japan and Korea have established effective ELV management systems (Ali, Simic et al., 2023; Jamaluddin et al., 2022). The absence of specific ELV laws in Malaysia has resulted in challenges, including abandoned vehicles and insufficient volumes of ELV components for remanufacturers (Mohamad-Ali et al., 2024).

Local governments enforce current regulations for handling abandoned vehicles (AVs) in Malaysia, governed by Act 133 (Street, Drainage And Building Act - Section 46, 1974), Act 333 (Road Transport Act 1987-Section 48, 1987), and the 2020 ministerial guidelines as shown in Figure 1 (Guidelines for the Management of Abandoned Vehicles in Local Authority Operational Areas, 2020).

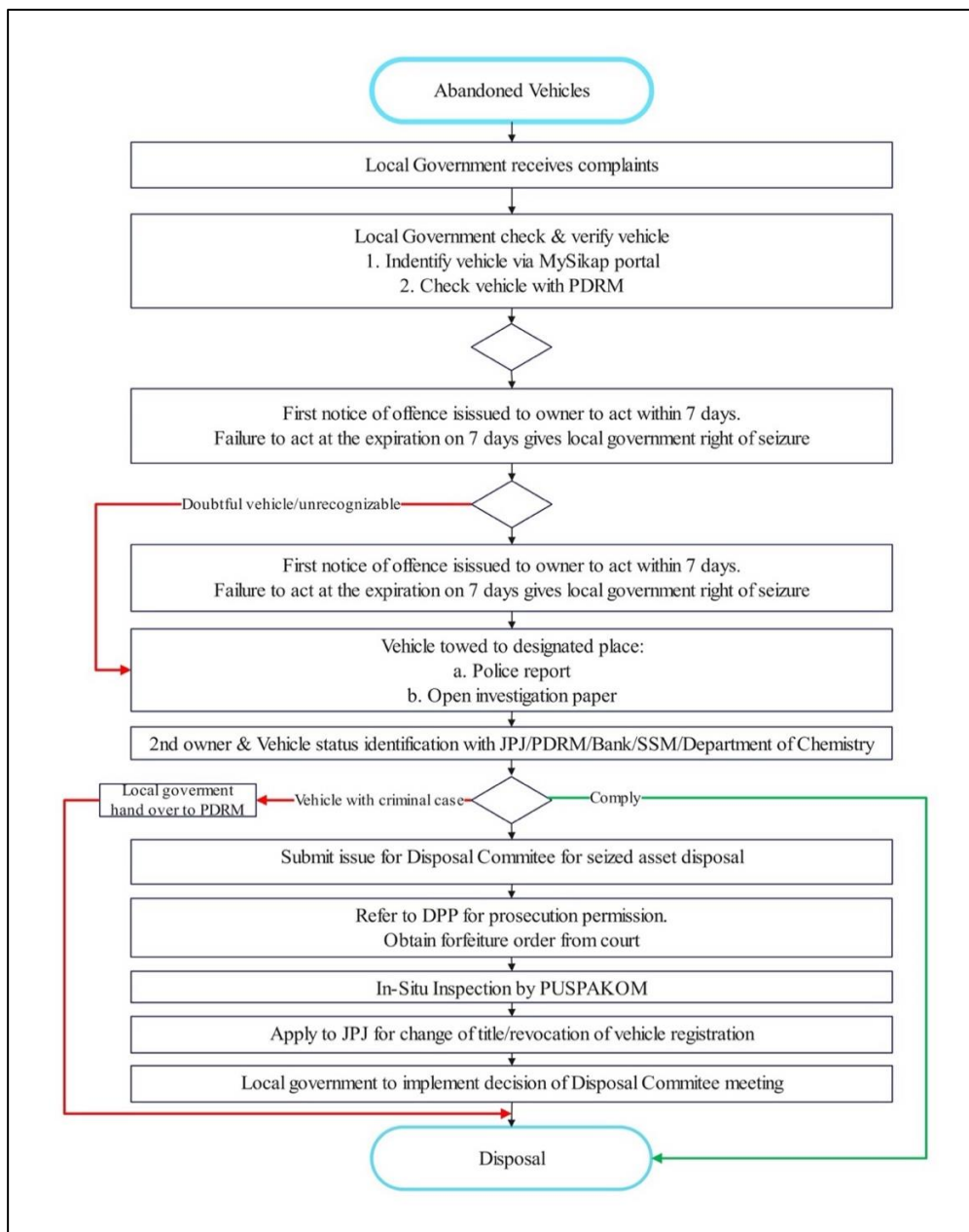


Figure 1: Abandoned Vehicle Management Guidelines (Ali, Simic, et al., 2023)

However, local governments in Malaysia face significant challenges in managing abandoned vehicles due to limited legislative powers, inadequate resources, and insufficient public awareness. The current provisions do not grant local governments the authority to effectively deregister and dispose of these vehicles, increasing to abandoned units (Sulaiman et al., 2023). Regional differences in population density, urbanization levels, and local enforcement capabilities create challenges that impact the prevalence and management of abandoned vehicles.

Abandoned vehicles significantly contribute to environmental degradation by releasing heavy metals and other toxic substances into soil and water systems, harming local ecosystems (Miner et al., 2024). The tyres from these vehicles are particularly problematic, serving as a significant source of microplastics and chemical pollutants, including heavy metals such as zinc and titanium. These substances pose chronic toxicity risks to aquatic life, potentially exceeding environmental safety limits (Mayer et al., 2024). Furthermore, releasing particulate matter and potential toxic elements (PTEs) from abandoned vehicles can have severe health consequences for nearby populations, leading to respiratory and cardiovascular issues (Ali et al., 2019). The chemical leachates from tyre particles are especially concerning due to their ability to penetrate biological systems, causing adverse health effects, including reduced lung function and an increased mortality risk (Boisseaux et al., 2024).

Current policies and interventions are insufficient to mitigate abandoned vehicles' pollution and health risks. The scale of contamination requires more comprehensive management strategies that address environmental and human health impacts (Miner et al., 2024). In addition to being a public health threat, abandoned vehicles underscore broader systemic issues in waste management and pollution control. Tackling these challenges will require coordinated policy efforts and innovative approaches to mitigate the adverse effects of vehicle abandonment on ecosystems and public health.

In Malaysia, the absence of clear standards for the proper management of ELVs has significantly contributed to the rising number of AVs. Without established guidelines, the likelihood of improperly managed vehicles increases, creating a substantial financial burden on local governments. The lengthy and complex administrative process required to deregister and dispose of abandoned vehicles further exacerbates this burden (H. M. Ali, Simic, et al., 2023). The lack of a streamlined system not only prolongs the management process but also drains public resources, diverting attention and funds from other critical areas of governance. These challenges, including the growing financial strain and operational inefficiencies faced by local authorities, prompted this study to explore solutions for improving the management of ELVs and abandoned vehicles in Malaysia.

Governance network theory offers a suitable framework for understanding the relationship between local and central governments because it captures the complexity and dynamics of their interactions (Molin & Masella, 2016). It comprehensively analyses how governmental entities collaborate, share resources, and make collective decisions. This framework effectively addresses challenges from fragmented governance structures and highlights the importance of coordinated policy responses.

Governance network theory underscores the interactions between local and central governments through mandated networks designed to address complex societal issues. Central governments typically establish the framework and expectations for collaboration, while local governments adapt these mandates to their specific contexts, fostering localized solutions. This interaction often results in a reciprocal influence, where local innovations can inform and shape central policies, creating a feedback loop that enhances overall governance effectiveness. However, differences in institutional logic between central and local governments may pose challenges to seamless collaboration, necessitating strategies to align objectives and promote cooperation across various levels of government (Krogh, 2022).

Central governments frequently mandate governance networks to encourage collaboration on complex issues. For instance, vertical and horizontal collaborations in China are vital for addressing environmental governance (Yi et al., 2019). With their deep understanding of community needs, local governments can play a critical role in influencing national strategies, particularly during crises and evident during the COVID-19 pandemic, where local input in cities like Liverpool helped shape central policies (Atkinson & Sheard, 2022). Governance networks, particularly during crises, face challenges such as mutual trust and transparency, which can strain central-local relations (Atkinson & Sheard, 2022).

Nonetheless, local governments can leverage their unique understanding of local conditions and community needs to enhance their role within governance networks. Even amid the challenges, local governments have the potential to assert their influence effectively and contribute to the development of responsive, tailored solutions (Atkinson & Sheard, 2022). While governance network theory emphasizes collaboration, the reality often involves balancing central control with local autonomy. Factors such as crisis management, regulatory frameworks, and the capacity of local governments to assert their influence shape the dynamics of these networks within the broader governance structure.

Ojo & Mellouli (2018) develop a comprehensive conceptual framework for governance networks, which serves as a tool to describe and analyse the various structures and strategies employed within these networks. The framework focuses on critical elements such as network design, which organizes the flow of information and resources, and information technology enablers, facilitating stakeholder collaboration and communication. Additionally, the framework emphasizes the importance of human capital, highlighting the skills, knowledge, and capabilities necessary for effective governance and performance integration, ensuring that all network components work together to achieve common goals.

Ojo & Mellouli (2018) apply this conceptual framework to analyse six case studies carefully selected to demonstrate the operation of governance networks in diverse settings. The authors apply the framework to examine how different networks design their operations, integrate technological solutions, manage human resources, and align performance metrics with strategic objectives. These case studies provide a rich set of insights into how governance networks function in practice, highlighting the adaptability of these networks in various contexts.

The case studies analysed reveal the strengths and weaknesses of governance networks across multiple sectors and regions. These studies demonstrate that effective

design and management of governance networks can significantly enhance cooperation and decision-making. However, they also uncover challenges such as coordinating diverse stakeholders with varying interests, leveraging technology effectively, and maintaining sustained human capital development. Ojo & Mellouli (2018) framework not only highlights the efficacy of governance networks in addressing these challenges and offers practical recommendations for improving their performance across different contexts.

According to the findings, governance networks are particularly well-suited to address societal challenges by integrating diverse actors, fostering innovation, enhancing citizen participation, leveraging technology, and building trust among stakeholders. By bringing together government agencies, private sector entities, and civil society, governance networks create a collaborative platform that allows for pooling resources and perspectives. This collaborative approach enables governance networks to develop innovative solutions tailored to modern societies' complex and multifaceted needs. In this way, governance networks provide a flexible and effective means of tackling societal problems by fostering cooperation, innovation, and inclusivity. Governance networks also play a crucial role in promoting citizen participation, creating opportunities for individuals and communities to engage actively in decision-making. This engagement ensures that policies and initiatives reflect the needs of the public but also helps build legitimacy and trust in governance processes. Furthermore, governance networks utilize technology to streamline communication, coordinate efforts, and improve transparency, making it easier for stakeholders to collaborate efficiently.

Building stakeholder trust is another critical advantage of governance networks (Picavet et al., 2023). By fostering open dialogue and cooperation, these networks reduce barriers to collaboration and create a shared sense of responsibility among actors (Sørensen & Torfing, 2017). This collaborative approach, combined with the flexibility of governance networks, makes them essential for addressing the complex and interconnected issues modern societies face, such as environmental degradation, public health crises, and social inequality.

Governance network theory directly relates to local government management of ELVs by emphasizing the integration of multiple stakeholders, including public agencies, private entities, and the community, to collaboratively address complex issues such as ELV disposal (Mosley & Jarpe, 2019). Local governments can leverage governance networks to enhance coordination, share resources, and develop innovative solutions for ELV management. By bringing together diverse actors, these networks allow local governments to pool expertise, streamline processes, and improve the efficiency of ELV disposal and recycling.

In the context of ELV management, governance network theory supports the idea that local governments should not operate in isolation but instead collaborate with car manufacturers, recycling industries, and environmental agencies to create a holistic approach (Jamaluddin et al., 2022). This collaboration fosters innovation, as stakeholders bring different perspectives and technological capabilities to improve recycling methods and reduce the environmental impact of ELVs. Furthermore, governance networks promote citizen participation, encouraging local communities to engage in voluntary ELV surrender programs, thereby enhancing compliance and public awareness of sustainable vehicle disposal practices.



By applying governance network theory, local governments can more effectively address the challenges posed by ELV management, such as limited resources and regulatory gaps. These networks enable local authorities to build partnerships, increase transparency, and create stakeholder trust, ultimately leading to more sustainable and efficient ELV management solutions.

The existing literature on governance networks primarily focuses on theoretical models emphasising collaboration among various stakeholders to address complex societal issues. However, much of this research overlooks local governments' practical challenges, particularly in developing contexts like Malaysia, where legal frameworks, policy clarity, and public awareness are often insufficient. In the context of ELV management, previous studies have primarily explored the role of national regulations and industry practices but have not adequately addressed local governments' critical role in effectively implementing ELV disposal strategies.

This research adds to the existing body of literature on governance networks and ELV management by bridging the gap between ideal governance frameworks and the real-world experiences of local authorities. While governance network theory provides valuable insights into stakeholder collaboration, this study moves beyond the theoretical application by examining the challenges local governments face in managing AVs and ELVs. Specifically, it explores how inadequate legal frameworks, ambiguous policies, and limited public engagement hinder effective ELV management.

The paper is organised as follows: Section 2 reviews the literature on ELV regulation and local government in Malaysia. Section 3 presents the basic concept of Governance Networks. Section 4 introduces the conceptual framework used to analyse the case studies described and examined in Section 5. Section 5.5 synthesizes the case analyses, while Section 6 offers concluding remarks.

## **Literature Review**

### *ELV Management*

Data from the Department of Road Transport shows that Malaysia had 31.2 million registered vehicles as of December 31, 2019 (Harun et al., 2021), while total automotive industry sales reached 529,234 units in 2020 (H. M. Ali, Simic, et al., 2023). These figures suggest a projected increase in ELVs, resulting in a vehicle-to-population ratio 1:2.25 (H. M. Ali, Simic, et al., 2023). In 2019, estimates indicated that approximately 60,000 AVs were scattered across the country (Norlin, 2021). This significant number highlights the growing issue of vehicle abandonment in Malaysia, placing a considerable burden on local authorities tasked with managing these vehicles. The sheer volume of AVs creates logistical challenges for local governments, including increased storage space, additional workforce, and financial resources to handle the disposal process. Without efficient systems for identifying, deregistering, and recycling these vehicles, the number of AVs will likely continue to rise, exacerbating environmental concerns and straining local government capacities. This estimate underscores the urgent need for comprehensive policies and coordinated efforts between local governments, national agencies, and other stakeholders to address Malaysia's growing problem of abandoned vehicles.

Malaysia's legal framework for ELV management currently focuses on AVs and operates under Act 133, Act 333, and the 2020 ministerial guidelines, with local governments responsible for executing these regulations (H. M. Ali, Simic, et al., 2023). However, the Road and Transport Department (JPJ) holds the authority for vehicle deregistration under Act 333, creating a division of responsibilities. This separation often causes extended delays, as local governments must store abandoned vehicles for prolonged periods while waiting to complete the lengthy deregistration process (Ali, Simic, et al., 2023).

The bureaucratic nature of this process burdens local authorities with additional operational costs, resource allocation challenges, and space limitations. The lack of an integrated, streamlined approach to ELV deregistration and disposal exacerbates inefficiencies within local governments and hinders their ability to address the increasing number of abandoned vehicles effectively. This situation calls for revising the legal and administrative framework to ensure faster, more coordinated action between local governments and the, ultimately reducing the strain on public resources and improving ELV management in Malaysia.

High-income countries like Japan and those in the European Union set specific recycling targets to recover and reuse a substantial percentage of ELV materials, effectively reducing landfill waste and conserving valuable resources (Numfor et al., 2021). These countries implement robust deregistration systems for tracking ELVs and preventing illegal dumping. Such systems facilitate the legal transfer of vehicles to authorized recycling facilities, ensuring compliance with environmental regulations (H. M. Ali, Simic, et al., 2023).

Authorities offer financial incentives, such as subsidies or tax breaks, to vehicle owners who surrender their ELVs to authorized recyclers, encouraging proper disposal. These incentives reduce the number of abandoned vehicles by motivating owners to dispose of them responsibly (Lin et al., 2018). The legislation mandates collaboration between manufacturers, recyclers, and government agencies to ensure compliance with recycling standards and streamline the recycling process (Andersson et al., 2017).

Public awareness campaigns and incentives play a crucial role in encouraging vehicle owners to voluntarily surrender their ELVs, significantly lowering the number of abandoned vehicles. By raising awareness about the benefits of proper disposal, these campaigns support sustainable practices in vehicle recycling (H. M. Ali, Simic, et al., 2023). Proper ELV recycling addresses the problem of abandoned vehicles and contributes to energy recovery and resource conservation, aligning with broader sustainable development goals (Petronijević et al., 2020).

However, challenges remain even in high-income countries with established ELV recycling frameworks. Ensuring the effective recycling of scarce metals and adapting recycling systems to meet local needs requires continuous improvement and innovation. These ongoing issues highlight the need for further advancements in ELV recycling practices to fully address environmental and resource conservation goals (Andersson et al., 2017).

*Local Government Governance*

Federal dominance over local governance in Malaysia significantly shapes the country's political landscape. The centralization of power has deep historical roots, with the federal system intentionally designed to maintain a strong central government. This design emerged from negotiations between the nationalist elite, the British, and traditional rulers during pre-independence (Hutchinson, 2014).

Recent studies highlight the complex nature of intergovernmental relations in Malaysia, where political alignments, formal institutions, and informal processes play significant roles in shaping these interactions (Puppim de Oliveira, 2019). One of the primary mechanisms governing intergovernmental relations is the legal framework that defines the powers and responsibilities of local governments. The Local Government Act of 1976 outlines the structure and functions of local authorities, reinforcing their subordinate position to state and federal governments (Rahman et al., 2022).

This legal framework establishes the foundational structure for the relationship between local and federal governments, often limiting local governments' autonomy and their ability to respond to local needs (Hutchinson, 2014). As the lowest tier in Malaysia's governance hierarchy, a legal structure constrains local governments, emphasizing their dependence on higher levels of authority. The central government's ability to impose mandates on local authorities adds another layer of complexity to this relationship (Nabiha & Saad, 2015). Local governments are often tasked with implementing policies dictated by the federal government, even when they lack the necessary resources or support to execute these mandates effectively.

This dynamic can lead to tensions, particularly when local authorities feel overburdened by responsibilities that exceed their capacity. The central government's dominance, coupled with the limited flexibility granted to local governments, hinders their ability to act independently and address local issues promptly and effectively. These tensions underscore the need for more balanced intergovernmental relations, where local governments are empowered with greater autonomy and resources to serve their communities better.

Local governments in developed countries coordinate with central governments through various mechanisms to achieve policy objectives. These mechanisms encompass formal and informal strategies shaped by the governmental structure, whether central or unitary and the specific policy context. The interaction between these mechanisms is essential for fostering effective intergovernmental collaboration.

Local governments utilize formal mechanisms, such as mandates and rules, to ensure long-term commitment and sustain collaboration with central governments. These formal approaches provide a structured framework for local governments, aligning their efforts with national policy objectives and offering a clear set of guidelines within which they operate (Park et al., 2021). Institutional frameworks further support these efforts by serving as macro-level structures that provide guidelines and resources, compensating for potential institutional gaps at the local level (Gartzou-Katsouyanni, 2024).



In addition to formal structures, informal mechanisms such as casual communication and ad hoc meetings are instrumental in building trust and fostering collaborative solid relationships among local government units. These informal interactions promote flexibility and adaptability in governance, allowing local governments to navigate evolving challenges effectively (Park et al., 2021). Voluntary working groups offer another layer of flexible collaboration, enabling local governments to respond swiftly to emerging policy issues and changing conditions (Park et al., 2021).

Local governments also engage in advocacy to enhance their autonomy and better address the needs of their communities, which involves crafting strategic narratives that emphasize the benefits of decentralization and the advantages of democratic proximity, which positions local governments as more responsive to community-specific challenges (Henderson, 2024). Facilitative Overarching Institutional Frameworks support decentralized cooperation, particularly in low-trust environments, by providing essential resources and leadership opportunities that empower local governments to lead initiatives effectively (Gartzou-Katsouyanni, 2024). Despite the effectiveness of these mechanisms, challenges persist, such as strained intergovernmental relations and the delicate balance between formal and informal approaches. Local governments must skillfully navigate these complexities to effectively coordinate with central governments, ensuring that policy objectives are met efficiently, equitably, and aligned with local needs.

The existing literature on ELV management in Malaysia reveals several critical research gaps this study aims to address. Much of the current research fails to fully explore local governments' vital role in managing AVs, particularly ELVs. There is a notable absence of detailed interpretative approaches that adequately capture the development and implementation of ELV management strategies in this context.

Sulaiman (2023) pointed out that despite amendments to Act 333, the legislation still lacks a comprehensive process for discarding vehicles after ownership transfers to the Director General of JPJ. This gap contributes to inefficiencies in handling abandoned vehicles. Although some studies suggest implementing an ELV policy, they do not offer concrete recommendations. The policy should outline more specific steps for implementation, identify potential challenges, and provide solutions for addressing those challenges. Mohamad-Ali et al. (2024) emphasize deregistering non-roadworthy vehicles to enhance ELV volume and promote legal spare parts markets. However, the study's model includes only a limited number of stakeholders. It should incorporate local governments, as they currently serve as the primary point for ELV retrieval. Expanding the scope to include local authorities would improve the effectiveness of ELV management strategies in Malaysia.

Ali, Simic et al. (2023) identify three key themes related to AVs and ELVs in Malaysia: reasons for abandonment, disposal procedures, and regulations. However, the literature fails to sufficiently explore local governments' experiences or public acceptance of current disposal methods, which is crucial for gaining a more nuanced understanding of the issue.

This study addresses the research gap by advocating an interpretative approach to bridge the divide between ideal and authentic experiences in managing AVs, particularly ELVs. By examining the local governments' challenges, such as inadequate legal frameworks,

unclear policies, and low public awareness, this research aims to provide a deeper understanding of ELV management complexities. This approach will help develop a more practical, context-specific framework for ELV governance, offering solutions to the challenges local governments face in Malaysia.

### *The Concept of Governance Network*

Governance improves coordination among interdependent actors, especially when dealing with societal issues. Effective governance in these situations necessitates well-organised engagement processes considering different contextual factors such as cultural, scientific, societal, economic, and political aspects to guarantee strong stakeholder involvement (Winther et al., 2020). Governance is an effort to enhance coordination among interdependent actors to address societal issues (Klijn, 2008). Environmental issues, including climate change, pollution, and deforestation, pose substantial risks to communities, economies, and overall quality of life. These challenges are deeply intertwined with social, economic, and political factors, making them complex societal concerns. Effective responses to environmental degradation necessitate a blend of policy reforms and community involvement. Research suggests that while policy frameworks establish the essential structure and allocate resources, community-based initiatives are critical in ensuring sustainable implementation and long-term success (Ding et al., 2019; Zeng et al., 2019).

According to Klijn (2008), there are four main perspectives on governance: good governance or corporate governance, New Public Management or Market Governance, multilevel governance or intergovernmental relations, and network governance. The good governance perspective emphasises the principles of effective state governance and the functioning of government. The second school of governance, known as new public management, emphasises enhancing government performance and accountability by transferring the responsibility of goal setting and implementation from the government to non-state actors. The third perspective on governance, known as inter-governmental relations or multilevel governance, emphasises utilising networks across agency boundaries and different levels of government to tackle issues. Network Governance is the fourth concept of governance discussed in this article. It involves governance within networks of both public and non-public actors, characterised by intricate processes. All four types prioritise the governance process over the government structure and its capacity limitations. In sustainability transitions, governing refers to the interactions between public and private actors working together to tackle societal challenges or opportunities (Ehnert et al., 2018).

Governance networks facilitate resource exchange and goal negotiation among independent organizations by providing structured frameworks for collaboration, resource coordination, and conflict resolution. These networks enable diverse actors to align their objectives and mobilize resources toward shared goals, particularly in complex and evolving environments (Howard et al., 2019). Governance Networks consist of participants from different levels and sectors of society, such as local, national, and global, including business, government, and civil society. Integrating diverse actors and resources strengthens the capacity to address multifaceted challenges, including environmental governance, inter-jurisdictional resource management, and complex social issues (Chaffin et al., 2024). These networks can autonomously structure themselves within limits to fulfil specific policy-making

functions, involving stakeholders in decision-making processes that range from consultations to full-fledged peer decision-making roles.

In the latter scenario, Governments assume multifaceted roles as co-participants in the policy-making process, engaging in collaboration, negotiation, and orchestration to formulate effective policies. Various factors shape these roles, including technological advancements, stakeholder engagement, and political dynamics (Goulart & Falanga, 2022). In a networked society, the social networks of non-state actors play a pivotal role in shaping governance processes by facilitating information exchange, influencing perceptions of governance models, and enabling collaboration across sectors. These networks can either enhance or impede governance effectiveness, depending on the actors' motivations, the reliability of the information disseminated, and the dynamics of interactions within the network (Reyes-Gonzalez et al., 2024).

Non-state actors like multinational corporations, NGOs, civil society groups, and experts play a crucial role in transnational governance by negotiating interconnected interests and ideas to reach shared objectives (Breslin & Nesadurai, 2018). Integrating formal governance structures with the social networks of actors in governance systems necessitates a nuanced approach that harnesses the strengths of both formal and informal mechanisms. Successful strategies require a comprehensive understanding of the dynamics of collaboration, complementarity, and the distinct roles of various actors within these networks (Chaffin et al., 2024). Leadership is crucial in governance networks, as effective leadership improves self-governance and coordination, leading to successful governance (Liu & Yang, 2019).

Developing trust among actors in governance networks is essential for enhancing decision-making and achieving favourable outcomes. Trust is a critical factor influencing the effectiveness of collaborative efforts, particularly within complex governance systems. Numerous studies underscore the importance of trust in improving procedural outcomes and fostering more effective coordination among network participants (George et al., 2024; Olausson & Nyhlén, 2017; Reyes-Gonzalez et al., 2024).

There are at least two models of Governance Networks in network organisation (Huppé et al., 2012). The first method entails direct steering by governments or centralised governance authorities. The second model emphasises governance networks as self-organising systems. Concrete governance networks are positioned on a spectrum between steering and self-regulating. From a research perspective, three dominant types of Governance Networks are Policy Networks, Service Delivery and Policy Implementation Networks, and Governing Networks (Klijn, 2008). Policy Networks concentrate on decision-making processes, outcomes, power dynamics, and agenda establishment. The network type, originating from Political Sciences, focuses on identifying key decision-makers, analysing power dynamics, and examining their impact on decision-making processes. Service delivery and policy implementation networks and governance focus on inter-organisational coordination, efficient policy and service delivery, and integrated policies. Research on Governance Networks, rooted in Organisational Sciences and Inter-organization Theory, explores strategies for efficiently coordinating complex integrated services and identifying mechanisms to facilitate this coordination. The third type focuses on addressing societal

issues, managing horizontal governance relationships, and linking Governance Networks with conventional institutions and deliberation processes. This research interest lies in managing Governance Networks and integrating them with traditional institutions, stemming from a background in Public Administration.

Designing an efficient governance network architecture for coordinating operations and facilitating information exchange necessitates thoroughly considering structural and functional components. Essential elements include the incorporation of data fusion technologies, the active participation of scientific organizations, the adoption of participatory governance models, and the establishment of core-periphery networks. These components collectively contribute to a cohesive framework that enhances communication, optimizes decision-making processes and increases the adaptability of governance networks (Ojo et al., 2011; L. Wang et al., 2023).

The design of Governance Networks encompasses the core aspects listed as follows: 1) Shared goal - the network's objective; 2) Governance - how the network's governance will be structured; 3) Administration - identification of actors and coordination within the network, 4) Delivery - processes to reach the Governance Network's goals.

### **Conceptual Framework**

We present a framework for examining Governance Networks, expanding on the ideas discussed in Section 3. The framework aims to simplify identifying, examining, and integrating patterns in the structures and strategies used in different instances of Governance Networks. This framework incorporates the concepts previously mentioned, based on Ojo & Mellouli (2018) presentation on Governance Networks. The model of Governance Networks identifies essential components as a central strategic element and four supporting elements: network design and activation, information technology enablers, human capital, and performance and integration.

The strategy element focuses on the joint and individual goals of participants in the network. Network design involves managing information and resources, such as human resources, within the network, the governance structure, and the methods used to achieve network objectives. The connecting element facilitates sharing knowledge, business processes, decision-making, client information, and workflows among partners through enabling technology. The accountability element assigns achievements, shortcomings, and emerging problems to the appropriate individuals within the network. The human capital element emphasises acquiring new skills and abilities needed in the network, especially for government officials. We can categorize the elements into two main groups: "Strategy" for the Governance Network and "Structures" needed to implement the strategy and achieve the network's goals. Ojo & Mellouli (2018) suggest that network structure is determined and shaped by network strategy based on the established relationship between organisational strategy and structure. Both network structure and network strategy play a role in achieving network goals. Figure 1 depicts these relationships.

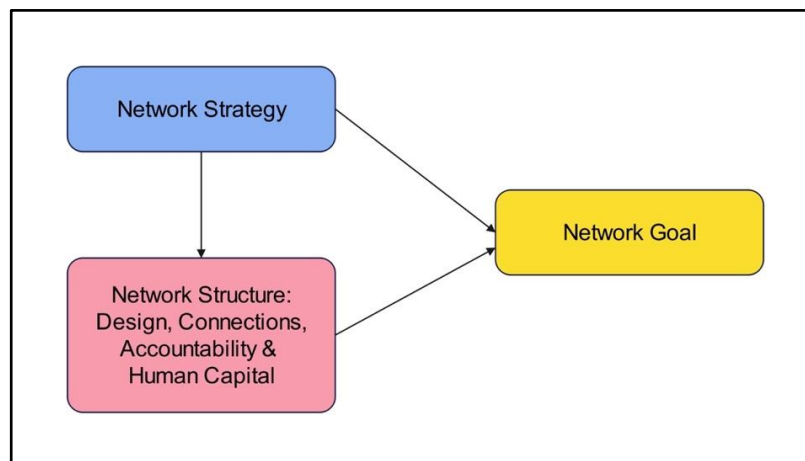


Figure 2: Conceptual model relating network strategy, structure and goals (Ojo & Mellouli, 2018)

#### *Case: Abandoned Vehicle Problem In Klang Valley, Malaysia*

We utilise the conceptual model from Section 4 to examine the Governance Networks case outlined below. Section 5.1 details the cases, Sections 5.2, 5.3, and 5.4 describe them, and Section 5.5 provides the analysis.

#### **Description**

Abandoned vehicles in Malaysia result from multiple complex factors. In Malaysia, vehicles commonly reach the ELV stage when they are deemed "total loss" following road accidents or classified as scrap cars upon reaching 25 years of age or older (Akram Khan et al., 2021). This leads to the build-up of abandoned vehicles in the entire country.

Enforcing the ELV policy is intricately connected to managing ELVs in Malaysia (Ali, Simic, et al., 2023). This policy is crucial for tackling the issues caused by abandoned vehicles in the nation. Enforcing efficient ELV policies aids in handling the increasing amount of abandoned vehicles and encourages sustainable practices in the automotive sector, which align with Malaysia's broader sustainability objectives and environmental efforts (Mohamad-Ali et al., 2024).

The Government in Malaysia has shown interest in research on ELVs, indicating a growing recognition of the significance of addressing this matter (Mohamad-Ali et al., 2024). Stakeholders in Malaysia have pinpointed factors that impact the effectiveness of ELV recovery to improve the country's ELV recovery model. Discussions regarding ELVs in Malaysia have been continuous since 2006, consistently focusing on handling ELVs.

#### *Network Goal*

A governance network is a collection of shared principles that govern the interactions between actors and the value generated within the network (Clauss & Ritala, 2023). These networks consist of interactions between different organisations or entities that collaborate to achieve shared objectives, often involving the exchange of resources and decision-making processes. Within the framework of governance networks, the interactions between individuals or organisations play a pivotal role in effectively organising tasks, exchanging knowledge, and collaboratively tackling intricate problems.

Governance networks emphasize collaboration and shared decision-making among network members to achieve objectives through coordinated actions (Vazquez-Brust et al., 2020). Within governance networks are various forms of network governance, such as collaborative decision-making coordination by leading organisations or administrative organizations, impacting, pursuing and achieving goals (Hedelin et al., 2023). The structure and management of governance networks are crucial factors in determining the effectiveness and efficiency of achieving network goals (Azeredo et al., 2024; Reyes-Gonzalez et al., 2024).

The National Automotive Policy (NAP) was implemented by the Malaysian Government in 2006 to tackle the problem with ELVs through a range of initiatives and regulations (Mohamad-Ali et al., 2018). The policy prioritises sustainable practices in the automotive industry, specifically addressing the management of ELVs to minimise their environmental impact and encourage the conservation of resources. The NAP emphasises the importance of effectively managing ELVs, including conserving natural resources and economic advantage (Mamat et al., 2018).

Nevertheless, the ELV directive in Malaysia encounters obstacles due to insufficient clarity, impeding efficient enforcement and implementation. Conversely, the EU Directive on ELVs offers explicit instructions regarding environmentally conscious dismantling, recycling techniques, and precise objectives for reusing, recovering, and recycling ELVs and their parts (Numfor et al., 2021). A lack of widespread public knowledge and approval impedes the execution of the ELV policy in Malaysia (H. M. Ali, Simic et al., 2023; Harun et al., 2021), as well as the absence of a comprehensive national policy for environmental goods and services (Paramasua et al., 2019). Malaysia's lack of an ELV policy has resulted in a notable issue with old vehicles leading to abandoned vehicles. The government had previously contemplated adopting an ELV policy but delayed its implementation due to public resistance (Mohamad-Ali et al., 2024; Solah et al., 2021).

The recycling process for ELVs in Malaysia comprises multiple stages, including document verification, hazardous material removal, vehicle dismantling, and segregation of metals for recycling or disposal. However, Malaysia encounters notable obstacles in terms of organisational management and the preparedness of facilities to handle ELV recycling effectively (Mohamad-Ali et al., 2024; Zamri et al., 2023).

On the other hand, Japan has an efficient ELV recycling system known for its meticulous record-keeping and state-of-the-art facilities. Japan's robust infrastructure allows for the efficient processing and recycling of ELVs, emphasising the shortcomings in Malaysia's current practices. The comparison highlights the necessity for Malaysia to strengthen its organisational frameworks and facilities to enhance the efficiency and effectiveness of its ELV recycling processes (Zamri et al., 2023).

The network's strategy and structure are affected in multiple ways due to the absence of clear network goals. The absence of clearness impacts the selection of network management strategies (Klijn et al., 2020), increases the intricacy of network administrative organisations (Iborra et al., 2018), and impacts the governance architecture, resulting in a greater level of fragmentation (Driel et al., 2022). As a result, these uncertainties can cause inefficiencies and hinder effective collaboration within the network.



Ultimately, the success of governance networks, characterised by adopting common principles and cooperative interactions, is essential for attaining synchronised goals. The objective of Malaysia's NAP of 2006 is to tackle environmental issues related to ELVs by implementing sustainable practices. Nevertheless, implementing the ELV directive encounters difficulties stemming from a lack of clarity, public awareness, and approval. Japan's advanced ELV recycling system exposes Malaysia's organisational management and facility preparedness shortcomings. Moreover, the lack of explicit network objectives further complicates the network's strategy and structure, resulting in inefficiencies and fragmented governance. Enhancing these structures is crucial for enhancing Malaysia's management of ELV and improving governance efficiency.

### *Network Strategy*

ELV governance increasingly focuses on sustainable practices and environmental factors. Studies emphasise the significance of using innovative methods to handle the disposal and recycling of ELV to reduce environmental impact and enhance resource efficiency (Jamaluddin et al., 2022). Research in policy and governance has concentrated on evaluating the economics of auto recycling activities in connection with regulations like the European Union Directive on ELVs (Hondroyiannis et al., 2024; Ravina et al., 2023). Studies have suggested policy measures to tackle environmental issues linked to ELV disposal, highlighting the importance of sustainable supply chain management practices to minimise environmental impact (Ali, Simic, et al., 2023; Harun et al., 2023).

The Malaysian automotive industry is currently experiencing a notable lack of vehicle component reuse (Mohamad-Ali et al., 2024). To effectively manage ELVs, authorities must implement strict regulations or market-driven approaches to ensure proper disposal and recycling processes. There is an urgent requirement to deal with the environmental issues related to ELV recovery, as mishandling and improper disposal of these vehicles can result in severe ecological impacts. Creating thorough plans for ELV management will improve the sustainability of the automotive industry and reduce the environmental consequences of vehicle disposal. Studying the challenges and advantages of remanufacturing in the automotive sector, as outlined in research on the automotive remanufacturing plan in Malaysia, can offer guidance for sustainable practices (Mohamad-Ali et al., 2024; Yusop et al., 2016). Comprehending the socio-technical perspectives on ELV recovery can help direct sustainable practices in the automotive industry (Go et al., 2016; Mohamad-Ali et al., 2024).

The future of ELVs in Malaysia is essential for sustainability, environmental consequences, and the advancement of the automotive sector. Several pivotal studies offer valuable insights into various factors that can impact the future of ELVs in Malaysia. Social acceptance behaviour towards ELV policy implementation is crucial (H. M. Ali, Simic, et al., 2023). Comprehending and forecasting social approval is crucial for gaining backing for ELV policies, which is essential for promoting sustainable practices and nurturing the expansion of the automotive sector in Malaysia (Ali, Sitinjak, et al., 2023). The ELV plan aims to improve safety and environmental management in the automotive sector by ensuring the environmentally friendly disposal of vehicles and the efficient recycling of reusable parts (Jawi et al., 2016; Mohamad-Ali et al., 2024). Malaysia encounters substantial obstacles in enforcing an ELV policy, mainly because of the impacts and actions of vehicle users (Ali, Sitinjak et al., 2023; Jawi et al., 2016). The challenges consist of insufficient public awareness regarding the

significance of ELV management, opposition to regulatory modifications, and inadequate incentives for consumers to engage in recycling programmes (H. M. Ali, Sitinjak et al., 2023). Furthermore, robust infrastructure and regulatory frameworks are required to implement ELV policies effectively (Mohamad-Ali et al., 2024). It is essential to tackle these user-related obstacles to effectively carry out an ELV plan that advocates for sustainability and environmental responsibility in the Malaysian automotive industry (Ali, Simic, et al., 2023; Jawi et al., 2016).

Many people remain uninformed about ELV management due to insufficient exposure and a lack of public education (Zulkifli & Abd Manaf, 2024). The lack of awareness leads to widespread uncertainty and misunderstandings regarding the process and advantages of ELV management. One significant issue is the problem of abandoned cars, which not only cause environmental and aesthetic issues but also present potential safety risks. Scepticism about the quality and reliability of reused automotive parts is a barrier to consumer acceptance and participation in ELV programmes (Mohamad-Ali et al., 2024). It is crucial to fill these knowledge gaps and address concerns by conducting thorough public awareness campaigns, implementing strict quality control measures for recycled components, and communicating the environmental and economic advantages of ELV management in order to educate and engage the public effectively.

Recent research supports previous discoveries demonstrating that public awareness of ELV management in Malaysia is significantly lacking (Ali, Simic et al., 2023; Harun et al., 2021). Most respondents hesitated about implementing ELV laws because they lacked understanding and familiarity with the processes and benefits. Despite some hesitation, the study emphasises the importance of appropriate ELV disposal for environmental protection. Efficient ELV management is crucial for reducing environmental risks like soil and water pollution caused by dangerous vehicle fluids and parts and for encouraging sustainable practices in the automotive sector. To address public reluctance and improve the enforcement of ELV policies, it is crucial to conduct strong educational campaigns that educate the public on the environmental and economic benefits of correct ELV disposal (Mohamad-Ali et al., 2024). Establishing trust by implementing precise and efficient regulatory frameworks can address worries and promote wider adoption and adherence to ELV laws. Furthermore, the lack of a comprehensive ELV plan in Malaysia's automotive industry, despite its potential advantages in terms of environmental sustainability and safety, highlights a deficiency in policy execution (Jamaluddin et al., 2022).

Creating a performance evaluation tool for ELV management system implementation can improve the efficiency and effectiveness of ELV management practices in Malaysia (Raja Mamat et al., 2018). Policymakers and stakeholders can evaluate and improve ELV management strategies using tools such as the analytic hierarchy process to preserve natural resources and minimise environmental harm. Additionally, investigating the idea of repurposing ELVs for construction materials can offer valuable perspectives on converting automotive waste into building products, advancing circular economy principles and resource efficiency (Wong et al., 2018). In Malaysia, using processing frameworks, reducing waste production, and promoting sustainable practices in the automotive industry through voluntary surrender programs are essential for the comprehensive management of ELV (Ali, Simic, et al., 2023). These programmes promote responsible disposal of old or non-functional

cars, improving regulatory oversight and encouraging environmentally sustainable practices (Ali, Simic, et al., 2023). Recycling used cars provides various advantages, such as saving energy, decreasing emissions, and potentially reducing unemployment rates. Reprocessing and reusing automotive materials reduces the need for raw materials, resulting in decreased energy consumption and lower greenhouse gas emissions (Mohamad-Ali et al., 2024). The recycling industry can generate employment opportunities, enhancing economic growth and stability.

Moreover, installing surveillance detectors to identify the owners of abandoned vehicles can significantly improve the management of ELVs (Hu & Ni, 2018). These technological tools aid authorities in efficiently identifying and contacting vehicle owners to ensure prompt removal and appropriate disposal of abandoned cars. This reduces environmental risks linked to abandoned vehicles and enhances urban beauty and public safety.

By integrating findings from research on manufacturing frameworks, remanufacturing challenges, material recycling, and adaptive reuse practices, Malaysia can formulate a thorough strategy to encourage the reuse of automotive components and advance sustainable practices in the automotive sector (Mohamad-Ali et al., 2019, 2024). By utilising research findings on legislative effectiveness, social acceptance, recycling frameworks, performance evaluation tools, and integrated conceptual models, Malaysia can improve its National Automotive Policy regarding ELVs (Ali, Simic, et al., 2023; Mohamad-Ali et al., 2024). Implementing sustainable ELV management practices is crucial for fostering environmental stewardship, resource efficiency, and stakeholder engagement in the automotive industry, leading to a more sustainable and robust automotive ecosystem in Malaysia.

Malaysia can achieve a sustainable future for ELVs by comprehending social acceptance behaviour, using performance evaluation tools, embracing socio-technical perspectives on ELV recovery, and implementing recycling frameworks. Developing efficient policies and practices for ELV management is essential for promoting environmental responsibility, improving resource utilisation, and attaining sustainable growth in the automotive sector.

### *Network Structure*

The local governments in Malaysia are proactively tackling the problem of abandoned vehicles. Presently, the regulations and jurisdictions governing the management of abandoned vehicles in Malaysia lack coherence and are dispersed (Ali, Simic, et al., 2023). The projected rise in ELVs in Malaysia will increase the vehicle-to-population ratio to 1:2.25 (Ali, Simic, et al., 2023). The increase in abandoned vehicles will unavoidably intensify the workload for local governments, potentially exceeding their ability to regulate and handle these vehicles effectively. This fragmentation poses various challenges, such as uncertainty about the entity accountable for abandoned vehicle management. Overlapping or unclear mandates among various local authorities complicate coordinating and enforcing abandoned vehicle policies.

Moreover, the procedures for managing an abandoned vehicle lack consistency and transparency (Ali, Simic, et al., 2023). Figure 1 provides a detailed depiction of the process by

local authorities to manage abandoned vehicles, explicitly focusing on identifying, removing, and disposing of vehicles classified as ELVs. The process begins with identifying and documenting abandoned vehicles, followed by notifying owners and removing the vehicles if no action is taken. The vehicles are then transported to specific facilities. However, the guidelines do not provide details about the extraction of hazardous substances, the dismantling process, or the segregation and treatment of recyclable materials. This exclusion creates deficiencies in comprehending the adherence to environmental regulations and endeavours towards sustainability. However, the organised procedure emphasises the significance of collaboration among different parties involved and emphasises the essential measures required to tackle the problem of abandoned vehicles effectively.

The absence of a standardised protocol for identifying, reporting, and disposing of abandoned vehicles leads to inconsistent enforcement of regulations and ineffective administration (Che Kasim et al., 2024; Sulaiman et al., 2023). This disorder can result in postponing abandoned vehicle removal and heightened environmental and social consequences. Stakeholders encounter considerable difficulties consistently implementing and enforcing ELV management policies because no specific provisions outline the criteria for classifying a vehicle as an ELV. The lack of regulation in this area leads to uncertainty, posing challenges for authorities in determining the precise timing and criteria for officially classifying a vehicle as an ELV (Ali, Simic, et al., 2023; Hall & McDonald, 2020). The need to conform to state or federal policies frequently limits the independence of local governments, impeding their capacity to tackle local matters efficiently (Zen et al., 2019). This presents a difficulty in balancing the distinct requirements of local communities and the mandates imposed by centralised authorities (Uster & Cohen, 2023).

Furthermore, Malaysian local governments still face ongoing challenges regarding accountability and transparency, as demonstrated by the absence of information about accountability practices on government websites (Ahmad et al., 2020). Strengthening mechanisms to hold individuals and organisations responsible and promoting openness are essential for building public confidence and ensuring effective governance. Transparency and efficient governance are crucial for ensuring accountability and effectiveness in urban governance processes, emphasising the requirement for transparent and participatory governance mechanisms (Iyer & Subba Rao, 2017; Rico et al., 2022).

The obstacles to efficient information and knowledge sharing within the local Government in Malaysia are complex and involve various factors. A significant obstacle is the absence of cooperation among government agencies, inadequate resources, and a dearth of proficient personnel to execute efficient programmes (Che Ku Kassim et al., 2019; Puppim de Oliveira, 2019; Vejaratnam et al., 2023). The internal challenges impede the smooth transmission of information and knowledge exchange within the government, affecting decision-making processes and overall efficiency. In addition, formal governance structures can occasionally impede social interactions essential for the successful exchange of knowledge, which relies on shared unspoken understandings (Whetsell et al., 2021). The existence of inflexible governance frameworks may obstruct the natural exchange of knowledge and impede the advancement of inventive solutions within the local government.

In addition, obstacles arising from the diversity of data and concerns regarding privacy may affect the exchange of client information and workflows between local government entities and external organisations (Moorthie et al., 2022). Maintaining data security and privacy while enabling the exchange of information is a significant obstacle, particularly when sharing sensitive client data to make informed decisions and deliver effective services (Ma & Lam, 2019).

External benchmarking mechanisms in Malaysian local authorities have enhanced operational performance management but have not successfully incorporated strategic performance management. This disconnect leads to operational controls that inhibit strategic processes, thereby restricting local governments' capacity to achieve long-term goals and improve overall service delivery (Siti-Nabiha & George, 2021). A primary challenge local governments in Malaysia face is strategic human resource management, which, while distinct, shares similarities with those encountered by other levels of Government (Ananthan et al., 2019; Senawi & Osmadi, 2024). As the administrative entities closest to the public, local governments confront unique difficulties in areas such as community engagement, resource allocation, and policy execution. Political interference and financial limitations further exacerbate these challenges, which are also expected at higher levels of government (Saron et al., 2022). These factors impede the effective management of human resources in local authorities, which in turn affects the generation of revenue and the overall efficiency of governance. Furthermore, human resource allocation and management challenges include a workforce shortage, financial limitations, and time-intensive procedures (Abd Rahman et al., 2021; Saron et al., 2022).

In conclusion, local governments in Malaysia are actively addressing the problem of abandoned vehicles despite the difficulties posed by fragmented regulations and jurisdictions. These challenges make it more complicated to coordinate and enforce policies. The lack of standardised protocols for identifying, reporting, and disposing of abandoned vehicles leads to inconsistent enforcement and inefficient administration, exacerbating environmental and social consequences. Furthermore, stakeholders encounter challenges when implementing ELV management policies because no specific guidelines exist for categorising vehicles as ELVs. This lack of clarity leads to additional uncertainty and inefficiency. Local governments often face challenges balancing their needs with centralised directives due to the necessity of adhering to state or federal policies, which can restrict their autonomy. The persistent problems regarding accountability and transparency require the enhancement of accountability mechanisms and the advancement of transparency in order to cultivate public confidence and ensure efficient governance. Efficient electronic governance and openness are essential for managing urban affairs, and international urban climate governance highlights the importance of cities in tackling climate change. Challenges in inter-agency collaboration, limited resources, and concerns about data privacy hinder the effectiveness of information exchange among local governments. To improve the management of abandoned vehicles and enhance overall governance efficiency, it is crucial to tackle human resource challenges, such as the scarcity of competent assessors and interference from political entities.

*Analysis*

The primary goal of the guidelines (Guidelines for the Management of Abandoned Vehicles in Local Authority Operational Areas, 2020), issued by the Ministry of Housing and Local Government, is to improve the efficiency of service delivery and the implementation of policies through establishing effective networks. These guidelines aim to enhance coordination among network members and promote increased citizen involvement. The guidelines aim to enhance the efficiency and effectiveness of local authorities by simplifying the processes involved in managing abandoned vehicles. In addition, the guidelines highlight the significance of enhancing the accessibility of services to the general public, thereby promoting and encouraging active engagement of citizens in local governance matters. This approach seeks to tackle the issue of abandoned vehicles comprehensively and aims to establish more robust, proactive, and transparent local governance systems. The guidelines prioritise enhanced accessibility and engagement, ensuring that citizens are adequately informed and empowered to participate in decision-making processes that impact their communities actively.

However, implementing the ELV directive in Malaysia faces significant challenges due to a lack of clear guidelines and formalised regulations and frameworks for managing ELVs. This inadequacy hinders the effective enforcement and implementation of policies designed to tackle issues related to ELVs. Local authorities encounter difficulties consistently identifying, processing, and recycling ELVs due to the absence of clear, standardised regulations and comprehensive management frameworks. The lack of specific guidelines and protocols leads to different interpretations and practices in various jurisdictions, resulting in inefficiencies and possible failures to comply with regulations. Furthermore, the absence of formalisation impedes the capacity to establish intense monitoring and accountability mechanisms, making enforcing ELV policies more challenging. In order to address these difficulties, it is crucial to establish and enforce well-defined regulations and frameworks that offer specific guidance on the management of ELVs, thus guaranteeing a consistent and efficient approach at all levels of governance.

Furthermore, the execution of the ELV directive in Malaysia encounters substantial obstacles to the preparedness of the populace to embrace and adhere to the policy. Research highlights the significance of considering the knowledge and attitudes of Malaysians towards ELV policies before their implementation. This underscores the necessity for extensive public awareness campaigns and educational initiatives to inform the public about the advantages and prerequisites of ELV policies, thereby promoting increased acceptance and adherence.

Another obstacle to effective ELV enforcement in Malaysia is the need for additional research on sustainable ELV management. This suggests a deficiency in both the comprehensive comprehension and the tools necessary for efficient management systems for ELVs. The lack of comprehensive research and data hinders the creation of efficient strategies and frameworks for handling ELVs in an environmentally sustainable way. Research should prioritise identifying optimal methods, technological advancements, and economic frameworks that can be adjusted to suit the specific needs of Malaysia in order to improve the long-term viability of ELV management.



In addition, the Malaysian automotive industry faces significant obstacles in implementing the ELV directive due to challenges related to the reuse, remanufacturing, and recycling of ELVs. The industry must tackle the technical and logistical challenges related to the disassembly and recycling of vehicles, guaranteeing the efficient recovery and reuse of valuable materials. Furthermore, it is imperative to establish infrastructure and allocate resources towards advancing recycling technologies to facilitate the efficient handling of ELVs. To summarise, the main barriers to successfully enforcing and implementing the ELV directive in Malaysia are the lack of formal regulations, limited public awareness, inadequate preparedness of the population, insufficient planning within the automotive ecosystem, a dearth of research on sustainable management, and challenges within the automotive industry about reuse and recycling. It is crucial to tackle these issues to effectively implement and enforce ELV policies, ultimately promoting environmental sustainability and preserving resources in Malaysia. To overcome these obstacles and encourage sustainable management of ELVs, it is crucial to implement comprehensive strategies that involve engaging stakeholders, conducting research and development, educating the public, and investing in infrastructure.

### **Conclusion**

Ultimately, the fusion of collaborative and network governance is essential for tackling intricate societal problems and improving governance structures. These approaches involve collaborating with various stakeholders in decision-making processes to address complex problems, especially in environmental management. The adoption of governance networks in Klang Valley, Malaysia, to tackle the problem of abandoned vehicles highlights the need for strategic coordination between local governments and independent entities. Enforcing ELV policies effectively is crucial for handling the increasing number of abandoned vehicles and aligning with Malaysia's sustainability objectives. However, challenges such as insufficient regulations, limited public awareness, and inadequate infrastructure impede progress. Developing a comprehensive strategy that includes engaging stakeholders, educating the public, and investing in sustainable management practices is necessary to overcome these obstacles. An essential approach is required to ensure the effective implementation of policies and promote environmental conservation in Malaysia.

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