Policy Networks and Relationship between Multiple Streams Approach and Implementation of Road Safety Policy Measures in Kenyan Counties

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ABSTRACT

Policymakers and policy practitioners have pointed out the use of policy networks in the development and execution of road safety policy measures as a suitable strategy for addressing road safety. Governments at all levels—national, state, and local—have moved from single- to multi-agency approaches to handle the execution of road safety policy measures. Previous research on policy networks in road safety has concentrated on the role that organizational networks play in this policy domain. This study aimed to investigate the moderating influence on the relationship between the multiple streams approach and the implementation of key road safety policy initiatives in Kisii and Kisumu counties. The study adopted descriptive survey and explanatory designs. The study adopted pragmatism and phenomenology research philosophies. The Multiple Streams Framework and Punctuated Equilibrium Model served as the study's foundation. The sample size of the study was 347 of the target population. Quantitative data was examined using multi-linear regression approaches and Pearson correlation analysis. Stepwise regression was used to analyze the moderating variable. Thematic analysis was used to assess qualitative data. The results of the study demonstrated that policy networks influenced the relationship between the MSF and the enforcement of road safety policy measures, which explains 6.5% of the variances in implementation. The study concludes that the execution of road safety rules is a collaborative effort that ought to include policy networks and other pertinent players in the transport industry.

Keywords: Implementation, Multiple Streams Approach, Policy Networks, Road Safety

INTRODUCTION

In response to an alarming increase in road accidents, fatalities, and injuries(site), there has been sustained actions among stakeholders to develop mitigation mechanisms, including policies, integrating safety into road design and construction; undertaking capacity-building efforts, and expanding emergency response services (Nduhura, Alinda, Mulindwa, Wanume, & Settumba, 2021). Of these methods, policies are seen as one of the sure ways of driving the sector into safety, which is widely acknowledged by stakeholders, many of whom have developed policy guidelines. Policies are domesticated in strategies, programs, standards, and compliance responsibilities bestowed upon various actors (Zahariadis & Exadaktylos, 2016). These policies are meant to promote a culture of safe driving and mitigate crashes or even fatalities. However, scholars

(Shoaib, Aziz, & Nadeem, 2020; Bora, Landge, & Dalai, 2018; & Sabyasachi & Shupinder, 2018; Belloumi & Ouni, 2019) and stakeholders continue to attribute the upsurge in road accidents to poor compliance.

Compliance is, therefore, one of the pillars of a policy strategy framework. It denotes consistency of observance of policies with the aim of risk and liability reduction among transport sector stakeholders. With consistency, road policies are normalized, and a culture of observance is built among players. Implementation of road safety policy measures occurs once the problem, policy, and political streams converge and open a policy window (Hawkins & McCambridge, 2020). Firstly, a problem is identified and afterward policy alternatives are translated into policy actions (Howlett, 2019). Here, communities of policy specialists produce numerous policy concepts for policy solutions that relate to technical feasibility and conformity with the host community's political and social ideals (Zahariadis, 2007). This cycle is not complete until politicians assess and prioritize the policies (Jamroz, Brudzinski, Romanowska, Ukowska, Oskarbski, & Kustra, 2019).

A wider community of policy actors often referred to as policy networks including state and non-state actors (Collingwood, El-Khatib, and O'Brien, 2019) participate in the policy ecosystem. Although they do not wild as much power as politicians, they form coalitions of interested parties to influence road safety policy. These players form a community of policymakers and determine the degree of implementation. The study identified government departments, traffic police, transportation authorities, road safety organizations, community groups, and matatu operators among others. They are however expected to endear shared beliefs, unbroken communication, and trust in the policy implementation process (Adam & Kriesi, 2019).

As a result, stakeholders continue to collaborate to bolster policy implementation (Olemo, 2016). In the case of Kenya, such measures include the Integrated National Transport Policy 2009, which called for improved access to safe and secure road transportation (Isaac, 2019); the National Road Safety Council's formation, which developed a five-year National Road Safety Action Plan (2009–2014) to develop a system to halve the number of traffic fatalities by 2014 in response to the United Nations Decade of Action for Road Safety (2011–2020), according to Kabue (2018); as a result, the NTSA was set up in 2012 with the mandate to coordinate the activities of the central road transport departments and contribute to reducing road fatality rates from traffic accidents (Muchoki, 2020). Since then, the NTSA has implemented legal, regulatory, and institutional reforms in the management of Public Service Vehicles, including registration of SACCOs for collective responsibility, reforms in driver education, testing, and licensing, interventions in speed limits and speed governors, interventions in drunk driving, projects to improve pedestrian safety, public awareness campaigns, and the application of ICT solutions (Gachanja & Mose, 2017). However, in Kenya, gaps exist in the execution of these programs, resulting the increase traffic accidents in the country (Lamont & Lee, 2015).

EMPIRICAL LITERATURE REVIEW

2.1 Implementation of Road Safety Policy Measures

Traffic safety is the manifestation of governmental policy to secure human life by eliminating or decreasing the repercussions of road crashes (World Health Organization, 2009). This could be achieved by initiating activities intended to regulate and moderate road user behavior by preventative, persuasive, and punitive measures to affect the safe and efficient movement of traffic (Castillo, Castro, López, & Pedregal, 2019). Traffic road accidents come with morbidity, mortality, and economic consequences (Akinyemi, 2020). The World Health Organization (2018) observes that traffic road accidents kill nearly 1.35 million people worldwide, harm an estimated 20 to 50 million people, and negatively impact countries' GDP. The World Health Organization has shown that road traffic injuries and deaths cost the global economy an estimated 3% of GDP. A case in point is the US, where the expense of road accidents in 2000 was $230.6 billion

(Kittelson, 2010); Iran lost 2.19% of GDP in 2019 (Yohannis, 2019); South Africa lost 3.5% of its GDP in 2017 (World Bank, 2018); Ghana lost 1.6 of GDP in 2020 (Boateng, 2021); Nigeria loses 80 million Naira yearly to road accidents (Atubi, 2017); Uganda lost 5% of GDP in 2018 (WHO, 2020); and Kenya loses up to 5% of GDP to road traffic accidents (NTSA, 2020).

Norton (2017) points out that the history of road safety policy measures dates back to the early 20th century. First, traffic signals were introduced in 1868 in London. Traffic signals have become an accepted practice worldwide and remain a cornerstone of road safety. Secondly, speed limits were adopted in 1901, and Connecticut became the first state in America to introduce speed limits for automobiles. Speed limits have since been adopted worldwide to control the speed of vehicles on the road. Third, seat belt laws were introduced into effect in the USA in 1968, and since then, many countries have embraced them. Today, wearing a seatbelt is mandatory in most countries. Fourth, implementation of traffic laws, including DUI, reckless driving, and distracted driving, are enforced worldwide to mitigate the risks associated with such driving behaviors. Fifth, the development of advanced technologies, such as Automatic Emergency Braking (AEB), lane departure warning, and adaptive headlights, has been introduced in vehicles. Sixth, road safety campaigns worldwide have been launched campaigns to encourage the use of safe driving practices, such as the "Click It or Ticket" campaign to promote seat belt use, the "Drive Sober or Get Pulled Over" campaign to discourage drunk driving, and the "Stop, Look, and Listen" campaign to encourage pedestrians to stay safe while crossing the road.

Additionally, numerous methods to address the effects of road accidents have been deliberated locally and internationally, the first phase having existed in the 1950s when the attention was on the responsibility of the driver (Burlacu, Racanel, & Burlacu, 2017). The second phase, which operated in the 1960s and 1970s, concentrated on initiatives on the infrastructure: drivers and vehicle systems before, during, and after a crash, while the third stage, which ran through the 1980s and 1990s, emphasized systemic interventions to develop action programs aimed at reducing road accidents (Burlacu, Racanel, & Burlacu, 2017). The fourth phase was in the years 2011-2020 after the UN proclaimed 2011-2020 the Decade of Action for Road Safety. The global plan for the Decade of Action for Road Safety 2011–2020 as an overall framework for activities was founded on four pillars, with the emphasis being the implementation of road safety measures in various countries (WHO, 2011). The fifth phase, christened as United Nation's Global Plan, covered the years 2021-2030. This strategy sought to reduce road traffic fatalities by 50% by 2030 through a collaborative approach by all stakeholders to implement policies and initiatives (European Commission, 2021).

2.2 Multiple Streams Framework and Implementation of Road Safety Policies

Multiple Streams Framework is a metaphorical construct that illustrates the policy process. The metaphoric approach to policy process is supported by Howlett, McConnell, and Perl (2016) who observe that metaphors are frequently used in academic policy analysis to simplify the complexity of policy processes. Earlier, policy scholars such as Lasswell (1956) believed that the policy process followed stages linearly. However, Brewer (1974) challenged Lasswell's linear approach. According to Brewer, most policies do not develop in a linear manner (from conception to implementation) because they resurface later in slightly altered form. As a result, he created another metaphor which he termed as policy cycle. However, this cyclic approach was also challenged in that it gave the impression that policymakers linearly pursue answers to public issues, yet, this is far from the norm (Howlett, McConnell & Perl, 2016). Subsequently, Kingdon (1984) too opposed the linear approach to the policy process and coined a metaphor of three separate activities, which he called the problem stream, policy stream, and politics stream.

Regarding the implementation of road safety policy measures, Ridde (2009) content that the problem stream is the first stage of the framework and involves identifying the social issues or problems in this case related to road safety. This may include high rates of accidents, fatalities, or injuries on the road, and associated

costs such as medical expenses, lost productivity, or property damage. The policy stream is the second stage that involves developing policy solutions and alternative courses of action to address these issues. Examples of policy solutions that are commonly used to improve road safety include traffic laws and regulations, infrastructure improvements, public education campaigns, and enforcement strategies. The politics stream is the last stage and involves the political context in which policy decisions are made. This includes factors such as the distribution of power, the interests of stakeholders, and the influence of advocacy groups. Effective road safety policy is often the result of collaboration and negotiation between various stakeholders, including government agencies, advocacy groups, and the public.

2.3 Policy Networks and Implementation of Road Safety Policy Measures

A study by Oliveira and Daroit (2020) examined public policy networks, focusing on implementing the Bolsa-Famila program. The methodological procedures adopted were document analysis and informal interviews with agents in charge of the program at the federal and administration of the questionnaires. The study was anchored on the Actor-Network Theory to explain routines, street-level bureaucrats, and territory and technology policy networks. The findings showed that the school attendance program influenced multilevel collaboration, promoting inter-sector education about the relationship between social assistance centers and schools. Oliveira and Daroit (2020) focused on implementing education policy, whereas the current study examined road safety policy measures.

In Serbia, Vukovic and Babovic (2014) investigated social interests, policy networks, and legislative outcomes while drawing their attention to the role of policy networks in shaping welfare and employment policies. The insights from the study pointed out that policy networks in Serbia resulted from resources and potential for the redistribution of power. Policy networks were found to influence only the social policy process as they were found to connect various professional groups more, especially in the nongovernmental sector, the public sector, and academia. The study concentrated on social and employment policy, an empirical gap the current study seeks to fill by exploring the influence of policy networks on the implementation of road safety policy.

In Germany and Switzerland, Ingold and Leifeld (2016) examined policy networks in decision-making and implementation, both collaborative and adversarial. This study focused on systemic and institutional factors that affect credibility. The researchers used temporal and cross-sectional exponential random graph models to compare flood control, environment, toxic chemical politics, and telecommunications among five policy networks in Germany and Switzerland. The study revealed that institutional and structural aspects significantly influence how actors behave during the policy-making process, especially during decision-making and implementation. The actors' abilities shaped outputs and service delivery based on these qualities. The above study on environmental policy was conducted in Germany and Switzerland, but the current study examined the implementation of road safety policy measures using descriptive design with mixed methods.

Castillo-Manzano, Castro-Nuno, and Fageda (2014) sought to answer the question of whether being in the European Union saves lives. To bring out the true picture of the common road safety for the EU-27, the study employed an econometric analysis. The findings revealed lower road fatalities in countries with developed transport infrastructure, high-risk exposure among the young population, high road fatalities among the vulnerable populations, and road fatalities were noted to decrease depending on the number of years a country has been a member of the European Union. On the contrary, the study noted that the populations' educational background had no link with road fatality same thing being reflected in the level of motorization. The above study did not link how multiple streams of policy influence road safety policy research gaps the current study seeks to fill.

Kim (2011) embarked on to answer the question of whether local policy networks deter the race to the bottom in environmental regulation in South Korea. The study suggests that the size of local networks and

their activeness have a greater influence on the enforcement of local environmental activities. Policy networks were also found to directly affect local government's regulatory behavior and mitigated the race to the bottom by counterbalancing the influence of the industry. The study focused on environmental policy enforcement whereas the current study will examine the influence of policy networks on the implementation of road safety policy.

Tantivess and Walt (2008) investigated the influence of policy networks in the implementation of antiretroviral therapy (ART) policies in Thailand. The study used qualitative methodologies, such as in-depth interviews, document reading, and direct observation. The findings of the study demonstrated the importance of non-state networks at every policy stage and at all levels of the health sector, and the supportive role that public-civic networks played. They played a role not only in defining the agenda, such as influencing the government but also in the actual development and implementation of health policy. Tantivess and Walt (2008) examined influence of policy networks in the implementation of antiretroviral therapy (ART) policies in Thailand, but the current study utilized mixed research methodologies to examine the moderating influence of policy networks on the connection between the Multiple Stream Framework and execution of rules for road safety.

Omar, et al (2010) did a comparative analysis of policymaking in South Africa's, Ghana's, Zambia's, and Uganda's mental health sector. Document analysis and semi-structured interviews were used to gather data for the study, which established that these countries' mental health policies are non-existent or in draft form and weak in nature, a state attributed to insufficient information to guide policy development, and lack of consultation among key policy networks. The poor implementation of policies in these countries was associated with a lack of resources and dissemination and operationalization of policies. The study above was, however, a comparative analysis of health policy, whereas the current study defined impact of policy networks on the implementation of road safety policy.

Finally, there is Ogada, Krhoda, Veen, Marani, and Oel (2017) who investigated the management of resources through stakeholder networks while paying attention to collaborative water governance in Lake Naivasha, Kenya. The study utilized social network analysis and stakeholder analysis to show how structural and stakeholders' social characteristics were defined by their influence, interactions, and interests. According to the study findings, despite the Kenyan government's and the agencies' dominance in the interest and power of water resource management, the participation of central stakeholders and the powerful characteristics from nongovernmental sectors play a critical role in strengthening partnerships in a governance climate with multiple sectors, conflicting interests, and complex issues. The above study was on water governance, whereas the current study was on the road transport sector.

METHODS

3.1 Population and Sampling Characteristics

Selected players in the transport sector including County NTSA directors, traffic police base commandants, county Matatu owners' associations, Matatu Sacco leaders, Matatu drivers, and PSV conductors were identified for the study. These stakeholders occupy an important space in the sector and their actions result in the progress of the sector. They determine the degree of compliance with the set road policy measures. Table 1 presents a breakdown of the target population into the various clusters.

Table 1: Target Population

Road Safety Policy Implementers	County		Population
	Kisii	Kisumu	
NTSA County Directors	1	1	2

NTSA County Directors	1	1	2
Traffic Police Base Commandants	2	6	8
Matatu Owners Association Chairs	1	1	2
Matatu Sacco Leaders	115	153	268
PSV Drivers	540	720	1,260
PSV Conductors	224	298	523
Total	**883**	**1179**	**2063**

Sources: Regional Traffic Commandant (2020), Njagi (2019), NTSA (2020), KNBS (2019)

Yamane1967 formula was used to calculate a sample size as shown in Table 2. The allocation of samples within clusters was carried out by the proportional allocation method.

Table 2: Sample Size

Strata	Category	Target Population	Sample Size
Kisii County	Sacco leaders	115	19
	PSV Drivers	540	88
	PSV conductors	224	37
Kisumu County	Sacco leaders	153	25
	PSV Drivers	720	117
	PSV conductors	298	49
Grand Total		**2050**	**335**

Source: Survey Data (2023)

Using mixed sampling techniques: stratified, purposive and systematic sampling techniques, sampling units were identified for data collection. This technique was applied for selected players in the transport sector. In the actual data collection, respondents were picked systematically. Key stakeholders were however purposively sampled.

A total of three hundred and thirty-five (335) questionnaires were distributed to matatu operators, and three hundred and twenty-seven (327) questionnaires, representing 97.6 percent, were collected back, having been filled. In addition, 9 of the 12 interviews that were to be conducted—75 percent response—was successful, while 3 (or 25%) were not. The response rate meets the threshold recommended by some scholars including Mugenda & Mugenda (2003).

3.2 Survey Instruments and Validation

The study variables were tested using a multi-item scale to test the hypothesis. The data analysis constructs were measured with a 5-point Likert scale that ranged from “strongly Disagree” (1) to Strongly Agree (5).

3.3 Data Management

Data was certified for accuracy before being coded into the Statistical Package for Social Sciences (SPSS) version 25 software code book. SPSS was considered an acceptable tool for this study due to its ability to analyze and manipulate exceedingly complex data and its design for both interactive and non-interactive use (Denis, 2018). Diagnostic tests such as normality, multicolinearity, homoscedasticity and linearity preceded

the actual analysis. The data collected was analyzed using descriptive, simple linear regression and thematic analysis. Quantitative data and qualitative data were harmonized using triangulation. Quantitative and qualitative data was presented using tables, figures, and continuous prose.

The statistical models are presented as follows:

$Y = \beta_0 + \beta_1 MSF + \beta_2 Z + \varepsilon$ ……1

$Y = \beta_0 + \beta_1 MSF + x\ \beta_2 Z + \beta_3 MSF^* Z + \varepsilon$ ……....2

FINDINGS

4.1 Demographic Profiles of Transport Stakeholders

Demographic variables such as academic qualification and residence of the respondents were analyzed. The findings of these demographics are presented in Table 3.

Table 3. Demographic representation of selected Transport stakeholders in Kenya

	Item	**F**	**%**
Academic Qualification	Informal	18	5.5
	Primary	66	20.2
	Secondary	150	45.9
	Middle College	73	22.3
	University	20	6.1
	Sub-Total	**327**	**100.0**
Residence	Kisii	125	38.2
	Kisumu	152	46.5
	Other	50	15.3
	Sub-Total	**327**	**100.0**

Source: Survey Data (2022)

As depicted in Table 3, 45.9% of the respondents had secondary level education, while about one-fifth of the respondents had primary (20.2%) and middle college (22.3%) levels of education. It was also established that 5.5% of the respondents had informal qualifications.

4.2 Descriptive Statistics

Data obtained on the constructs (i.e., policy networks and implementation of road safety policies) was analyzed using means and standard deviation and presented in Table 4. The analysis sought to establish perceptions of policy networks in the sector.

Table 4. Perceptions of transport Stakeholders on the status of policy networks in Kenya

Item	**N**	$\bar{x}$	**SD**
Perceived Benefits			
Societal groups benefit others	327	2.91	1.336
Activities on road safety are open for players	327	3.18	1.247

Road safety policy initiatives are attractive	327	3.17	1.158
Mobilization			
Policy networks place encouraging adverts in PSVs.	327	3.52	1.055
Policy networks roll out programs on road safety	327	3.25	1.180
Societal groups convince me to observe road safety policy.	327	3.38	1.160
There are incentives for compliance	327	3.35	1.251
Collaboration			
Policy actors co-exist	327	3.43	1.135
There is a linkage among policy actors	327	3.14	1.200

Source: Field Data (2021)

The role played by the policy networks in compliance were grouped into: perceived benefit and their abilities to effectively mobilize and create collaborations. On perceived benefits, respondents perceived networks as entities that were fairly balanced in the distribution of benefits (Mean=2.91, SD=1.336); however, respondents were not persuaded to adhere to the road safety policy initiatives (Mean=3.17, SD=1.158) nor had taken part in activities organized by the policy networks (Mean=3.18, SD=1.247). On Mobilization, it was observed that policy networks had put out adverts on road safety (Mean=3.52, SD=1.055) although they had not rolled out sufficient programs for advocating enforcement (Mean=3.25, SD=1.18) and used incentives to enhance compliance (Mean=3.35, SD=1.251). On collaboration, findings show that there was a weak relationship between the transport stakeholders and the policy networks (Mean=3.43, SD=1.135) and that policy networks could not be easily reachable (Mean=3.14, SD=1.200).

4.2 Hypothesis Testing Results

Simple regression was used to test the relationship between service automation and satisfaction of the three generations of delegates. Simple linear regression was used to establish how much the predictor variable influences satisfaction. The results of the regression analysis are presented in Tables 5-8.

Table 5: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.301[a]	.091	.088	.41112
2	.395[b]	.156	.151	.39670

Source: Survey Data (2023)

As demonstrated in Table 5, Model 1 shows that the multiple streams approach explained 9.1% of the changes in road policy implementations in the selected counties in Kenya. In Model 2, the combined contribution of multiple streams approach and policy networks was 15.6%. This implies that policy frameworks enhanced the relationship between multiple streams approach and implementation of policies by 6.5%.

ANOVA presented in Table 6 shows coefficients indicating the predictive strength of automation on satisfaction as represented by F coefficients and significant levels.

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Table 6: Anova Table for Multiple Streams approach, Policy Networks and Implementation of RoadPolicies in Kenya

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.484	1	5.484	32.444	.000[b]
	Residual	54.932	325	.169		
	Total	60.415	326			
2	Regression	9.427	2	4.713	29.951	.000[c]
	Residual	50.989	324	.157		
	Total	60.415	326			

Source: Survey Data (2023)

In Model 1, findings show that the multiple stream approach predicts the implementation of road policies (F=32.444; df =1, sig.=.000<0.05) even with the introduction of policy networks, both constructs (multiple streams approach and policy networks) could predict implementation of road policies ((F=29.951; df =2, sig.=.000<0.05).

Table 7 illustrates indices (*t* coefficients and sig. levels) that were utilized to test the hypothesis (the study accepted or rejected the hypothesis when the p-value was p<0.05 and vice versa).

Table 7: coefficient Table on Multiple Streams approach, Policy Networks, and Implementation of Road policies in Kenya

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.041	.149		13.657	.000
	Multiple Stream	.239	.042	.301	5.696	.000
2	(Constant)	2.161	.146		14.783	.000
	Multiple Stream	.034	.058	.043	.585	.559
	Policy networks	.185	.037	.364	5.006	.000

Source: Survey Data (2023)

As depicted in Table 7, model 1 shows that multiple stream network influences the implementation of road safety policies ((β = .301, t =5.696, p=0.000<0.05). However, when the policy network is introduced in model 2, the role of the multiple stream approach becomes insignificant ((β = .043, t =0.585, p=0.559>0.05). In the Model 2. The study also shows that policy networks moderate the relationship between multiple streams approach and implementation of road policies.

RESEARCH IMPLICATIONS

5.1 Implication to Theory

This research contributes to the corpus of information on Multiple Stream Framework. Kingdon's concept has been applied to numerous policy fields. The use of Kingdon's concept in the healthcare industry has been noted by Rawat and Morris (2016). Majority of other studies have also used MSF in the field of health

policy, particularly in the areas of drugs and substance abuse. However, relatively few researches have used or evaluated Kingdon's paradigm in the field of transportation. As a result, this research contributes to its use in advancing knowledge in transport sector, specifically in road safety transportation policy.

5.2 Implication to Practice

The research's results revealed flaws in the enactment of road safety policy initiatives in Kenya. The focus on Problem Stream, Policy Stream, Political Stream, and Policy Networks provided a conceptual framework that policy makers, implementers, experts, policy practitioners, and the ministry of transportation can draw upon to quantitatively assess the potential strengths and weaknesses in road safety policy, particularly at the implementation level, and guide in taking action. Road safety policymakers need to develop a policy implementation framework to guide in predicting aspects that could affect positively or negatively the enactment of strategies for promoting road safety and which could predict whether strategies will have a positive or negative impact.

CONCLUSION

The study established that policy networks influenced the link between MSF and enactment of road safety policy measures. This study suggests that coordination be established between networks for road safety policy and the NTSA, NPS, and other pertinent organizations in charge of putting policy into action. This is so because the network approach places a strong emphasis on the interconnection of different players.

RECOMMENDATIONS FOR FUTURE RESEARCH

The study recommends that an investigation on the role and impact of MSF on building of road safety institution in Kenya be continued. Further, this study recommends that comparable study be carried out using a cohort study approach because policy implementation is a long-term process involving various policy actors. The study also recommends comparative research with inclusion of components such as policy window and policy entrepreneurs.

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