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The Influence of Social Media Use on Homicide Rates in Jamaica (1970–2024): A Quantitative Analysis

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ABSTRACT

This study examines the influence of social media on homicide rates in Jamaica from 1970 to 2024, integrating socio-economic and structural determinants using both Ordinary Least Squares (OLS) and Autoregressive Integrated Moving Average with Exogenous variables (ARIMAX) models. Analysis of secondary data from the United Nations Office on Drugs and Crime, the Jamaica Constabulary Force, and DataReportal reveals that homicide rates increased from 21.5 per 100,000 in the 1970s to 52.1 per 100,000 in 2020–2024, coinciding with social media adoption rising from 12% to 82% after 2000. OLS results indicate a significant positive association between social media and homicide ($\beta = 0.541$, $p < 0.001$), while ARIMAX results ($\beta = 0.080$, $p = 0.071$) suggest that temporal and structural factors moderate this effect. GDP per capita and firearm prevalence also demonstrate positive associations, reflecting the interaction between economic growth, access to lethal means, and digital engagement. Youth populations appear particularly susceptible, consistent with Social Disorganisation and Routine Activities theoretical frameworks, highlighting the interplay of online exposure, community fragmentation, and opportunity creation for violence. Comparative international analysis indicates that Jamaica's patterns are consistent with global trends, wherein social media amplifies rather than independently drives crime, particularly in contexts of inequality and weak institutional capacity. The findings underscore the need for integrated interventions combining digital literacy, community mobilisation, firearm regulation, and socio-economic policies to mitigate homicide.

Keywords: Jamaica, social media, homicide, youth violence, structural factors, ARIMAX

Introduction

Jamaica has experienced persistently high homicide rates over the past five decades, making it one of the most violent nations in the Caribbean and globally (Macrotrends, n.d; IndexMundi, n.d; The Global Economy, n.d; Jamaica Observer, 2025). From approximately eight homicides per 100,000 population in 1970, rates have surged to over 60 per 100,000 by 2024, reflecting both socio-economic and institutional challenges (Bourne, 2025a, 2025b). Scholars have attributed this escalation to factors including political instability, economic inequality, urbanisation, and the proliferation of firearms (Bailey, 2011, 2017). The emergence of social media in the early 2000s introduced new dimensions to the societal landscape, potentially influencing patterns of crime and violence (Boyd & Ellison, 2007; Kemp, 2024; UNODC, 2019). Platforms such as Facebook, Instagram, and WhatsApp have become widely accessible, with over 1.6 million active users in Jamaica by 2024 (Kemp, 2024). This digital transformation has coincided with shifts in social interactions, exposure to violent content, and online communication between criminal actors (Patton et al., 2013; Miller et al., 2016; Weimann, 2014). Understanding how social media interacts with traditional determinants of homicide is crucial for developing effective crime prevention strategies.

Despite extensive research on socio-economic and institutional determinants of crime (Baailey, 2011; Harriott, 2003; Leslie, 2010), the role of social media in shaping homicide trends in Jamaica remains underexplored. International studies have documented correlations between social media usage and violent crime, suggesting that online platforms can both facilitate coordination among offenders and amplify exposure to violent behaviours (Wright-Myrie et al., 2016). However, the Jamaican context is unique due to high baseline homicide rates, entrenched gang activity, and historical social inequalities. The growth of social media could act as a risk amplifier, particularly among youth populations vulnerable to online influence. Conversely, these platforms offer potential for intervention, such as disseminating public safety campaigns and promoting digital literacy. This duality underscores the need for empirical analysis to distinguish between the positive and negative effects of social media on homicide. Such research is essential to inform policymakers, law enforcement, and community organisations aiming to curb violent crime in a digital era.

The primary objective of this study is to examine the relationship between social media usage and homicide rates in Jamaica from 1970 to 2024, utilising both OLS and ARIMAX models to capture linear and time-series dynamics. Specifically, the study seeks to answer the research question: to what extent has the increase in social media usage contributed to fluctuations in homicide rates over the past five decades? By analysing secondary data on social media penetration, homicide rates, and relevant socio-economic indicators, the study provides a quantitative assessment of this relationship. The research also aims to situate Jamaica's experience within a broader international context, comparing findings with evidence from other countries affected by digital transformations. Through rigorous statistical modelling,

the study addresses gaps in the literature regarding digital influences on violent crime in the Caribbean. It further examines the interaction between social media and structural factors, including economic conditions, unemployment, and firearm prevalence. Ultimately, the study offers evidence-based insights to guide interventions targeting both digital and traditional determinants of homicide.

Theoretical Framework

This study draws upon Social Disorganisation Theory to conceptualise how structural and community-level factors influence homicide rates in Jamaica. Social Disorganisation Theory posits that weakened social institutions, diminished community cohesion, and inadequate informal social control lead to higher rates of crime and violence (Bourne, 2025a, 2025b). In the Jamaican context, rapid urbanisation, economic disparities, and limited community resources have historically exacerbated social disorganisation. Social media can compound these dynamics by facilitating interactions that bypass traditional social controls, enabling the dissemination of violent content and coordination among offenders. The theory also underscores the role of collective efficacy, where communities with stronger social bonds are better able to regulate behaviour and reduce criminality. By integrating social media into this framework, the study recognises the digital environment as a new dimension of community structure and influence. This approach provides a foundation for analysing how online interactions intersect with established criminological determinants of homicide.

Routine Activities Theory further informs the study by emphasising the conditions that facilitate criminal events, including motivated offenders, suitable targets, and the absence of capable guardianship. Social media can modify these conditions by increasing the visibility of potential targets or providing avenues for offenders to coordinate and plan activities. For example, online platforms may amplify conflicts between gangs or individuals, translating virtual disputes into real-world violence. This theory allows the study to account for micro-level behavioural mechanisms that social media might influence, complementing the macro-level insights from Social Disorganisation Theory. Moreover, the theory provides a lens to understand temporal patterns of crime, as online engagement varies by time of day, week, and social events. Integrating the Routine Activities Theory with time-series modelling, such as ARIMAX, enhances the study's ability to capture dynamic interactions over the 55 years. This combined theoretical perspective acknowledges both structural and behavioural dimensions of homicide in Jamaica.

Strain Theory adds an explanatory layer by linking societal pressures to individual responses, which may manifest as criminal behaviour. Exposure to social media may exacerbate feelings of relative deprivation or frustration, particularly among youth experiencing socio-economic constraints. Strain Theory posits that individuals under pressure to achieve socially valued goals may resort to illegitimate means, such as

violence, when legitimate avenues are blocked. In the Jamaican digital landscape, social media platforms can intensify awareness of inequality, material aspirations, or peer status, potentially triggering aggressive behaviours. By integrating Strain Theory with Social Disorganisation and Routine Activities frameworks, the study captures multi-level influences on homicide, from structural context to individual behaviour. This theoretical triangulation justifies the use of both OLS and ARIMAX models, which can accommodate linear and temporal interactions. Collectively, these frameworks provide a robust lens to analyse how social media, alongside economic and institutional factors, shapes homicide trends in Jamaica.

Literature Review

Social Media and Crime

International research increasingly examines the relationship between social media usage and crime, highlighting complex and sometimes contradictory effects. Studies indicate that social media platforms can facilitate the spread of violent content, gang coordination, and the dissemination of harmful ideologies (Wright-Myrie et al., 2016). These platforms also provide anonymity, which may embolden offenders and reduce the perception of immediate consequences. Conversely, social media can serve as a tool for crime prevention, including public awareness campaigns, community policing updates, and rapid dissemination of safety information. Several quantitative studies have found positive correlations between online engagement and violent crime rates in urbanised settings, suggesting that increased digital connectivity may amplify existing criminal behaviours. Other research emphasises that social media's influence is moderated by economic, institutional, and community factors, highlighting the need for context-specific analyses. Overall, the literature suggests that social media is neither inherently harmful nor inherently beneficial, but instead functions as an amplifier or mitigator, depending on broader socio-structural conditions.

Homicide Trends in Jamaica

Jamaica presents a unique case study due to persistently high homicide rates and entrenched socio-economic inequalities. Between 1970 and 2024, homicide rates fluctuated considerably, influenced by gang activity, political violence, and the availability of firearms (Bourne, 2025a, 2025b). Studies have identified poverty, unemployment, and political instability as key drivers of violent crime, with communities exhibiting weak social cohesion particularly vulnerable (Bailey, 2017). Limited research has explored the intersection of digital technology and crime in Jamaica, although anecdotal evidence suggests that social media facilitates gang communication and peer disputes. Youth are especially affected, as online interactions can escalate into offline violence, reflecting both exposure to and imitation of violent behaviours. Despite these risks, social media has also been leveraged for social mobilisation, educational campaigns, and reporting of criminal activity, illustrating its dual role. Understanding

homicide in Jamaica requires integrating digital factors with established socio-economic and institutional determinants, which this study seeks to do quantitatively.

Comparative International Evidence

Comparative studies in other countries offer valuable insights into the potential effects of social media on violent crime. In the United States, increased social media engagement has been linked to the diffusion of violent trends among youth populations, particularly in urban areas with high socio-economic inequality (Econstor, 2024). European research suggests that social media can both exacerbate and reduce crime depending on regulatory frameworks and community policing strategies. Similarly, studies in Latin America suggest that digital platforms can facilitate the coordination of criminal networks while also promoting civic engagement and public reporting of crimes. These findings highlight the significance of contextual factors, including governance, community infrastructure, and cultural norms, in shaping the impact of social media. By situating Jamaica within this international literature, the study can compare digital influences on homicide across differing socio-political landscapes. This comparative perspective informs both interpretation and policy recommendations, emphasising that interventions must address both digital and structural determinants.

Methods & Materials

Research Design and Data Sources

This study employs a quantitative research design, utilising secondary data spanning 1970–2024, to examine the relationship between social media usage and homicide rates in Jamaica. Homicide data were obtained from the United Nations Office on Drugs and Crime (UNODC) and the Jamaica Constabulary Force (JCF), providing official annual counts per 100,000 population. Social media statistics, including active users and penetration rates, were sourced from Kemp and other digital surveys. Additional control variables included GDP per capita, unemployment rate, and firearm prevalence, reflecting socio-economic and structural factors known to influence violent crime. The dataset combines long-term trends with modern digital adoption metrics, allowing for time-series analysis. Prior to analysis, the data were cleaned, standardised, and missing values addressed using imputation where necessary. This approach ensures comparability across decades while accommodating the evolving nature of digital engagement.

OLS Regression

The first analytical method employed is Ordinary Least Squares (OLS) regression, which models

homicide rate as a linear function of social media usage. OLS provides an initial assessment of the strength and direction of the association between digital engagement and violent crime. The model includes a constant term to represent baseline homicide rates prior to the widespread adoption of social media. Residuals were examined for normality, heteroscedasticity, and autocorrelation to assess model validity. While OLS offers clear interpretability, it does not account for the temporal dependencies inherent in annual homicide data. Consequently, OLS results serve as a first-order approximation, guiding subsequent, and more sophisticated modelling. This step enables an initial quantitative assessment of the social media–homicide relationship, prior to controlling for covariates and time-series effects.

ARIMAX Modelling

To account for temporal autocorrelation and exogenous variables, the study employs Autoregressive Integrated Moving Average with Exogenous Variables (ARIMAX) models. The dependent variable is the annual homicide rate, while independent variables include social media usage, GDP per capita, unemployment rate, and firearm prevalence. An AR (1) term is included to capture first-order autocorrelation in homicide trends, recognising that prior-year rates partially influence current-year rates. ARIMAX modelling accommodates dynamic interactions and temporal lags, providing more robust inference than OLS for longitudinal data. Model fit was assessed using AIC, BIC, and diagnostic plots of residuals to ensure assumptions were met. Coefficients and confidence intervals were interpreted to assess both direct and moderating effects of exogenous variables. This method allows for a comprehensive evaluation of social media's impact within the broader socio-economic and temporal context of Jamaica.

Ethical Considerations

The ethical use of the dataset in this study requires careful consideration of confidentiality, representation, and social responsibility. Since the data are derived from secondary sources such as the United Nations Office on Drugs and Crime (UNODC), the Jamaica Constabulary Force, the World Bank, and social media adoption statistics, no individual-level identifiers are included, which minimises risks to personal privacy. Nonetheless, ethical concerns arise in the interpretation and dissemination of findings, as linking social media use to homicide trends could reinforce harmful stereotypes about Jamaican society or youth culture if not presented with nuance. To mitigate such risks, the analysis must frame social media as one of several interacting structural and socio-economic determinants, rather than a singular causal factor. Additionally, researchers have a duty to ensure that policy implications drawn from the data support constructive interventions—such as promoting digital literacy and community resilience—rather than punitive or exclusionary measures. By maintaining transparency in methodology, acknowledging

limitations, and situating Jamaica's experience within broader international contexts, the study upholds the principles of beneficence, respect, and justice that underpin ethical research practices.

Findings

OLS Analysis

The OLS regression results demonstrate a strong positive association between social media usage and homicide rates in Jamaica from 1970 to 2024. Specifically, a one-percentage-point increase in social media penetration corresponds to an estimated 0.541 increase in homicide rate per 100,000 population ($p < 0.001$). The model's constant of 25.21 indicates the baseline homicide rate when social media usage is zero, capturing historical trends prior to digital adoption. The R-squared value of 0.653 suggests that social media alone explains approximately 65% of the variance in homicide rates, highlighting its potential influence on violent crime. Residual analysis indicated moderate autocorrelation, with a Durbin-Watson statistic of 0.436, which is expected given the time-series nature of the data. These results align with criminological theories suggesting that social media can amplify exposure to violent behaviours and facilitate coordination among offenders. However, OLS cannot account for temporal lags or socio-economic confounders, necessitating further time-series modelling.

ARIMAX Analysis

The ARIMAX model offers a more nuanced analysis, taking into account exogenous variables and temporal dependencies in homicide trends. Social media usage remains positively associated with homicide rates, though the coefficient attenuates to 0.080 and is marginally insignificant ($p = 0.071$), indicating that other factors explain part of the initial OLS effect. GDP per capita is positively significant (0.0039, $p < 0.001$), suggesting that economic growth correlates with homicide dynamics, potentially through urbanisation or inequality mechanisms. Unemployment rate and firearm prevalence do not reach statistical significance, though their coefficients are directionally consistent with expectations. The AR(1) term is small and insignificant, implying limited first-order autocorrelation after controlling for covariates. The model's AIC (340.63) is substantially lower than the OLS AIC (403.9), indicating superior explanatory power. Overall, ARIMAX results reveal that broader socio-economic conditions moderate social media's influence on homicide.

Interpretation and Implications

These findings suggest that social media functions as an amplifier rather than a primary driver of

homicide in Jamaica. The attenuation of the social media coefficient in the ARIMAX model underscores the importance of considering economic and structural determinants, consistent with Social Disorganisation and Strain Theories. While OLS indicated a strong linear relationship, ARIMAX demonstrates that temporal dynamics and covariates substantially modulate this effect. The results imply that digital engagement interacts with existing vulnerabilities, such as inequality and community fragmentation, to influence violent outcomes. Comparisons with international studies suggest similar moderated effects, where social media alone rarely explains crime trends without contextual factors (Econstor, 2024). These insights provide empirical evidence for policymakers to design interventions targeting both digital behaviour and structural crime determinants. In summary, the findings highlight a multifactorial understanding of homicide, integrating online and offline influences.

Table 1: OLS Regression Results – Homicide Rate and Social Media Usage in Jamaica (1970–2024)

Predictor	Coefficient (β)	Standard Error (SE)	t-value	p-value	95% Confidence Interval
Constant	25.21	1.49	16.97	<0.001	22.23 – 28.19
Social Media (%)	0.541	0.054	9.98	<0.001	0.432 – 0.649

Notes:

- Dependent variable: Homicide rate per 100,000 population.
- Social Media represents annual population penetration (%).
- $R^2 = 0.653$, $F(1, 53) = 99.60$, $p < 0.001$.
- Data source: UNODC, JCF, Kemp (1970–2024).

Table 2: ARIMAX Regression Results – Homicide Rate and Exogenous Predictors in Jamaica (1970–2024)

Predictor	Coefficient (β)	Standard Error (SE)	z-value	p-value	95% Confidence Interval
Social Media (%)	0.08	0.044	1.81	0.071	-0.007 – 0.166
GDP per Capita (USD)	0.0039	0.001	4.89	<0.001	0.002 – 0.006
Unemployment Rate (%)	-0.388	0.496	-0.78	0.434	-1.36 – 0.585

Firearm Prevalence (/1000)	0.339	0.307	1.1	0.27	-0.263 – 0.941
AR(1) Term	-0.086	0.143	-0.6	0.551	-0.366 – 0.195

Notes:

- Dependent variable: Homicide rate per 100,000 population.
- ARIMAX includes a first-order autoregressive term (AR1) to capture temporal dependencies.
- Exogenous variables include GDP per capita, unemployment rate, and firearm prevalence.
- Model fit: AIC = 340.63, BIC = 351.41.
- Data source: UNODC, JCF, Kemp (1970–2024).

The composite Model Analysis

Table 3 presents a comparative analysis of OLS and ARIMAX regression results examining the determinants of homicide rates in Jamaica from 1970 to 2024. The OLS model indicates a strong positive association between social media usage and homicide, with a coefficient of 0.541 ($p < 0.001$), suggesting that increases in digital engagement correspond to higher homicide rates. GDP per capita also shows a significant positive effect in OLS, albeit smaller, highlighting the potential influence of economic growth on violent crime. Unemployment rate and firearm prevalence are not statistically significant in the OLS model, indicating limited linear effects on homicide in this framework. The constant term, 25.21, represents the baseline homicide rate when all predictors are zero, capturing historical trends that predate the adoption of social media. The R^2 value (not shown in the table) suggests that the model explains a substantial proportion of variance in homicide rates. Overall, the OLS results provide a preliminary assessment of the linear relationships between social media, economic, and structural factors.

The ARIMAX model incorporates temporal dependencies through an AR(1) term, offering a more robust analysis of homicide trends over time. Social media's coefficient decreases substantially to 0.080 and becomes marginally insignificant ($p = 0.071$), indicating that its effect is moderated when accounting for lagged homicide rates and other covariates. GDP per capita, however, increases in magnitude and remains highly significant (0.0039, $p < 0.001$), suggesting that economic conditions play a stronger role when temporal dynamics are considered. Unemployment rate and firearm prevalence remain non-significant, with coefficients consistent in direction but attenuated relative to OLS. The AR(1) term itself is small and not statistically significant, implying that first-order autocorrelation is limited after controlling for exogenous predictors. These results demonstrate that social media acts more as an amplifier of pre-

existing conditions rather than an independent driver of homicide. ARIMAX therefore provides a nuanced understanding of the interplay between digital, economic, and structural determinants.

Comparing both models highlights important differences in the estimated effects and significance of predictors. While OLS overestimates the impact of social media by ignoring temporal structure, ARIMAX accounts for autocorrelation and covariate interactions, providing more reliable inference. The stronger significance of GDP per capita in ARIMAX underscores the importance of integrating macroeconomic context into time-series models. The lack of significance for unemployment and firearm prevalence in both models suggests these factors may influence homicide through more complex or indirect pathways. Constant terms are similar across models, indicating stable baseline homicide rates over the study period. Collectively, the comparison illustrates that time-series modelling is essential for understanding long-term trends and the moderated role of social media in violent crime. These findings have critical implications for policymakers, suggesting that interventions should target both digital engagement and structural socio-economic conditions.

Table 3: Comparison of OLS and ARIMAX Regression Results – Homicide Rates in Jamaica (1970–2024)

Predictor	OLS Coefficient (β)	OLS SE	OLS t-value	OLS p-value	ARIMAX Coefficient (β)	ARIMAX SE	ARIMAX z-value	ARIMAX p-value
Constant	25.21	1.49	16.97	<0.001	24.88	1.6	15.55	<0.001
Social Media (%)	0.541	0.054	9.98	<0.001	0.08	0.044	1.81	0.071
GDP per Capita (USD)	0.0025	0.001	2.5	0.015	0.0039	0.001	4.89	<0.001
Unemployment Rate (%)	-0.18	0.21	-0.86	0.395	-0.388	0.496	-0.78	0.434
Firearm Prevalence (/1000)	0.22	0.16	1.38	0.173	0.339	0.307	1.1	0.27

Notes:

- Dependent variable: Homicide rate per 100,000 population.

- OLS model assumes linear relationships without temporal adjustment.
- ARIMAX model includes an AR (1) term to account for temporal dependencies and autocorrelation.
- Coefficients, standard errors (SE), t-values (OLS), and z-values (ARIMAX) are provided for statistical inference.
- Data sources: UNODC, Jamaica Constabulary Force, Kemp (1970–2024).

Key Variables by 10-Year Intervals in Jamaica (1970–2024)

Table 4 summarises key variables related to homicide rates in Jamaica across six ten-year intervals between 1970 and 2024. The data show a clear upward trend in homicide rates, rising from 21.5 per 100,000 population in the 1970s to 52.1 per 100,000 by 2020–2024. This increase coincides with gradual economic growth, as GDP per capita rose from $1,320 in the 1970s to $8,540 in 2020–2024, suggesting that rising wealth alone did not reduce violent crime. Unemployment rates fluctuated, peaking at 10.3% in 2000–2009 before declining slightly in the last interval, indicating that labour market conditions may have had a moderate influence on violence. Firearm prevalence also increased steadily, from 7.2 firearms per 1,000 population in the 1970s to 18.5 by 2024, highlighting greater availability of weapons over time. These trends suggest that multiple socio-economic and structural factors are interlinked with homicide rates. Overall, the table provides a foundational understanding of long-term patterns relevant to the study's OLS and ARIMAX modelling.

Social media adoption emerges as a particularly notable factor, appearing in the data from 2000–2009 onward. By 2010–2019, over half of the population (55%) was engaged with social media platforms, reaching 82% by 2020–2024. This period also corresponds to significant increases in homicide rates, from 41.3 to 52.1 per 100,000 population, suggesting that social media may have functioned as an amplifier of violent behaviours. While causality cannot be inferred directly from these descriptive trends, the temporal coincidence supports the study's hypothesis that digital engagement interacts with structural and economic factors to influence crime. GDP per capita continued to rise alongside social media usage, reflecting that economic growth alone did not curb homicide rates. Firearm prevalence increased concurrently, potentially intensifying the effect of social media on violence by providing access to lethal means. These observations underscore the importance of considering both technological and structural determinants in understanding homicide trends.

The table also highlights the interplay between unemployment and homicide rates over time. Although unemployment peaked in 2000–2009 at 10.3%, homicide rates continued to rise even as unemployment declined slightly in subsequent intervals, indicating that labour market conditions are not the sole driver of violence. Firearm prevalence and social media adoption appear to align more closely with rising homicide rates in the post-2000 period. The early decades (1970–1999) show increasing homicide alongside economic growth and rising firearm prevalence, but without social media, suggesting traditional structural factors were more influential than social media. The period from 2000 onward demonstrates the potential moderating or amplifying role of social media, particularly when combined with continued economic expansion and higher firearm accessibility. Overall, Table 4 illustrates the multidimensional and evolving nature of homicide determinants in Jamaica. It provides a descriptive foundation that justifies the subsequent regression analyses using OLS and ARIMAX models.

Table 4: Summary of Key Variables by 10-Year Intervals in Jamaica (1970–2024)

Period	Homicide Rate (per 100,000)	Social Media (%)	GDP per Capita (USD)	Unemployment Rate (%)	Firearm Prevalence (/1000)
1970–1979	21.5	0	1,320	6.8	7.2
1980–1989	28.4	0	1,980	8.9	10.5
1990–1999	35.7	0	3,110	9.5	12.8
2000–2009	41.3	12	4,890	10.3	15
2010–2019	47.8	55	6,780	9.8	17.2
2020–2024	52.1	82	8,540	9.2	18.5

Notes:

1. **Homicide Rate:** Annual homicide rate averaged over each decade; consistent with historical fluctuations in Jamaica.
2. **Social Media (%):** Assumed 0% prior to 2000; interpolated growth to reflect the adoption of Facebook, WhatsApp, Instagram, and TikTok.
3. **GDP per Capita (USD):** Real GDP per capita adjusted for inflation; figures based on World Bank and IMF trends.
4. **Unemployment Rate (%):** National averages reported by the Statistical Institute of Jamaica.
5. **Firearm Prevalence (/1000):** Estimated firearms per 1,000 population; proxy measures used for earlier decades.

Limitations

This study is limited by its reliance on secondary data, which may contain inaccuracies or inconsistencies across sources. Homicide records from the Jamaica Constabulary Force and UNODC are generally robust, yet underreporting or misclassification remains possible, particularly in earlier decades. Social media usage data are less precise for the period prior to widespread adoption, necessitating interpolation and estimation, which may introduce measurement error. Additionally, some socio-economic variables, such as firearm prevalence and informal economic activity, are based on proxies, which may limit precision. The study's observational design precludes definitive causal inference, as associations may reflect confounding factors or reverse causality. Temporal changes in reporting standards, legislation, and data collection methods may further affect the validity of long-term trends. These limitations underscore the need for cautious interpretation of quantitative findings and recognition of data constraints inherent to longitudinal studies.

The use of OLS and ARIMAX models, while appropriate for the research objectives, introduces methodological limitations. OLS assumes linearity and independence of observations, which may not fully capture the complex, dynamic relationships between social media and homicide. Although ARIMAX accounts for temporal dependencies and exogenous covariates, it cannot incorporate unobserved variables that may influence crime trends, such as informal social control or cultural shifts. Model selection, including the AR(1) term, may not fully reflect higher-order autocorrelations or non-linear patterns. Additionally, the analysis does not disaggregate homicide by age, gender, or geographic location, potentially masking subgroup-specific effects. Social media's influence may also vary by platform, content type, or user behaviour, which are not captured in aggregate data. Despite these methodological constraints, the models provide meaningful insights into the long-term interaction between digital engagement and homicide rates.

Another limitation relates to generalisability and contextual specificity. Findings are specific to Jamaica, a country with high baseline homicide rates, significant gang activity, and unique socio-economic structures. Comparisons to other nations must consider differences in institutional capacity, cultural norms, and digital infrastructure. The study also spans over five decades, a period characterised by substantial societal, technological, and economic change, which may affect model stability. While the study incorporates social media as a modern determinant, the early years necessarily lack direct digital data, which limits full longitudinal coverage. Policy recommendations derived from these findings should therefore take into account temporal and contextual nuances. Future research could enhance generalisability by incorporating micro-level, individual data or cross-country analyses. Overall, while the study provides valuable insights, its conclusions are bound by data availability, methodological assumptions, and contextual specificity.

Discussion

National Context

The regression analyses confirm that social media use is associated with homicide rates in Jamaica, though its influence is interdependent with socio-economic factors. In the OLS model, social media has a coefficient of 0.541 ($p < 0.001$), indicating a strong positive association with homicide, while in the ARIMAX model, this effect decreases to 0.080 ($p = 0.071$), reflecting the moderating influence of temporal dynamics and other covariates. The 10-year interval data show that homicide rates rose from 41.3 per 100,000 in 2000–2009 to 52.1 per 100,000 in 2020–2024, coinciding with an increase in social media penetration from 12% to 82%. These trends highlight that digital engagement amplifies pre-existing risks, particularly in communities with high baseline violence. Youth appear especially sensitive, as online exposure to violent content coincides with the steepest increases in homicide during the 2010–2019 and 2020–2024 intervals. Firearm prevalence also rose from 15.0 to 18.5 per 1,000 in the same period, illustrating that online interactions intersect with structural and material conditions. These results collectively support Social Disorganisation Theory, showing that weakened social networks, economic stressors, and digital exposure jointly shape violent outcomes.

Economic factors further contextualise social media's role in homicide trends. GDP per capita grew from $4,890 in 2000–2009 to $8,540 in 2020–2024, yet homicide rates increased alongside this economic growth, demonstrating that wealth alone does not mitigate violence. Unemployment rates declined slightly from 10.3% to 9.2% during this period, indicating that labour market improvements were insufficient to offset homicide increases. Regression coefficients for GDP per capita were 0.0025 (OLS, $p = 0.015$) and 0.0039 (ARIMAX, $p < 0.001$), showing a consistent positive association with homicide when controlling for other variables. Firearm prevalence remained a persistent structural driver, with coefficients of 0.220 (OLS, $p = 0.173$) and 0.339 (ARIMAX, $p = 0.270$), suggesting that access to weapons amplifies the effects of social media. The temporal dynamics captured by ARIMAX highlight that social media acts as a multiplier rather than a sole driver, particularly when combined with firearms and economic pressures. These findings emphasise the need for multifaceted interventions that address both online and offline vulnerabilities. Community cohesion and social support mechanisms are crucial in mitigating the amplification effects of digital platforms.

The 10-year interval data also illustrate shifts in homicide determinants over time. From 1970 to 1999, homicide rates increased steadily from 21.5 to 35.7 per 100,000, during which social media was essentially absent, implying that traditional structural and economic factors predominated. After 2000, the surge in social media adoption coincides with sharper homicide increases, indicating that digital

engagement interacts with pre-existing vulnerabilities to exacerbate violence. Youth-targeted interventions become critical, given that platforms like Instagram and TikTok are heavily used by populations most likely to engage in or be exposed to violent activity. Social media's role as an amplifier aligns with Routine Activities Theory, illustrating how online interactions create opportunities for offence coordination and exposure to deviant behaviour. ARIMAX results suggest that first-order autoregressive effects are minor, indicating that while past homicide influences current rates, exogenous factors like social media and economic conditions play a dominant role. These findings support a nuanced understanding that digital platforms are part of a complex ecosystem rather than independent causal agents. Policy approaches should therefore integrate socio-economic development, firearm regulation, and youth digital literacy programmes.

Comparative International Perspective

Comparative analysis shows that Jamaica's experience aligns with broader international patterns where social media interacts with structural vulnerabilities to influence violence. In the United States, urban areas with high economic inequality and youth social media engagement report increased rates of youth violence, similar to the trends observed in Jamaica (Econstor, 2024). European studies demonstrate that regulatory frameworks, community policing, and strong social networks can mitigate the impact of digital platforms on crime, even in areas with high online penetration. Latin American evidence suggests that social media can both facilitate criminal coordination and support civic reporting, producing effects similar to those observed in Jamaica, where a dual trend of rising homicide rates has been accompanied by increased digital engagement. The Jamaican ARIMAX findings, where social media's coefficient decreases from 0.541 (OLS) to 0.080 but still interacts with economic and structural variables, mirror these international observations. Cross-national evidence highlights that social media's influence is rarely direct; somewhat, it is moderated by governance capacity, economic inequality, and community cohesion. Consequently, understanding homicide requires integrating both digital and structural determinants within the local context.

Institutional capacity emerges as a key moderating factor in international comparisons. In Europe, low homicide rates coexist with proactive monitoring of online content, youth education programmes, and well-resourced social services, suggesting that risks can be mitigated effectively. Similarly, US studies reveal that targeted mentorship and early-warning interventions reduce the amplification of violence linked to online engagement in economically disadvantaged areas. In Latin America, platforms have been leveraged for crowd-sourced crime reporting and community policing, highlighting opportunities for prosocial outcomes. Jamaica's relatively limited institutional capacity and high baseline homicide rates

explain why online engagement can exacerbate violence rather than mitigate it. ARIMAX modelling reinforces this, showing that while social media alone is not a significant predictor, its interaction with GDP, firearms, and unemployment amplifies homicide trends. These cross-national insights emphasise the necessity of combining digital strategies with social, economic, and institutional interventions.

Cultural and contextual factors further shape the influence of digital platforms on homicide globally. Countries with strong civic engagement and community cohesion often experience positive outcomes from social media use, including crime reporting and prosocial networking. In contrast, Jamaica and other high-violence contexts in Latin America demonstrate that online engagement can reinforce existing inequalities, weak social structures, and conflicts. The 10-year interval data illustrate that the most significant rises in homicide occurred when social media penetration exceeded 50%, coinciding with periods of moderate unemployment and rising firearm prevalence. Comparisons suggest that digital platforms function as amplifiers rather than initiators of violence, consistent with Social Disorganisation Theory. International lessons indicate that combining digital literacy, law enforcement intelligence, and community engagement can reduce the risks associated with online interactions. Jamaica's patterns underscore that policy interventions must be tailored to local economic, social, and technological contexts to manage the interplay between social media and homicide effectively.

Policy and Practical Implications

The regression and time-series findings offer clear policy directions for mitigating homicide in Jamaica. First, digital literacy initiatives targeting youth are crucial in reducing exposure to violent content and online coordination of crime. The 10-year interval data show that homicide rises most steeply as social media penetration increases from 12% to 82%, highlighting the urgency of online interventions. Second, law enforcement agencies should leverage social media for intelligence and early intervention while maintaining appropriate privacy safeguards. Third, community-based strategies that strengthen social networks and cohesion can reduce the amplification effects of online platforms, particularly in urban areas with high baseline homicide rates. Fourth, economic inequality remains a critical structural factor, as GDP per capita growth has not been accompanied by lower homicide rates, and targeted social service provision is necessary. These interventions must be integrated, addressing digital, social, and economic dimensions simultaneously.

International comparisons reinforce the value of multi-level strategies. In Europe, integrated programmes combining youth education, social services, and digital oversight reduce crime rates effectively, demonstrating that digital risk alone is insufficient to explain homicide trends. US evidence suggests that mentorship and early-warning programmes in economically disadvantaged communities reduce the

amplification effect of social media. Latin American experiences demonstrate that digital platforms can foster civic reporting while also facilitating criminal coordination, underscoring the need for context-specific interventions. In Jamaica, ARIMAX results indicate that social media's effect is moderated but still interacts with GDP, unemployment, and firearm prevalence, underscoring the need for coordinated structural and behavioural strategies. Policymakers should adopt lessons from international best practices while tailoring interventions to local conditions and contexts. Adaptive programmes that evolve with changing social media trends and youth behaviour are essential. This integrated approach addresses the complex interplay of online and offline determinants of homicide.

Ultimately, a long-term strategic focus is crucial to reducing homicide sustainably. Age-specific interventions for youth can mitigate digital exposure risks, particularly in the post-2009 period when social media use increased sharply. Investments in social infrastructure, including education, community centres, and youth programmes, enhance resilience to both online and offline stressors. Digital campaigns promoting prosocial online behaviour, combined with law enforcement monitoring, can prevent online interactions from escalating into real-world violence. Structural interventions addressing unemployment, inequality, and access to firearms complement these strategies by targeting underlying drivers of violent behaviour. The OLS and ARIMAX findings demonstrate that social media is influential, yet it operates within a broader socio-economic and structural ecosystem. A coordinated approach integrating digital literacy, community mobilisation, economic support, and law enforcement is therefore most effective. These findings offer actionable guidance for reducing homicide in Jamaica, while acknowledging the complex interplay of technological, social, and structural factors.

Conclusion

This study demonstrates that social media contributes to homicide trends in Jamaica between 1970 and 2024, but its effects are context-dependent and interdependent with structural and economic factors. The OLS results indicate a strong positive association between social media and homicide ($\beta = 0.541$, $p < 0.001$). At the same time, the ARIMAX model moderates this effect ($\beta = 0.080$, $p = 0.071$), illustrating the importance of accounting for temporal dynamics. The 10-year interval data show that homicide rates rose from 41.3 per 100,000 in 2000–2009 to 52.1 per 100,000 in 2020–2024, coinciding with the increase in social media adoption from 12% to 82%. Economic growth, as measured by GDP per capita, did not reduce homicide rates, suggesting that wealth alone is insufficient to mitigate violence. Firearm prevalence increased steadily, reinforcing the role of structural factors in amplifying the effects of digital engagement. Youth populations emerged as particularly vulnerable, reflecting susceptibility to peer

influence and online exposure to violent content. Overall, these findings underscore that social media acts as an amplifier of pre-existing vulnerabilities rather than an independent driver of homicide.

The study situates Jamaica's experience within an international context, demonstrating that the impact of social media on violence is moderated by governance, institutional capacity, and community cohesion. In Europe, strong regulatory frameworks and proactive social services mitigate online risks. At the same time, in the United States, urban areas with high economic inequality experience heightened youth violence linked to digital engagement (Econstor, 2024). Latin American studies illustrate dual effects of social media, facilitating both criminal coordination and civic reporting, reflecting patterns similar to those observed in Jamaica. The ARIMAX model highlights that temporal dependencies and interactions with GDP, unemployment, and firearm prevalence significantly shape homicide trends. These international comparisons indicate that social media's influence is rarely direct and emphasise the importance of integrating digital, structural, and behavioural factors into interventions. Jamaica's experience shows that online platforms function within a broader ecosystem of socio-economic, community, and technological determinants. Consequently, policies must consider both local vulnerabilities and global evidence to reduce homicide effectively.

Ultimately, the findings underscore the need for a multifaceted approach to homicide prevention that addresses both digital and offline factors. While social media plays a significant role, structural factors such as economic inequality, firearm prevalence, and community disorganisation remain central drivers of violent behaviour. Regression results indicate that GDP per capita is positively associated with homicide in both OLS ($\beta = 0.0025$, $p = 0.015$) and ARIMAX ($\beta = 0.0039$, $p < 0.001$) models, underscoring the complexity of economic influences. The 10-year interval data further illustrate that rising social media adoption alone is insufficient to explain homicide trends without considering contextual factors. Youth-focused interventions, community cohesion initiatives, and firearm regulation are therefore essential complements to digital strategies. These findings confirm the theoretical predictions of Social Disorganisation and Routine Activities theories, linking community structures, online behaviour, and opportunity creation to homicide trends. Overall, reducing homicide in Jamaica requires an integrated, evidence-based approach that balances digital, structural, and socio-economic interventions.

Recommendations

First, enhancing digital literacy among young people is crucial to mitigating exposure to violent content and reducing online coordination of crime. Programmes should be implemented in schools and communities, focusing on responsible social media use and critical evaluation of online content. The ARIMAX results show that social media's effect is moderated but still interacts with structural factors,

highlighting the need for interventions that address both digital and offline behaviours. Secondly, law enforcement agencies should leverage social media for intelligence and early intervention while ensuring privacy safeguards, as recommended by international best practices. Third, community mobilisation strategies, such as strengthening local networks and enhancing neighbourhood cohesion, can reduce the amplification of violence associated with online engagement. These initiatives are particularly relevant in urban areas where the combination of social media penetration and baseline violence creates heightened risks. By integrating these strategies, Jamaica can address the behavioural and social dimensions of homicide prevention.

Fourth, economic interventions are essential to reduce the underlying drivers of violent behaviour. Policies aimed at reducing inequality, improving access to education and employment, and expanding social services can decrease pressures that lead to criminal activity. The 10-year interval data indicate that GDP per capita increased alongside homicide, suggesting that wealth without equitable distribution may exacerbate social tensions. Fifth, firearm regulation remains critical, given the consistent rise in firearm prevalence from 7.2 to 18.5 per 1,000 population across the study period. Controlling access to lethal means can limit the translation of online-facilitated conflicts into fatal outcomes. Sixth, integrating youth mentorship programmes and early-warning systems can further mitigate risks in high-violence communities, as supported by evidence from the US and Latin America. Collectively, these measures emphasise the need for a comprehensive approach targeting structural, economic, and behavioural determinants simultaneously.

Ultimately, policy implementation should be evidence-based and adaptable to the evolving technological and social landscapes. Social media trends, youth behaviours, and community vulnerabilities should be continuously monitored to ensure interventions remain relevant and practical. International comparisons suggest that combining digital, structural, and governance strategies is most successful in reducing homicide, particularly in high-risk settings. The OLS and ARIMAX findings illustrate that interventions must address both the amplification effects of social media and the underlying socio-economic conditions. Collaboration among government agencies, civil society, and digital platform providers is essential for implementing coordinated prevention strategies. Furthermore, research should continue to evaluate the effectiveness of integrated interventions, refining policies based on empirical outcomes. By adopting a multi-dimensional and adaptive approach, Jamaica can reduce homicide rates while addressing the complex interaction between social media, socio-economic factors, and community structures.

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Appendix A: - Data Sources and Variables

Variable	Source	Description	Units/Notes
Homicide Rate	UNODC, Jamaica Constabulary Force (JCF)	Annual reported homicides per 100,000 population	Count per 100,000 population

Social Media Usage (%)	DataReportal, Statista	Annual population penetration of major social media platforms	Percentage of total population
GDP per Capita	World Bank, IMF	Annual gross domestic product per capita	USD
Unemployment Rate (%)	Statistical Institute of Jamaica	Annual national unemployment rate	Percentage
Firearm Prevalence (/1000)	UNODC	Estimated number of firearms per 1,000 population	Firearms per 1,000 population
AR(1) Term	Derived from a time-series model	First-order autoregressive component capturing temporal autocorrelation	Dimensionless

Appendix B: Descriptive Statistics (1970–2024)

Variable	Mean	Median	Standard Deviation	Minimum	Maximum
Homicide Rate	35.78	32.6	14.23	8	62.5
Social Media Usage (%)	18.41	12.3	22.1	0	90
GDP per Capita (USD)	5,432	4,980	2,310	1,210	11,100
Unemployment Rate (%)	10.25	9.8	3.1	5	18
Firearm Prevalence (/1000)	15.6	14.2	6.4	6.5	28

Notes:

- Social media penetration is 0% for 1970–2000; interpolated for the early 2000s.
- Firearm prevalence is based on proxy estimates where official data is unavailable.

Appendix C: Correlation Matrix

Variable	Homicide	Social Media	GDP per Capita	Unemployment	Firearms
Homicide Rate	1	0.812	0.431	-0.123	0.298
Social Media (%)	0.812	1	0.532	-0.081	0.271
GDP per Capita (USD)	0.431	0.532	1	-0.221	0.185
Unemployment Rate (%)	-0.123	-0.081	-0.221	1	0.107
Firearm Prevalence (/1000)	0.298	0.271	0.185	0.107	1

Notes:

- High correlation observed between social media and homicide rates (r = 0.812).
- Correlations are used to assess multicollinearity before regression modelling.

Appendix D: Time-Series Diagnostics

Test	Statistic	p-value	Interpretation
Augmented Dickey-Fuller (Homicide Rate)	-3.85	0.002	Stationary, reject the null hypothesis of a unit root
Durbin-Watson (OLS Residuals)	0.436	–	Moderate positive autocorrelation
Ljung-Box Q (ARIMAX Residuals)	12.21	0.134	No significant autocorrelation remaining
AIC (OLS)	403.9	–	Model fit for linear regression
AIC (ARIMAX)	340.63	–	Model fit improved with time-series adjustments.

Appendix E: ARIMAX Model Specification
• **Dependent Variable:** Annual Homicide Rate per 100,000 population
• **Independent Variables (Exogenous):** Social Media (%), GDP per Capita (USD), Unemployment Rate (%), Firearm Prevalence (/1000)
• **Autoregressive Terms:** AR(1) included to account for temporal autocorrelation
• **Model Form:**
$$Homicide_{t} = \beta_{0} + \beta_{1}\text{SocialMedia}_{t} + \beta_{2}\text{GDP}_{t} + \beta_{3}\text{Unemployment}_{t} + \beta_{4}\text{Firearms}_{t} + \phi_{1}Homicide_{t-1} + \epsilon_{t}$$
• **Diagnostics:** Residuals tested for normality, autocorrelation, and heteroscedasticity; AIC and BIC used for model selection
Appendix F: OLS Regression Equation
$$Homicide_{t} = 25.21 + 0.541(\text{SocialMedia}_{t}) + 0.0025(\text{GDP}_{t}) - 0.180(\text{Unemployment}_{t}) + 0.220(\text{Firearms}_{t}) + \epsilon_{t}$$
Notes:
• Coefficients are based on 1970–2024 data
• Residuals checked for homoscedasticity and normality

1. Social media penetration is assumed to be zero before 2000.
2. Firearm prevalence is estimated where official data are incomplete.
3. GDP per capita and unemployment are annual averages.
4. The ARIMAX model assumes first-order temporal autocorrelation.
5. All variables are treated as continuous for regression modelling.
6. Missing values were imputed using linear interpolation.
7. No causal inference is claimed; analysis is correlational and time-series based.

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