World Journal of Advanced Research and Reviews
eISSN: 2581-9615 CODEN (USA): WJARAI
Cross Ref DOI: 10.30574/wjarr
Journal homepage: https://wjarr.com/

(REVIEW ARTICLE)

Digital redlining: AI Infrastructure and Environmental Racism in Contemporary America

Mario DeSean Booker *

Department of Information Technology, School of Business and Information Technology, Purdue University Global, United States.

World Journal of Advanced Research and Reviews, 2025, 27(01), 974-988

Publication history: Received on 31 May 2025; revised on 05 July 2025; accepted on 08 July 2025

Article DOI: https://doi.org/10.30574/wjarr.2025.27.1.2602

Abstract

When tech giants build massive AI data centers, where do they choose to put them? This study reveals a disturbing pattern: companies consistently dump pollution on Black and Brown neighborhoods while building cleaner facilities in white communities. We call this "digital redlining" -- a modern twist on the racist housing policies that segregated American cities decades ago. Just as banks once drew red lines around Black neighborhoods to deny them loans, tech companies now target these same communities for environmental harm.

We studied three cases: xAI's Memphis facility in historically Black South Memphis, Meta's proposed data center in predominantly Black East Cleveland, and Facebook's pristine Prineville campus in a community that's 87% white. Elon Musk's xAI operates illegal gas turbines that spew dangerous chemicals into neighborhoods where cancer rates already run four times the national average. Meanwhile, Facebook's Oregon facility meets the highest environmental standards and receives millions in community grants. By overlaying historical redlining maps with current facility locations, a clear pattern emerges.

Using critical race methodology and comparative case analysis, we examined demographic data, environmental impacts, and corporate decision-making processes across these facilities. The evidence shows these aren't random business decisions -- they're calculated choices that exploit racial power imbalances. Companies systematically target communities with limited political power while avoiding wealthier, whiter areas.

This research exposes how supposedly neutral technology perpetuates racial inequality. Without intervention, digital redlining will create new geographies of environmental injustice lasting generations.

Keywords: Digital Redlining; Environmental Racism; AI Infrastructure; Environmental Justice; Spatial Inequality

1. Introduction

The AI boom isn't just changing technology it's repeating America's ugliest history. When tech giants decide where to build their massive data centers, they're making the same racist choices that banks made in the 1930s when they drew red lines around Black neighborhoods.

Take Elon Musk's supercomputer in Memphis. He didn't pick just any neighborhood he chose South Memphis, where 64% of residents are Black and the community already suffers from decades of industrial abuse. His facility runs 35 illegal gas turbines that pump out formaldehyde and other toxins into neighborhoods where cancer rates run four times the national average. Residents are surrounded by 17 toxic waste sites. Musk knew this when he moved in.

* Corresponding author: Mario DeSean Booker, Ph.D

This isn't coincidence. It's strategy.

The pattern repeats nationwide. AI facilities cluster in communities of color already choking on pollution, while cleaner facilities with better environmental standards end up in whiter, wealthier areas. Companies dress up these decisions with fancy talk about "economic development" and "innovation hubs." But the math is simple: dump pollution on Black and Brown folks, send profits to white suburbs.

This research asks a critical question: How does AI infrastructure placement perpetuate environmental racism? The answer reveals a systematic targeting of vulnerable communities that treats Black and Brown lives as expendable in service of technological progress.

We're calling this "digital redlining" because it works exactly like the old redlining—just with fiber optic cables instead of mortgage contracts. Same playbook, new technology. Banks once refused loans to Black neighborhoods. Now tech companies refuse clean air.

Digital redlining represents the evolution of racial spatial control for the digital age. While historical redlining used explicit racial language to segregate cities, today's version operates through supposedly neutral market decisions that consistently harm communities of color. The mechanisms have changed, but the outcomes remain devastatingly familiar.

This matters because AI infrastructure is exploding across America without any racial equity oversight. Companies are making billion-dollar siting decisions at breakneck speed, often bypassing normal environmental review processes. Every month of delay in addressing this crisis means more toxic facilities dumped on Black and Brown communities.

Academic research has largely ignored how AI infrastructure reproduces racial inequality. Studies focus on algorithmic bias or workforce diversity while missing the fundamental environmental justice issues. This research fills that gap by applying critical race theory to technology infrastructure, revealing how digital progress depends on racial exploitation.

The stakes couldn't be higher. AI represents the fastest-growing industrial sector in America. Without intervention, digital redlining will create new geographies of environmental injustice lasting generations. We need anti-racist policies now, before this pattern becomes permanently entrenched in America's technological landscape.

This study analyzes three strategic cases that reveal digital redlining's operation: xAI's Memphis facility targeting Black communities, Meta's Louisiana data center impacting rural Black populations, and Facebook's Prineville campus receiving preferential treatment in a predominantly white area. Using comparative case analysis, we examine demographic data, environmental impacts, and decision-making processes to document systematic patterns of environmental racism. The research combines historical redlining maps with contemporary facility placement to reveal statistical correlations between past discrimination and present-day AI infrastructure decisions. The findings from this research establish an anti-racist policy framework for AI governance, including community consent requirements, cumulative impact assessments, and environmental justice screening for all major technology infrastructure projects.

2. Literature Review: Environmental Racism and Technology Infrastructure

2.1. Environmental Racism Theory

Robert Bullard's pioneering 1983 Houston study fundamentally established environmental racism as a systematic pattern rather than coincidence. Investigating waste facility placement for a civil rights lawsuit, Bullard documented that all five city-owned garbage dumps, six of eight incinerators, and three of four privately owned landfills operated in Black neighborhoods, despite African Americans comprising only 25% of Houston's population (Bullard, 1983). This spatial analysis introduced the "path of least resistance" concept—the tendency to site unwanted facilities in communities with limited political power to resist.

Bullard's methodology revealed that environmental racism represented deliberate policy choices directing hazards toward communities of color while protecting white neighborhoods. His subsequent work "Dumping in Dixie" (1990) documented similar patterns across multiple states, proving race operated as an independent factor in environmental risk distribution beyond socioeconomic status. The Commission for Racial Justice's 1987 national study confirmed these findings, showing three out of five African American and Hispanic Americans lived in communities with uncontrolled toxic waste sites, establishing environmental racism as systematic institutional behavior affecting millions (Commission for Racial Justice, 1987).

Environmental justice scholarship has evolved to understand these patterns through the concept of "sacrifice zones"—communities systematically designated as acceptable locations for environmental harm in service of broader economic interests. As Bullard observed in later work, environmental racism operates through interconnected systems that concentrate multiple environmental hazards in vulnerable communities, creating cumulative exposure burdens (Bullard, 2008).

Contemporary research demonstrates that these patterns persist across different industries and time periods, revealing environmental racism as an ongoing structural force rather than historical artifact. Perry et al. (2021) argue that structural racism should be classified as an environmental exposure itself, noting that geography functions as "a fundamental implement of racism" in contemporary environmental health disparities. Their analysis shows how environmental epidemiology has systematically excluded communities of color from research while failing to address racism as a root cause of environmental health disparities.

2.2. Digital Redlining and Spatial Technology Justice

Historical redlining practices established spatial frameworks that continue to influence contemporary environmental outcomes. The federal Home Owners' Loan Corporation's 1930s "residential security maps" used explicitly racial criteria to designate neighborhoods as investment risks, employing language that described areas with "infiltration of a lower grade population" as unsuitable for federal loan support (Rothstein, 2017). These maps created lasting geographic patterns of disinvestment that extend far beyond their original housing market applications.

Recent empirical research has documented the persistence of redlining's environmental effects across multiple decades. Lane et al. (2022) conducted a comprehensive analysis of air quality data from 202 U.S. cities, finding strong correlations between historical redlining grades and contemporary pollution levels. Their research revealed that pollution levels maintain consistent associations with historical Home Owners' Loan Corporation designations, with particularly pronounced nitrogen dioxide disparities between neighborhoods originally graded as "best" versus those marked as "hazardous."

This spatial analysis demonstrates that historical discriminatory policies created environmental disparities affecting 45 million Americans living in formerly mapped areas. Lane et al.'s findings show that air pollution disparities by redlining grade exceed those by race and ethnicity alone, indicating how institutionalized spatial segregation produces environmental health effects that persist across generations (Lane et al., 2022).

Complementary research has documented how redlining's effects extend beyond air quality to multiple environmental indicators. Hoffman et al. (2020) found that historically redlined neighborhoods experience significantly higher surface temperatures and reduced tree canopy coverage compared to non-redlined areas within the same metropolitan regions. These studies reveal how discriminatory housing policies created environmental vulnerabilities that compound over time.

Digital technology infrastructure has emerged as a contemporary mechanism through which these spatial inequalities reproduce and evolve. Sanders and Scanlon (2021) document how digital access disparities systematically affect low-income populations, people of color, older adults, Native Americans, and rural residents, creating what they term "digital redlining." Their research establishes digital equity as a human rights issue, building on the United Nations General Assembly's 2016 declaration that internet access constitutes a fundamental right.

Friedline and Chen (2021) provide empirical evidence of digital redlining's operation in financial technology markets. Their zip code-level analysis documented that each percentage point increase in a community's African American population correlated with an 18% decrease in high-speed internet access, along with reduced smartphone ownership and diminished access to online financial services. This research demonstrates how digital infrastructure decisions reproduce historical patterns of spatial discrimination through contemporary technological systems.

However, existing digital redlining scholarship primarily examines access and adoption patterns while overlooking the environmental consequences of digital infrastructure placement. The physical facilities supporting digital technologies data centers, server farms, and telecommunications infrastructure—represent substantial industrial operations with significant environmental impacts that require systematic analysis through environmental justice frameworks.

2.3. Research Gap and Theoretical Framework

This study introduces "digital redlining" as a framework for understanding how technology infrastructure placement systematically concentrates environmental burdens in communities of color while directing economic benefits toward

predominantly white areas. Unlike historical redlining's explicit racial criteria, digital redlining operates through ostensibly neutral market-based narratives that obscure discriminatory spatial outcomes.

Building on Lane et al.'s (2022) demonstration that contemporary pollution disparities reflect legacies of structural racism embedded in federal policy-making, this framework analyzes how digital infrastructure development continues historical patterns of spatial discrimination. Digital redlining represents an evolution of the "path of least resistance" logic Bullard identified, adapted for twenty-first-century technological infrastructure while maintaining consistent patterns of environmental burden concentration in communities of color.

Current artificial intelligence governance scholarship focuses predominantly on algorithmic bias, data privacy, and workforce diversity while systematically overlooking infrastructure placement decisions and their environmental consequences. This gap reflects what Ergene et al. (2024) identify as "silences and erasures" in management and organization studies regarding environmental racism. Their analysis reveals how technological solutions frequently overlook or exacerbate racial injustices, calling for analytical shifts from "uncritical endorsement of global technologies" to examination of local impacts on marginalized communities.

The rapid expansion of AI infrastructure creates urgent analytical needs, as companies make billion-dollar facility placement decisions at unprecedented speeds, often circumventing traditional environmental review processes. Without governance frameworks informed by environmental justice research—such as Lane et al.'s documentation of redlining's persistent effects—digital redlining threatens to establish new geographic patterns of environmental injustice that will persist for decades.

This research contributes to environmental justice scholarship by extending environmental racism analysis to emerging technology industries. Following Perry et al.'s (2021) call for research that names racism as a root cause rather than treating race as a statistical control variable, this study centers racial inequality in technology infrastructure analysis. The framework provides theoretical tools for developing anti-racist AI governance policies that prevent emerging technologies from becoming additional mechanisms of racial environmental domination.

Contemporary technology infrastructure decisions occur within spatial contexts shaped by decades of discriminatory policies, making environmental justice analysis essential for understanding their societal impacts. By connecting historical environmental racism research with contemporary digital infrastructure development, this study addresses critical gaps in both environmental justice and technology studies scholarship.

3. Methodology: critical race case study analysis

3.1. Research Design

This study uses critical race methodology to examine where AI companies choose to build their facilities and why. The approach treats race as the primary factor driving these decisions rather than a background demographic variable (Delgado & Stefancic, 2017). While companies claim their site selection is purely economic, critical race theory helps reveal how supposedly neutral business decisions consistently burden Black and Brown communities while benefiting white ones.

The research examines three AI facilities selected specifically for their contrasting community demographics. Comparing how the same types of companies behave in Black versus white neighborhoods exposes patterns that individual case studies might miss. This comparative approach has limitations—three cases cannot represent all AI infrastructure decisions but it provides enough evidence to demonstrate systematic targeting patterns.

The study combines demographic analysis with document review to understand both what happens and how it happens. Census data shows which communities get selected for facilities, while corporate documents and community responses reveal the decision-making processes behind these choices. This mixed approach acknowledges that numbers alone cannot capture the full experience of environmental racism, but stories without data often fail to persuade skeptics.

3.2. Case Selection and Data Sources

3.2.1. Cases Selected by Racial Demographics

The three cases were chosen to maximize demographic contrast while representing different regions and company types. This selection strategy prioritizes revealing patterns over achieving statistical representativeness.

Memphis, Tennessee provides the starkest example of environmental targeting. Elon Musk's xAI facility sits in South Memphis, where 64% of residents are Black and the community already faces elevated health risks. The company operates gas turbines without required permits in an area already burdened by industrial pollution. Local officials signed confidentiality agreements that excluded residents from decision-making about the facility's environmental impacts.

East Cleveland, Ohio represents systematic targeting of economically vulnerable Black communities. With 93% Black residents, the city exemplifies communities that corporations view as unlikely to mount effective resistance. Decades of disinvestment have weakened local political capacity, creating the conditions that make East Cleveland attractive for companies seeking minimal oversight.

Prineville, Oregon serves as the contrast case. Facebook's facility operates in a community that is 85% white with minimal Black population. Here, the same industry demonstrates different behavior—achieving environmental certifications, using renewable energy, and maintaining transparent community relationships. The demographic difference is the most obvious explanation for this behavioral change.

3.3. Data Sources and Limitations

3.3.1. Demographic Analysis

Census data from 1940-2020 tracks how these communities became demographically distinct and economically vulnerable. This historical data helps explain current targeting patterns but cannot prove direct causation between past discrimination and present facility placement.

3.3.2. Spatial Analysis

Comparing historical redlining maps with current AI facility locations reveals geographic correlations between past discrimination and present infrastructure decisions. While suggestive, this analysis cannot definitively establish that companies deliberately follow historical redlining patterns.

3.3.3. Corporate Documents

Public records including environmental assessments, permit applications, and company communications provide insight into official rationales for site selection. However, these documents reflect public justifications rather than internal decision-making processes, limiting their analytical value.

3.3.4. Community Documentation

Public meeting records, environmental justice reports, and media coverage capture community responses to facility development. This documentation provides crucial perspectives often missing from academic research, though it may overrepresent the most organized community voices.

Research Limitations

This study cannot access internal corporate communications or interview decision-makers directly. The analysis relies on publicly available information and may miss important aspects of the site selection process. Additionally, focusing on three cases risks overgeneralization, though the stark demographic contrasts suggest broader patterns worth investigating.

The research design acknowledges these constraints while arguing that the available evidence reveals concerning patterns in AI infrastructure placement. Perfect data is impossible in studies of ongoing corporate discrimination, but the combination of demographic analysis, spatial correlation, and community documentation provides sufficient evidence to identify systematic environmental targeting of communities of color.

Ethical Approval

The present research work does not contain any studies performed on animals/humans' subjects by any of the authors. This study relies exclusively on publicly available documents, census data, corporate records, and published reports.

4. Case study analysis

4.1. Memphis, Tennessee - xAI Colossus: Environmental Racism in Action

4.1.1. Racial Demographics and Historical Context

South Memphis tells a story that's been repeated across America for generations. Walk through these neighborhoods today and you'll find that 64% of residents are Black, with families trying to get by on a median income of $31,000—less than half what most American families earn (U.S. Census Bureau, 2020). But these numbers didn't happen by accident. They're the result of nearly a century of deliberate choices that pushed Black families into certain areas while keeping them out of others.

Back in the 1930s, federal housing officials literally drew red lines around South Memphis on their maps, marking it as "hazardous" for government-backed home loans. Their reason? What they called the "infiltration of undesirable population" (Mapping Inequality, 2023). Those red lines became a blueprint for where Memphis would put its dirtiest industries for decades to come—in neighborhoods where people had the least power to fight back.

Today, South Memphis bears the weight of all those decisions. Drive through the area and you'll pass a steel mill, an oil refinery, a wastewater treatment plant, and the state's biggest natural gas power plant. Seventeen different facilities that the EPA tracks for toxic releases all clustered in one area (Environmental Protection Agency, 2023). People living here face cancer risks four times higher than the national average. When the air gets bad enough, the county issues "code orange" warnings telling parents to keep their kids inside.

For families already struggling to pay bills, this pollution creates impossible choices. You can't afford air conditioning to escape the bad air outside. You can't afford the healthcare you need when that air makes you sick. And often, the same industrial plants that are poisoning your neighborhood are also the places where you have to work to support your family. When Elon Musk's xAI company decided to put their massive computer facility here, they were moving into a community that had already been turned into what experts call a "sacrifice zone"—a place where environmental harm has become normal because it's been happening for so long.

4.1.2. Digital Redlining Analysis

When Elon Musk chose South Memphis for his xAI Colossus supercomputer, he was following a playbook that environmental justice experts have seen many times before. Companies look for what researcher Robert Bullard called the "path of least resistance"—communities where people don't have the political connections or resources to fight back when corporations want to move in (Bullard, 1983).

The Colossus facility isn't just a computer center—it's basically a small power plant disguised as a tech company. Thirty-five gas turbines burn fossil fuels on-site to generate the massive amounts of electricity the computers need. These turbines pump out nitrogen oxides, tiny particles, and other pollutants that create ground-level ozone—the same stuff that makes the air hard to breathe on smoggy days. In a neighborhood where kids already have higher asthma rates than most places, this is the last thing families need. The Southern Environmental Law Center has threatened to sue xAI because the company started operating these turbines without getting the proper environmental permits first (Southern Environmental Law Center, 2024).

What's telling is how fast this all happened. Companies understand the political landscape in places like South Memphis. They know that the same facility would face massive opposition if they tried to put it in Memphis's wealthier, whiter neighborhoods—places where residents have the political connections and resources to stop projects they don't want. But in South Memphis, corporate executives felt confident they could move quickly without much pushback.

The speed really shows how this works. The facility went from announcement to operation in just months, skipping normal environmental reviews that would have given the community a chance to weigh in (Jankowski, 2025; Romo, 2024). Try to imagine that happening in East Memphis or Germantown—it's impossible. Those communities have the political clout to demand proper reviews and community input. The rushed timeline in South Memphis excluded residents from decisions that affect their daily lives and their children's health.

4.1.3. Community Impact and Response

The xAI facility doesn't just add one more source of pollution—it makes everything worse in a place where things were already bad. The massive computers generate so much heat they're raising temperatures in neighborhoods that already don't have enough trees or green space to provide relief from Memphis summers. The air pollution adds to what families are already breathing in an area where people already get sick from bad air at higher rates than most places.

Despite being shut out of the decision-making process, community members fought back. Memphis Community Against Pollution, led by KeShaun Pearson, organized neighborhood meetings and demonstrations to demand better treatment. They documented health problems and pushed for stronger enforcement of environmental rules while building partnerships with environmental justice groups across the region (WREG, 2025).

But the response from xAI and city officials revealed how differently Black residents get treated compared to white business leaders. While company executives met privately with Chamber of Commerce members and signed secret deals with city officials, they refused to attend community meetings in the neighborhoods their facility would affect. Mayor Paul Young claimed he didn't know much about how the facility operated while simultaneously defending the company against community concerns (Young, 2024). The message was clear: corporate leaders have time for white business leaders but not for Black residents whose health is on the line.

The limited success of community organizing efforts shows the structural barriers that environmental justice groups face in communities targeted for digital redlining. Residents have to organize opposition while dealing with the daily stress of making ends meet and worrying about their health. They're going up against corporations with massive financial resources and political connections while having much less access to lawyers, technical experts, or political influence themselves.

5. East Cleveland, Ohio - Corporate Exploitation of Black Municipal Desperation

5.1.1. Racial and Economic Context

East Cleveland exemplifies digital redlining's targeting of financially desperate Black municipalities. With 93% Black residents and a median income of $19,592, the city faced such severe fiscal crisis by 2020 that the state threatened takeover (Ohio State Auditor, 2021). This desperation creates exactly the conditions corporations exploit—cities that will accept environmental risks for minimal economic benefits.

When Meta considered a data center placement, they approached officials during the worst financial crisis, knowing desperate cities can't afford thorough environmental studies or strict pollution controls. Meta's proposal would have brought substantial heat, noise, and electromagnetic pollution while straining already compromised infrastructure. The company offered minimal community benefits while demanding extensive tax breaks—a cost-benefit analysis that would never succeed in wealthier, whiter areas.

East Cleveland's political isolation strengthened corporate leverage while limiting resistance capacity. The city lacks representation on regional planning bodies where major development decisions occur, reflecting broader patterns of democratic exclusion in communities bearing environmental burdens. Although local advocates organized resistance and built regional coalitions, they faced overwhelming disadvantages from the fiscal crisis and limited technical expertise. Meta's eventual withdrawal reflected corporate calculations rather than successful community resistance, demonstrating how corporations exploit vulnerabilities during site selection while maintaining flexibility to relocate when better opportunities emerge.

5.2. Prineville, Oregon - White Spatial Privilege in AI Development

5.2.1. Contrast Case: Corporate Respect for White Communities

Prineville, Oregon provides the stark contrast that exposes how AI companies behave when they're operating in predominantly white communities. The city is 85% white with a median household income of $52,000 and strong rural political networks (U.S. Census Bureau, 2020). When Facebook decided to build their data center facility in Prineville, their approach revealed dramatically different corporate behavior compared to how the same industry operates in communities of color.

Before Facebook even announced their plans, they started extensive community consultation. They held multiple public meetings, established ongoing conversations with city officials, business leaders, and resident groups. The company

hired local contractors for construction, bought materials from regional suppliers, and set up scholarship programs for area students interested in technology careers. This community investment approach reflected corporate recognition that Prineville residents had both the political influence and social connections necessary to block development they didn't want.

The facility itself represents environmental standards that were never offered to communities of color. Facebook achieved LEED Gold certification through advanced energy efficiency measures, operates entirely on renewable energy, and uses cutting-edge cooling technologies that minimize water use. The company funded local infrastructure improvements including road upgrades and utility expansions that benefit the broader community beyond just their facility's needs.

Corporate messaging emphasized partnership rather than extraction. Facebook executives joined local civic organizations, sponsored community events, and maintained transparent communication about facility operations and expansion plans. This engagement pattern stands in sharp contrast to the secrecy and exclusion that characterized AI facility development in Black and Brown communities.

5.3. Quality of Corporate Engagement Across Racial Lines

The difference in how corporations engage with communities reveals how AI companies change their behavior based on the racial composition of the places where they operate. In Prineville, Facebook treated residents as genuine partners whose concerns deserved serious consideration and response. Company representatives attended city council meetings, participated in community forums, and maintained ongoing dialogue about facility impacts and how to address them.

This level of engagement reflected corporate assessment of community political capacity and potential resistance. Facebook executives understood that Prineville residents had the social networks, economic resources, and political connections necessary to challenge corporate decisions through multiple channels. Rural Oregon communities maintain strong traditions of local political participation and have connections to state and federal representatives who take constituent concerns seriously.

Environmental protection received priority in white communities that would never be extended to facilities in communities of color. Facebook invested in advanced pollution controls, renewable energy systems, and water conservation technologies that exceeded what regulations required. These investments reflected corporate understanding that white communities expect and can demand environmental protection measures that companies consider optional in Black and Brown neighborhoods.

5.4. Analysis: Racial Double Standards

The comparison between corporate behavior in Prineville versus Memphis and East Cleveland reveals systematic racial double standards in AI facility development. The same industry demonstrates dramatically different environmental standards, community engagement practices, and economic benefit distribution depending on the racial composition of the community. These patterns can't be explained by geography, economics, or technical factors—they reflect corporate decision-making that consistently privileges white communities while exploiting communities of color.

White communities get environmental protection, economic benefits, and genuine political partnership. Communities of color get pollution, health risks, and political exclusion. This differential treatment happens within the same industry, often by the same companies, revealing how digital redlining operates through corporate decision-making processes that appear neutral but produce consistently discriminatory outcomes.

The evidence shows that AI companies have both the technical capability and financial resources to operate environmentally responsible facilities that benefit host communities. However, they reserve these practices for white communities while treating Black and Brown neighborhoods as sacrifice zones where normal environmental and social standards don't apply. This represents digital redlining in its purest form—the systematic use of technology infrastructure to perpetuate racial environmental inequality.

6. Findings: systematic digital redlining

6.1. Racial Targeting Patterns

Our analysis reveals clear patterns in how AI companies choose where to build their facilities—patterns that look remarkably similar to the redlining maps drawn in the 1930s. Neighborhoods with higher percentages of Black and Brown residents consistently get stuck hosting the most energy-intensive AI infrastructure, while predominantly white areas remain largely untouched. This isn't coincidence or market forces at work—it's the result of corporate site selection that embeds racial bias within seemingly neutral business criteria.

AI companies use what they call "community acceptance" metrics when deciding where to locate facilities, but these criteria consistently favor places where residents have limited political power to fight back. The data shows a clear inverse relationship: areas with stronger electoral representation, higher incomes, and better political connections consistently avoid becoming hosts for massive data centers and supercomputers (Madrigano et al., 2022). This targeting follows what researcher Robert Bullard identified as the "path of least resistance"—corporations deliberately seek locations where residents lack the resources and political connections needed to organize effective opposition.

The speed of AI facility development tells its own story about racial targeting. In predominantly white places like Prineville, Oregon, companies spend months or years in community consultation before breaking ground. But in predominantly Black neighborhoods like South Memphis, the same companies skip normal environmental reviews and get facilities running within months of the initial announcement (Madrigano et al., 2022). This timing difference reflects corporate confidence that Black and Brown neighborhoods can't organize the kind of political resistance that would stop or delay unwanted projects.

Corporate site selection documents show sophisticated understanding of racial political geography. Companies explicitly analyze factors like voter turnout, political representation, and past community organizing when evaluating potential locations. These analyses consistently identify predominantly Black and Brown neighborhoods as ideal sites for facilities that would face impossible opposition in whiter, wealthier areas. The deliberate nature of this targeting shows that what we're seeing isn't accidental—it's the result of calculated corporate strategies designed to exploit racial power imbalances.

The concentration of AI facilities in historically redlined neighborhoods represents a continuation of century-old patterns of environmental racism. Research shows that neighborhoods redlined in the 1930s continue to experience higher levels of environmental burdens today, including air pollution, toxic waste sites, and industrial facilities (Madrigano et al., 2022; Swope et al., 2022). AI companies' facility placement decisions perpetuate these historical injustices by adding new sources of environmental burden to communities already bearing disproportionate pollution loads.

6.2. Environmental Health Disparities

AI infrastructure creates layers of environmental problems that pile onto existing health challenges in Black and Brown neighborhoods. Data centers and supercomputers generate massive amounts of heat, guzzle enormous quantities of water for cooling, and often require on-site power generation that produces air pollution (Bashir & Olivetti, 2025). These impacts get added to neighborhoods that already host more than their share of industrial facilities, highways, and other pollution sources.

The energy hunger of AI infrastructure makes environmental racism worse through heavy reliance on fossil fuel electricity. Despite corporate promises about renewable energy, the explosive growth of AI computing consistently outpaces clean energy development (Bryan, 2025). This means AI facilities increase demand for electricity from natural gas and coal plants, with the resulting air pollution hitting hardest in the same neighborhoods where the facilities are located.

Water consumption by AI data centers poses particular threats to already vulnerable neighborhoods. Each kilowatt hour of energy consumed by a data center requires about two liters of water for cooling systems (Bashir & Olivetti, 2025). In regions already facing water shortages, this consumption diverts resources away from community needs while requiring expensive infrastructure investments that strain municipal budgets. The competition for water resources becomes especially intense when AI facilities locate near neighborhoods already struggling with reliable access to clean water.

Heat from AI facilities creates local climate effects that make existing urban heat problems worse in low-income Black and Brown neighborhoods. These areas typically have less tree cover and more concrete and asphalt, making them particularly vulnerable to temperature increases (Hoffman et al., 2020). The additional heat from AI facilities can raise local temperatures several degrees, increasing health risks for residents who often can't afford air conditioning.

Noise pollution from AI infrastructure hits Black and Brown neighborhoods through both facility operations and increased truck traffic for equipment delivery and maintenance. Research shows that historically redlined neighborhoods already experience higher levels of transportation noise (Collins & Grineski, 2025). AI facilities add to these problems through cooling system operations, backup generator testing, and round-the-clock maintenance activities that disrupt community life and contribute to stress-related health issues.

The cumulative nature of these environmental impacts means that AI infrastructure doesn't just add one more source of pollution it multiplies the health risks facing communities already experiencing elevated rates of asthma, cardiovascular disease, and other pollution-related illnesses. This cumulative burden creates compounding health disparities that reinforce existing racial inequities in health outcomes and life expectancy.

6.3. Economic Extraction and Racial Wealth Impact

The economic relationship between AI companies and communities of color follows extraction patterns that build corporate wealth while providing minimal benefits to local residents. Tax incentive structures for AI facilities typically involve substantial public subsidies that flow from community resources to corporate coffers, representing a transfer of wealth from predominantly Black and Brown neighborhoods to predominantly white corporate shareholders.

Analysis of tax abatement agreements reveals that AI companies receive extensive property tax reductions, utility rate discounts, and infrastructure improvements funded by local taxpayers. These incentive packages often span decades and involve public investments worth hundreds of millions of dollars. However, the economic benefits flowing back to communities remain limited to minimal job creation and modest tax revenues that pale in comparison to the public investments required (Urban Institute, 2024).

The employment promises made by AI companies during facility development consistently fail to materialize into meaningful economic opportunities for local residents. Most AI infrastructure requires highly specialized technical skills that few community members possess, while companies make limited investments in local workforce development programs. The jobs that do become available to local residents typically involve low-wage security, maintenance, or construction work rather than the high-paying technical positions that company marketing materials emphasize (Gross et al., 2005).

Property value impacts from AI facilities create complex patterns of economic displacement in communities of color. While some areas experience modest property value increases that benefit existing homeowners, these changes often trigger gentrification pressures that force long-term residents to relocate due to rising housing costs and property taxes. The communities that bear the environmental burdens of AI infrastructure frequently cannot afford to remain in neighborhoods where property values increase due to corporate investment.

Corporate profits from AI operations represent wealth extraction from communities that provide the labor, infrastructure, and environmental sacrifice necessary for company operations. The global AI industry generates hundreds of billions of dollars in annual revenue, but vanishingly small portions of these profits flow back to the communities hosting the physical infrastructure that enables AI development. This extraction pattern mirrors historical relationships between extractive industries and communities of color, where corporate wealth accumulation depends on exploiting community resources while externalizing environmental and social costs.

The tax avoidance strategies employed by AI companies further limit economic benefits to host communities. Through complex corporate structures and international tax arrangements, companies minimize their tax obligations while maximizing their use of publicly funded infrastructure and services. This tax avoidance means that communities bearing the environmental costs of AI infrastructure cannot even capture adequate revenue to address the public health and environmental problems these facilities create.

7. Discussion: Breaking the Pattern

7.1. How AI Perpetuates Old Racism Through New Technology

Digital redlining shows how the tech industry has found new ways to do something very old using technological progress as an excuse to dump problems on Black and Brown folks while keeping the benefits for white communities. When companies claim their site choices are just about business efficiency or technical requirements, they're hiding the fact that these decisions consistently follow racial lines that were drawn decades ago.

The contrast between how AI companies behave in white versus Black neighborhoods exposes this lie. Facebook can afford environmental protections and community investment in Prineville, Oregon, but xAI can't manage basic pollution controls in South Memphis? The only difference is the color of the people living there. This isn't about costs or technology it's about corporate executives believing some communities matter more than others.

What makes digital redlining particularly insidious is how it hides behind the language of innovation and progress. When communities organize against harmful AI facilities, they get accused of opposing technological advancement rather than defending their right to breathe clean air. This framing makes resistance seem backwards while allowing companies to continue treating Black and Brown neighborhoods as sacrifice zones for their profit.

7.2. Building Real Technology Justice

Communities deserve the same power over AI development that they have over other industrial projects—including the right to say no. This means moving beyond asking companies to be nicer and instead giving neighborhoods legal authority to reject projects that would harm them. Environmental justice principles like meaningful participation and fair treatment must apply to technology infrastructure, not just traditional polluting industries.

Technology justice requires coalitions that can tackle multiple problems at once. Environmental groups fighting pollution, digital rights advocates challenging algorithmic bias, and labor organizers demanding good jobs all have reasons to work together against corporate tech power. The convergence of environmental harm, economic extraction, and technological control in the same neighborhoods creates opportunities for powerful organizing that addresses the whole problem rather than just pieces of it.

8. Policy recommendations: building fair AI development

8.1. Federal Regulatory Requirements

Before any AI company can build a facility with public money or permits, federal agencies should require them to answer tough questions: How will this affect families already dealing with pollution? Will it force people from their homes? Who gets hurt, and who benefits? These racial impact assessments must give neighborhoods real power to say no to projects that would harm them, working through community organizations that residents trust. The government needs to update environmental laws to explicitly cover AI infrastructure and protect communities that have already been dumped on for decades.

Companies can no longer get away with systematically targeting Black and Brown neighborhoods for their dirtiest facilities. They should have to prove they considered the pollution burden these communities already carry and looked at cleaner alternatives that would spread impacts more fairly. When AI companies do build in overburdened neighborhoods, they must sign enforceable agreements that guarantee real benefits - actual jobs for local residents, cleanup of existing pollution, and investments that help families build wealth rather than just survive.

The federal government should only buy AI services from companies that treat communities fairly. The EPA needs to set tougher pollution standards for facilities going into already-polluted areas and make companies pay for independent community groups to monitor air quality and hold them accountable. Companies should be required to publish clear information about their environmental impacts and site selection process in languages that community members can understand.

8.2. Community Control and Wealth-Building

Neighborhoods should have real say over whether AI companies can build in their areas. This means community oversight boards with actual power to approve projects, set conditions, or reject them entirely based on what residents

decide is acceptable. These boards need funding to hire their own experts who can challenge corporate claims and evaluate whether projects truly benefit the community.

Instead of just extracting wealth from Black and Brown neighborhoods, AI development should help families build assets and control their economic future. This includes community ownership of facilities, profit-sharing that puts money directly in residents' pockets, and community land trusts that prevent gentrification while letting existing residents benefit from investment. Federal programs should provide low-interest loans and technical support so communities can own and control technology development rather than just being victims of it.

9. Conclusion

Key Contributions

This research documents patterns of environmental racism in AI infrastructure development, showing how corporate site selection consistently targets Black and Brown neighborhoods for environmentally harmful technology facilities. Through analyzing facility placement across multiple cities, we've shown that AI companies use calculated strategies to identify and exploit neighborhoods with limited political power. This represents a modern adaptation of redlining practices for the digital economy.

Digital redlining provides a useful framework for understanding how technological development can worsen racial inequities rather than improving them. While much AI ethics work focuses on algorithmic bias within software systems, this approach exposes how the physical infrastructure of AI development data centers, cooling systems, and power plants becomes a tool for concentrating environmental burdens in already struggling neighborhoods. Understanding technology's role in reinforcing racial hierarchy offers important insights for both researchers and policymakers.

Our analysis provides clear evidence of discriminatory corporate behavior through multiple case studies and data sources. The research shows that different treatment of neighborhoods based on racial makeup can't be explained by technical needs, costs, or geography. Instead, the evidence reveals deliberate corporate strategies that exploit racial power differences to minimize opposition while maximizing profits. This documentation gives policymakers, advocates, and affected neighborhoods concrete evidence to challenge harmful development and demand better alternatives.

Future Research Directions

Research that puts community knowledge at the center represents the most important next step for understanding how AI infrastructure actually affects people's lives. Residents of neighborhoods hosting these facilities know firsthand about environmental changes, health problems, and community disruption that academic researchers and policymakers often miss. Working partnerships that prioritize community knowledge and goals can generate better assessments of AI infrastructure impacts while building local capacity for advocacy and organizing. This should include residents controlling their own data collection, leading environmental monitoring efforts, and analyzing potential solutions.

Long-term health studies in neighborhoods hosting AI facilities could provide important evidence for policy changes and community organizing. Current research relies mainly on emissions data and demographics, but lacks investigation of actual health outcomes among people living near these facilities. Studies tracking respiratory health, heart disease, and other pollution-related conditions before and after AI facility development could establish clearer links between infrastructure placement and health problems. These studies should use community-based methods and include health indicators that residents consider important, not just clinical measurements.

Looking at how gender, class, immigration status, and other factors intersect would help us understand how AI infrastructure impacts combine with other forms of inequality. Women, undocumented immigrants, and working-class residents may experience AI facility impacts differently because of different exposure patterns, health vulnerabilities, and barriers to political participation. Research examining these intersections could lead to better targeted policies and coalition-building strategies. Comparing different regions, urban versus rural contexts, and international examples could also reveal how local politics and economics shape how this new form of redlining gets implemented.

Urgency for Action

AI infrastructure is expanding rapidly, creating an immediate need for policy intervention before harmful patterns become even more entrenched. Industry projections show massive increases in data center construction and supercomputer deployment over the next decade, driven by growing demand for AI applications across all economic

sectors. Without quick policy action, this expansion will accelerate the concentration of environmental burdens in Black and Brown neighborhoods while further enriching predominantly white corporate shareholders. We have a narrow window to embed racial equity requirements into technology governance before the industry becomes too powerful to regulate effectively.

Federal investments in AI research through the CHIPS Act and other legislation create real opportunities to tie public funding to environmental justice compliance. Policymakers can require community consent, environmental protection, and local benefits as conditions for receiving taxpayer support. This leverage will shrink as the industry matures and becomes less dependent on direct government funding. The current moment demands immediate action to establish precedents for how communities can control technology development in their neighborhoods.

Community organizing around technology justice is building the political foundation needed for policy change. Residents in places like South Memphis and East Cleveland are connecting their local fights against harmful AI facilities to broader movements for environmental and economic justice. This growing organizing capacity creates openings for policy advocates to push for bigger changes rather than just responding to individual facility proposals. With community organizing growing, policy windows opening, and research evidence mounting, now is the time to push for racial justice in how AI develops.

Compliance with ethical standards

Disclosure of conflict of interest

The author has no conflicts of interest to disclose.

References

[1] Bullard, R. D. (1983). Solid waste sites and the black Houston community. Sociological Inquiry, 53(2-3), 273-288. https://doi.org/10.1111/j.1475-682X.1983.tb00037.x

[2] Bullard, R. D. (1990). Dumping in Dixie: Race, class, and environmental quality. Westview Press.

[3] Bullard, R. D. (2008). Dumping in Dixie: Race, class, and environmental quality (3rd ed.). Westview Press.

[4] Commission for Racial Justice. (1987). Toxic wastes and race in the United States: A national report on the racial and socio-economic characteristics of communities with hazardous waste sites. United Church of Christ.

[5] Ergene, S., Banerjee, S. B., & Ergene, E. (2024). Environmental racism and climate (in)justice in the Anthropocene: Addressing the silences and erasures in management and organization studies. Journal of Business Ethics, 193(4), 785-800. https://doi.org/10.1007/s10551-024-05723-x

[6] Friedline, T., & Chen, Z. (2021). Digital redlining and the fintech marketplace: Evidence from US zip codes. Journal of Consumer Affairs, 55(2), 366-388. https://doi.org/10.1111/joca.12297

[7] Hoffman, J. S., Shandas, V., & Pendleton, N. (2020). The effects of historical housing policies on resident exposure to intra-urban heat: A study of 108 US urban areas. Climate, 8(1), 12. https://doi.org/10.3390/cli8010012

[8] Lane, H. M., Morello-Frosch, R., Marshall, J. D., & Apte, J. S. (2022). Historical redlining is associated with present-day air pollution disparities in U.S. cities. Environmental Science & Technology Letters, 9(4), 345-350. https://doi.org/10.1021/acs.estlett.1c01012

[9] Nardone, A., Rudolph, K. E., Morello-Frosch, R., & Casey, J. A. (2021). Redlines and greenspace: The relationship between historical redlining and 2010 greenspace across the United States. Environmental Health Perspectives, 129(1), 017006. https://doi.org/10.1289/EHP7495

[10] Perry, M. J., Arrington, S., Freisthler, M. S., Geschwind, S., Morello-Frosch, R., & Woodruff, T. J. (2021). Pervasive structural racism in environmental epidemiology. Environmental Health, 20(1), 119. https://doi.org/10.1186/s12940-021-00801-3

[11] Rothstein, R. (2017). The color of law: A forgotten history of how our government segregated America. Liveright Publishing Corporation.

[12] Sanders, C. K., & Scanlon, E. (2021). The digital divide is a human rights issue: Advancing social inclusion through social work advocacy. Journal of Human Rights and Social Work, 6(2), 130-143. https://doi.org/10.1007/s41134-020-00147-9

[13] Delgado, R., & Stefancic, J. (2017). Critical race theory: An introduction (3rd ed.). New York University Press.

[14] Bullard, R. D. (1983). Solid waste sites and the black Houston community. Sociological Inquiry, 53(2-3), 273-288. https://doi.org/10.1111/j.1475-682X.1983.tb00037.x

[15] Environmental Protection Agency. (2023). Toxics Release Inventory (TRI) data and tools. https://www.epa.gov/toxics-release-inventory-tri-program

[16] Jankowski, P. (2025, May 19). Elon Musk's xAI is using gas turbines at Memphis facility, raising pollution concerns. CNN. https://www.cnn.com/2025/05/19/climate/xai-musk-memphis-turbines-pollution

[17] Mapping Inequality. (2023). Redlining in New Deal America. University of Richmond. https://dsl.richmond.edu/panorama/redlining/

[18] Memphis Community Against Pollution. (2024). Fighting for environmental justice in South Memphis. https://mcapmemphis.org

[19] Musk, E. (2024, July 15). Memphis supercomputer facility completed in record time [Tweet]. Twitter. https://twitter.com/elonmusk

[20] Ohio State Auditor. (2021). East Cleveland financial emergency report. State of Ohio.

[21] Romo, V. (2024, September 11). How Memphis became a battleground over Elon Musk's xAI supercomputer. NPR. https://www.npr.org/2024/09/11/nx-s1-5088134/elon-musk-ai-xai-supercomputer-memphis-pollution

[22] Southern Environmental Law Center. (2024). Elon Musk's xAI threatened with lawsuit over air pollution from Memphis data center [Press release]. https://www.selc.org/press-release/elon-musks-xai-threatened-with-lawsuit-over-air-pollution-from-memphis-data-center

[23] U.S. Census Bureau. (2020). American Community Survey 5-year estimates. https://www.census.gov/programs-surveys/acs

[24] WREG. (2025). Environmental justice coalitions in Memphis have invested significantly in community-based air quality monitoring and activism. WREG News Channel 3.

[25] Young, P. (2024, August 3). City supports innovative technology partnerships. Memphis Commercial Appeal, A1.

[26] Bullard, R. D. (1983). Solid waste sites and the black Houston community. Sociological Inquiry, 53(2-3), 273-288. https://doi.org/10.1111/j.1475-682X.1983.tb00037.x

[27] Environmental Protection Agency. (2023). Toxics Release Inventory (TRI) data and tools. https://www.epa.gov/toxics-release-inventory-tri-program

[28] Jankowski, P. (2025, May 19). Elon Musk's xAI is using gas turbines at Memphis facility, raising pollution concerns. CNN. https://www.cnn.com/2025/05/19/climate/xai-musk-memphis-turbines-pollution

[29] Mapping Inequality. (2023). Redlining in New Deal America. University of Richmond. https://dsl.richmond.edu/panorama/redlining/

[30] Memphis Community Against Pollution. (2024). Fighting for environmental justice in South Memphis. https://mcapmemphis.org

[31] Ohio State Auditor. (2021). East Cleveland financial emergency report. State of Ohio.

[32] Romo, V. (2024, September 11). How Memphis became a battleground over Elon Musk's xAI supercomputer. NPR. https://www.npr.org/2024/09/11/nx-s1-5088134/elon-musk-ai-xai-supercomputer-memphis-pollution

[33] Southern Environmental Law Center. (2024). Elon Musk's xAI threatened with lawsuit over air pollution from Memphis data center [Press release]. https://www.selc.org/press-release/elon-musks-xai-threatened-with-lawsuit-over-air-pollution-from-memphis-data-center

[34] U.S. Census Bureau. (2020). American Community Survey 5-year estimates. https://www.census.gov/programs-surveys/acs

[35] WREG. (2025). Environmental justice coalitions in Memphis have invested significantly in community-based air quality monitoring and activism. WREG News Channel 3.

[36] Young, P. (2024, August 3). City supports innovative technology partnerships. Memphis Commercial Appeal, A1.

[37] Bashir, M., & Olivetti, E. (2025, January 17). Explained: Generative AI's environmental impact. MIT News. https://news.mit.edu/2025/explained-generative-ai-environmental-impact-0117

[38] Bryan, K. (2025, May 25). The growing environmental impact of AI data centers' energy demands. PBS News Weekend. https://www.pbs.org/newshour/show/the-growing-environmental-impact-of-ai-data-centers-energy-demands

[39] Bullard, R. D. (1983). Solid waste sites and the black Houston community. Sociological Inquiry, 53(2-3), 273-288. https://doi.org/10.1111/j.1475-682X.1983.tb00037.x

[40] Collins, T. W., & Grineski, S. E. (2025). Race, historical redlining, and contemporary transportation noise disparities in the United States. Journal of Exposure Science & Environmental Epidemiology, 35(1), 50-61. https://doi.org/10.1038/s41370-024-00682-x

[41] Gross, J., LeRoy, G., & Janis-Aparicio, M. (2005). Community benefits agreements: Making development projects accountable. Good Jobs First and Partnership for Working Families. https://goodjobsfirst.org/community-benefits-agreements-making-development-projects-accountable/

[42] Hoffman, J. S., Shandas, V., & Pendleton, N. (2020). The effects of historical housing policies on resident exposure to intra-urban heat: A study of 108 US urban areas. Climate, 8(1), 12. https://doi.org/10.3390/cli8010012

[43] Madrigano, J., Hernandez, C. C., Stephenson, S. R., Youngblood, A., Siddiqi, S. M., Gahlon, G., Ntazinda, A., Chari, R., & Preston, B. L. (2022). Environmental racism: A tool for exploring the enduring legacy of redlining on urban environments. RAND Corporation. https://www.rand.org/pubs/tools/TLA1456-1.html

[44] Perry, A. M. (2024, February 20). The US must balance climate justice challenges in the era of artificial intelligence. Brookings Institution. https://www.brookings.edu/articles/the-us-must-balance-climate-justice-challenges-in-the-era-of-artificial-intelligence/

[45] Reia, J., Wang, Y., & Forelle, M. C. (2024). Reimagining AI for environmental justice and creativity. University of Virginia Libra Open. https://libraopen.lib.virginia.edu/public_view/3n203z326

[46] Swope, C. B., Hernández, D., & Cushing, L. J. (2022). The relationship of historical redlining with present-day neighborhood environmental and health outcomes: A scoping review and conceptual model. Journal of Urban Health, 99(6), 959-983. https://doi.org/10.1007/s11524-022-00665-z

[47] Urban Institute. (2024). Community benefit agreements. https://www.urban.org/apps/pursuing-housing-justice-interventions-impact/community-benefit-agreements.