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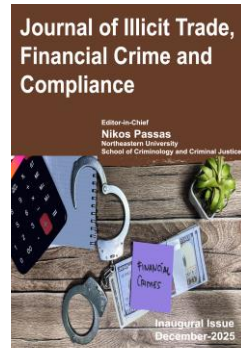

State-Corporate Crime, Systemic Risk, and Governance Failures in Mass Transportation: Insights from the Tempi Train Tragedy

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ABSTRACT

This paper analyzes the Tempi railway tragedy of 28 February 2023 as a case of state-corporate crime and institutional corruption rather than a mere accident, focusing on the systemic endangerment of Greece's mass transportation system. Drawing on qualitative content analysis of official documents and media records, 76 semi-structured interviews, and ongoing participant observation, the study reconstructs how safety-critical investments and controls were undermined by corrupt practices, regulatory neglect, and austerity-driven privatization. The analysis shows how criminogenic asymmetries, dysnomie, and the normalization of deviance allowed unlawful and "lawful but awful" policies to hollow out the railways' safety function while serving mutually reinforcing state and corporate interests. These governance failures obscured systemic risk, facilitated the misrepresentation of violations as "human error," and weakened transparency, accountability, and effective compliance in the rail sector. By situating Tempi within a comparative framework of state-corporate crimes and transport disasters, the paper highlights the blurred boundaries between financial crime, institutional corruption, and regulatory failure in critical infrastructure. It concludes with policy and compliance recommendations aimed at strengthening structural accountability, restoring institutional integrity, and reducing systemic risk in mass transportation governance.

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1. Introduction

The Hellenic Train S.A. (formerly TRAINOSE) privatized in 2017 and acquired by Italy's Ferrovie dello Stato Italiane Group for €45 million, is Greece's exclusive rail operator. The Tempi tragedy of February 28, 2023 - a head-on collision killing 57 people and injuring dozens of others - was not a mere accident but the culmination of systemic state-corporate corruption and other financial crimes. This paper argues that the disaster resulted from a normalized context of endangerment shaped by neoliberal privatization, austerity policies imposed through the post-2010 memoranda, and the irresponsible, partly criminal neglect of essential safety works.

These policies constitute "lawful but awful" practices - actions conforming with the letter of the law that produce serious risks and social harm [5]. The Troika's austerity measures, which stripped public services of funding and personnel while prioritizing privatization, represent practices that, while formally legal, generated conditions of systemic endangerment. These "remedies" to the crisis triggered massive unemployment, sharp GDP decline, and the dismantling of public infrastructure, factors that set the stage for the Tempi tragedy [6].

The destructive impact of austerity policies in Greece is well documented. Blyth [7] described the measures as an experiment in contractionary fiscal policy with predictable and devastating consequences. Between 2008 and 2013, Greece's GDP contracted by approximately 25%, a decline comparable to the US Great Depression [8,9]. Unemployment peaked at 27.5% in 2013, with youth unemployment exceeding 60% [10,11]. Even the IMF later admitted that it had significantly underestimated fiscal multipliers: austerity's contractionary effects were far more severe than projected [12].

The human costs were staggering. Budget cuts led to public health crises, including dramatic increases in suicide rates, HIV infections, and preventable mortality [13, 16]. Public hospital budgets shrank by 40% between 2007 and 2012, causing severe shortages of medicines and supplies [14,15]. These dynamics parallel the degradation of the railway sector.

Public infrastructure investment collapsed, as capital expenditure by the Greek state fell from 3.4% of GDP in 2009 to 2.1% in 2013, with transportation among the hardest-hit sectors [17]. The memoranda's emphasis on primary surpluses systematically blocked investment in maintenance and modernization, creating a self-reinforcing cycle of decay [18,19]. The Troika's approach treated the symptoms while exacerbating structural causes of the crisis, prioritizing creditor repayment over public goods essential for economic recovery and citizen safety [20].

These dynamics illustrate "institutional corruption", where an institution's effectiveness in achieving its core purposes is systematically undermined by dependencies that distort institutional judgment and practice, even without individual venality or intent [21-23]. Such corruption may not be illegal, but diverts institutions from their core purpose and harms those who rely on them [24]. In Greece's railways, institutions meant to ensure safe transportation were redirected toward serving privatization agendas and corporate profit extraction.

This pattern aligns with analyses of "shadow elites" - influential actors who move seamlessly between government, business, and advisory roles, blurring boundaries between public and private interests [25,26]. Privatization of government functions and deregulation enable networks of power brokers to advance their agendas at the expense of public welfare, eroding accountability [27].

Following the tragedy, the Minister of Transport resigned, and an official investigation was launched [72]. The intense social reaction exposed deep problems in the rule of law and systemic pathologies across public and private sectors: mutually reinforcing state-corporate interests, lack of transparency and accountability, corrupt practices, media influence, and pressure on judicial processes.

The Mediterranean Institute for Investigative Reporting has pointed out that Greek railway transport is "dangerous," as evidenced by high accident rates, deaths, and injuries [28]. Between 2010 and 2018, 137 deaths and 97 serious injuries occurred in railway incidents. In 2018, Greece ranked first among EU member states in deaths from railway accidents and second in serious injuries per train-kilometer traveled [28]. The main cause: lack of basic infrastructure due to systemic pathologies. Key systemic failures include:

(a) Level crossings made of wood and soil—many makeshift—pose severe risks. In 2017, Greece had 1,263 level crossings, 45% unguarded [29].

(b) Frequent causes of death include pedestrian trespassing and derailments linked to infrastructure deficiencies and non-operational signaling and telecontrol systems.

(c) Additional factors: poor maintenance of rolling stock, traffic management failures, and external hazards.

(d) Non-completion of critical systems such as telecontrol, signaling, and the European Rail Traffic Management System (ERTMS).

(e) Sparse railway traffic, which increases danger if schedules densify.

(f) Severe personnel shortages—linked to memorandum policies—leading to exhaustion, errors, and worsened by clientelistic appointments of unqualified individuals to key posts [28].

Criminological scholarship has traditionally concentrated on “conventional” street crimes and safety concerns at railway crossings and stations [30,31]. In contrast, critical criminology conceptualizes major railway disasters as crimes of the powerful [32-34], categorizing them as state crimes [35-37], corporate crimes [38], or state-corporate crimes [39-41]. These offenses typically originate in corruption and structural social, economic, and political conditions. The theory of criminogenic asymmetries [1,2,42] elucidates how systemic disjunctions and inequalities across political, cultural, economic, and legal domains create opportunities for misconduct and erode regulatory capacity.

State-corporate crimes, in particular, are rooted in entrenched power configurations and the reciprocal reinforcement of governmental and corporate interests. This study interrogates the Tempi tragedy through this analytical lens, employing the conceptual frameworks of state-corporate crime, dysnomie, criminogenic asymmetries, and the normalization of deviance. It examines the antecedent period to demonstrate how systemic criminality evolved into a normalized condition of endangerment [43], wherein insecurity in mass transportation advanced state-corporate objectives. The analysis focuses on the pre-disaster era, emphasizing how interlocking interests institutionalized systemic risk, with particular attention to the financial crime mechanisms and compliance failures that enabled the catastrophic outcome.

2. State-Corporate Crimes in Mass Transportation

The Challenger space shuttle explosion [44] shows how such events may not constitute "accidents" but crimes realized through state-corporate activity and normalized deviance [3], demonstrating how dangerous practices can become incrementally accepted as normal within organizational cultures and produce catastrophic outcomes.

State-corporate crime refers to illegal or socially harmful actions arising from the interaction between state institutions and corporate actors. The concept highlights how governance and economic practices can mutually reinforce activities that produce social harm [46]. Such crimes can occur through both horizontal and vertical institutional relationships. Other scholars expanded the framework to include instances where the state plays a passive role, enabling or failing to prevent corporate misconduct. Overall, state-corporate crimes involve "shadowy transactions" that blur the line between legality and illegality, often facilitated by corruption [45,47,48].

In a globalized neoliberal context, the close relationship between state institutions and businesses facilitates corporate criminal activity through legislation, regulation, and only superficial interventions [49]. The blurred boundaries between business activity, regulation, and control make state-corporate criminality a structural norm aimed at capital accumulation, producing social harm and human rights violations, while the state actively enables this harm through regulatory frameworks that privilege corporate interests over public safety [50].

This framework aligns with the analysis of global anomie and dysnomie [1,2], which explains how neoliberal globalization weakens normative structures and control mechanisms while generating pressures and opportunities for misconduct. Dysnomie, the absence or withdrawal of allegiance from conventional norms and weakening of their guiding power on behavior, emerges when economic liberalization outpaces the development of adequate governance frameworks [1]. This creates criminogenic asymmetries: structural discrepancies and inequalities that fuel illegal markets, furnish opportunities for illicit profit, reduce transparency, prevent accountability, and weaken social controls [42].

This is consistent with the analysis of "shadow elites" [25], which points to ways in which privatization, deregulation and the state-private nexus lead to networks of power that operate beyond traditional accountability structures [26], where the boundaries between regulatory oversight and capture by private interests become systematically blurred [27].

2.1. Normalization of Deviance and Organizational Culture

Works on the "normalization of deviance" [3,4] enhance our understanding how the conditions enabling the Tempi tragedy became embedded within organizational practice. Drawing on the Challenger disaster, one can see how signals of risk were normalized through cultural processes within NASA and contractor organizations. Technical deviations from design specifications were incrementally redefined as acceptable risk through "practical drift", the gradual, incremental movement away from normative standards that occurs as organizations adapt to operational pressures [4,51].

This framework illuminates a central paradox of organizational disasters: the very people responsible for safety may inadvertently contribute to catastrophe not through willful negligence but through culturally embedded patterns of sense-making that downplay dangers. It is a process through which unacceptable practice becomes acceptable: "As the deviant behavior is repeated without catastrophic results, it becomes the social norm for the organization" [3]. In the Greek railway context, operating trains without functioning safety systems, maintaining inadequate staffing levels, and proceeding without operational telecontrol all became normalized practices - deviations that became de facto business as usual.

This normalization process operates through a "culture of production", organizational pressures that prioritize schedule, budget, and operational continuity over safety considerations [3]. When combined with structural secrecy - the way organizational complexity and specialization can hide the significance of information from decision-makers - the result is a systematic inability to recognize accumulating risk. In the Tempi case, the fragmentation of railroad into multiple entities, the separation between infrastructure management and train operations, and the interface of government, regulatory bodies and private contractors contributed to structural secrecy that obscured the magnitude of danger.

The normalization of corrupt practices [52] constitutes a central aspect of state-corporate crimes and includes different processes at the individual, organizational and structural levels [53]. The normative consolidation is realized within: (a) individual action through differential interactions where acting subjects learn techniques of commission and neutralization applying practices such as denial of responsibility; (b) formed organizational culture, through practices of institutionalization, cover-up, impunity - practices that produce "grey zones" in state-corporate activity; (c) structural level, through forms of informally institutionalized lawlessness and improper practices based on which the institutions of political and economic governance and businesses operate.

2.2. Institutional Corruption and Systemic Dysfunction

The institutional corruption framework [21-23], provides additional theoretical resources for understanding the Tempi tragedy. Unlike individual corruption involving personal venality and explicit quid pro quo exchanges, institutional corruption refers to legitimate institutional dependencies - funding relationships, career incentives, regulatory structures - which systematically undermine core purposes. Institutional corruption occurs when officials receive a benefit that is improperly connected to their official actions, even if no law is violated, no improper motive can be identified [21], and no individual actor acts corruptly [22]. When regulatory agencies become dependent on the industries they regulate for expertise, career opportunities, and political support, their judgments become distorted. This captures the Greek railway regulatory environment, where the Railway Regulatory Authority (RAS) lacked the capacity, resources, and independence to effectively oversee the railway system's safety.

Others have emphasized the link to institutional purpose, how this form of corruption undermines not merely legal compliance but the institution's capacity to fulfill its key purpose [54]. The Greek railway system's purpose - providing safe, efficient public transportation - was systematically subordinated to other objectives: fiscal consolidation, privatization targets, corporate profit extraction, and clientelistic distribution of positions. This represents institutional corruption in its fullest sense: not merely the violation of rules but the hollowing out of institutional purpose.

Related are also analyses of "state capture" [55], which occurs when private interests significantly influence a state's decision-making processes to shape laws, policies, and regulations for their own benefit. The Greek railway privatization, conducted under Troika pressure during a period of fiscal crisis, created conditions favorable to state capture - where the terms of privatization were opaque and systematically favored corporate interests at the expense of safety requirements and public accountability.

There are other case studies of state-corporate crimes in mass transportation, such as the tragedy of ValuJet flight 592 [56] and the railway transportation industry in the United States [31]. The crash of flight 592 due to explosion of dangerous materials illustrates state-facilitated state-corporate crimes, as private companies involved in airline maintenance and the Federal Aviation Administration were co-responsible. Deregulation and the pursuit of profit prevailed over application of rules for transportation of dangerous materials, while the FAA - with conflicting roles as regulator and as supporter of the industry - did not apply the framework of supervision and safeguarding of air transportation. The other study examined crimes in railways and impunity in the USA during 2000-2017 as corporate crimes of the railway industry which breached railway regulations, presenting the railway events as "accidents" and not as crimes, although laws concerning railway safety were violated and led to harmful consequences [31].

3. Methods

Beyond individualizing narratives of " human error", our research questions were: (a) What is the social organization of the state-corporate crime of Tempi? (b) What is the origin of the deficiencies in basic railway infrastructure and safety measures? (c) What is the framework of transparency, accountability and control regarding railway events? (d) How are these crimes described in institutional texts and how are they addressed by the agencies of formal social control? (e) Are there practices of cover-up within the institutional reaction, promoting treatment of the event as an "accident" resulting from "human error," attributing a personalized character---or is a systemic and reality-based character attributed? [the latter is the subject of future papers].

We conducted semi-structured interviews as a method based on a non-standardized design for thematic categories and questions, following an "open" framework of discussion and co-formation of conversation during data production. The interview guide included main thematic categories and questions, enriched during conversation through what interviewees narrated. We selected interviewees through theoretical sampling and the snowball method, using criteria such as the familiarity of interviewees with the case and their activity in social/professional networks enabling expansion of knowledgeable sources. Our interviews were with: (a) survivors, (b) relatives of victims, (c) experts, (d) lawyers for families of victims, (e) witnesses examined in the pre-trial stage (f) investigative reporters (g) members of judiciary. Conversations were completed when theoretical saturation occurred. In total, seventy-six interviews were conducted. Because several court cases are ongoing, a new cycle of conducting conversations will follow to highlight additional aspects about the case. These interviews gave us access to non-public information, insights, and confirmed media reports about numerous facts and aspects of the case.

Our participant observation started in 2024, is ongoing, and results in recorded field notes and collected material, such as posters, informational leaflets and publicly available court records.

We engaged in legal and qualitative content analysis of the following documents: (a) the report of the investigative committee of the Hellenic Parliament for "the investigation of the crime of Tempi and all aspects related to it" [57]; (b) guidelines and regulations of the European Parliament concerning development of railway infrastructure and safety of railways; (c) contents of laws, presidential decrees and ministerial decisions concerning development and improvement of railway safety as well as investigation of accidents; (d) expert reports for the railway event, specifically: the Report of the Committee of Experts for the railway accident in Tempi on 28.02.2023, the Railway Accident Report 28.02.2023 in the area of Tempi Larissa from the Committee of Investigation of Independent Experts of Families, and the Rail Accident Report RL01-2025 from the Hellenic Air and Rail Safety Investigation Authority (HARSIA/EODASAAM), Railway Sector, 27 February 2025 [58]; and (e) journalistic texts press releases of railway workers.

Part of the content analysis is included in this paper, focusing on the period before the train crash. The data were processed through categorical classification along thematic axes common to all three qualitative methods.

4. Analysis of Research Data

4.1. Liberalization and Privatization of Railway Transportation

Central to understanding how two trains moved on the same track in opposite directions for twelve minutes before their collision is the evolution of public-private sector relations shaped by practices of liberalization and privatization. These practices started in the 1990s through the separation of the Hellenic Railways Organization into subsidiaries, institutionalizing a framework of mutually reinforcing public and private interests oriented toward profit. In 2008, TRAINOSE S.A. was separated from OSE, with its total share capital transferred to the Greek state. Following Greece's notification of support measures - such as the transfer of employees, debt deletion, and annual grants - the European Commission opened an investigation in 2011. These measures were approved as part of Greece's broader privatization program. In 2013, all shares of TRAINOSE S.A. were transferred to the Hellenic Republic Asset Development Fund (HRADF). Two years later, in 2015, a contract concerning services of general economic interest (SGEI) was signed, and in 2017 TRAINOSE was privatized through the sale of shares by HRADF to the Italian *Ferrovie dello Stato Italiane Group* (FSI) (renamed Hellenic Train S.A. in 2021) for the remarkably low price of 45 million euros - despite granting exclusive use and exploitation of national railway infrastructure. Meanwhile, OSE was chronically underfunded, and staffing was reduced, while the FSI received subsidies of 50 million euros annually from the Greek state for fifteen years to operate certain routes [59].

The Report of the investigative committee [57], "...noted that in the relevant contract, beyond the particularly low price for the sale of the total shares of TRAINOSE, there was no contractual obligation whatsoever of the Buyer for the execution of mandatory investments, but not any other form of reciprocal benefits towards the Greek State." This pattern of privatization without adequate safeguards exemplifies the criminogenic effects of hasty liberalization policies during a financial crisis [6], and reflects a "privatization of policy" wherein public functions are transferred to private actors without robust oversight mechanisms [27].

MPs of the SYRIZA-Progressive Alliance parliamentary group described these developments as "Policies of fragmentation of the unified O.S.E., toward the fulfillment of privatization policies of railway transportation activity, rolling stock maintenance, parts of its real estate, the freight centers through PPPs, as well as of the maintenance and operation of infrastructure, also through PPPs" [57].

Similarly, MPs of the K.K.E. parliamentary group noted how "the competitive relations that were formed by the problematic separation of the Hellenic Railways Organization into subsidiaries, as well as the liberalization and privatization subsequently of the transportation work, magnified conflicting interests... [and] reveal the responsibilities of the E.U. and of the bourgeois parties that serve at any cost the policy of capitalist development and competitiveness, putting in second priority the safety in railways and human life itself" [57].

These liberalization and privatization policies align with closely European policies, including Directive 440/1991 on the accounting separation of infrastructure and exploitation, which led to the full liberalization of EU freight railway transports in 2007, and Directive 2016/2370 of the European Parliament and Council on opening domestic passenger railway markets and governance of railway infrastructure. Another report attributes the failure of European railway policy, inter alia, to the separation of infrastructure and rolling stock encouraging competition practices, while the privatizations implemented under the memoranda obligations and national governments under lobbying pressure favored road, construction and airline industries instead [59; see also 18].

The consequences were severe: degradation of railway services, non-completion of crucial infrastructure such as telecontrol and signaling systems, cancellation of night routes, and interruption of international passenger connections [59]. Austerity/streamlining measures under the memoranda entrenched this pattern, producing a context of halted works, reduced personnel, clientelistic relations serving state–corporate interests, and increased exposure of passengers to unsafe transport conditions.

The austerity measures deepened the humanitarian crisis rather than resolving debt or stimulating growth. They stripped people of dignity and hope, while public health and education budgets were slashed to nearly one-third of the euro area average [6]. The dismantling of public services, including transportation infrastructure, is a direct outcome of such policies. This reflects institutional corruption, where organizations lose legitimacy and deviate from their main purpose [21,22-24].

The railway sector exemplifies the broader degradation of infrastructure under austerity. The memoranda's fiscal targets created systematic disincentives for public investment, treating it as a discretionary spending to be cut rather than an essential public good to be maintained [60]. Fiscal consolidation in Greece disproportionately affected capital expenditure, with public investment plunging by over 60% in real terms between 2009 and 2014 [61]. This cutting of investment to meet short-term fiscal targets while ignoring long-term consequences for public safety can be considered as an "austerity delusion" - the belief that contractionary policy may somehow yield expansion, contradicting both economic theory and historical evidence [62].

The EU Commission's own ex-post evaluation acknowledged significant flaws in the program’s design, including lack of attention to the social consequences of fiscal adjustment and failure to safeguard essential public services [63]. The IMF's Independent Evaluation Office [64] similarly concluded that the Fund had underestimated the social and economic damage caused by fiscal consolidation – particularly the neglect to protect of vulnerable populations and essential infrastructure. Overall, the Greek crisis exposed fundamental deficiencies in European governance, which prioritized creditor interests over democratic accountability and citizen welfare [65]. These dynamics are directly relevant to understanding the Tempi tragedy.

By 2004, OSE had accumulated 3.5 billion euros in debt. By 2009, the figure exceeded 9 billion, and by 2010, 10.7 billion euros. In 2004, despite having 24% more employees, OSE’s payroll costs were 16% lower than in 2009. OSE earned 250 million per year but spent 271 million per year solely for payroll. TRAINOSE generated 106 million annual revenue but paid 116 million in wages. The combined annual deficit reached approximately 1.2 billion euros in 2009.

The failure to operate safety systems across the railway network, poor infrastructure maintenance, and non-compliance with standards such as fire safety – combined with pressure from Hellenic Train S.A. to increase speed and freight volume for profit - represents a clear prioritization of profit over safety.

A key dimension of this broader state-corporate crime is the persistence of high-level corruption, including illegal state aid - e.g., see " Mismanagement resulting in the creation by the European Commission of three files of illegal state aids, amounting to 15.683 billion euros" [57], is directly connected with the Siemens scandal.

4.2. Technological "Modernization" as a Condition of Insecurity and Risk

Part of the social organization of state-corporate crimes is the use of contract fragmentation and pressure to serve mutually reinforcing interests, through which "developed" technological systems become incompatible and ultimately non-functional. Additional aspects include the wasting of technological equipment through chronic disuse, the inability to find spare parts due to age, and failure to execute projects because of understaffing. Main contracts launched without all projects being completed include 10012/2006 for supply of GSM-R systems, contract 10004/2007 for supply of ETCS systems on trains, 10005/2007 for supply of ETCS systems on lines, 635/2013 for network upgrade works, and the controversial contract 717/2014 for the Reorganization and Upgrade of the Remote Control System.

An official report noted that "the choice of segmenting the various contracts in order to serve different business interests led to incompatibilities of the various systems but also to long delays that arose precisely from the manifestation of these competing interests (appeals, objections, continuous extensions)... The main reason for the delays in the implementation of the above contracts was basically their segmentation, since problems of incompatibility between systems constantly arose due to different technology used by contracting companies. Such issues were of course often deliberately exploited by the companies as a lever of pressure to obtain an even larger share of the pie" [57].

These are manifestations of criminogenic asymmetries at the organizational level, where regulatory gaps, conflicting interests, and inadequate oversight create opportunities for exploitation that undermine public safety [1,42]. They are also illustrative of "flex nets", networks of actors with overlapping roles and interests who operate beyond traditional accountability structures [25,26]. Furthermore, this fragmentation produced "structural secrecy", whereby diffused responsibility across multiple contractors, regulatory agencies, and government bodies, prevented a comprehensive view of the accumulating risk [3,4].

With regard to contract 717, its non-execution stemmed from decisions between companies Aktor, the French multinational Alstom, ERGOSE and successive governments involved in its implementation (ND, PASOK, SYRIZA) [66]. The contract was signed in 2014 between ERGOSE and a consortium comprising TOMI-AVETE (a subsidiary of Aktor) and Alstom Transport SA, with projected delivery time in 2016. As reported by the technical director of company AES (Advanced Engineering Solutions), the project had been completed in December 2016 but was never put into operation, owing to deliberate delays and extensions of Contract 717 by the contractor, which increased the implementation cost from 41.3 million euros to 87 million euros.

State-corporate activity is thus shaped through relationships of dependence, influence, facilitation and corruption. According to Bersi [66], the Bobola Group's Aktor dominated Greek state contracts between 1980-2000 while exerting influence through privately owned media and maintaining close relations with successive governments; also, the multinational railway transport company Alstom has been implicated in corruption cases (including a 772 million euro fine imposed by the US government in 2014).

As a result, safety systems were not installed, railway network projects were incomplete, producing structurally unsafe rail travel in Greece: As one report emphasized, "None of the necessary security systems, which were provided for in at least four contracts whose contractual completion time had expired many years ago, have been delivered and fully put into operation... inadequate maintenance of the network and infrastructure, due to underfunding" [57].

Analysis of the available evidence indicates that the non-functioning of safety systems in rail travel in the EU is not the exception but a normalized condition. Based on recent data, only 13% of routes of the EU's core network operated with the ERTMS system [57]. In the Greek railway network, remote control based on ETCS and GSM-R safety systems is not functioning, and the non-operation of basic infrastructures such as traffic lights is frequent: "there was no Remote Control, i.e. recording and control in real time of the position and movement of each train on the entire railway network on a remote traffic board...on the day of the Tempi crime in our country not only was there no Remote Control and none of the above modern safety systems (ETCS -- GSM-R) were functioning but even the traffic lights were out of operation!" [57].

So, while railway safety systems remained non-functional and core infrastructure was poorly maintained, fire safety standards were not applied and Hellenic Train S.A. pressed for higher train speeds in pursuit of additional profit: "increasing the capacity of the network and the speed of freight transport, at the expense of all necessary safety measures... At the same time, Hellenic Train S.A., despite the poor condition, deficiencies and gaps in the safety systems of the railway network, was pushing for an increase in the speed of traffic and even though it itself had not taken care to bring modern trains to the Greek network, to install the GSM-R system in all its trains and its wagons did not meet the updated fire safety standards" [57].

Supervisory controls were also inadequate: "The control capacity and activity of the Railway Regulatory Authority (RAS) were shown to be completely inadequate, in relation to the certification of the safety of railway transport" [57], while numerous letters and publications before the crash at Tempi pointed out unsafe working and operating conditions in train traffic. For example, in a statement by the RAILWAY CONFERENCE on 07/02/2023, it was warned that "as long as protective measures are not taken in the workplace and the safe operation and traffic of trains, accidents will never end."

The conclusion of the European Railway Agency (ERA) in the aftermath of the Tempi crime reflects aspects of this state-corporate crime: the normalization of opaque practices, the entrenchment of mutually reinforcing interests between state and business, and the persistence of diffuse responsibility. These are reinforced by complexity of legal frameworks and "grey zones" of impunity, enabling shifting responsibilities, role confusion, selective rule application, and failure to address risks and implement a safety plan.

Adding insult to injury, the passenger public was misled through advertisements promoting safety of rail travel based on innovative technologies. As stated by SYRIZA MPs [57]: "The above misleading advertisement was promoted not only in the form of a video but also with brochures as well as by posting on the corporate website where it is stated by Hellenic Train S.A.: '...With respect for the citizen, continuous information, with particular emphasis on facilitating people with mobility problems, with modern infrastructure and high-tech trains, Hellenic Train S.A. ensures the quality of your travels and guarantees safe, fast and accurate routes...'".

4.3. Railway Staff Shortages and Clientelism

The privatization of rail proceeded with reduced staffing and practices, such as the hiring of inadequately trained personnel or appointments justified through arbitrary “essential criteria” of selection: "The staff of the unified OSE had reached 13,000 people in 1984 and was reduced in 2007 to approximately 7,100 people. The staff reduction continued until 2010 with the retention of employees with special expertise. However, after 2010, especially as a result of Law 3891/2010 known as the 'Reppas law,' the reduction in staff was rapid. Also, a second chronic pathology that the Greek railways faced - and which is related to a certain extent to the understaffing of OSE - has to do with the inadequate maintenance of the works" [57]. KKE MPs noted the "methodical, continuous reduction of human resources and their insufficient training and experience... the necessary job positions for OSE should have been 2,800 people. However, the organic positions of OSE were 2,098 and ultimately only about 1,000 people worked at OSE (755 permanent and 230,607 contract workers)...; the evening shift at the Larissa station was staffed by just one (!) person" [57].

Under these conditions, employees were placed in impossible situations - tasked with responsibilities that exceeded human capacity in the absence of functioning technical systems. When individuals are placed within organizational structures that set them up for failure, blaming "human error" misidentifies the true source of risk [3,4]. The stationmaster working alone, without functioning safety systems, represents not individual negligence but organizational failure. This reflects "latent conditions", organizational pathologies that lie dormant until they combine with active failures to produce catastrophic outcomes [67]. An official reported noted: "It is not simply a matter of 'human error' by someone exhausted on the fateful night. In the case of the stationmaster, we observe... the chronic criminal social pathology, when the suitability of a person is judged opportunistically and clientelistically, without regard to the responsibility and the impact on ... people who ride the trains every day" [57].

4.4. The "Dark Side" of Greek Trains

Another aspect of this state-corporate crime is illegal trafficking of goods and organized criminality, further endangering rail transport. A witness before the Greek Parliament commented on "the dark side" of OSE: "... namely corruption and mismanagement, the most notable aspects of this situation are the so-called "black wagons," where OSE trains transported private goods without these being recorded, with these loads being carried under arrangements made by private individuals in cooperation, unfortunately, with OSE officials, without OSE gaining anything. Second, the so-called "ghost wagons," that is, wagons that came from abroad and, because the system was paper-based and there was no electronic way to track how the trains were moving, some wagons would disappear onto a branch line, usually in the Sindos area of Thessaloniki, for two months and would be used as storage space for private individuals, who paid a very small fee to certain OSE officials who were complicit in this sabotage against OSE. Third, fuel theft. It was observed that for a particular route a train would sometimes burn fuel costing 5,000 euros and at other times fuel costing 50,000 euros. It was therefore established that some trains were again being diverted onto certain branch lines of the network, where part of the fuel they carried was transferred to tanker trucks, which then transported this fuel to various petrol stations" [57, p.33].

These points are even more relevant, as questions and requests for proper and independent investigation continue with respect to a massive fireball and intense fire that followed the collision of electric trains that killed several passengers and caused chemical wounds, which cannot be adequately explained by the declared load of the freight train. In a future paper, we will examine the role of possible illegal trade in flammable materials that caused the fire and, in combination with non-compliant fire-resistant and defective train seats, may be responsible for the deaths of 27 passengers, who had survived the force of the crash but were trapped in the burning car.

4.5. Financial Crimes and Explicit Compliance Breaches

The Tempi state-corporate crime was fundamentally enabled by financial misconduct and regulatory violations. These practices, ranging from formally illegal acts to ethically bankrupt yet lawful decisions, created the material conditions for the disaster.

- Illegal State Aid and Procurement Fraud: The European Commission's creation of "three files of illegal state aids, amounting to 15.683 billion euros" for OSE and TRAINOSE represents a core formally illegal act [57]. This is linked to the Siemens scandal, involving bribery for contracts, a clear case of corporate bribery and corruption. The privatization of TRAINOSE itself, sold for a particularly low price with investment obligations that were not enforced, while the state simultaneously subsidized the new private owner, raises serious questions about fraudulent asset transfer and state capture, potentially constituting misallocation of public funds [57, 59].
- Contract Manipulation and Cost Overruns: The deliberate fragmentation of safety system contracts (e.g., GSM-R, ETCS) to serve competing business interests led to intentional incompatibilities and delays. Contractors exploited these issues "as a lever of pressure to obtain an even larger share of the pie" [57]. This is a violation of procurement integrity and fiduciary duty. The case of Contract 717 is stark: completed technically in 2016 but never activated, its cost ballooned from €41.3m to €87m due to "intended delays and extensions" [57,66]. This constitutes procurement fraud, willful waste of public money, and non-compliance with contractual obligations, enriching contractors while safety systems remained inoperable.
- Regulatory Non-Compliance and Enforcement Gaps: Operating trains for years without legally mandated safety systems like ETCS/GSM-R was a persistent and knowing regulatory breach. The Railway Regulatory Authority (RAS) admitted its "completely inadequate" control capacity [57]. This represents a failure of regulatory enforcement, a key compliance gap that allowed hazardous practices to continue. Hellenic Train S.A.'s pressure to increase speeds despite known safety deficits and non-compliant rolling stock demonstrates corporate negligence and reckless endangerment, prioritizing profit over safety.
- The "Dark Side": Theft and Organized Crime: The "black wagons," "ghost wagons," and fuel theft schemes described by witnesses reveal systemic embezzlement, theft of services, and organized criminal infiltration of a state-owned enterprise [57]. These are unambiguous financial crimes that diverted resources from maintenance and safety, further degrading the system.

These mechanisms illustrate a spectrum of wrongdoing: from clear-cut illegal acts (bribery, theft, illegal state aid) to "lawful but awful" financial engineering (exploitative contracting, value extraction through privatization) and gross regulatory non-compliance. They were enabled by dysnomie and were normalized within the organizational culture, becoming the uncontested "way things are done." It is essential to stress that a number of criminal trials, investigations and lawsuits are currently active, including a prosecution of 30 public and private officials by EPPO for subsidy fraud, false certification with the purpose of obtaining an unfair advantage for another person, misappropriation of funds, as well as instigation of subsidy fraud and instigation of false certification, complicity in the misappropriation of funds to the detriment of the financial interests of the EU and the Hellenic Republic, as well as instigation to the misappropriation of funds [103].

5. Dysnomie, Institutional Corruption, and the Normalization of Deviance

The Tempi tragedy is the culmination of systemic conditions that can be analyzed through the theoretical lenses of criminogenic asymmetries, dysnomie, institutional corruption, and normalization of deviance [2,3,24,42].

Dysnomie refers to a situation where laws and regulations are present, but they are ineffective, inconsistent, poorly enforced, or applied in a discriminatory manner [1]. This occurs when rapid economic and political changes undermine the development of adequate governance and regulatory structures, precisely the conditions that characterized Greek railway transportation following the privatization and Troika's memoranda period.

5.1. The Normalization of Deviance in Railway Operations

The normalization of deviance framework helps us understand how the Tempi tragedy became possible [3,4]. The Challenger disaster case showed how engineers and managers at NASA and Morton Thiokol came to accept as normal the erosion of O-ring seals that ultimately caused the spacecraft's destruction without willful negligence but through incremental processes of cultural normalization whereby each instance of successful operation despite technical anomalies reinforced the acceptability of risk.

The same dynamic operated in Greek railway transportation. Each day that trains operated without functioning safety systems, without adequate staffing, without operational telecontrol – and, for some time, without catastrophic consequences - reinforced the organizational belief that these conditions were acceptable. The absence of a major disaster apparently became evidence that disaster could not occur, a "practical drift", a gradual movement of operational practice away from formal rules and safety requirements, driven by production pressures, apparent success and organizational complexity [4,51, see also 68 on the 1994 Black Hawk shootdown].

Several features of the Tempi case exemplify this process. First, the operation of trains without functioning ETCS and GSM-R systems became routine practice, normalized through years of major-incident-free operation despite non-compliance with safety requirements. Second, the staffing of critical stations with single operators became accepted as normal rather than recognized as a dangerous deviation from safe practice, despite repeated warnings. Third, the fragmentation of safety responsibilities across multiple contractors, with no single entity possessing comprehensive oversight, was normalized as an inevitable consequence of liberalization rather than understood as a structural vulnerability. Fourth, corporate pressure to increase speed and capacity despite inadequate safety infrastructure was normalized as legitimate commercial practice. In this case, the gap between formal safety requirements and actual practice widened over the years, until deviation became the norm and compliance became the exception.

5.2. Institutional Corruption and Systemic Dysfunction

The body of work on institutional corruption [21-24] shows how systemic corruption, fraud and mismanagement result in a lack of crisis preparedness for the prevention of certain crises or mitigation of catastrophic events. When natural disasters inevitably strike or other emergencies arise, inadequate preparedness or responses result in government distrust and legitimacy crises, which aggravate problems and cause further victimization [24]. The Tempi case exemplifies this dynamic, decades of institutional corruption in the railway sector created conditions where a catastrophic "accident" became not merely possible but probable.

This analytical framework illuminates how corruption operates at the institutional level. The distinction between individual and institutional corruption is crucial here: while individual corruption involves officials receiving benefits improperly connected to their actions, institutional corruption describes conditions where institutional dependencies systematically distort judgment even when individuals do not act corruptly. The Greek railway system exhibited both individual corruption (clientelism, bribery) and institutional corruption, where its core purpose was systematically subverted by dependencies on fiscal targets, privatization agendas and contract manipulation. This corruption directly facilitated the financial crimes outlined in Section 3.5. The resource constraints, the regulatory capture of the RAS and the state's failure to enforce contracts or safety standards were not mere oversights but institutionalized patterns that enabled the misallocation of funds and procurement fraud. The subordination of safety to commercial imperatives created a perverse incentive structure where cost-overruns and delays in safety projects became profitable, while compliance was left way behind. Greece ended up with a regulatory system whose effectiveness was systematically undermined by the very neo-liberal measures it was supposed to oversee.

5.3. Criminogenic Asymmetries and State-Corporate Symbiosis

The Tempi case demonstrates multiple dimensions of criminogenic asymmetries [1,2,42]: asymmetries between the powerful Troika and a bankrupt state on its knees; between profit imperatives and safety requirements; between rapid privatization and slow regulatory development; between European integration mandates and national implementation capacity; and between the formal adoption of safety standards and their actual enforcement. These asymmetries created opportunities for misconduct while systematically weakening the controls that might have prevented the tragedy.

The asymmetry of information and power between the state and contractors like Aktor/Alstom allowed for contract manipulation and cost inflation. The asymmetry in accountability - where corporate actors could diffuse responsibility through complex contracts, and state officials were shielded by legal immunities – facilitated and prevented effective prosecution of procurement fraud and illegal state aid at the national level.

These asymmetries were maintained and exploited through "shadow elites" [25-27]. The interface of government positions, regulatory bodies, and private contractors created networks of actors whose interests aligned more closely with corporate profit than with public safety. Analysis of similar dynamics in the United States and post-communist Europe, points to systemic transformations in governance in many contexts that weaken accountability mechanisms [26,27].

Other works [49,50,69] demonstrated how state-corporate crime operates through symbiotic relationships where the state does not merely fail to control corporate harm but actively enables it. The Greek railway case exemplifies this symbiosis: the state (through OSE and regulatory bodies) and corporations (through Hellenic Train S.A. and contractors) developed mutually reinforcing relationships that prioritized fiscal objectives and corporate profit over public safety. Such symbiosis is a structural feature of neoliberal governance, where the distinction between public regulation and private interest becomes systematically eroded [50].

Moreover, the conditions leading to Tempi exemplify "lawful but awful" practices [5], actions that are technically within legal bounds while producing severe social harm. The austerity measures, the opaque privatization without adequate safeguards, the understaffing of critical safety positions, and the failure to complete infrastructure projects all operated largely within existing legal frameworks, yet collectively created conditions of systemic endangerment. We reiterate that, when laws and policies allow or impose such harmful outcomes, these laws and policies must be changed. Dogmatically insisting on them amounts to "regulatory fundamentalism" that engenders safety and other risks [6].

6. Comparative Transport Governance Failures

The governance failures analyzed above are not confined to the Greek context. Comparable forms of state–corporate corruption and financial crime have been documented in transport systems across multiple jurisdictions, revealing a recurring pattern in which regulatory weaknesses, political protection, and financial incentives converge to produce systemic risk and social harm.

In Italy, rail disasters such as the Viareggio explosion exposed persistent failures in safety oversight, maintenance supervision, and regulatory enforcement despite repeated warnings and documented risks. Parliamentary inquiries and judicial proceedings demonstrated that formal compliance structures coexisted with substantive regulatory neglect, while accountability processes were protracted and uneven, reinforcing public perceptions of elite impunity [74,75]. These dynamics align with broader analyses of infrastructure governance in which fragmented authority and political shielding undermine effective deterrence.

In the United Kingdom, the privatization and fragmentation of rail governance following the Railways Act 1993 generated complex accountability chains that diluted responsibility for safety and maintenance. Catastrophic incidents such as the Hatfield derailment revealed how cost-cutting pressures, performance-driven contracting, and regulatory deference to private operators created criminogenic conditions rather than enhancing efficiency or safety. Official inquiries underscored that outsourcing and financialization of oversight functions weakened regulatory capacity and obscured responsibility [76,77].

The United States offers parallel examples, particularly in freight rail and hazardous materials transport. Recurrent derailments have prompted investigations by federal agencies identifying deferred maintenance, weakened safety standards, and forms of regulatory capture as contributing factors. Despite extensive formal regulation, enforcement gaps, negotiated compliance arrangements, and sustained lobbying by large corporate actors have limited criminal accountability, illustrating how political–economic power can undermine safety governance even in highly regulated environments [78,79].

Argentina provides a particularly instructive case in the 2012 Once rail tragedy. As documented in the civil-society report *Trenes sin control*, institutional fragmentation, prolonged dysfunction of the national transport regulator (CNRT), and weak enforcement of contractual and safety obligations produced a "disintegrated control system" in which neither regulators nor concessionaires were held to effective standards [80]. Despite repeated violations by the private concessionaire and visible deterioration of infrastructure, oversight bodies failed to intervene meaningfully. Subsequent prosecutorial and administrative actions confirmed that regulatory neglect and institutional inertia were as consequential as technical failures in producing the disaster [81,82]. The Argentine case illustrates how the mere existence of regulatory bodies can mask substantive incapacity, particularly where transparency, legislative oversight, and public access to information are systematically weakened [83].

Mexico offers a contemporary example of how corruption risks, regulatory failure, and political expediency can converge in large-scale transport projects. Investigative reporting on the Maya Train project has documented extensive use of no-bid contracts, reliance on emergency or "national security" designations to bypass ordinary oversight, and repeated judicial disputes over environmental and safety compliance [93,95,99,100]. Safety incidents, including derailments and reported workplace fatalities, have raised concerns about rushed timelines, weakened supervision, and accountability deficits, echoing earlier failures such as the 2021 Mexico City subway collapse, where underfunding, opaque contracting, and regulatory neglect culminated in fatal infrastructure failure [94,101]. While investigations remain ongoing, these patterns reflect a governance environment in which political protection and opacity undermine preventive oversight.

Serbia mirrors many of these dynamics in the 2023 collapse of the roof at the Novi Sad railway station during reconstruction, which caused deaths, injuries, and weeks of sustained public protests. Prosecutors have charged more than a dozen individuals - including a former infrastructure minister, designers, and supervisors - for serious offences against public safety and irregular construction works [102]. Parallel investigations by anti-corruption authorities have examined potential misuse of public and EU-linked funds, though parts of the indictments have reportedly been narrowed or returned by courts, deepening public mistrust [102-104]. Independent investigative reporting and EU monitoring assessments have linked the disaster to chronic weaknesses in construction oversight, procurement transparency, and political interference in regulatory bodies [100-102]. As in Greece, official narratives emphasizing "technical error" have been challenged by citizens and civil society actors who frame the tragedy as a symptom of deeper corruption, clientelist contracting, and institutional impunity. The case illustrates how long-term collusion, negligence, and institutional capture can embed risk into routine governance, making disaster a foreseeable outcome rather than a freak event.

Taken together, these cases demonstrate that transport-related harms often reflect structural configurations of state-corporate relations in which regulatory fragmentation, financial pressures, and political insulation converge to normalize risk and diffuse responsibility. Such patterns reinforce the international relevance of the Tempi case and situate it squarely within the broader literature on state–corporate corruption, crime, and criminogenic governance.

7. Conclusion and Policy Implications

This paper has analyzed the Tempi tragedy as a state-corporate crime, demonstrating its roots in neoliberal privatization, austerity, and normalized deviance. The theoretical frameworks of dysnomie, normalization of deviance, and criminogenic asymmetries explain how systemic risk became obscured, while specific financial crime mechanisms - illegal state aid, procurement fraud, contractual malfeasance, and regulatory non-compliance - operationalized that risk. These practices, spanning clearly illegal conduct, unlawful acts, and ethically bankrupt yet formally legal decisions, diverted resources and attention away from safety and created the conditions for disaster.

The pathologies revealed in the Tempi case are not unique to Greece. From Italy and the United Kingdom to the United States, Argentina, Mexico, and Serbia, recurring patterns of regulatory weakness, political protection of corporate interests, and fragmented accountability generate criminogenic conditions in mass transportation systems worldwide. State-corporate crimes in the transport sector are thus neither accidental nor anomalous; they are the predictable outcome of criminogenic governance.

This paper has only addressed part of the criminality surrounding the Tempi case. Additional and ongoing investigations focus on allegations of interference at the crime scene through the rapid removal of soil, victim remains, and train wreckage, destruction of evidence within hours of the crash and orchestrated obstruction of justice [57,73]. As the HARSIA report confirmed, pressure from coordinators to restore the accident scene resulted in the loss of evidentiary material that could clarify questions about a suspected illegal load of flammable materials. Furthermore, rail travel in Greece remains dangerous, as in some sections of the network signaling and remote-control safety systems are still deactivated [71].

Preventing such state-corporate and financial crimes requires reforms that move beyond the criminalization of individual actors toward structural accountability and institutional integrity, in line with international standards such as the United Nations Convention against Corruption (UNCAC), the OECD Anti-Bribery Convention, and the European Union's rule-of-law architecture [86,89,90]. The Greek context—particularly the accountability barriers created by constitutional provisions like Article 86 on ministerial liability - crystallizes these challenges [84,85,87,88].

Key policy and compliance implications include:

1. Revising immunity regimes: Constitutional and statutory immunity should be reformed to remove procedural obstacles to investigating and prosecuting ministers and senior officials for corruption, financial crime, or abuse of office, consistent with UNCAC Articles 7 and 30 [86].
2. Reinforcing institutional independence: Regulatory and judicial bodies require guaranteed independence through transparent, merit-based appointments, secure tenure, and protection from political retaliation, using OECD and EU benchmarks as reference points [89,90].
3. Ensuring substantive transparency: Public access to procurement data, beneficial ownership information, and verified asset declarations (UNCAC Articles 9 and 52) must be secured in practice and not only on paper [86].
4. Strengthening oversight and enforcement capacity: Parliamentary committees, audit institutions, and anti-corruption agencies need greater resources and authority, while robust whistleblower protection frameworks aligned with international norms are essential for exposing complex wrongdoing [91,92].
5. Evaluating policy and compliance by outcomes: Preventive governance should integrate integrity and risk considerations into procurement and regulatory supervision, moving beyond formalistic box-ticking to preventing "lawful but awful" practices [5,42].

The Tempi tragedy stands as a stark and internationally relevant reminder of the catastrophic consequences when the pursuit of profit, the pressures of austerity, and the normalization of dysnomie converge. When institutions designed to serve the public interest are systematically redirected toward serving private interests, the result is a crisis of governance that produces cascading social harms [6,24,73]. Without addressing the underlying conditions of asymmetrical accountability, inadequate oversight, and institutionalized opacity through structural reforms, cycles of disaster, scandal, and impunity in critical infrastructure sectors are likely to persist.

Conflict of Interest

The authors declare that they have no conflicts of interest related to this research/study.

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