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From Static Logistics to Dynamic Ecosystems: Evaluating the Emergence of an Event Mobility Governance Framework in Dubai's Mega-Event Sector

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ABSTRACT

Mega-events compress months of ordinary travel demand into days, and they do so on top of a city that must keep working. This white paper examines how Dubai has moved from event-specific, largely reactive transport logistics towards a formalised Event Mobility Governance Framework (EMGF) that treats surge mobility as a permanent institutional capability rather than a temporary project. Drawing on the mobilities paradigm and on collaborative and adaptive governance theory, we describe the framework as a four-layer architecture: a tripartite institutional layer (Roads and Transport Authority, Dubai Police and venue authorities), a shared data and decision layer, a set of supply, demand and network levers, and outcomes layer. Two contributions are original to this paper. The first is the Event Mobility Governance Maturity Index (EMGMI), a weighted five-dimension composite that scores how far a jurisdiction has institutionalised event mobility. The second is the Surge Absorption Ratio (SAR), a simple published-data metric of how much of an event's attendance the public transport system actually carries. We compare two embedded cases within one jurisdiction, Expo 2020 (a supply-side, fixed-infrastructure baseline) and COP28 (a demand-side, predictive model), against a pre-framework baseline. Because passenger-level operational data are not public, the inferential analysis uses an illustrative event-day panel (n = 255) calibrated to published RTA magnitudes; it is presented as a reproducible analytic template rather than as audited evidence. On that panel, one-way ANOVA shows large regime effects on corridor delay ($F(2, 252) = 53.3$, $\eta^2 = 0.30$), crowd dispersal time and incident response, and hierarchical OLS shows that public-transport share and digital integration jointly explain most of the regime difference (adjusted R^2 rising from 0.05 to 0.47). The EMGMI rises from 30.5 (baseline) to 59.7 (Expo 2020) and 79.1 (COP28). We close with ownership-assigned recommendations for RTA leadership and a research agenda for validating the index with operational data.

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Introduction

Dubai hosts an unusually dense calendar of large gatherings for a city of its size: the Dubai Shopping Festival, GITEX Global, the Dubai Airshow, the World Government Summit, New Year celebrations that draw hundreds of thousands to a handful of waterfront locations, and, in the space of two years, a six-month World Expo followed by a United Nations climate conference with tens of thousands of accredited delegates. Each of these events asks the same question of the transport system in a slightly different form: how does a city absorb a surge that is far larger than its daily peak, keep the rest of the network functioning, satisfy security constraints, and do all this without building infrastructure that will sit idle once the event is over?

The conventional answer, documented across three decades of Olympic and Expo host cities, has been to build. Fixed rail extensions, dedicated bus corridors and large parking estates are commissioned against the event deadline, and the host city hopes the legacy will justify the cost (Kassens-Noor, 2013; Currie & Shalaby, 2012). The record is mixed. Flyvbjerg's (2014) synthesis of megaprojects finds systematic cost and schedule overruns, and Batty (2013) warns that physical expansion alone leaves cities with under-used assets once the temporary demand disappears. Against this, a second strand of practice, visible in London 2012 and increasingly in Asian and Gulf host cities, treats the event as a demand-management problem to be solved with information, incentives and coordination rather than concrete (Currie, Jones & Woolley, 2014).

Dubai's recent experience is interesting because it contains both strands inside a single jurisdiction and within a short interval. Expo 2020 (held October 2021 to March 2022) was served by Route 2020, a fifteen-kilometre metro branch, an extensive free bus network and large park-and-ride operations; RTA reported 37.3 million uses of its services over the six months, including 8.2 million metro riders to the Expo station (Dubai Media Office, 2022). COP28, held at the same site in late 2023, could not commission new infrastructure and instead relied on extended metro hours, complimentary nol cards for delegates, biofuel and electric shuttle fleets, hybrid and electric taxi allocation, and coordinated road closures managed with Dubai Police and the venue (Dubai Media Office, 2023). The two events therefore form a natural, if imperfect, comparison between a supply-side and a demand-side approach delivered by the same institutions.

This paper has three purposes. First, it describes the governance arrangement that has emerged from these events, which we call the Event Mobility Governance Framework (EMGF), and situates it in the academic literature on mobilities, collaborative governance and smart urban governance. Second, it proposes two measurement instruments that have been missing from the practitioner conversation: a maturity index (EMGMI) that scores institutionalisation across five dimensions, and a Surge Absorption Ratio (SAR) computed from figures that transport authorities already publish. Third, it demonstrates, on a calibrated illustrative panel, the statistical apparatus (ANOVA, hierarchical OLS, robustness checks) that RTA could apply directly to its operational data to test whether the framework delivers measurable outcomes. We are explicit throughout about what is documented, what is modelled, and what remains to be verified.

The remainder of the paper is organised as follows. Section 2 states the problem, the objectives and the hypotheses. Section 3 sets out the theoretical foundations. Section 4 reviews the relevant literature and identifies the gap. Section 5 presents the EMGF architecture, the Tripartite Model and the two indices. Section 6 describes the methodology. Section 7 reports the institutional analysis of the two cases and Section 8 reports the quantitative results. Section 9 discusses the findings and the emerging technological frontier, Section 10 sets out recommendations, and Sections 11 and 12 cover limitations and conclusions.

Problem Statement, Objectives and Hypotheses

Problem statement

Two failure modes bracket the mega-event mobility problem. The first is overbuilding: capital-intensive, supply-side expansion timed to an event deadline that leaves the city with debt and under-utilised assets (Batty, 2013; Flyvbjerg, 2014). The second is under-coordination: relying on the existing network without the institutional machinery to share information and authority across agencies, which produces gridlock, unsafe crowding at interchanges and slow incident response (Ansell & Gash, 2008). Between these lies a governance problem rather than an engineering one. Hierarchical bureaucracies are structurally poor at sharing real-time data and re-allocating assets across organisational boundaries under time pressure, precisely the conditions a mega-event creates.

The practical question for RTA is therefore not whether Dubai can move large numbers of people, which Expo 2020 settled, but whether the arrangements that worked can be made durable, measurable and transferable to the next event without being rebuilt each time. That requires a framework with named components, a way to score maturity, and an evaluation design that can attribute outcomes to governance choices rather than to attendance alone.

Research objectives

Analyse how the mobilities paradigm and collaborative and adaptive governance theory reframe event surges from logistical exceptions into continuous, data-driven urban management.

Formalise the Tripartite Model (RTA, Dubai Police, venue authorities) and embed it in a four-layer Event Mobility Governance Framework.

Develop and apply two measurement instruments, the EMGMI maturity index and the Surge Absorption Ratio, to the Expo 2020 and COP28 cases.

Specify and demonstrate an inferential evaluation design (ANOVA and hierarchical regression) that isolates the contribution of public-transport share and digital integration from raw attendance.

Translate the analysis into ownership-assigned recommendations aligned with the Dubai 2040 Urban Master Plan.

Hypotheses

The quantitative component tests four hypotheses derived from the theoretical review. They are stated so that they can be re-tested on operational data with no change to the design.

Table 1. Hypotheses and associated tests

Hypothesis	Statement	Test
H1	Governance regime (baseline, Expo 2020, COP28) is associated with significant differences in mean corridor delay, crowd dispersal time and incident response time.	One-way ANOVA with Tukey HSD post hoc; η^2 effect size
H2	After controlling for attendance, higher public-transport share is associated with lower corridor delay.	Hierarchical OLS, Model B; HC3 robust SE
H3	After controlling for attendance and mode share, higher digital integration is associated with lower delay, faster dispersal and faster incident response.	OLS Models B, C and auxiliary models
H4	The regime effect on delay is largely mediated by mode share and digital integration, so that regime dummies shrink once those mechanisms enter the model.	Comparison of Model A/B/C coefficients; two-way ANOVA regime × weekend

Theoretical Foundations

The mobilities paradigm

Sheller and Urry (2006) argued that the social sciences had treated movement as a residual, something that happened between the places where social life occurred. The mobilities paradigm reverses that emphasis. Movement is constitutive: it produces and reproduces spatial and social order, it is uneven in who can move and how, and it is increasingly entangled with information systems that track, price and coordinate it. Applied to transport planning the shift is subtle but consequential. A surge of visitors is not simply a load to be discharged through a pipe of fixed capacity; it is a flow that can be observed, anticipated and shaped while it is happening. The relevant asset is therefore not only the metro line but the data and coordination layer that sits on top of it.

This reading is close to what Kitchin (2014) calls the real-time city, in which pervasive sensing and analytics allow urban systems to be managed on much shorter cycles than the annual planning round. Kitchin is careful to note the risks: technocratic governance, corporate capture of public data and the temptation to treat what is measurable as what matters. Those cautions are directly relevant to a framework that asks private ride-hailing and micromobility operators to share location data with a public authority, and we return to them in Sections 9 and 11.

Networked, collaborative and adaptive governance

The institutional side of the argument draws on three linked bodies of work. The networked governance literature describes the movement from hierarchies to self-organising, inter-organisational networks that share authority and resources to deliver public outcomes. Ansell and

Gash (2008), synthesising 137 cases, identify the conditions under which such collaboration succeeds: a history of trust or at least of managed conflict, facilitative leadership, institutional design that is inclusive and transparent, and a collaborative process built on face-to-face dialogue, shared understanding and intermediate outcomes. Emerson, Nabatchi and Balogh (2012) extend this into an integrative framework in which a collaborative governance regime is nested within a system context, driven by principled engagement, shared motivation and the capacity for joint action.

Adaptive governance adds the dimension of time. Folke, Hahn, Olsson and Norberg (2005) describe governance systems that self-organise around crisis, that draw on distributed knowledge and that learn between episodes. A mega-event is a scheduled crisis. The value of the adaptive lens is that it directs attention to what happens between events: whether the network dissolves once the closing ceremony ends, or whether protocols, data pipelines and relationships persist and are improved. This distinction, between a temporary coalition and a standing regime, is precisely the transition the EMGF is intended to formalise.

Finally, the smart urban governance literature connects these institutional ideas to technology. Meijer and Bolívar (2016), reviewing 51 publications, conclude that smart city governance is best understood as crafting new forms of human collaboration through information and communication technologies, and that technology by itself does not make a city smarter. The EMGF is designed in that spirit: the data cloud and the predictive engine are instruments of collaboration, not substitutes for it.

Literature Review

Mega-events and transport: from legacy infrastructure to demand management

Müller (2015) offers the most useful definitional anchor. A mega-event is a one-off, fixed-duration occasion that scores highly on four dimensions: visitor attractiveness, mediated reach, cost and transformative impact on the built environment. World Expos and COP conferences differ on these dimensions, an Expo being far larger in visitors and COP being far more demanding in security and diplomatic protocol, but both sit comfortably within Müller's mega-event class and both impose the transport problem in an acute form.

Currie and Shalaby (2012) synthesise transport planning approaches across Summer Olympic Games and the Hajj and identify a consistent repertoire: dedicated lanes and routes, temporal spreading of demand, park-and-ride with shuttle feeders, strong travel-demand messaging, and centralised command. Kassens-Noor (2013), tracing the transport legacy of six Olympic Games, finds that the durable benefits are less often the headline rail projects than the operational practices, inter-agency relationships and travel-behaviour changes that outlive the event. Currie, Jones and Woolley (2014) document how London 2012's travel-demand management programme, with its warnings of severe congestion, produced measurable reductions in background travel and allowed the network to cope without the feared collapse. These studies collectively support two propositions that the EMGF adopts: that demand-side levers are as powerful as supply-side ones, and that the institutional capability is the legacy worth planning for.

The megaproject literature supplies the cautionary counterweight. Flyvbjerg (2014) documents the iron law of megaprojects, over budget and over time with high frequency, and Batty (2013) argues

that data-driven planning should be used to optimise existing capacity before adding more. Neither author denies that some infrastructure must be built; the point is that the case for building must be made against the alternative of managing demand better, and that alternative is only credible if the governance and data capability exists to deliver it.

Smart urban governance and the real-time city

Kitchin (2014) and Meijer and Bolívar (2016) frame the shift from planning to real-time management as an institutional transformation, not a technology procurement. Deng, Zhang and Shen (2021) review the emerging practice of digital twin cities, virtual replicas of

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urban systems that are continuously updated from sensor data and used to test interventions before they are applied. Okamoto, Noor, Larsen and Smith (2026), in the International Journal of Automation and Digital Transformation, synthesise the enabling technologies and adoption barriers of digital twins across sectors, including smart cities, and conclude that the technical foundations are now mature enough that the frontier has moved from feasibility to disciplined implementation, standardisation and organisational readiness. That conclusion is exactly the position of a transport authority that has a digital twin capability and must decide how to institutionalise its use for events.

The public acceptance side of digital government matters as well. Elbatanouny, Dafoulas and Saleeb (2025), extending UTAUT2 with technology readiness, show that acceptance of mobile government applications depends on perceived usefulness, facilitating conditions and users' readiness. For an event mobility framework that delivers much of its demand-side effect through apps, digital passes and journey planners, the behavioural conditions for uptake are part of the governance design.

First-and-last-mile integration and micromobility

The most persistent bottlenecks at large events occur not on the trunk network but in the short transitions between it and the venue gates. Oeschger, Carroll and Caulfield (2020), in a systematic review of micromobility and public transport integration, find that shared e-scooters and e-bikes can extend the catchment of rail stations and relieve station-area congestion, but only when parking, pricing and regulatory arrangements are integrated with the transit operator. For event operations, this translates into geofenced speed limits and no-ride zones in pedestrian plazas, dynamic pick-up zones for ride-hailing and a shuttle layer that is scheduled against gate throughput rather than against a timetable.

The Dubai and Gulf context

El Jallad, Alozn, Ahmed and colleagues (2026) propose a data-driven framework for measuring multimodal transport success in smart cities using Dubai as the case, providing evidence that integrated performance measurement across modes is feasible in the emirate's data environment. Daouda (2024), reviewing smart city initiatives in the Middle East in the Emirati Journal of Civil Engineering and Applications, notes that Gulf cities have moved quickly on technology deployment but that governance, interoperability and institutional coordination remain the binding constraints, a finding that echoes Meijer and Bolívar at the regional scale. Together these studies position Dubai as a setting in which the technical preconditions for an EMGF are in place and the governance question is the live one.

Synthesis and gap

Table 2. Synthesis of the literature and the gaps the EMGF addresses

Strand	Representative sources	Contribution to EMGF	Gap addressed here
Mobilities paradigm	Sheller&Urry(2006); Kitchin (2014)	Movement as data-rich flow;real-time management	Operationalising the idea for event surges
Collaborative/ adaptive governance	Ansell & Gash (2008); Emerson et al. (2012); Folke et al. (2005)	Conditions for inter-agency collaboration; learningbetween episodes	Naming and scoring theregime(EMGMI)
Mega-event transport	Currie & Shalaby (2012); Kassens-Noor (2013); Currie et al. (2014); Müller (2015)	Supply and demand levers; institutional legacy	Single-jurisdiction supply vs demand comparison
Megaproject critique	Flyvbjerg(2014);Batty(2013)	Case against reflexive overbuilding	Quantifying what governance adds beyond capacity
Smart urban governance & digital twins	Meijer & Bolívar (2016); Deng et al. (2021); Okamoto et al. (2026)	Technologyasinstrumentof collaboration; predictive simulation	Placing the twin inside a decision layer with owners
Micromobility integration	Oeschger et al. (2020)	First/last-milerelief with regulation	Venue-scale geofencingasa governance lever
Gulf smart city context	Daouda (2024); El Jallad et	Regionalreadiness;	Anchoringthe framework in

	al. (2026); Elbatanouny et al. (2025)	multimodal measurement;app acceptance	UAE evidence

The gap is a measurement gap more than a conceptual one. The literature tells us what good event mobility governance looks like and why it matters, but it does not provide a compact instrument for scoring how far a jurisdiction has institutionalised it, nor a within-jurisdiction comparison of supply-side and demand-side models delivered by the same agencies. The EMGMI and SAR, and the Expo 2020 versus COP28 design, are our response.

The Event Mobility Governance Framework

Architecture

Figure 1. sets out the EMGF as four layers. The institutional layer is the Tripartite Model described in Section 5.2. The data and decision layer comprises a Sovereign Mobility Data Cloud that hosts shared application programming interfaces for transit telemetry, ride-hailing and micromobility feeds and venue gate data, with the guarantee that data remain within national jurisdiction; a predictive engine that runs the digital twin, arrival models and bottleneck forecasts; and a set of decision rules that convert forecasts into dispatch triggers, signal priority requests and geofence changes. The operational layer groups the levers available to the network into supply (headways, fleets, park-and-ride), demand (free passes, arrival slotting, incentives) and network (vehicle-to-everything signal priority, green waves, diversions). The outcomes layer specifies what is measured, and a feedback loop returns lessons to the institutional layer between events.

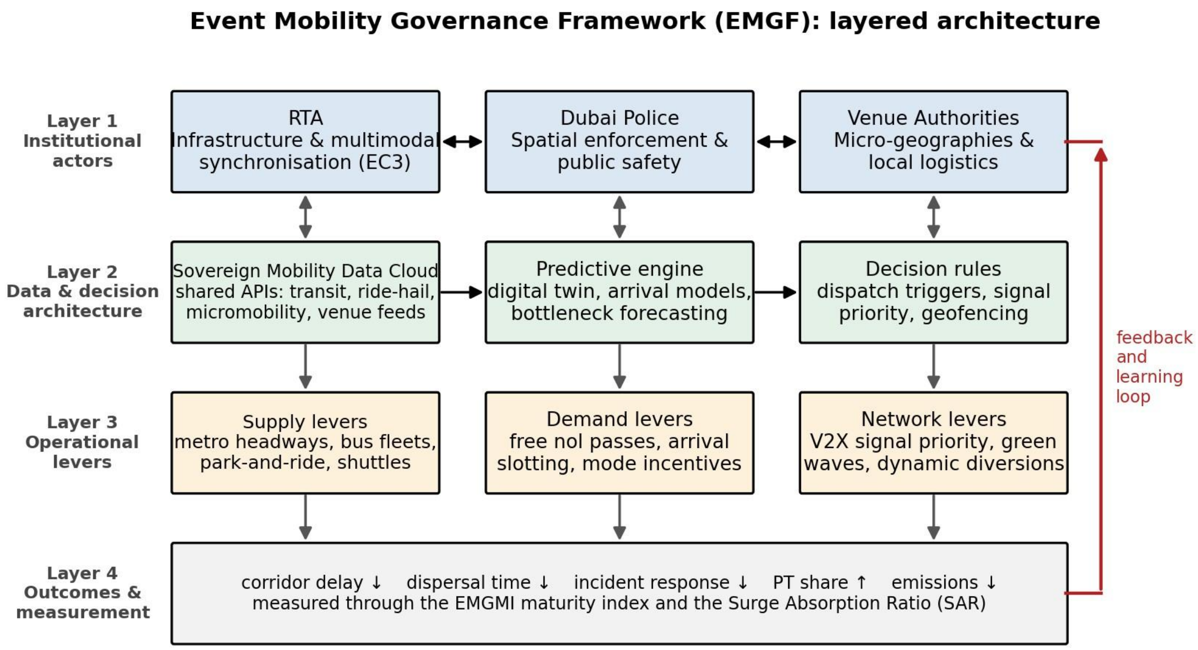

Figure 1. The Event Mobility Governance Framework (EMGF) as a four-layer architecture. Source: authors.

The Tripartite Model

The Tripartite Model is the institutional core. RTA, through its Enterprise Command and Control Centre (EC3) and the Dubai Intelligent Traffic Systems Centre, administers the multimodal grid: metro headways, bus fleets, taxi and e-hail allocation, and the signal network. Dubai Police, through the Smart Operations Room, holds jurisdiction over perimeters, diversions and physical crowd safety, and can request that transit arrivals be held when checkpoint throughput falls behind. Venue authorities such as Expo City Dubai and the Dubai World Trade Centre govern the micro-geographies inside the perimeter: pedestrian routing, pick-up zones, screening plazas, and the gate-

scan and session-schedule data that give the other two parties advance notice of departure surges. Figure 2 shows the principal information flows.

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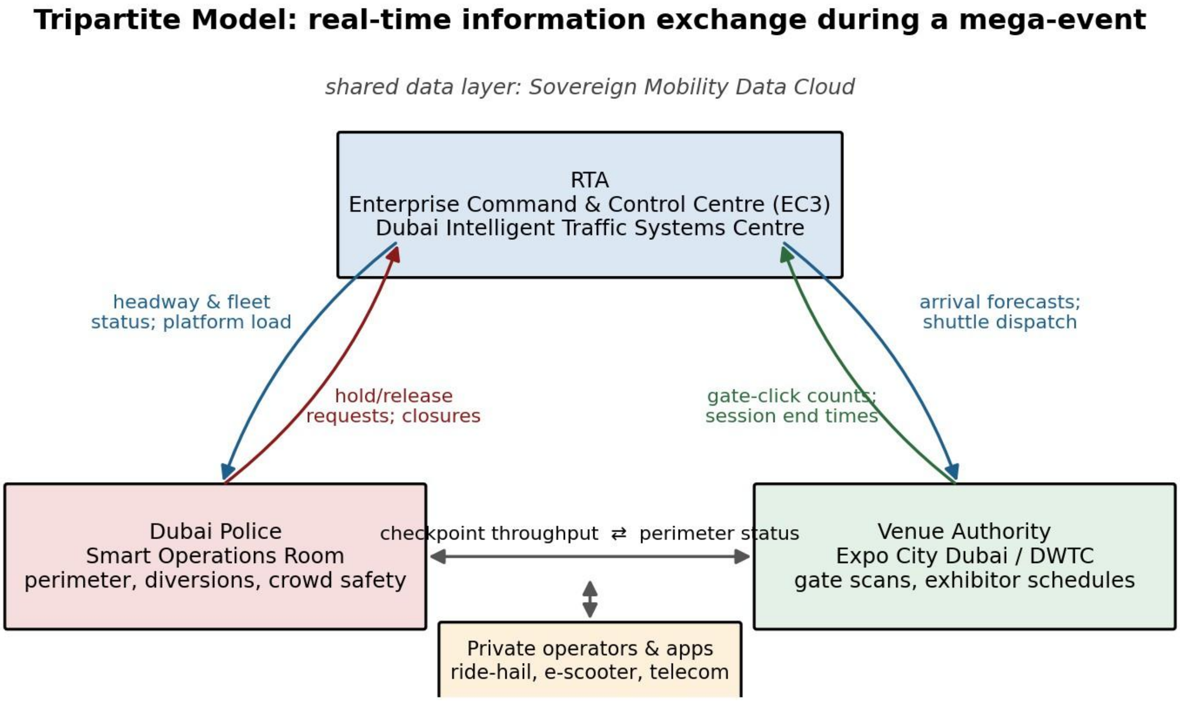

Figure 2. The Tripartite Model: principal real-time information flows between RTA, Dubai Police and venue authorities, with private operators feeding the shared data layer. Source: authors.

What distinguishes the model from an ordinary inter-agency liaison is the direction and latency of the flows. Venue gate counts travel to EC3 within minutes and trigger shuttle dispatch and, where the corridor is instrumented, green-wave requests on the arterials serving the site; police checkpoint status travels to EC3 and can throttle metro release at the adjacent station; RTA arrival forecasts travel to the venue and shape staffing at screening plazas. Ansell and Gash's (2008) conditions for successful collaboration are visible in the design: a shared operational picture, intermediate outcomes measured daily during the event, and facilitative leadership located in a single command node rather than in a committee.

The Event Mobility Governance Maturity Index (EMGMI)

The EMGMI scores five dimensions on a 0 to 100 scale and combines them with weights that reflect the theoretical review's emphasis on institutional and data capability over hardware. Institutional integration (weight 0.25) captures whether the Tripartite arrangement is a standing charter with defined data-sharing protocols or an event-by-event coalition. Data architecture (0.20) captures the existence, coverage and governance of the shared data layer. Multimodal supply flexibility (0.20) captures the ability to re-allocate fleets and headways in real time. Predictive capability (0.20) captures the presence and operational use of forecasting and digital twin tools. Sustainability alignment (0.15) captures the extent to which event operations advance zero-emission and mode-shift targets. The index for regime r is defined in Equation 1.

$$\mathrm{EMGMI}_r = \sum_{i=1}^{5} w_i D_{i,r}, \qquad \sum_{i=1}^{5} w_i = 1, \qquad 0 \le D_{i,r} \le 100$$

Dimension scores are assigned against the rubric in Appendix A. In this paper they are expert-rubric scores assigned by the authors from documentary evidence and are therefore illustrative; the intended operational use is a scored self-assessment by the three institutions, with inter-rater checks, repeated after each event.

The Surge Absorption Ratio (SAR)

The SAR is deliberately simple. It is the ratio of public transport trips attributable to an event to the event's total attendance, as shown in Equation 2, where T is the count of public transport trips serving the event and V is total visits. It can be computed entirely from figures transport authorities already publish. For Expo 2020, RTA reported that public transport, taxi and e-hail together carried

$$SAR_e = \frac{T_e^{PT}}{V_e}$$

(2)

Decision rules and trigger thresholds

A framework that stops at architecture leaves the hardest part to improvisation. The decision-rule component of the data and decision layer therefore specifies, for each operational lever, the signal that triggers it, the threshold at which it fires, the owner who can override it and the latency within which it must act. Table 5a gives an illustrative set drawn from the practices observed at the two events and from the mega-event transport literature; the numerical thresholds are placeholders to be calibrated by EC3 against its own data, and their purpose here is to show the form that codified rules should take. Two design principles govern the table. First, every automated trigger has a named human owner who can suspend it, which is the practical answer to the algorithmic accountability question raised in Section 9.2. Second, thresholds are expressed in quantities that are already observed in real time, so that a rule can be audited afterwards against the log.

Table 5. a. Illustrative decision rules for the EMGF operational layer

Lever	Trigger signal	Illustrative threshold	Action	Owner / override	Target latency
Metro headway	Platform occupancyat event station	>80%of design capacity for 10 min	Reduce headwayto minimum; hold release if police request	EC3 rail control; Police can hold	≤ 5 min
Shuttle dispatch	Venue gate-out count; session end feed	Forecast egress> shuttle capacityin next 20 min	Dispatch reserve shuttles to affected gate	EC3 bus control; venue can re-prioritise gates	≤ 8 min
Signal priority	V2X request from shuttle or convoy	Corridor saturation<0.9 on cross street	Extend green; activate green wave on egress arterial	DITSC; Police override for security convoys	Real time
Ride-hail geofence	App demand density inside venue	> 150 requests per 5 min per gate	Shift pick-up zone; push in-app routing	EC3 data desk; venue for on-site zones	≤ 3 min
Micromobility limits	Pedestrian densityin plazas	> 2 persons per m² sustained	Reducee-scooter speed cap; enforce no-ride zone	JointPersonal Mobility Monitoring Unit	≤ 2 min

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Road diversion	Corridor delay index; closure notice	Delay index >25minor police closure	Activatepre-planned diversion; updateVMS and apps	PoliceSmart Operations Room;RTA implements	≤ 10 min
Demand messaging	Digitaltwinforecastof bottleneck	Predicted queue>30min within 60 min	Push arrival-slot adviceto registered attendees	EC3communications; venue co-signs	≤ 15 min

Methodology

Research design

The study is a comparative single-jurisdiction case design with two embedded cases, Expo 2020 (October 2021 to March 2022) and COP28 (30 November to 12 December 2023), set against a pre-framework baseline of ordinary large-event days. Holding the jurisdiction constant removes variation in regulatory structure, federal arrangement and geography that confounds cross-city comparisons, at the cost of external validity, which we address in Section 11. The design has a qualitative component (institutional analysis of the two cases from documentary sources) and a quantitative component (statistical evaluation of event-day outcomes).

Data sources

Three categories of source were used. Peer-reviewed literature supplied the theoretical framework and the comparative evidence from other host cities. Official documentation from RTA, the Dubai Media Office and the Government of Dubai supplied the descriptive facts about Expo 2020 and COP28 operations, including the published ridership figures used for the SAR and Figure 7. RTA's internal Traffic Management and Transportation Systems Policy During Events (Right-of-Way Department, January 2026) informed the description of the Tripartite Model. No passenger-level or commercially sensitive operator data were accessed.

Because day-level operational data are not public, the inferential analysis was carried out on an illustrative event-day panel constructed for this paper and calibrated to the published magnitudes. The panel contains 255 event-days: 60 baseline days representing pre-framework large-event operations, 182 Expo 2020 days and 13 COP28 days. Attendance means were set to published or reported ranges (Expo averaged roughly 130,000 visits per day over 182 days; COP28 hosted several tens of thousands of accredited delegates per day), public-transport share was anchored to the 37 per cent Expo figure and to the design intent of COP28, and outcome variables were generated with a structural relationship to attendance, mode share and digital integration plus random noise. We stress that every coefficient, F statistic and p value reported in Section 8 describes this panel and not Dubai's actual operational performance. The purpose is to demonstrate an evaluation design that RTA can execute unchanged on its EC3 data.

Variables

Table 3. Variables in the illustrative event-day panel

Variable	Role	Definition and unit	Calibration source
Regime	Factor	Baseline / Expo 2020 / COP28	Case design
Attendance	Predictor	Dailyeventattendance, thousands	DubaiMediaOffice (2022; 2023)
PT share	Predictor/ mechanism	Share of event trips by public transport, 0–1	RTA 37% Expo figure; COP28 design intent
Digital integration index	Predictor/ mechanism	Composite 0–100: data sharing, predictive use, V2X coverage	Documentaryevidence; Appendix A rubric

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Weekend	Control	1 if Friday/Saturday	Calendar
Corridordelay index	Outcome	Excess travel time on approach corridors, minutes	Literaturerangesfor event corridors
Crowddispersal time	Outcome	Minutes from session end to 80% egress of peak crowd	Currie & Shalaby (2012) ranges
Incident response	Outcome	Minutes from detection to first response	Illustrative

Analytical models

$$F = \frac{\mathrm{MS_{between}}}{\mathrm{MS_{within}}} = \frac{\sum_g n_g(\bar{y}_g - \bar{y})^2/(k-1)}{\sum_g\sum_j (y_{gj} - \bar{y}_g)^2/(N-k)}, \qquad \eta^2 = \frac{\mathrm{SS_{between}}}{\mathrm{SS_{total}}}$$

(3)

Hypotheses H2 to H4 are tested with a hierarchical ordinary least squares design. Model A regresses corridor delay on attendance alone; Model B adds public-transport share and the digital integration index; Model C adds regime dummies (baseline as reference) and the weekend control, as specified in Equation 4. Heteroskedasticity-consistent (HC3) standard errors are used throughout. If the regime dummies shrink substantially between the equivalent of Model A with dummies and Model C, the interpretation is that the regime effect operates through the two mechanisms rather than through unobserved features of the events.

$$\mathrm{Delay}_d = \beta_0 + \beta_1\mathrm{Att}_d + \beta_2\mathrm{PT}_d + \beta_3\mathrm{Dig}_d + \gamma_1\mathrm{Expo}_d + \gamma_2\mathrm{COP}_d + \delta\,\mathrm{Wkd}_d + \varepsilon_d$$

Model diagnostics include variance inflation factors for multicollinearity, the Breusch–Pagan test for heteroskedasticity, the Shapiro–Wilk test on residuals and the Durbin–Watson statistic for serial correlation. A two-way ANOVA (regime by weekend) tests whether the regime effect is stable across day types, and auxiliary OLS models are estimated for crowd dispersal and incident response. Finally, an attendance-normalised comparison of delay per 10,000 attendees between

Expo 2020 and COP28 is tested with Welch's t test, to separate scale effects from governance effects. All analyses were run in Python 3.12 with statsmodels 0.14 and SciPy.

Institutional Analysis: Expo 2020 and COP28

Expo 2020: the supply-side baseline

Expo 2020 was the first sustained test of Dubai's large-event capability: 24.1 million visits across

182 days, with one visit in three from overseas. The structural response was heavy fixed infrastructure. Route 2020 added a fifteen-kilometre metro branch from Jebel Ali to the Expo station, designed for very high hourly throughput; a free Expo Rider bus network ran from across Dubai and from other emirates; and three gate-side parking estates were connected by high-frequency shuttles. RTA's own account reports 37.3 million uses of its services, 67 per cent of all transport usage at the event, of which 26.3 million were public transport, taxi and e-hail riders (Dubai Media Office, 2022). Figure 7 breaks the published ridership down by service.

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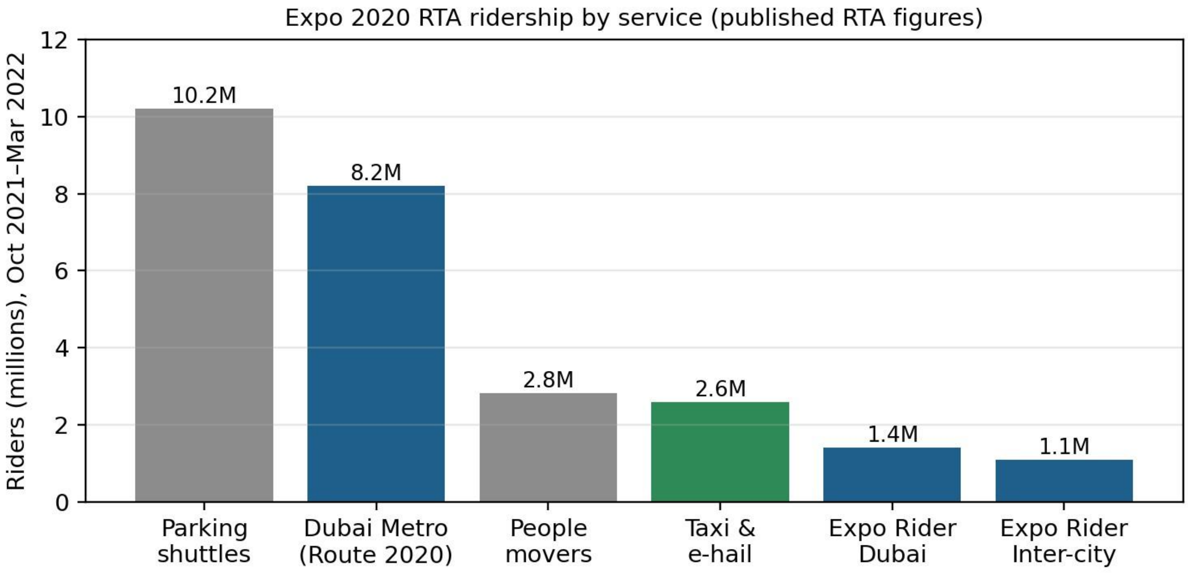

Figure 7. Expo 2020 ridership by RTA service, October 2021 to March 2022 (millions of riders). Source: Dubai Media Office (2022); authors' chart.

Two features of Figure 7 deserve comment. The first is that the largest single flow, 10.2 million, was the parking-to-gate shuttle: the supply-side model succeeded partly by accommodating private cars rather than replacing them. The second is that the metro branch, the most expensive component, carried 8.2 million riders, a substantial but not dominant share. Both observations are consistent with the megaproject literature's caution and both are exactly what a demand-side model would seek to shift. Operationally, Expo established the EC3 as the central clearing house for asset telemetry and demonstrated the ability to re-allocate rolling stock and buses against gate counts and pavilion wait times; this is the origin of the Tripartite Model's data flows.

COP28: the demand-side model

COP28 used the same site with a very different constraint set: no new infrastructure, a two-week window, heads of state and international negotiators with diplomatic security requirements, and a

host commitment to demonstrate low-emission operations. The published plan (Dubai Media Office, 2023) extended metro operating hours to 01:00 for the duration, issued special-edition complimentary nol cards to delegates, deployed 67 biofuel and 10 electric buses on four internal stops, allocated more than 10,000 hybrid taxis and 1,000 electric vehicles through the Hala platform and partner apps, opened new bus routes to delegate hotel clusters for after-metro hours, and coordinated planned road closures near the site during the opening days with Dubai Police. Free multi-storey parking at Centrepoint, Etisalat by e& and Jebel Ali stations turned the metro into a park-and-ride spine.

From a governance standpoint the important elements are the ones that are least visible in the press release: the pairing of delegate registration data with arrival forecasts to schedule electric shuttles at hotel clusters; the joint RTA–Police management of closures that changed at short notice; and the venue's feed of session-end times into shuttle dispatch. These are the predictive, algorithmic data-sharing practices that define the demand-side regime. Their weakness, from an evaluation standpoint, is that the outcome metrics were not published in a form comparable to Expo's, which is why the SAR cannot be computed for COP28 and why Section 8 relies on a calibrated panel.

The three institutional roles in operation

The two cases allow the Tripartite roles to be described with some precision. RTA's role extends well beyond asset ownership. During both events the EC3 functioned as the clearing house through which Metro frequencies were adjusted, bus fleets scaled and taxi supply steered towards the venue, and the nol ticketing data gave advance warning of platform congestion, allowing articulated buses to be dispatched before crowding reached critical levels. The Dubai Intelligent Traffic Systems Centre in Al Barsha, whose coverage RTA is extending towards the whole primary road network, provides the signal-control substrate on which corridor-level interventions run. What RTA learned between Expo and COP28 was less about capacity than about latency: the value of a forecast falls quickly with the time it takes to act on it.

Dubai Police's role is often described as enforcement, but in an event context it is better described as the guardian

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of the spatial constraints within which the transport system optimises. Perimeter security, temporary diversions and crowd safety at arrival points are all decisions that change the network's effective capacity in real time. The direct data link between the Smart Operations Room and EC3 means that a checkpoint slowdown can be translated within minutes into a metro hold or a shuttle re-route rather than into an unsafe accumulation at the gate. The joint Personal Mobility Monitoring Unit, which applies geofenced speed limits to e-scooters and e-bikes in high-density zones, is a small but telling example of the two agencies exercising shared authority over a single behaviour.

Venue authorities are the least visible of the three and, on the evidence of the two events, the most consequential for the last hundred metres. Expo City Dubai and the Dubai World Trade Centre control the internal geometry of the event: where queues form, where taxis load, where screening happens. They also hold the earliest-warning data, registration numbers, session schedules and gate-scan counts, that the other two parties need to anticipate rather than react. Where the feed from venue to EC3 was timely, as with session-end times at COP28, dispersal was smooth; where it lagged, the trunk network found itself responding to crowds that had already formed. The lesson for the charter recommended in Section 10 is that venue data obligations must be specified as precisely as agency ones.

Comparative synthesis

Table 4. Comparative synthesis of the two embedded cases

Dimension	Expo 2020 (2021–22)	COP28 (2023)
Governance focus	Supply-side capacity expansion	Demand-sideoptimisationof existing assets
Primary infrastructure	Route 2020 metro branch; parking estates; free bus network	Existingmetrowithextended hours; electric and biofuel shuttles
Data utilisation	EC3telemetry;reactivere-allocation against gate counts	Registration-linkedarrival forecasting; predictive shuttle dispatch
Demand instruments	Free Expo Rider buses; parking supply	Free nol cards; park-and-ride at stations; app-based taxi allocation
Security interface	Perimetermanagement;crowd control at gates	Diplomatic convoys; short-notice closures managed jointly with Police
Sustainability lens	Mass volume served; car access accommodated	Zero-emissionfleet;public transport strongly encouraged
Publishedoutcome metrics	Ridership by mode (37.3 M uses); 37% visitors served	Fleetcompositionandservice hours; no ridership share published
EMGMI (illustrative)	59.7	79.1

Quantitative Results

All results in this section are estimated on the illustrative event-day panel described in Section 6.2 (n = 255). They demonstrate the evaluation design and are calibrated to published magnitudes; they are not audited measurements of Dubai's operational performance.

Descriptive statistics

Table 5. Descriptive statistics by regime, mean (standard deviation), illustrative panel

Variable	Baseline (n = 60)	Expo 2020 (n = 182)	COP28 (n = 13)
Attendance (thousands)	40.0 (17.3)	138.3 (41.5)	55.0 (14.9)
Public-transport share	0.24 (0.05)	0.37 (0.06)	0.60 (0.06)
Digital integration index (0–100)	33.6 (7.8)	58.1 (9.4)	84.2 (6.0)
Corridor delay index (min)	21.3 (4.5)	19.5 (4.3)	7.5 (4.6)

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Crowd dispersal time (min)	67.0 (8.8)	64.8 (9.8)	39.0 (6.2)
Incident response (min)	17.8 (3.0)	12.7 (2.5)	9.3 (2.5)

The descriptives already show the shape of the argument. Expo 2020 handled attendance roughly three and a half times the baseline with a corridor delay index only slightly lower than the baseline, which is the supply-side achievement: much more volume at no worse service. COP28 handled attendance closer to the baseline with a delay index of roughly a third, a dispersal time of roughly 60 per cent and an incident response time of roughly half, alongside a public-transport share two and a half times the baseline and a digital integration score two and a half times higher. Figure 3 shows the distributions.

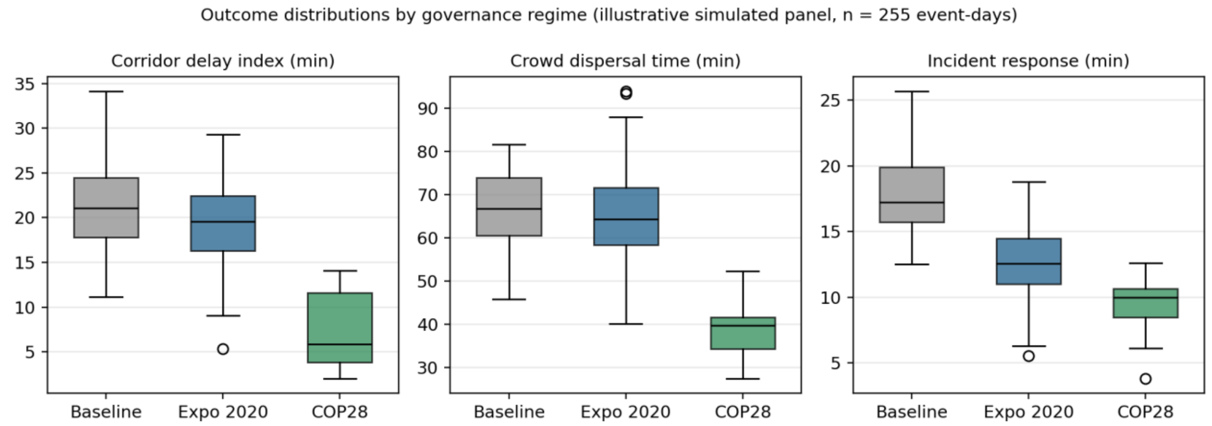

Figure 3. Distributions of the three outcome variables by governance regime, illustrative panel (n = 255 event-days).

One-way ANOVA (H1)

Table 6. One-way ANOVA of outcomes by governance regime, illustrative panel

Outcome	SSbetween	SSwithin	df	MSbetween	MSwithin	F	p	η²	Levene p
Corridor delay	2035.9	4811.3	2,252	1018.0	19.09	53.32	< 0.001	0.297	0.756
Crowd dispersal	8756.3	22205.5	2,252	4378.2	88.12	49.69	< 0.001	0.283	0.129
Incident response	1452.3	1761.8	2,252	726.1	6.99	103.86	< 0.001	0.452	0.322
PT share	1.688	0.839	2,252	0.844	0.0033	253.59	< 0.001	0.668	0.673

Regime differences are large and statistically significant for all four variables (all $p < 0.001$), and Levene's test does not reject equal variances in any case, so the standard F test is appropriate. Effect sizes are substantial: the regime factor accounts for about 30 per cent of the variance in corridor delay, 28 per cent in dispersal time and 45 per cent in incident response. H1 is supported on the panel. Tukey contrasts (Table 7) locate the effect: COP28 differs from both baseline and Expo on every outcome, whereas Expo differs from baseline only modestly on delay and not at all on dispersal time. In other words, the supply-side regime absorbed a much larger surge at roughly baseline service quality, and the demand-side regime improved service quality at a smaller surge.

Table 7. Tukey HSD pairwise contrasts for corridor delay and crowd dispersal (minutes), illustrative panel

Contrast	Delay: mean diff	95% CI	p adj	Dispersal: mean diff	95% CI	p adj
COP28 – Baseline	-13.73	[-16.9,-10.6]	< 0.001	-27.94	[-34.7, -21.2]	< 0.001
Expo2020– Baseline	-1.81	[-3.3, -0.3]	0.016	-2.16	[-5.5, 1.1]	0.273

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Expo2020–COP28	11.92	[9.0, 14.9]	< 0.001	25.79	[19.4, 32.1]	< 0.001

Two-way ANOVA: regime by day type

Table 8. Two-way ANOVA of corridor delay by regime and day type, illustrative panel

Source	SS	df	F	p
Regime	1994.1	2	53.12	< 0.001
Weekend	90.8	1	4.84	0.029
Regime × Weekend	46.9	2	1.25	0.288
Residual	4673.6	249		

Weekend days carry a small but significant additional delay ($p = 0.029$), reflecting higher attendance, but the regime-by-weekend interaction is not significant ($p = 0.288$). The regime effect is therefore stable across day types, which matters for practice: a framework whose benefit evaporated on peak days would be of limited value.

Hierarchical regression (H2–H4)

Table 9. Hierarchical OLS models of the corridor delay index (minutes), HC3 robust standard errors in parentheses, illustrative panel

Predictor	Model A	Model B	Model C
Intercept	16.815*** (0.825)	28.088*** (0.995)	25.920*** (1.433)
Attendance (per 1,000)	0.022*** (0.006)	0.043*** (0.004)	0.052*** (0.007)
PT share (0–1)	—	-24.691*** (3.064)	-20.049*** (4.292)
Digital integration (0–100)	—	-0.093*** (0.021)	-0.057* (0.025)
Expo 2020 (vs baseline)	—	—	-2.815* (1.313)
COP28 (vs baseline)	—	—	-4.231† (2.473)
Weekend	—	—	-0.260 (0.575)
R^2	0.058	0.472	0.482
Adjusted R^2	0.055	0.465	0.470
F (model)	14.63	73.62	36.66
AIC	1551.4	1408.0	1408.9
n	255	255	255

Significance: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$; † $p < 0.10$.

Model A confirms the obvious: attendance raises delay, but on its own it explains only 6 per cent of the variance. Adding public-transport share and digital integration in Model B raises the adjusted R^2 to 0.47, an eight-fold improvement in explanatory power, and both mechanisms are strongly significant with the expected signs. Each 0.10 increase in public-transport share is associated with roughly 2.5 minutes less corridor delay, and each ten-point rise in the digital integration index with roughly 0.9 minutes less, holding attendance constant. H2 and H3 are supported. Standardised coefficients ($\beta = 0.47$ for attendance, -0.47 for PT share and -0.28 for digital integration) indicate that mode share is as important as attendance itself in determining corridor performance.

Model C adds the regime dummies. The COP28 coefficient (-4.23 minutes) is only marginally significant ($p = 0.087$) once the two mechanisms are in the model,

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even though the raw COP28–baseline difference in Table 7 was 13.7 minutes. The Expo dummy is small and significant at the 5 per cent level. This is the pattern predicted by H4: most of what distinguishes the demand-side regime is captured by the mode-share and digital-integration variables, leaving little unexplained regime effect. The practical implication is that the benefit is transferable. It does not depend on something unique to COP28, but on two things any event can be designed to achieve. Figure 4 shows the fitted relationships and Figure 5 the Model C coefficients with confidence intervals.

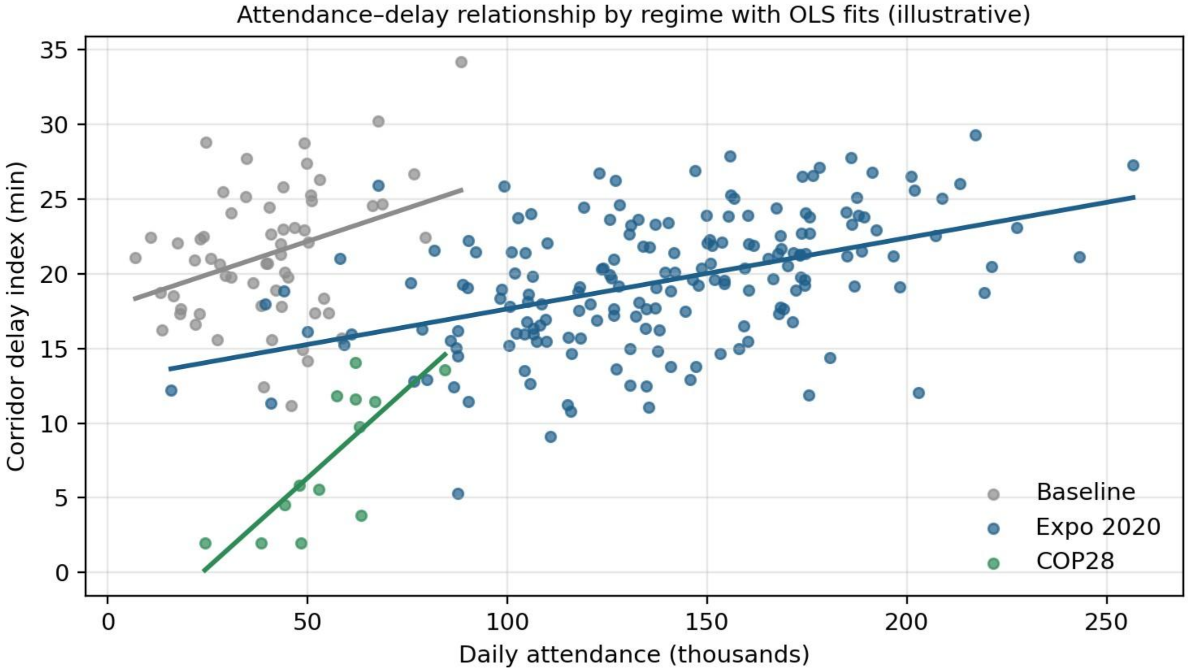

Figure 4. Attendance and corridor delay by regime with ordinary least squares fits, illustrative panel.

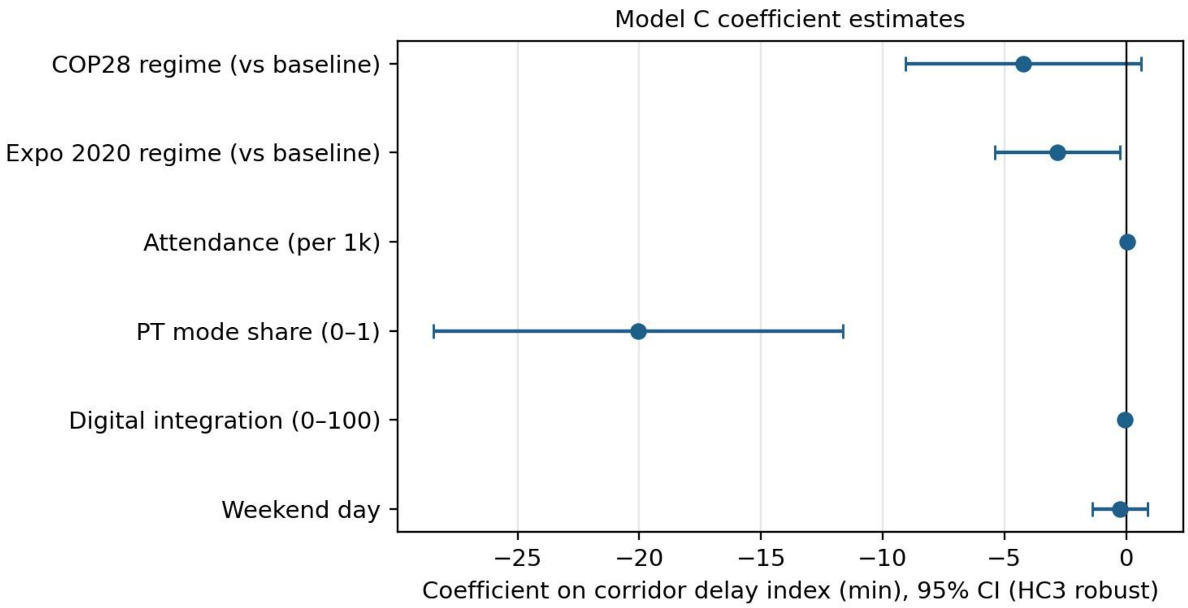

Figure 5. Model C coefficient estimates with 95 per cent confidence intervals (HC3 robust standard errors), illustrative panel.

Auxiliary models and diagnostics

Table 10. Auxiliary models and regression diagnostics, illustrative panel

Model / statistic	Value	Interpretation

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Dispersal ~ attendance + digital + PT share: adjusted R^2	0.331	Digital integration: -0.225*** min per index point; PT share: - 32.73***
Incidentresponse~digital+ attendance: adjusted R^2	0.358	Digital integration: -0.119*** min per index point
VIF (attendance / PT share / digital)	1.16 / 1.69 / 1.80	All below 2: no multicollinearity concern
Breusch–Pagan (Model C), p	0.866	No evidence of heteroskedasticity; HC3 retained as precaution
Shapiro–Wilk on residuals (Model C), p	0.866	Residuals consistent with normality
Durbin–Watson (Model C)	2.06	No serial correlation
Welch t: delay per 10k attendees, Expo vs COP28	t = 1.49, p = 0.157	Expo 1.55 vs COP28 1.29 min per 10k; not significant

The auxiliary models extend the mechanism story to the other two outcomes: digital integration is a significant predictor of both faster crowd dispersal and faster incident response after controlling for attendance, and public-transport share of dispersal. The diagnostics give no reason to doubt the OLS assumptions on this panel. One result cuts against a simple reading: when delay is normalised per 10,000 attendees, the Expo and COP28 regimes are not statistically distinguishable (Welch p = 0.16). The supply-side model was, per unit of demand, about as efficient at the corridor level as the demand-side model; where COP28 clearly outperformed was in absolute service quality at a given attendance, in mode share and in the speed of the operational feedback loop. This nuance should survive the transition to real data and it argues for keeping both models in the repertoire.

EMGMI scores

Table 11. EMGMI dimension scores and weighted index by regime (rubric-scored from documentary evidence; illustrative)

Dimension	Weight	Baseline	Expo 2020	COP28
Institutional integration	0.25	35	62	78
Data architecture	0.20	28	55	82
Multimodal supply flexibility	0.20	42	85	70
Predictive capability	0.20	20	45	80
Sustainability alignment	0.15	25	48	88
EMGMI (weighted)	1.00	30.5	59.7	79.1

The index profile in Figure 6 makes the two regimes' different strengths visible. Expo 2020 scores highest of the three on multimodal supply flexibility (85) and moderately on institutional integration; its predictive capability was limited by design. COP28 scores highest on data architecture, predictive capability and sustainability alignment, and highest overall (79.1 against 59.7), but lower than Expo on supply flexibility because there was no dedicated capacity to flex. A jurisdiction that combined Expo's supply depth with COP28's data and prediction layer would score in the high eighties, which is a reasonable statement of the EMGF's target state.

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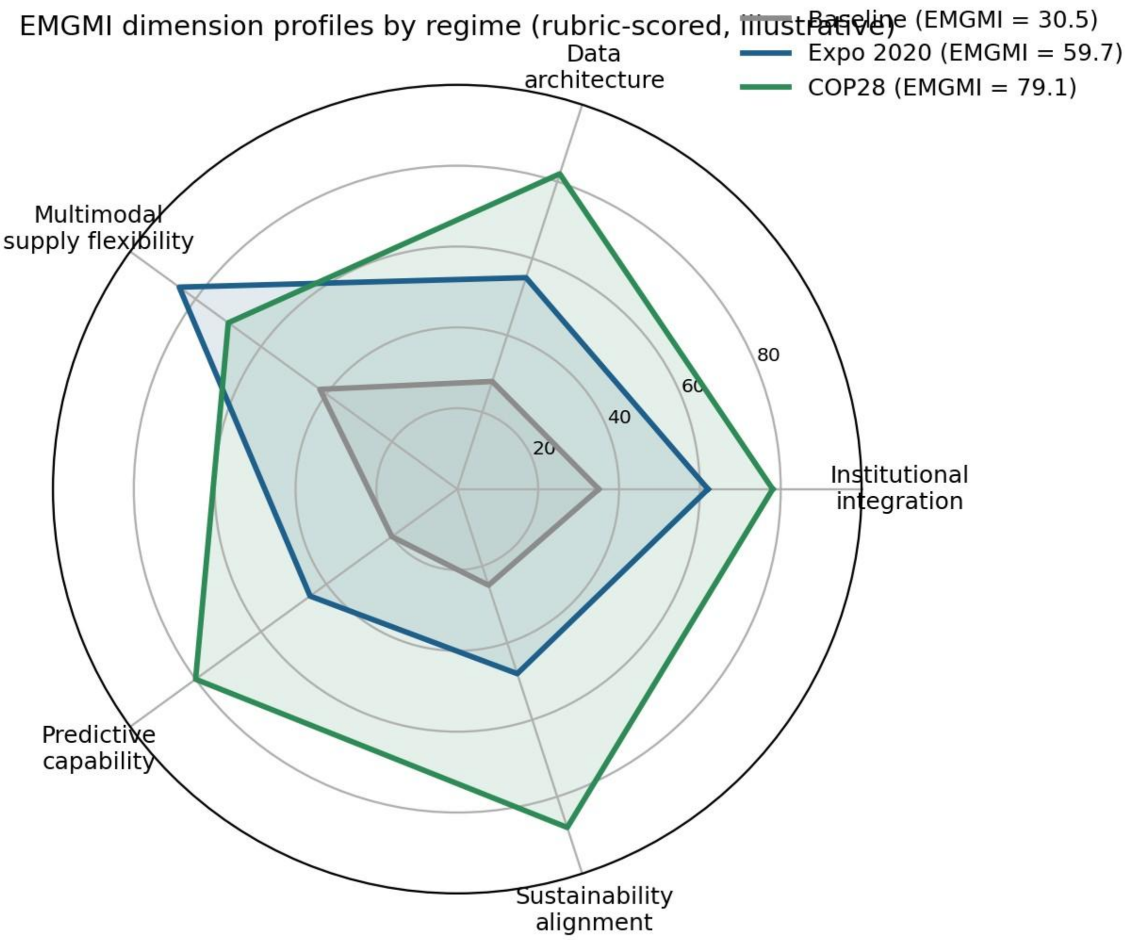

Figure 6. EMGMI dimension profiles by regime (0–100 per dimension), rubric-scored, illustrative.

Sensitivity of the EMGMI to weights

Table 11. a. Sensitivity of the EMGMI to alternative weighting schemes (I = institutional, D = data, S = supply, P = predictive, E = sustainability)

Weighting scheme	Weights (I, D, S, P, E)	Baseline	Expo 2020	COP28	Ordering preserved
Paper weights	0.25, 0.20, 0.20, 0.20,0.15	30.5	59.7	79.1	—
Equal weights	0.20, 0.20, 0.20, 0.20,0.20	30.0	59.0	79.6	Yes
Institution-heavy	0.35, 0.20, 0.15, 0.15,0.15	30.9	59.4	79.4	Yes
Technology-heavy	0.15, 0.25, 0.15, 0.30,0.15	28.3	56.5	79.9	Yes
Sustainability-heavy	0.20, 0.15, 0.15, 0.20,0.30	29.0	56.8	80.8	Yes

The ordering of the three regimes is robust to every weighting scheme tested, including one that gives institutional integration a 35 per cent weight and one that gives sustainability 30 per cent. The gap between Expo 2020 and COP28 narrows under a supply-oriented weighting and widens under a technology-oriented one, which is as it should be: the index is transparent about

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what it values, and institutions adopting it should set and publish their weights before scoring.

Discussion

What the comparison shows

Read together, the institutional analysis and the panel results support a specific and, we think, useful claim: the outcome advantage of a demand-side, predictive regime is not a property of the event but of two measurable mechanisms, public-transport share and digital integration, that any event can be designed to maximise. That is the difference between an anecdote and a transferable governance model. It also reframes the supply-side investment. Route 2020 and the parking estates are not the alternative to the EMGF; they are the supply flexibility dimension of it, and the panel suggests they delivered per-attendee corridor efficiency comparable to the demand-side model. What they could not deliver on their own was mode shift, sustainability alignment or a fast feedback loop, and that is where the framework's data and decision layer adds value.

The finding connects to the literature in three ways. It is consistent with Kassens-Noor's (2013) conclusion that the enduring transport legacy of a mega-event is institutional and behavioural rather than physical. It is consistent with Currie, Jones and Woolley's (2014) evidence that demand-side measures in London 2012 did real work. And it gives empirical shape to Meijer and Bolívar's (2016) insistence that smart governance is about collaboration enabled by technology: in the panel, the digital index matters, but it matters most alongside mode share, and mode share is produced by institutions (free passes, extended hours, station parking) rather than by software.

The technological frontier and its governance

Three technologies underpin the data and decision layer, and each brings a governance question that the framework must answer rather than defer. The Sovereign Mobility Data Cloud requires standing agreements with ride-hailing and micromobility operators on what is shared, at what latency, under what anonymisation and with what audit. Kitchin's (2014) warning about corporate data and technocratic governance applies in both directions: public authorities must not become dependent on private feeds they cannot verify, and private operators must not be asked to hand over more than the operational purpose justifies. Vehicle-to-everything signal priority through the AI-driven traffic control layer allows shuttle buses and official convoys to request green time; the governance question is who ranks competing requests and how the trade-off against cross-traffic is made visible. Digital twins, following Deng, Zhang and Shen (2021) and Okamoto et al. (2026), allow bottlenecks to be forecast an hour ahead and interventions to be tested in simulation before they are applied; the governance question is whether automated dispatch decisions require human approval, and if not, how they are reviewed afterwards. The recommendations in Section 10 assign each of these questions to an owner.

Alignment with the Dubai 2040 Urban Master Plan

The Dubai 2040 Urban Master Plan sets targets for a 20-minute city in which residents reach most daily needs within a short walk, cycle or ride, and for a larger share of the population living within reach of mass transit (Government of Dubai, n.d.). Event mobility is a stress test of exactly those capabilities: gate-side geofencing of micromobility, station-based park-and-ride, and predictive shuttle scheduling are the same tools, at a higher intensity, that a 20-minute neighbourhood needs every day. The EMGF should therefore be understood as a laboratory for the master plan rather than as a separate programme, and the EMGMI's dimensions map onto the plan's transport objectives in a way that allows event-tested capability to be reported against them.

From temporary coalition to standing regime

The adaptive governance lens raises the question that will determine whether the framework outlives this paper: what persists between events. Expo 2020 built an operational coalition that COP28 inherited eighteen months later; COP28 refined it under different constraints. Whether a third event inherits both, or starts again, depends on whether the Tripartite arrangement becomes a charter with named data protocols, whether the EMGMI is scored after every event, and whether the analysis in Section 8 is repeated on EC3 data. Emerson et al.'s (2012) framework predicts that the regime will endure if it produces intermediate outcomes that participants value; the SAR and the EMGMI are designed to make those outcomes legible.

Replicability and future research

Three research directions follow directly from the limitations. The first is validation: running the Section 8 design on EC3 data would convert the illustrative estimates into audited ones and would allow the EMGMI's weights to be calibrated against observed outcomes rather than assigned from the literature. The second is transferability: Dubai's unified emirate-level governance is favourable to the Tripartite Model in a way that federated metropolitan regions, where transport, policing and venue management sit in different jurisdictions, are not. A comparative study of two or three host cities with different institutional structures, scored on the same EMGMI rubric, would show whether the index discriminates in the way its design intends. The third is the data-privacy and algorithmic-transparency agenda raised by Kitchin (2014) and by Meijer and Bolívar (2016): as the Sovereign Mobility Data Cloud and automated dispatch mature, the balance between transit efficiency and passenger privacy, and the auditability of algorithmic decisions, become empirical questions that the framework's owners should commission research on rather than assume away.

Recommendations for RTA Leadership

The recommendations translate the analysis into ownership-assigned actions, ordered by implementation horizon. They are deliberately few; a longer list would dilute accountability.

Table 12. Recommendations, ownership and horizon

#	Recommendation	Responsible function	Horizon	Evidence basis
1	Formalise the Tripartite Model as a standing inter-agency charter with defined data-sharing protocols, latency targets and escalation paths, replacingevent-by-event arrangements.	RTA EC3; Dubai PoliceSmart Operations Room; venue authorities	Immediate	Sections 5.2, 9.4; Ansell & Gash (2008)
2	Establish permanent governance for the Sovereign Mobility Data Cloud coveringride-hailingand micromobility operators: purpose limitation, anonymisation, retention, audit and operator reciprocity.	RTADigital& Datafunction;DubaiData Establishment	Immediate	Section9.2;Kitchin (2014)
3	Adopt the EMGMI as a post-event self-assessment scored jointly by the three institutions, and publish the SAR for every mega-event in the same form as the Expo 2020 figures.	RTAStrategy& Corporate Governance	Next event cycle	Sections 5.3, 5.4,8.6

#	Recommendation	Responsible function	Horizon	Evidence basis
4	Run the Section 8 evaluation design (ANOVA,	RTAEC3analytics;TRA Right-of-Way Department	6–12months	Section 6.4, 8

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	hierarchical OLS, diagnostics) on EC3 day-level data for Expo 2020 and COP28 to replace the illustrative panel with audited estimates.			
5	Codify the Expo and COP28 lessons into a reusable pre-event mobility playbook covering supply, demand and network levers with trigger thresholds.	TRA Right-of-Way Department	12–18months	Sections 7, 8.4
6	Commission an independent review of algorithmic decisions in AI-driven signal control and automated dispatch, defining which decisions require human approval and how all are logged and audited.	RTAIntelligentTrafficSystems function	12–18months	Section 9.2; Meijer & Bolívar (2016)
7	Extend the demand-side model piloted at COP28 (station park-and-ride, targeted free passes, predictive shuttle scheduling) to recurring city events and, progressively, to daily operations in support of the 20-minute city.	RTAStrategic Planning	Aligned to Dubai 2040milestones	Section 9.3

Limitations

Four limitations should be kept in view. First, the quantitative results describe an illustrative panel calibrated to published magnitudes, not audited operational data; Recommendation 4 exists precisely to close that gap, and the design has been specified so that it can be run without modification. Second, the study is a single-jurisdiction case. Dubai's unified emirate-level governance, with a single transport authority and a single police force, is unusually favourable to the Tripartite Model, and the framework's transferability to federated or fragmented metropolitan regions is untested. Third, the institutional account relies substantially on official and press-released material, which describes intent and inputs more fully than outcomes; the absence of a published COP28 ridership share is a case in point. Fourth, the EMGMI weights and rubric scores reflect the authors' reading of the literature and the evidence, and a different weighting scheme

would shift the index values, though not, we believe, the ordering. The index is offered as a starting point for calibration by the institutions that will use it.

Conclusion

Dubai's mega-event decade has produced more than two well-run events. It has produced, almost as a by-product,

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an institutional arrangement in which a transport authority, a police force and venue operators exchange operational information in near real time and re-allocate assets against it. This paper has named that arrangement the Event Mobility Governance Framework, described its four layers and its Tripartite institutional core, and supplied two instruments, the EMGMI maturity index and the Surge Absorption Ratio, that allow its progress to be scored and compared. The Expo 2020 and COP28 cases show the framework's two faces: a supply-side regime that absorbed an enormous surge at baseline service quality, and a demand-side regime that raised service quality, mode share and sustainability at a smaller surge. On the illustrative panel, the advantage of the second regime is almost entirely explained by two mechanisms, public-transport share and digital integration, that are within any event planner's control.

The contribution to the academic conversation is a measurement apparatus that connects the mobilities paradigm and collaborative governance theory to numbers that a transport authority already collects. The contribution to practice is a set of seven ownership-assigned actions, the most important of which is simply to run the evaluation on real data. If the framework is as robust as the panel suggests, the evidence will show it; if it is not, the same evidence will show where to strengthen it. Either way, the shift from temporary logistics to a standing, measurable governance regime is the legacy that will still be paying dividends when the next event is announced.

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