## Author's Note

This paper serves the 14 goals of the OMXUS project. Each is a prevention requirement, traced to a system that failed real people.

Goal 1 (direct democracy): citizens vote directly on major decisions; the Swiss have done it for 178 years. Goal 2 (22-hour work week): give people back 20 hours and they have time to govern their own communities. Goal 3 (rehabilitation over imprisonment): Norway shows that conditions shape behaviour, and its prisons report far lower reoffending. Goal 5 (community crisis response): the CAHOOTS model has sent crisis workers to non-criminal calls for 35 years. Goal 13 ($29 emergency ring): press it, your people come in 60 seconds, not an ambulance in 14 minutes.

Every one of these goals requires a governance structure. Not a government — a governance structure. The difference is the direction of authority. In a government, decisions flow down from representatives to constituents. In a governance structure built on federation, decisions flow up from communities to delegates who can be recalled at any time.

This paper asks: what does the evidence actually say about how humans organise? Not the theory. Not the TED talk version. The evidence. From primatology, anthropology, organisational psychology, and — most importantly — from communities that are doing it right now.

The answer is not complicated. It has been operating for 60,000 years in Aboriginal Australia, for 500 years in Hutterite colonies, for 70 years in the Basque Country, for 30 years in Chiapas, and for over a decade in northeastern Syria under active bombardment. The structural pattern is the same everywhere: small groups for intimacy, medium groups for governance, federation for scale. Rotating leadership. Shared economic base. Mandatory inclusion. Face-to-face deliberation at the bottom. Delegates — not representatives — at every level above.

Dunbar said we can only maintain 150 relationships. Lindenfors showed that number has a 95% confidence interval of 2 to 520. Both miss the point. The question was never how many people you can know. The

question is what structures allow care to operate beyond the people you know. Aboriginal kinship systems answered that question tens of thousands of years ago. So did the Haudenosaunee Confederacy. So does Mondragon. So do the Zapatistas.

The animal already knows how to organise. It has always known. What it needs is an enclosure that lets it.

– A.A. & L.N.C.

## Abstract

Dunbar's number — the claim that humans can maintain approximately 150 stable social relationships — has become received wisdom in organisational design, management theory, and popular science. This paper examines the statistical foundations of that claim and finds them wanting: Lindenfors et al. (2021) demonstrated that the neocortex-to-group-size regression produces a 95% confidence interval of 2 to 520, rendering the specific figure of 150 statistically meaningless. However, the observation that governance changes character at different scales is robustly supported across disciplines. Dunbar's layered model (5/15/50/150/500/1,500) finds empirical support from phone records, social media interaction data, and cross-cultural ethnographic evidence.

We examine eight functioning examples of scaled community governance — Mondragon (80,000 worker-owners), Rojava (4 million under democratic confederalism), the Zapatista autonomous zones (300,000 governed), Marinaleda (2,700 in cooperative economy), Swiss cantons (8.8 million in direct democracy), Hutterite colonies (500 years of communal living), kibbutzim, and Aboriginal Australian kinship systems (continent-wide trust networks without hierarchy). From these cases, we derive eight design principles for community governance that scales without centralising: nested autonomy, power rotation, shared economic base, mandatory inclusion, face-to-face deliberation at the base, federation (not hierarchy) for scale, circular time, and the Peck-Dunbar bridge connecting intimacy groups to governance groups to confederal structures.

The evidence converges on a single structural pattern observable across cultures, continents, and millennia: autonomous groups of 25-150 people, federated through recallable delegates, with rotating leadership and shared material stakes. This pattern is neither theoretical nor historical — it is operational, tested under

conditions including active warfare, economic crisis, and state hostility, and it consistently outperforms centralised governance on measures of equity, resilience, and democratic participation.

**Keywords:** Dunbar's number, federation, democratic confederalism, cooperative governance, social scaling, community design, direct democracy, rotating leadership

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9. Band: 25-50 individuals. The people you live with. Everyone knows everyone.
10. Clan/regional group: 150-500. People who share a dialect, a territory, and periodic gatherings. You know them by name and reputation. You intermarry with them.
11. Tribe/linguistic group: 500-2,500. People who share a language and cultural identity. You may never meet most of them, but you recognise them as "us."
12. "It only works in small, homogeneous communities." Rojava governs 4 million people across four major ethnic groups.
13. "It can't survive without state support." The Zapatistas have been governing for 30 years without a single peso from the Mexican government.

14. "Direct democracy is too slow for modern complexity." Switzerland holds 4 referendums per year on tax policy, immigration, military spending, and constitutional amendments. It is one of the most competitive economies on Earth.
15. "It depends on charismatic leadership." Marinaleda does. The Zapatistas, Rojava, and Switzerland do not. The difference is rotation.

## 4.1 Swiss Cantons: 178 Years of Proof

The Swiss objection-killer deserves emphasis because it neutralises the most common dismissal: "that's a small tribal thing, it can't work in a modern industrialised country."

Switzerland is a modern, industrialised, multilingual, multi-ethnic country of 8.8 million people. It has four official languages (German, French, Italian, Romansh). It has no natural resources to speak of. It is landlocked, mountainous, and surrounded by much larger neighbours who have historically shown interest in annexing parts of it. It has been a federation with direct democratic mechanisms since 1848 — 178 years.

The cantonal structure is federation in its purest modern form. Each canton is essentially a small state. The canton of Appenzell Innerrhoden has 16,000 people and still governs by open-air assembly. The canton of Zurich has 1.6 million and uses ballot-box referendums. Both are part of the same federal structure. The system accommodates communities of 16,000 and 1,600,000 under the same constitutional framework, because the framework is built on subsidiarity — decisions at the lowest level possible — not uniformity.

The economic argument is decisive. Switzerland is consistently among the top 5 countries in GDP per capita, innovation indices, and economic competitiveness rankings. It achieved this without a strong executive, without natural resources, and without a permanent political class. The Federal Council's seven members are almost unknown outside Switzerland. The presidency rotates annually. No Swiss citizen has ever needed to know their president's name to prosper.

This is what Goal 1 (direct democracy) looks like after 178 years of operation. It is not utopian. It is Swiss.

# The Connection

The 14 goals require a governance structure. You cannot implement direct democracy, redesign education, restructure work, reform justice, and reshape public space through conventional representative government. The institutions that would need to change are the ones making the decisions. They will not vote to dissolve themselves.

But the governance structure needed is not hypothetical. It exists. It is operating right now — in the Basque Country, in northeastern Syria, in Chiapas, in Swiss cantons, in Aboriginal communities that have been running functional governance systems for 60,000 years. The structural principles are documented, tested, and resilient. Small autonomous groups. Rotating leadership. Shared economic base. Mandatory inclusion. Face-to-face deliberation. Federation for scale.

The question is not invention. It is adoption. The animal already knows how to organise. It's been doing it for a very long time, in every environment, on every continent, under conditions far more challenging than the ones most of us face. What it needs is not a new theory of social organisation. What it needs is an enclosure that lets it do what it already knows how to do.

The evidence is not ambiguous. The examples are not obscure. The principles are not complicated. The only thing standing between the current structure and a functional one is the unwillingness of existing power structures to yield. Which is, of course, exactly the problem that every community described in this review has already solved — by building the alternative and making the old structure irrelevant.

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# Appendix A: Confidence Assessments

| CLAIM | CONFIDENCE | NOTES |
| --- | --- | --- |
| Dunbar's original regression predicted ~150 | High | Direct from 1992 paper |

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|---|---|---|
| Lindenfors showed 95% CI of 2-520 | High | Peer-reviewed, reproducible |
| Layered structure (5/15/50/150) empirically supported | Medium-High | Multiple datasets converge, individual variation large |
| Chimp/bonobo social organisation contrast | High | Well-established in primatology |
| ~85% of pre-industrial societies permitted polygyny | High | Murdock's Ethnographic Atlas, widely accepted |
| Monogamy is culturally specific, not biologically fixed | High | Henrich et al. 2012, extensive cross-cultural data |
| Hunter-gatherer bands are 25-50 | High | Well-established, confirmed by Hill et al. (2011) |
| Aboriginal kinship systems function as governance | High | Extensively documented over 100+ years |
| Haudenosaunee influenced US Constitution | Medium | Documented but degree of influence debated |
| Mondragon: ~80,000 worker-owners, federated structure | High | Multiple academic and corporate sources |
| Mondragon: no layoffs in 2008 crisis | High | Well-documented |
| Rojava: functioning democratic confederalism | Medium-High | Multiple observers; conflict zone limits verification |
| Rojava: mandatory gender parity | High | Written into constitutional documents |
| Zapatistas: ~300,000 governed, rotating leadership | Medium-High | Multiple researchers; Zapatistas don't publish official stats |
| Zapatistas: improved health/education outcomes | Medium | Reported by researchers but exact figures hard to confirm |

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|---|---|---|
| Marinaleda: near-zero unemployment, 15 euro housing | Medium-High | Multiple sources; definitions of "zero unemployment" vary |
| Marinaleda: single-leader dependency risk | High | Acknowledged by Hancox (2013) and observers |
| Swiss direct democracy: 700+ referendums since 1848 | High | Public record, extensively documented |
| Swiss Federal Council: rotating annual presidency | High | Constitutional provision, public record |
| Switzerland: top economic/quality-of-life outcomes | High | Multiple international indices |
| Hutterites split at ~150 | High | Well-documented across multiple sources |
| Hutterites: 500 years continuous operation | High | Historical record from 1528 |
| Peck's "true community" at 10-15 | Medium | Practitioner observation, not controlled research |
| Facebook doesn't expand social capacity | High | Multiple studies with large datasets |
| Shared leadership positively predicts team performance | High | Meta-analysis, 50 studies, D'Innocenzo et al. (2016) |

# Appendix B: Cross-References to the OMXUS Research Series

This paper is part of a broader research programme examining the structural conditions for human flourishing across fourteen domains. The following papers in the OMXUS Research Series intersect directly with the findings presented here.

## Governance & Democracy

| PAPER | RELEVANCE |
| --- | --- |
| Democratic Voting Mechanisms (democratic_voting_mechanisms/) | Examines how voting systems function at different scales. Direct complement to this paper's analysis of federation and direct democracy. The Swiss referendum model and Zapatista assembly model are both discussed. |
| Consensus, Distillation, and Trust (consensus_distillation_trust/) | Group size directly affects consensus mechanisms. The threshold at which consensus breaks down maps onto the 50-150 governance unit described here. |
| Cooperative Capitalism (cooperative_capitalism/) | Deep analysis of Mondragon and alternative economic models. Extends this paper's Section 2.1 with detailed economic performance data and structural analysis. |

## Justice & Safety

| PAPER | RELEVANCE |
| --- | --- |
| Community Policing Alternatives (community_policing_alternatives/) | The CAHOOTS model (Goal 5 (replace police with community response) (replace police with community response)) and community-based safety. Federation enables community-scale safety systems that don't require centralised police. |
| Prevention Over Punishment (prevention_over_punishment/) | Norway's 20% recidivism vs 77% (Goal 3, rehabilitation over imprisonment). Community governance structures change justice outcomes because the community that governs is the community that knows the person. |

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| Justice Paradigm Shift (justice_paradigm_shift/) | Restorative resolution first (Goal 4). Federation-based dispute resolution (ViewSwap, mediation, community accountability) settles disputes before they reach court. |
| Emergency Response (emergency_response/) | The $29 ring (Goal 13 ($29 emergency ring) ($29 emergency ring)). Community emergency response requires the social infrastructure described in this paper — you need to know your neighbours, and they need to know you. |
| Direct Personal Alerts (direct_personal_alerts/) | Technical design for community-based emergency systems. Dunbar's layered model (5/15/150) is discredited (Lindenfors et al. 2021: CI of 2-520). The Ripple model replaces it: accountability = 1/distance, weighted by physical proximity. Response networks operate on the proximity gradient — whoever is nearest responds. |
| Bystander Effect (bystander_effect/) | Group size affects intervention behaviour. The diffusion of responsibility that prevents bystander intervention is a direct consequence of scale without structure. |

## Health & Environment

| PAPER | RELEVANCE |
|---|---|
| Food Toxicology & Safety (food_toxicology_safety/) | Goal 10 (food proven safe) (food proven safe): food contains only things proven safe. Requires community-scale governance to implement — national food regulators are captured by industry. |
| Drug Policy Reform (drug_policy_reform/) | Goal 7 (regulate drugs): a regulated, age-checked supply. Portugal's health-first model works through community health infrastructure, not centralised enforcement. |

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| Indoor Living & Nature Deficit (indoor_living_nature_deficit/) | Goal 11 (physical infrastructure) (physical infrastructure): monkey bars at every bus stop. Public space design requires community-level decision-making about the built environment. |
| Play Deprivation (play_deprivation/) | Goal 12 (play-based education) (play-based education): every school is play, mastery, curiosity. The Zapatista autonomous education system (Section 2.3) demonstrates community-designed education in practice. |

## Economy & Work

| PAPER | RELEVANCE |
|---|---|
| Labour Economics: 22-Hour Week (labor_economics_22hr_week/) | Goal 2 (22-hour work week) (22-hour work week): work 22 hours, keep your pay. The freed time is what makes community governance possible — you cannot participate in weekly commune meetings if you work 50 hours. |
| Economic Servitude (economic_servitude/) | The economic structures that prevent community self-governance. Mondragon's 6:1 pay ratio vs S&P 500's 300:1 — the connection between economic inequality and governance capture. |
| Bullshit Jobs (bullshit_jobs/) | Graeber's analysis of purposeless work. The cooperative model (Mondragon, Zapatista, Marinaleda) eliminates bullshit jobs because workers govern their own work. |
| Housing First (housing_first/) | Goal 9 (housing for living) (housing for living): no foreign investment in housing. Marinaleda's 15-euro self-build housing model is the evidence that housing can be decommodified at community scale. |

## Identity & Technology

| PAPER | RELEVANCE |
|---|---|

| | |
|---|---|
| Platform Sovereignty & Identity (platform_sovereignty_identity/) | Sovereign identity enables federation without centralised identity providers. The VexID system (one identity everywhere) is the technical infrastructure for federated governance. |
| Sybil Resistance & Physical Presence (sybil_resistance_physical_presence/) | How to prevent fake identities in decentralised governance. Physical presence (BLE mesh onboarding) maps onto the face-to-face principle in Section 3.5. |
| BLE Mesh Networking (ble_mesh_networking/) | Goal 8 (free internet) (free internet): internet costs nothing. Mesh networking is the communication infrastructure for federated communities. |

## Human Behaviour & Psychology

| PAPER | RELEVANCE |
|---|---|
| Environmental Determination (environmental_determination/) | The enclosure shapes the animal. The central metaphor of The Zookeeper and the theoretical foundation for this paper's argument that governance structures (enclosures) determine social outcomes (behaviour). |
| Human Enclosure (human_enclosure/) | Detailed analysis of how built environments constrain human social behaviour. Direct complement to the enclosure metaphor used throughout this paper. |
| Death & Terror Management (death_terror_management/) | Why people cling to authoritarian structures. Terror management theory explains the psychological mechanism behind resistance to federation — hierarchy feels safer even when it produces worse outcomes. |
| Screens & Attention Economy (screens_attention_economy/) | Why digital tools don't replace face-to-face governance (Section 3.5). The attention economy is designed to extract, not to connect. |

## The Books

| WORK | RELEVANCE |
| --- | --- |
| The Zookeeper (zookeeper/) | The animal/enclosure metaphor that frames this entire paper. Chapter 11 draws directly on this research. The Zookeeper's argument is that the enclosure determines the behaviour — and governance structure is the enclosure. |
| Applebee's Report (applebee_report/) | The statistical companion. Where this paper provides case studies and design principles, Applebee's Report provides the numbers — recidivism rates, pay ratios, health outcomes, education data — that make the case quantitative. |

*Total word count: approximately 16,800*

*OMXUS Research Series – Social Group Scaling*

*First draft for The Zookeeper, Chapter 11. Expanded to unified thesis.*

*"The animal already knows how to organise. It has always known. What it needs is an enclosure that lets it."*