



*Classificazione Decimale Dewey*

— 303.4834028563 (23.) CAUSE DEL CAMBIAMENTO SOCIALE. ELABORATORI. Intelligenza artificiale

*Thema*

— Soggetto: UYQ. Intelligenza artificiale

— Qualificatori: 3MR. XXI secolo, 2000-2100

**GERARDO IOVANE, SANTI TOMASELLI  
FRANCESCO SAVERIO TORTORIELLO**

# **DATA CENTER**

**ARTIFICIAL INTELLIGENCE  
AND DATA SOVEREIGNTY**





ISBN  
979-12-218-2959-4

PRIMA EDIZIONE  
**ROMA** 24 SETTEMBRE 2026

Table of Contents

Preface ..... 15

Introduction - The New Geography of Power ..... 19

    1. From Gold to Oil, from Oil to Data ..... 20

    2. Why Raw Data Is Not Enough ..... 21

    3. The New Triangle of Power: Data, Energy, and Computation ..... 22

    4. Data Centers as Cognitive Arsenals ..... 23

    5. Digital Sovereignty and National Security ..... 24

    6. Why This Book Expands the Framework of the 12 UNI 11621-8 Profiles ..... 25

    7. Guiding Question: Does whoever governs AI also govern the industrial future? ..... 26

    8. Summary of Key Concepts ..... 29

PART I - AI, DATA, AND POWER ..... 31

Chapter 1 - Artificial Intelligence as an Infrastructure of Power ..... 31

    1.1 AI as a General-Purpose Technology ..... 32

    1.2 AI as a Productivity Lever and Cognitive Infrastructure ..... 34

    1.3 AI as a Tool of Geopolitical Competition ..... 37

    1.4 Using AI and owning AI infrastructure are not the same thing ..... 39

    1.5 Technological Dependency and Loss of Autonomy ..... 42

    1.6 The Strategic Chain: chips → cloud → data centers → models → applications ..... 44

    1.7 Three Case Studies: the United States, China, and the European Union ..... 48

    1.8 Application Scenario ..... 50

    1.9 Operational Checklist ..... 54

    1.10 Questions for Reflection ..... 54

    1.11 Final Summary ..... 54

    Essential Bibliography ..... 56

    Essential Web Resources ..... 57

Chapter 2 - Data: The New Strategic Raw Material ..... 59

|                                                                             |     |
|-----------------------------------------------------------------------------|-----|
| 2.1 The Major Categories of Strategic Data .....                            | 60  |
| 2.2 Personal, Industrial, Healthcare, and Financial Data.....               | 63  |
| 2.3 Public, Military, Synthetic, and Proprietary Data .....                 | 66  |
| 2.4 Why Data Without Governance Does Not Create Value .....                 | 69  |
| 2.5 Data Quality, Lineage, Cataloging, and Security .....                   | 72  |
| 2.6 Link to UNI 11621-8 Profiles .....                                      | 75  |
| 2.7 Application Scenario.....                                               | 78  |
| 2.8 Operational Checklist .....                                             | 80  |
| 2.9 Questions for Reflection .....                                          | 81  |
| 2.10 Final Summary .....                                                    | 81  |
| Essential Bibliography .....                                                | 83  |
| Essential Web Resources .....                                               | 84  |
| Chapter 3 - Data Centers: The Cognitive Factories of the 21st Century ..... | 85  |
| 3.1 What Is a Data Center, Really? .....                                    | 86  |
| 3.2 Traditional Data Center versus AI Data Center .....                     | 89  |
| 3.3 GPUs, TPUs, Accelerators, and Supercomputing .....                      | 92  |
| 3.4 Energy, Cooling, Resilience, and Localization .....                     | 94  |
| 3.5 Operational Continuity, Tier, Redundancy, and Disaster Recovery .....   | 97  |
| 3.6 Public, Private, Sovereign, and AI Factories .....                      | 100 |
| 3.7 Application Scenario.....                                               | 103 |
| 3.8 Operational Checklist .....                                             | 106 |
| 3.9 Questions for Reflection .....                                          | 106 |
| 3.10 Final Summary .....                                                    | 107 |
| Essential Bibliography .....                                                | 110 |
| Essential Web Resources .....                                               | 111 |
| PART II - EUROPE, FUNDS, AND DIGITAL SOVEREIGNTY .....                      | 113 |
| Chapter 4 - The European Strategy to Become an AI Continent .....           | 113 |
| 4.1 The AI Act and Europe's Regulatory Advantage .....                      | 113 |

|                                                                                               |     |
|-----------------------------------------------------------------------------------------------|-----|
| 4.2 Digital Europe, EuroHPC, and the Logic of Capacity .....                                  | 116 |
| 4.3 AI Factories, AI Gigafactories, and Shared Data Spaces .....                              | 119 |
| 4.4 AI Continent Action Plan, Cloud and AI Development Act, EDIH .....                        | 121 |
| 4.5 The Difference Between Regulation and Industrial Capacity .....                           | 124 |
| 4.6 From Europe to the Regions: Strategic Implementation and Operational Sovereignty<br>..... | 128 |
| 4.7 Application Scenario.....                                                                 | 131 |
| 4.8 Operational Checklist .....                                                               | 133 |
| 4.9 Questions for Reflection .....                                                            | 134 |
| 4.10 Final Summary .....                                                                      | 134 |
| Essential Bibliography .....                                                                  | 137 |
| Essential Web Resources .....                                                                 | 138 |
| Chapter 5 - European Funds for AI, Cloud, Data, and Infrastructure .....                      | 139 |
| 5.1 Why EU Funds Are a Strategic Lever.....                                                   | 139 |
| 5.2 Horizon Europe, Digital Europe, CEF, InvestEU, PNRR .....                                 | 142 |
| 5.3 EuroHPC, Cybersecurity Funds, Digital Skills, and Data Spaces.....                        | 144 |
| 5.4 How to Read an AI Call for Proposals and Develop a Fundable Project.....                  | 147 |
| 5.5 The FUND-AI Operational Framework .....                                                   | 150 |
| 5.6 From Application to Sustainability .....                                                  | 153 |
| 5.7 Application Scenario.....                                                                 | 156 |
| 5.8 Operational Checklist .....                                                               | 159 |
| 5.9 Questions for Reflection .....                                                            | 159 |
| 5.10 Final Summary .....                                                                      | 159 |
| Essential Bibliography .....                                                                  | 162 |
| Essential Web Resources .....                                                                 | 163 |
| Chapter 6 - Digital Sovereignty: From Political Concept to Operational Capability .....       | 165 |
| 6.1 Data, Cloud, and Computing Sovereignty .....                                              | 165 |
| 6.2 Algorithmic, Regulatory, and Energy Sovereignty .....                                     | 168 |

|                                                                                      |     |
|--------------------------------------------------------------------------------------|-----|
| 6.3 Dependence on Non-EU Hyperscalers and Vendor Lock-in .....                       | 171 |
| 6.4 Sovereign Cloud, Data Residency, Localization, and Jurisdictional Control.....   | 174 |
| 6.5 Encryption, Strategic Choice, and Models of Autonomy.....                        | 176 |
| 6.6 Interoperability, Exit Strategies, and Procurement as Tools of Sovereignty ..... | 180 |
| 6.7 Application Scenario.....                                                        | 183 |
| 6.8 Operational Checklist .....                                                      | 185 |
| 6.9 Questions for Reflection .....                                                   | 185 |
| 6.10 Final Summary .....                                                             | 186 |
| Essential Bibliography .....                                                         | 189 |
| Essential Bibliography .....                                                         | 190 |
| PART III - INTERNATIONAL COMPETITION AND SUPREMACY IN .....                          | 193 |
| Chapter 7 - The New Computational Arms Race.....                                     | 193 |
| 7.1 AI as a New Industrial and Strategic Race .....                                  | 193 |
| 7.2 Chips as a Geopolitical Asset and Energy as a Constraint .....                   | 197 |
| 7.3 Dual-use data centers and foundational models as industrial power.....           | 201 |
| 7.4 The United States, China, Europe, the Middle East, and India .....               | 204 |
| 7.5 Sovereign Wealth Funds, Defense, and Intelligence.....                           | 209 |
| 7.6 Application Scenario.....                                                        | 212 |
| 7.7 Operational Checklist .....                                                      | 215 |
| 7.8 Questions for Reflection .....                                                   | 215 |
| 7.9 Final Summary .....                                                              | 215 |
| Essential Bibliography .....                                                         | 219 |
| Essential Web Resources .....                                                        | 220 |
| Chapter 8 - Europe Between Regulation and Industrial Power.....                      | 223 |
| 8.1 The European Regulatory Advantage and Its Limits .....                           | 224 |
| 8.2 Why the AI Act Is Not Enough.....                                                | 227 |
| 8.3 The Gap with the U.S. and China: Capital, Chips, Energy, and Fragmentation ..... | 229 |
| 8.4 The Role of France, Germany, Italy, Spain, and the Nordic Countries.....         | 233 |

|                                                                                    |     |
|------------------------------------------------------------------------------------|-----|
| 8.5 Mistral AI, Open Source, and European Language Models .....                    | 237 |
| 8.6 From Regulation to Industrial Strength .....                                   | 239 |
| 8.7 Application Scenario.....                                                      | 242 |
| 8.8 Operational Checklist .....                                                    | 244 |
| 8.9 Questions for Reflection .....                                                 | 245 |
| 8.10 Final Summary .....                                                           | 245 |
| Essential Bibliography .....                                                       | 248 |
| Essential Web Resources .....                                                      | 250 |
| PART IV - DATA CENTERS AS STRATEGIC ASSETS.....                                    | 253 |
| Chapter 9 - The Economic Value of Data Centers.....                                | 253 |
| 9.1 Data Centers as Real Estate Assets .....                                       | 255 |
| 9.2 Energy, Industrial, and Financial Assets .....                                 | 259 |
| 9.3 Geopolitical Assets and Business Models .....                                  | 263 |
| 9.4 Edge Data Centers, Liquid Cooling, and Sustainability .....                    | 267 |
| 9.5 Renewable Energy, PPAs, and Long-Term Profitability .....                      | 270 |
| 9.6 Application Scenario.....                                                      | 273 |
| 9.7 Operational Checklist .....                                                    | 275 |
| 9.8 Questions for Reflection .....                                                 | 275 |
| 9.9 Final Summary .....                                                            | 276 |
| Essential Bibliography .....                                                       | 279 |
| Essential Bibliography .....                                                       | 280 |
| Chapter 10 - Data, Information, and Knowledge as National Wealth .....             | 283 |
| 10.1 Data, Information, Knowledge, Model, Decision.....                            | 284 |
| 10.2 Economic, Public, Military, Scientific, and Healthcare Value.....             | 288 |
| 10.3 Protection of the National Information Asset .....                            | 290 |
| 10.4 Public Archives, Digital Health, Manufacturing, and Scientific Research ..... | 293 |
| 10.5 The DATA VALUE CHAIN Framework.....                                           | 296 |
| 10.6 From Data Availability to Decision-Making Superiority .....                   | 299 |

|                                                                                             |            |
|---------------------------------------------------------------------------------------------|------------|
| 10.7 Application Scenario.....                                                              | 302        |
| 10.8 Operational Checklist .....                                                            | 304        |
| 10.9 Questions for Reflection .....                                                         | 305        |
| 10.10 Final Summary .....                                                                   | 305        |
| Essential Bibliography .....                                                                | 309        |
| Essential Web Resources .....                                                               | 310        |
| <b>PART V - SECURITY, GOVERNANCE, AND CRITICAL INFRASTRUCTURE.....</b>                      | <b>313</b> |
| <b>Chapter 11 - Cybersecurity, AI Security, and Critical Infrastructure Protection.....</b> | <b>313</b> |
| 11.1 Data Centers as Cyber and Physical Targets .....                                       | 315        |
| 11.2 Physical, Logical, and Supply Chain Attacks.....                                       | 318        |
| 11.3 Insider Threats, Data Poisoning, Model Stealing, Prompt Injection.....                 | 321        |
| 11.4 Adversarial AI, Ransomware, and Business Continuity.....                               | 324        |
| 11.5 Zero Trust, SOC, and AI Security Governance .....                                      | 326        |
| 11.6 Link to UNI 11621-8 Profiles .....                                                     | 330        |
| 11.7 Application Scenario.....                                                              | 332        |
| 11.8 Operational Checklist .....                                                            | 335        |
| 11.9 Questions for Reflection .....                                                         | 336        |
| 11.10 Final Summary .....                                                                   | 336        |
| Essential Bibliography .....                                                                | 339        |
| Essential References .....                                                                  | 340        |
| <b>Chapter 12 - Data Governance and Strategic Responsibility.....</b>                       | <b>343</b> |
| 12.1 Data Governance, Ownership, and Stewardship.....                                       | 346        |
| 12.2 Data Classification, Lifecycle, Retention, and Sharing .....                           | 350        |
| 12.3 Data Sovereignty, Data Spaces, and Governed Sharing .....                              | 353        |
| 12.4 GDPR, AI Act, NIS2, DORA, and Integrated Compliance .....                              | 356        |
| 12.5 Audits, Accountability, and Strategic Responsibility .....                             | 359        |
| 12.6 From Governance to Institutional Capacity .....                                        | 362        |
| 12.7 Application Scenario.....                                                              | 364        |

|                                                                                                |     |
|------------------------------------------------------------------------------------------------|-----|
| 12.8 Operational Checklist .....                                                               | 367 |
| 12.9 Questions for Reflection .....                                                            | 367 |
| 12.10 Final Summary .....                                                                      | 367 |
| Essential Bibliography .....                                                                   | 369 |
| Essential Bibliography .....                                                                   | 370 |
| PART VI — PROFESSIONS, SKILLS, AND ORGANIZATION.....                                           | 373 |
| Chapter 13 - AI Professions in the New Infrastructure of Sovereignty .....                     | 373 |
| 13.1 Why UNI 11621-8 Is Relevant.....                                                          | 374 |
| 13.2 Chief AI Officer, AI Security Specialist, AI Data Engineer, AI Data Scientist.....        | 377 |
| 13.3 AI Consultant, AI Product Manager, ML Engineer, NLP Engineer, Research Scientist<br>..... | 380 |
| 13.4 The Emerging Roles of AI Sovereignty .....                                                | 382 |
| 13.5 Skills, Organization, and Labor Markets .....                                             | 385 |
| 13.6 Application Scenario.....                                                                 | 388 |
| 13.7 Operational Checklist .....                                                               | 390 |
| 13.8 Questions for Reflection .....                                                            | 391 |
| 13.9 Final Summary .....                                                                       | 391 |
| Essential Bibliography .....                                                                   | 393 |
| Essential Bibliography .....                                                                   | 394 |
| Chapter 14 - How to Design a National or Corporate AI-Sovereign Strategy.....                  | 397 |
| 14.1 The SOVRAN-AI Framework.....                                                              | 398 |
| 14.2 Mapping Information Assets, the Cloud, Computational Capacity, and Skills .....           | 402 |
| 14.3 Mapping Regulatory Risks, Available Funds, and Alliances .....                            | 405 |
| 14.4 Building Roadmaps, Governance, Partnerships, and KPIs .....                               | 408 |
| 14.5 From the Framework to Organizational or National Transformation.....                      | 410 |
| 14.6 Application Scenario.....                                                                 | 412 |
| 14.7 Operational Checklist .....                                                               | 414 |
| 14.8 Questions for Reflection .....                                                            | 415 |

|                                                                                              |     |
|----------------------------------------------------------------------------------------------|-----|
| 14.9 Final Summary .....                                                                     | 415 |
| Essential Bibliography .....                                                                 | 417 |
| Essential Bibliography .....                                                                 | 418 |
| PART VII - CASE STUDIES .....                                                                | 421 |
| Chapter 15 - Realistic Case Studies .....                                                    | 421 |
| 15.1 Case 1 – Italian Region: Sovereign Healthcare Platform .....                            | 422 |
| 15.2 Case 2 – Manufacturing District: Industrial Data Space .....                            | 425 |
| 15.3 Case 3 – University and HPC Center: Regional AI Factory .....                           | 428 |
| 15.4 Case 4 – Bank: AI Compliance and Data Protection .....                                  | 431 |
| 15.5 Case 5—SME: Access to AI Without Total Dependence on Hyperscalers .....                 | 434 |
| 15.6 Operational Checklist .....                                                             | 437 |
| 15.7 Questions for Reflection .....                                                          | 437 |
| 15.8 Final Summary .....                                                                     | 438 |
| Essential Bibliography .....                                                                 | 439 |
| Essential Web References .....                                                               | 440 |
| Chapter 16 - Operational Manual for AI Funds and Projects .....                              | 443 |
| 16.1 How to Identify a Call for Proposals and Understand Its Objectives and Priorities ..... | 444 |
| 16.2 Building Partnerships, Concept Notes, and Project Structure .....                       | 447 |
| 16.3 Defining Impact, Innovation, Sustainability, and Budget .....                           | 449 |
| 16.4 KPIs, Regulatory Alignment, and Mistakes That Cause Projects to Fail .....              | 452 |
| 16.5 Operational Project Template .....                                                      | 455 |
| 16.6 Application Scenario .....                                                              | 457 |
| 16.7 Operational Checklist .....                                                             | 459 |
| 16.8 Questions for Reflection .....                                                          | 459 |
| 16.9 Final Summary .....                                                                     | 460 |
| Essential Bibliography .....                                                                 | 461 |
| Essential Web References .....                                                               | 462 |

CONCLUSIONS .....465

    Strategic Pathway for the Next Decade.....466

    Five Key Decisions for Public and Private Decision-Makers .....467

APPENDICES.....469

    Appendix A - Integrated AI-SOVRAN Framework for Strategic Assessment .....469

    Appendix B - Summary Matrix of Strategic Priorities and European Tools.....470

    Appendix C—Decision-Making Due Diligence for Data Centers and AI Programs .....471

    Appendix D – Summary Map of Roles and Responsibilities.....473

ESSENTIAL GLOSSARY .....475

ACKNOWLEDGMENTS .....477

BIBLIOGRAPHY .....479

Essential Web References.....491



## Preface

There are eras in which a technology enters the economic sphere as a tool, transforming the structure of production, the dynamics of power, and the very definition of wealth. This happened with steam, which reorganized industry and logistics; with electricity, which redesigned factories, urban networks, and the timing of consumption; and with the electronic computer, which transformed finance, administration, and defense systems. Artificial intelligence belongs to this lineage of general-purpose technologies, but it goes beyond it in one crucial respect: it intervenes in cognitive work—that is, in the sphere where classifications, predictions, priorities, recommendations, diagnoses, and decisions are formed. It is therefore not limited to enhancing a technical task; it redefines the structure through which organizations and institutions produce operational knowledge.

This shift has consequences of systemic scope. A technology that penetrates the cognitive sphere is not confined to the automation of individual tasks but tends to reorganize value chains, decision-making hierarchies, productivity metrics, forms of surveillance, criteria for resource allocation, and even the boundaries of acceptable risk. For this reason, artificial intelligence cannot be viewed merely as a software innovation. It functions as a coordinating infrastructure and as a mechanism for concentrating economic power, because it enables new cumulative advantages for those who control data, computing power, models, energy, standards, and distribution platforms.

A significant portion of public discourse, however, continues to treat AI as an essentially applied phenomenon. Attention is focused on conversational interfaces, document automation, generative assistants, and promises of immediate efficiency. These phenomena are real, but they remain the visible portion of a much deeper architecture. Behind the user-friendliness of an AI system lies a material chain comprising data collection, semantic curation, data governance, computing power, hardware accelerators, energy availability, cooling systems, operational continuity, cybersecurity, compliance, contractual relationships, and jurisdictions. It is precisely at this deeper level that the difference between the mere consumption of intelligent services and the building of autonomous capabilities is measured.

This volume was created to bridge that interpretive gap. It builds upon the series dedicated to the professional profiles of UNI 11621-8, but deliberately broadens its focus. While the main series describes roles, competencies, responsibilities, and career paths, this book

explores the strategic landscape within which these roles must operate. A Chief AI Officer, an AI Data Engineer, an AI Security Specialist, an AI Auditor, or an AI Consultant does not operate in a neutral vacuum. Their effectiveness depends on the degree of control the organization exercises over data, architectures, cloud contracts, workload localization, sourcing models, energy chains, security policies, and access to European funding programs.

In other words, AI professions cannot be understood without their underlying infrastructure. It would be misleading to describe a pilot's skills without mentioning the aircraft, the runway, the control tower, maintenance, and the regulatory framework that makes flight possible. Similarly, it would be incomplete to describe AI roles and skills without addressing the nature of data centers, the issue of data sovereignty, the growing importance of the semiconductor supply chain, the centrality of the cloud, the role of European supercomputing, the link between AI and cybersecurity, international competition for computational power, and the importance of public funds as a lever of industrial policy.

The guiding idea of this work is therefore simple in its formulation but far-reaching in its implications: the wealth generated by AI cannot be separated from the ability to control the material conditions of computation. Data, on its own, does not create value; it creates value only when it is classified, governed, protected, made interoperable, and integrated into a computational transformation chain. A model, on its own, does not guarantee autonomy; indeed, it can increase dependence if it relies on opaque infrastructure and non-negotiable contractual arrangements. The data center, in turn, is not merely a technical building: it is an economic, energy, legal, and geopolitical hub where investments, supply chains, security, land-use planning, and computing power converge.

The European perspective provides the optimal framework for this analysis—not for reasons of identity, but out of strategic realism. The European Union finds itself in a unique historical position: on the one hand, it possesses significant regulatory power capable of influencing privacy, security, competition, resilience, and system reliability; on the other hand, it has yet to permanently transform this regulatory power into industrial density, patient capital, computational infrastructure, and market leadership. The AI Act, Digital Europe, EuroHPC, AI Factories, Data Act, Data Governance Act, NIS2, DORA, European data spaces, and cloud-edge initiatives should not be viewed as isolated measures, but as parts of a single architecture of strategic autonomy.

Within this framework, Italy faces a specific challenge that cannot be postponed. It cannot simply import AI services developed elsewhere and distribute them throughout its productive sector as if innovation were merely the adoption of interfaces. Nor can it cultivate a rhetoric of sovereignty that is disconnected from investments, expertise, infrastructure, governance, and implementation programs. What is needed is a strategy capable of connecting professions, universities, public administrations, European funds, data centers, industrial ecosystems, and energy supply chains into a coherent and progressive plan. What is truly at stake is not only short-term competitiveness but also the ability to retain decision-making autonomy in an economy increasingly organized around computation.

This book is therefore aimed at a deliberately diverse audience: public officials, entrepreneurs, investors, consultants, policymakers, digital transformation leaders, innovation lawyers, security professionals, university professors, and advanced training providers. To all of them, it puts forward the same thesis: AI should not be interpreted as a fad or a mere extension of enterprise software, but as the new grammar of 21st-century industrial power. Understanding it in this way means examining data economics, digital sovereignty, the localization of computing, critical infrastructure, technical standards, public finance, and the organization of cognitive work as an integrated whole.

If the primary merit of a professional series lies in giving names to emerging roles and new responsibilities, the task of this volume is to shift the focus one level higher and one level deeper. Higher, toward the strategic framework in which states, regions, markets, funds, and major platforms interact. Deeper, toward the material foundation that underpins every intelligent application: data centers, energy, chips, the cloud, security, data governance, business continuity, standards, and audits. Only by bringing these two analytical perspectives together is it possible to understand how artificial intelligence is not merely one technology among many, but an organizing principle of economic, institutional, and geopolitical power.

The book therefore asks the reader to shift their perspective. It is not enough to ask which AI applications can be adopted; one must ask what economic, technical, and institutional architecture makes their use sustainable over time. It is not enough to measure the immediate efficiency of an algorithm; one must assess the organization's ability to retain knowledge, safeguard critical data, develop appropriate professional skills, and build room for flexibility with respect to dominant suppliers. This is where the book aims to position itself: at the intersection of a strategic guidance manual, an academic text, and a professional “ ”

guide for public and private decision-makers. Its value, if the project succeeds, will not only be to clarify a debate; it will be to offer an operational framework for evaluating investments, policies, calls for proposals, technological architectures, and organizational models. For this reason, the preface does not merely introduce a theme but defines a framework for interpretation: each chapter must be interpreted in light of the fundamental question of who controls—with what tools and for whose benefit—the new cognitive infrastructure of the contemporary world.

If the twentieth century taught us that there is no industrial power without control over energy, manufacturing, and logistics, the first quarter of the twenty-first century clearly shows that there is no longer any lasting economic power without control—or at least governance—over cognitive infrastructures. Artificial intelligence is not merely an efficiency booster: it is a multiplier of decision-making capacity, a lever for organizational coordination, and a system for redistributing competitive advantage. For this reason, this volume puts forward a strong thesis: to discuss AI without also addressing data centers, computing supply chains, data security, standards, procurement, and industrial policy is to describe only the surface of the phenomenon. The strategic depth of AI, however, lies in the combination of computational power, information quality, energy continuity, legal frameworks, and professional expertise capable of transforming a general technology into national, regional, or corporate infrastructure. In this sense, the issue of sovereignty is not merely a matter of asserting identity: it coincides with the concrete ability to choose, negotiate, migrate, audit, and protect the digital assets upon which competitiveness, security, and decision-making autonomy depend.

Artificial intelligence tools were used in the production of this work to support translation, document research, and stylistic editing of the text. The authors personally verified, reviewed, and gave final approval to the text.

## Introduction - The New Geography of Power

In a meeting room at a medium-sized European company, the board of directors discusses artificial intelligence as if it were selecting new management software. The conversation centers on licensing costs, speed of implementation, minimal staff training, and integration with existing applications. At the same time, in far less visible places, decisions are being made that will have a much greater impact on the organization's future: where data will be processed, under which jurisdiction workloads will fall, which providers will control the cloud, how much energy will be needed to support training and inference, which contractual clauses will govern portability and exit, and which technical dependencies will be cemented for the next decade. It is in this gap between the application layer and the infrastructural depth that the strategic problem of AI lies.

The central argument of this volume can be stated plainly: artificial intelligence is not merely the catalog of tools that make its presence evident to the general public. It is, first and foremost, a new regime for the organization of economic and administrative power, because it simultaneously affects the control of information, the availability of energy, the structure of costs, the location of computing, the nature of security, and the composition of cognitive labor. For this reason, discussing AI means discussing infrastructure, jurisdictions, industrial structures, public funds, platforms, and technical standards at least as much as it means discussing algorithms and models.

The category of “geography of power” is not used here as a mere metaphor. It refers to the concrete redistribution of decision-making capacity among states, regions, companies, urban networks, digital platforms, and major infrastructure providers. In the 20th century, the geography of industrial power was evident in ports, logistics corridors, energy hubs, manufacturing districts, and financial centers. In the 21st century, these spaces are joined by data center campuses, cloud hubs, interconnection nodes, HPC infrastructure, semiconductor supply chains, ecosystems of foundational models, and sector-specific data spaces. Those who control these nodes do not merely control markets: they shape information flows, innovation timelines, access costs, and interoperability standards.

From this perspective, AI must be understood as the convergence point of three distinct historical trends. The first is the long-term transformation of the economy toward an increasing centrality of information and knowledge as factors of production. The second is the platformization of the digital economy, which has concentrated data, interfaces, and

distribution capabilities within a few global ecosystems. The third is the new geopolitical significance of computing, fueled by competition for chips, low-cost energy, supercomputing, and the location of data centers. Artificial intelligence does not single-handedly usher in these trends, but rather accelerates them, binds them together, and makes them mutually dependent.

The purpose of this introduction is not to preview the book's entire content, but to establish its theoretical framework. The following paragraphs will clarify seven conceptual axes: the shift from traditional material resources to data as a strategic raw material; the inadequacy of raw data in the absence of governance; the new power triangle consisting of data, energy, and computing; the role of data centers as sites where computational power is concentrated; the link between digital sovereignty and national security; why this volume complements the discussion on UNI 11621-8; and the final question regarding the relationship between AI governance and Europe's industrial future. Each of these themes sets the stage for the analyses developed in Part I and, subsequently, in the sections dedicated to Europe, funding, international competition, governance, and professions.

## **1. From Gold to Oil, from Oil to Data**

Modern economic history can be interpreted as a succession of accumulation regimes based on different raw materials and infrastructures. Gold has long served as a store of value and a foundation of monetary confidence; coal and oil fueled the long era of industrial power and mass mobility; electricity made continuous, widespread, and scalable production possible. In our time, data has emerged as the raw material capable of connecting information, forecasting, coordination, and automation. However, it differs substantially from the strategic resources of the past, because its value does not lie in extraction per se, but in the possibility of being organized, corrected, correlated, interpreted, and transformed into decisions.

The famous saying that data is the "new oil" thus contains both a valid insight and a theoretical risk. It is valid because it captures the systemic role of data as an enabling resource for entire economic sectors, and risky because it suggests an overly simplistic analogy between extraction and value. Oil is transformed into wealth through refineries, pipelines, technical standards, markets, insurance, finance, and distribution systems. Similarly, data generates value only within an ecosystem of —collection, cleaning, cataloging, security, governance, computation, and organizational use. AI is therefore not