Metascenarios

Poland Resilience Agenda Digital 2040

Integrated scenario research results

Development scenarios / Megatrends / Recommendations

WORKING MATERIAL

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The material is a generalization of the results of scenario research.
It integrates the most frequently recurring narrative threads and observations from all twenty scenarios resulting from the research, regardless of their strategic area.

Polish Digital Society
http://cyfryzacja.org

Technological foundations

Key pillars of digital transformation (present in 100% of scenarios)

Artificial Intelligence & ML

The basic mechanism for automating cognitive and decision-making processes. It enables predictive analysis of data on a macroeconomic scale and personalization of public services.

Cognitive automation

Internet of Things & Digital Twins

Real-time monitoring of critical infrastructure. Optimization of energy and logistics systems through virtual operating models.

Real-Time Monitoring

Blockchain & Post-Quantum Cryptography

Securing digital identity, medical data and financial transactions. Guarantor of the immutability of public registers and data privacy.

Cybersecurity

Digital Identity (Biometrics/SSI)

The foundation for access to integrated public and private services. Moving towards a Self-Sovereign Identity model.

Access to services

Cloud & Edge Computing

Scalable infrastructure for distributed data processing. Transferring computing power to the edge of the network to minimize delays in critical systems.

Data Infrastructure

Platformization of Services

Moving from traditional, siled institutions to open digital ecosystems. Integration of public and commercial services into coherent user environments.

Digital Ecosystems

Temporal Architecture

Three-phase transformation model (2025-2040)

2025-2030

Phase I: Foundations and Origins

The period of building critical digital infrastructure. The energy crisis acts as a catalyst for forced change and optimization.

Key moment: Emergency "exit from the IT desert" and investments in energy cybersecurity.

2030-2035

Phase II: Consolidation

Achieving maturity of the systems implemented in Phase I. Integration of island solutions into coherent national ecosystems.

Key moment: Quantum revolution (~2029-2035) changing the cybersecurity paradigm.

2035-2040

Phase III: Emergence

Crystallization of a new socio-economic order. Full automation of routine processes and stabilization of new structures.

Key Moment: The establishment of the "New Social Contract" in response to the automation of work.

Macroeconomic Megatrends

Key indicators of transformation pressures and costs

Pressure on the Labor Market

2.5 - 4 million

Number of jobs at risk of automation. It mainly affects routine occupations (cognitive and physical).

Energy Costs

PLN 1,200 billion

Estimated costs of energy transformation until 2040. Necessary expenditure on network modernization and renewable energy sources.

Competence Gap

20,000 specialists

The current deficit of IT staff in strategic sectors, slowing down the pace of digitalisation of public services.

Crisis Window

2025-2030

A critical period of the energy crisis, acting as a catalyst for change. Power priority for IT infrastructure.

Three-class Social Structure 2040

Population distribution according to access to digital resources

Class A Elite/Digitariat — 8-12%

A narrow group with full control over digital assets and technological capital.

- Full digital sovereignty
- Access to premium technology (Health 4.0)
- Algorithm and platform owners

Class B Precariat / Contractors — 45-55%

The largest social group operating within the platform economy ("gig economy").

- Work managed algorithmically
- Limited data privacy
- Low employment stability

Class C Excluded — 33-40%

People who are permanently digitally excluded, which in 2040 means actual social exclusion.

- Lack of digital competences
- Welfare dependence
- Limited access to e-services

Crisis of Traditional Institutions

Erosion of the public sector in strategic areas

Education

50% Brain drain top STEM graduates

- Degradation of public schools. Transition from the transmission of knowledge to a purely welfare and socialization function.
- Non-competitiveness of universities No Polish universities in the global TOP 100 (Shanghai 2040 ranking).
- Privatization of education Real-world education is moving to paid digital platforms and tutoring.

VS

Health Care

25% Operating budgets absorbed by IT systems

- Predictive diagnostics Transition from reactive medicine to prevention based on AI analysis (Health 4.0).
- Telemedicine as standard Virtual visits and mobile medical teams are replacing traditional clinics.
- Two-class system. A clear division into the fast premium (private) level and the basic public level.

Paradoxes of Transformation

Common tensions present in all scenarios

Paradox Hyperconnectivity

Access vs. Competencies

Access to digital resources is not the same as the ability to use them.

"Use gap" - the cultural capital of the family determines the efficiency of use.

Personalization algorithms deepen social divisions instead of eliminating them.

Paradox Privacy

Security vs. Freedom

The fundamental tension between collective security and individual privacy.

Data as currency in the common "free data" model.

High risk of hidden algorithmic discrimination in public services.

Paradox Efficiency

Solution vs. Risk

Digitalisation is both a solution to problems and a source of new systemic risk.

Vendor lock-in – the state's critical dependence on technology suppliers.

Threat of losing technological sovereignty and control over data.

Bifurcation Point

A strategic window of opportunity determining the development trajectory

Bifurcation is a phenomenon of a sudden, sudden qualitative or structural change in a system (physical, mathematical, natural) caused by a small, continuous change in the control parameter

Path A

Emancipation

- Data sovereignty
- Inclusive automation
- Open standards
- Sector synergy

Path B

Domination

- Privatization of the state
- Extractive capitalism
- Loss of autonomy
- Algorithmic surveillance

Critical Decision Areas

Management

DANE Data sovereignty basis of autonomy

- Emergent State (Purpose) Active regulator defining standards and coordinator of ecosystems vs. eroded state.
- New Control Mechanisms Selective deregulation and algorithmic protocols instead of rigid bureaucratic hierarchies.
- Data Sovereignty The guarantee that digital infrastructure remains under public control, not BigTech.

VS

Economy

TOKEN Citizens as data owners

- Sharing Economy The cooperative model, fractional ownership and NFT 2.0 as an alternative to corporate neo-feudalism.
- Development Bonus A conditional benefit financed from transparent savings from automation (instead of UBI).
- Platform Cooperatives Users and employees as co-stakeholders of value-generating platforms.

Critical decision areas

Priorities: Society, Technology and Strategic Sectors

Society

Cohesion and Human Capital

Proactive "Second Chance" programs instead of passive acceptance of social inequalities.

Systemic talent retention policy (counteracting brain drain).

A new social contract – redefining the work-income-identity relationship in the era of AI.

Technology

Architecture and Standards

Self-Sovereign Identity (SSI) vs. state or private centralization.

Federated learning – data decentralization for privacy protection.

Enforcing open standards (FHIR, HL7, PBSN) in critical infrastructure.

Strategic Sectors

Smart Specialization

Energy and Logistics: Geothermal energy and CPK supported by AI ("intelligent bridge").

Health: Crisis medicine 2.0 (mobile teams, drones).

Export: Video games, IT, Engineering and precision agriculture.

Positive Trajectory

Emergence i synergy

An integrated innovation ecosystem in which education, science and the economy work synergistically. Poland uses "digital judo" to build a competitive advantage.

- **Conscious meritocracy with strong compensation mechanisms**
- **Tokenization and democratization of development investments**
- **Circulation of talent instead of brain drain**

Regional Technology Center for CEE
Poland as a leader of transformation in Central and Eastern Europe

GDP Per Capita
50 000+ USD
Significant increase in wealth

High-Tech Export
> 40% of the total
Dominance of the digital sector

Talent Balance
Positive
Emigration 20% | Repatriation 30%

Dystopian metascenario

Threats of lack of transformation by 2040

⚠ Negative Trajectory

Systemic destabilization

Corporate neo-feudalism, where BigTech takes over the functions of the state. Poland is falling into the middle-income trap as a permanent state, losing technological and logistic sovereignty.

- ✕ **Collapse of public institutions (education, health)**
- ✕ **Social Bonus that punishes non-conformity**
- ✕ **Loss of sovereignty (technological, epistemological)**

Digital Peripherals

Dependence on external providers and algorithms

Work balance

-2 to 3 million

↘ Job deficit

Economic status

The middle income trap

∞ Permanent condition

State control

Neofeudalism

BigTech domination

Strategic Imperatives

Key conditions for transformation success

Decision Window 2025-2030 KRYTYCZNE

01

The next 5 years will determine the trajectory for decades. Delaying reforms means technological lock-in, loss of position in value chains and deepening of the competence deficit. This is a "to be or not to be" moment for digital sovereignty.

Foundations before acceleration

- ⚠ Avoiding the error of "chaotic digitalisation" on an unstable database.
- ✓ "IT Desert" recovery plan: PLN 20 billion (2025-2028).
- ✓ Goal: Increase in digital maturity from 2.1/5 to 4.5/5.

The trihelix of innovation

- ✓ IP reform: 70% rights for creators/scientists.
- ⚡ Fast grant track: decision within 30 days.
- 🌱 Seed funds: PLN 1 billion annually for deep-tech.

Algorithm control

- ✓ Transparency and the right to explanation of AI decisions.
- ✓ Mandatory ethical audit of public systems.
- ✓ Protocol-based governance: separating infrastructure from politics.

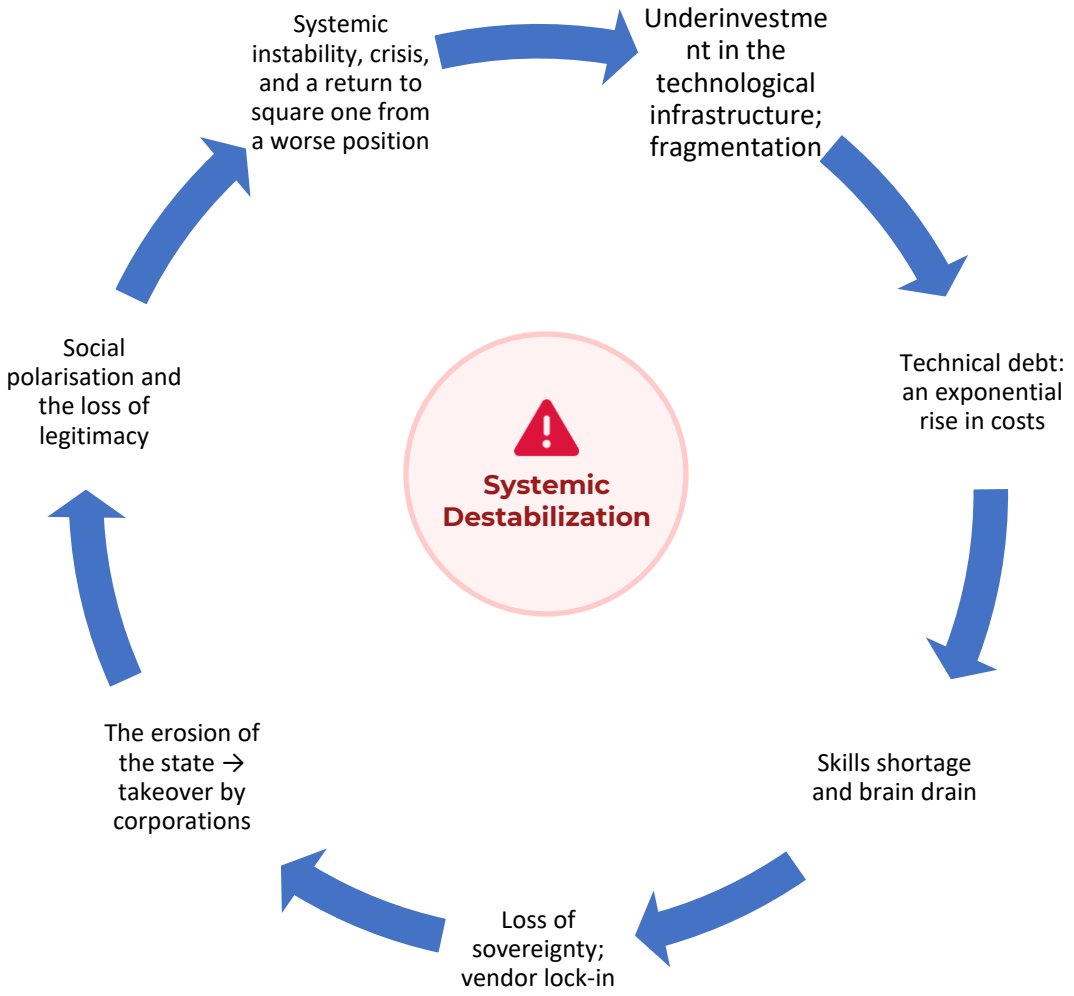
A new social contract

- ✓ **Development Bonus financed from automation savings.**
- ✓ Portfolio career as standard (80% of employees).
- ✓ Positive social credit (rewarding, not punishing).

Systemic risk map

Degenerative loop and early warning signals

Degenerative loop (Negative scenario)



Early signs

Critical indicators signaling entry into a degenerative spiral. Crossing thresholds requires immediate strategic intervention.

growth y/y

IT failure rate (Energy/Finance)

> 15% increase y/y

remains in the country

STEM graduate retention

<50% stays in the country

one vendor

Supplier concentration (Lock-in)

> 60% one vendor

alarm level

Inequalities (Gini Coefficient)

>0.35 alarm level

for 2 years

Expenditures on R&D

< 1.5% of GDP for 2 years

Four strategic priorities

Pillars for building digital resilience by 2040

Priority I
Technological sovereignty

- **Control of data infrastructure and critical national standards**
- Legal requirement to use open interoperability standards
- IT talent repatriation program (grants and tax breaks)

01

Priority II
Human capital

- Educational revolution: transition to a lifelong learning model
- Competency micro-certificates recognized by key employers
- "Second Chance" program: budget of PLN 30,000. PLN for retraining

02

Priority III
Innovation ecosystem

- **Creation and support for the development of new business models. SME integration**
- Platform cooperatives as an alternative to corporations
- "Free resources" model instead of just-in-time in strategic sectors.

03

Priority IV
Social cohesion

- **Data tokenization – citizen as owner and beneficiary**
- Democratic control and auditability of public algorithms
- A new social contract based on the Development Bonus

04

Strategic priorities: actions

Technological sovereignty

200k PLN start-up grant for IT repatriates (+ discounts)

- **Data infrastructure control** Maintain full control over critical resources and data transmission standards.
- **Open interoperability** A legal requirement to use open standards in public systems.
- **Competence Centers** Construction of strategic technology hubs (AI, Quantum, Cybersec).

&

Human capital

100k People per year in the program "Second Chance" (PLN 30k/person)

- **Educational revolution** Transition from one-time education to the "lifelong learning" model throughout life.
- **Micro-certificates** A flexible qualification system recognized by 50+ largest employers.
- **Professions of the future** Educating AI staff, technological hybrids and modern care professions.

"Digital Judo" Scenario

A unique opportunity to use the power of global digital trends (automation, platformization) against their negative effects in order to build competitive advantage and social cohesion.

01
Savings from automation

Financing the Development Bonus and reskilling

02
Platformization of Services

Building cooperative ownership (instead of extractive ownership)

03
AI in Diagnostics

Democratizing access to predictive medicine

04
Blockchain & Crypto

Sovereign identity control by citizens

05
New sources of competitiveness

Freeing up resources for creativity and innovation. A system for creating new business models

Condition for Success (2025-2030)

Conscious, coordinated legislative and investment decisions. Prioritizing human capital over technological capital while maintaining transparent standards of democratic control.

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PTC
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