Comparative analysis

Scenarios of the impact of digitalisation and automation on the Polish economy and the competitiveness of enterprises

Polish Digital Resilience Agenda 2040 - a model of strategic preparedness for the antinomies of digitalisation.

Strategic, technological and social perspective

Time Horizon

2025–2040

Scope of Analysis

4 alternative development paths

Analysis context (2025–2040)

Time horizon

The period of transformation

2025–2040: An era of accelerated automation

- The key period of the post-quantum breakthrough,
- Long-term strategic perspective,
- The dynamics of technological changes as the main determinant,
- Verification of assumptions every 5 years.

Breakthrough points

Critical moments

- **Recession 2024–2028: Adaptive shock forcing change,**
- **Quantum revolution (2029–2035): Migration to post-quantum cryptography,**
- **Decision window (2025–2030): Time for structural reforms,**
- **Quantum Singularity (2036): The Risk of an Extreme Scenario.**

Methodology

Comparative approach

Multidimensional scenario analysis

- Axes of analysis: Technological sovereignty vs. social model,
- Common denominator: Macrotrends and demographic challenges,
- Key KPIs: GDP per capita, unemployment level, innovation index,
- Geopolitical impact assessment.

Common Elements

Technology macrotrends

Automation and digitalisation

Transformational power

An irreversible process transforming the structure of the economy. Elimination of routine tasks in favor of autonomous processes, fundamentally influencing the labor market and companies' operating models.

Quantum revolution (2029–2035)

Breaking point

A critical moment requiring migration to post-quantum cryptography. A threat to current security systems and an opportunity for rapid optimization of computational processes.

Reporting automation

Business-regulator relationship

Elimination of routine office work through Real-Time Reporting systems. Changing the supervision paradigm from follow-up to ongoing, reducing compliance administrative costs.

Global sea-air logistics

Geography of competitiveness

Reconfiguration of supply chains changing the position of transport hubs. Increasing importance of intermodality and resilience instead of the just-in-time model.

Common elements

Socio-economic challenges

Pressure on the middle class

Crisis of the "average"

Growing fiscal burdens and automation are hitting the traditional middle class and medium-sized companies. The need to redefine the business model, where "average" is no longer a safe haven.

Reversal of work prestige

The Renaissance of craftsmanship

Drastic increase in the value of manual, technical and care skills. The decline in the importance and prestige of routine office work (white-collar), which is easiest to automate by AI.

Polarization of wages

Elimination of the agent

The disappearance of semi-skilled positions leads to an hourglass structure: rising wages for high-class specialists and wage pressure in the simple services sector, while the stable middle is washing out.

Massive retraining

Need for retraining

The need for constant adaptation of the workforce. The education system is shifting towards micro-credentials and lifelong learning to keep up with the pace of technological change (competence half-life < 5 years).

Common elements

Strategic dilemmas

Technological dependence vs. digital sovereignty

Importing solutions vs. own competences

A fundamental choice between the easy absorption of ready-made technologies from the US and China, which involves "digital vassalization", and the expensive and risky construction of our own infrastructure, standards and data sovereignty.

Poland's geopolitical position

Direction of strategic integration

A strategic reorientation requiring the choice of priorities: close Atlantic integration (military security), pragmatic cooperation on Eurasian routes (logistics) or building regional strategic autonomy within the EU.

Window of opportunity (2025–2030)

Time of critical decisions

Narrow time frame for carrying out key structural reforms. Failure to make bold investment and regulatory decisions this decade risks permanently relegating the Polish economy to the role of a subcontractor.

4 Digital transformation scenarios (2025–2040)

Optimistic

01

Polish Paradox

"Hyperintelligent Bridge of Eurasia"

- Deregulation: Selective digitalisation as a growth accelerator
- Logistics: CPK and AI in logistics as key advantages
- Strategy: "Free resources" instead of just-in-time
- Culture: Polish work ethos as a unique value

Tone: Proactive

Transformational

02

Automation and value

"Crisis as a catalyst for change"

- Economics: Recession 2024-2028 forcing adaptation
- Model: "Agility 2.0" (Quality × Digitalization × Speed)
- Society: New Contract (UBI, Wallet Career)
- Technology: Digital glocalization and QaaS

Tone: Evolutionary

Dystopian

03

The Transformation Paradox

"Loss of sovereignty and control"

- Sovereignty: Poland as a "price taker" and outsourcing of critical infrastructure
- Threats: Quantum Singularity (2036) and GDP collapse
- Regulations: Climate Authoritarianism (ECEA)
- Work: The "Work Always" model instead of social protection

Tone: Warning

Dualistic

04

Techno-polarization

"Neofeudalism and division"

- Structure: Corporate scale vs. economics of uniqueness
- Society: The permanent disappearance of the middle class
- Economy: Renaturalization and return to local resources
- Market: Compliance factories and professional bifurcation

Tone: Systemic

Scenario 1: Optimistic

"Polish Paradox"

Selective deregulation

Digitalisation of public administration as the main growth accelerator. Reduction of bureaucratic barriers through intelligent e-governance systems and automation of decision-making processes.

The hyperintelligent bridge of Eurasia

Strategic use of geographical location through the construction of CPK and the integration of AI in logistics. Poland as a key transport hub connecting the East with the West.

Free Resources Strategy

Moving away from the just-in-time model towards building strategic reserves and resilience of supply chains. Investments in storage and infrastructure redundancy.

Polish work ethos

Using unique cultural features - resourcefulness, innovation and work ethic - as a ethic - as a competitive advantage in the era of digital transformation.

TON SCENARIUSZA

"Proactive, strategic, assuming the ability to carry out deep structural reforms and build "smart specializations" on a global scale.

Key domain

Digital sovereignty

Scenario 1: Optimistic

Key effects and results (2040)

GDP per capita (PPS)

85-90%

EU average by 2040

Unemployment Level

5-7%

Stable, natural level

Strategic Results

Games and Entertainment Sector

A global leader in the production of games and digital entertainment, entertainment, using Polish creativity and programming competences. competences.

Precision Farming

Implementation of autonomous agrotechnical systems, increasing the efficiency and quality of food production.

Infrastructure Control

Full sovereignty over critical data infrastructure and cybersecurity standards.

Niche Competencies (Growth)

Development Profile

Scenario 2: Transformational

"Between automation and the value of work"

Crisis as a catalyst

Recession of 2024-2028 (GDP -8-12%, unemployment 15-18%) forcing rapid adaptation of the labor market and the search for new models of economic efficiency.

The "Agility 2.0" model

A hybrid of traditional quality with a digital layer. The speed of adaptation (agility) becomes a key resource in an unstable economic environment.

Digital glocalization

Global distribution of local uniqueness. Polish companies use digital platforms to sell niche products and services on global markets.

Democratization (QaaS)

Universal access to quantum technologies in the service model (Quantum as a (Quantum as a Service), equalizing the opportunities of smaller entities compared compared to corporations.

TONE

Evolutionary by shock. It assumes a profound change in the social paradigm and a fundamental reconfiguration of work values in response to the crisis.

Key domain

Social adaptation

Scenario 2: Transformational

New social contract (2040)

Basic Income (UBI)

2500 PLN

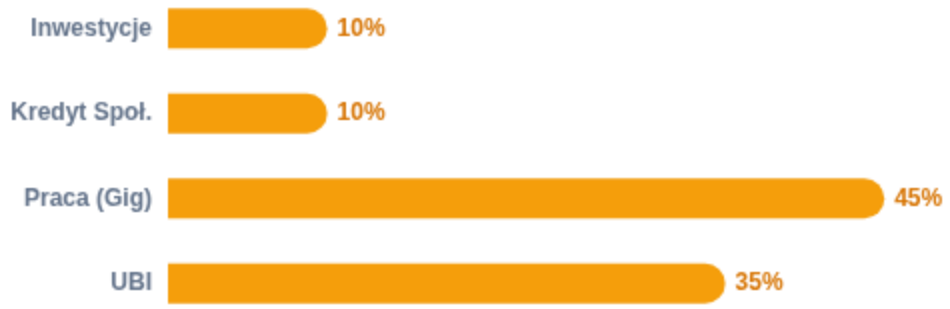
Monthly + targeted allowances

Employment Model

Wallet

Domination of project work

Income structure (2040)



Pillars of the new order

Portfolio career

The disappearance of full-time employment in favor of flexible work for work for many entities, supported by the state insurance system. system.

Social credit

A scoring system promoting ecological and social behavior, determining access to premium services.

Climate Police (ECA)

Strict supervision of the carbon footprint of citizens and companies by the European Climate Agency.

Development Profile

Scenario 3: Dystopian

"The paradox of Polish transformation"

Poland as a "Price Taker"

Loss of subjectivity in the global logistics architecture. Poland becomes a passive link in the supply chain, forced to accept the conditions dictated by the superpowers.

Critical infrastructure outsourcing

Key state systems (Gov Cloud, AI, 5G/6G networks) managed by global Big Tech corporations. No control over the flow of sensitive data.

Quantum Singularity (2036)

The critical point of collapse of cybersecurity systems. A shock hit to the economy resulting in a 47% drop in GDP in just 6 months.

Loss of epistemological sovereignty

Lack of own analytical and cognitive tools. Complete dependence of decision-making decision-making processes on external algorithms and knowledge providers. providers.

TONE

Warning, pessimistic. It illustrates the consequences of the lack of strategic decisions ("bad choices") and the loss of control over the digital fate of the country.

Key risk

Loss of sovereignty

Scenario 3: Dystopian

Consequences and effects (2040)

Critical Risk

FDI decline (2027-2030)

-28%

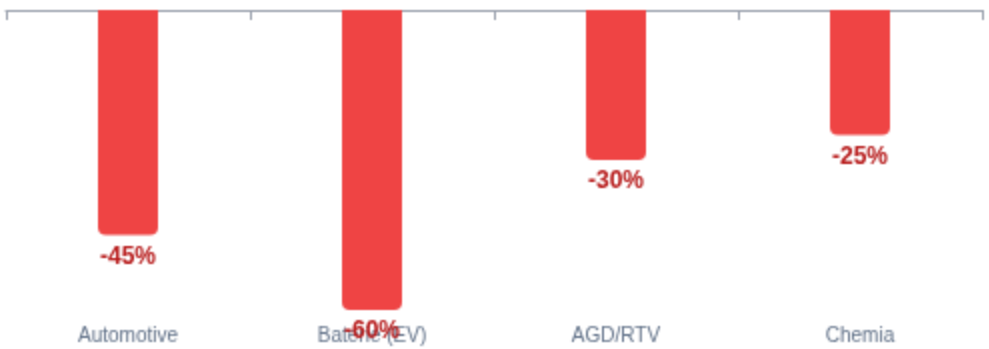
Drastic outflow of foreign capital

GDP per capita (2040)

<60% EU

Persistent economic peripheralization

Outflow of Key Investors



Systemic consequences

Climate Authoritarianism (ECEA)

Algorithmic sanctions forcing deindustrialization. The Polish economy is economy is losing industrial competitiveness.

The "Work Always" model

Instead of UBI, economic coercion for low-paid work. Work treated as a "right and dignity" in conditions of scarcity.

Massive Relocation

Flight of industrial giants (VW, LG Chem, Bosch) to port countries with lower energy costs and better logistics.

Fall Profile (Transformation Paradox)

Scenario 4: Dualistic

"Techno-polarization"

Dualistic neofeudalism

Division of the economy into two separate worlds: the corporate sector (dominance of Big Tech) vs. uniqueness economy (small guilds and crafts). No intermediate zone.

The disappearance of the middle class

The elimination of the "mediocre" is not a temporary crisis, but a new, permanent social structure. Polarization into a narrow technocratic elite and a broad service class.

Renaturalization of economics

A return to local resources, circular mining and the revival of craft guilds. Increase in the value of physical, repairable goods in contrast to virtualization.

Post-quantum systemic meltdown

Collapse of trust in digital systems forcing "analog redundancy". Maintaining parallel Maintaining parallel systems offline as a security guarantor.

TONE

Structural, systemic, accepting deep duality as the new normal. A world divided into the realms of digital performance and analog authenticity.

Key domain

Analog redundancy

New order and results (2040)

Techno-polarization polarization

Wages of craftsmen

≈ IT specialist

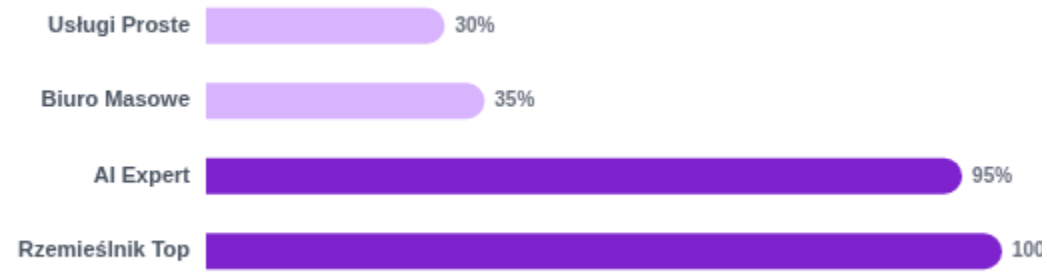
Premium segment equated with B2B

Market structure

Bifurcation

A deep divide: premium vs. mass

Polarization of Salaries



Pillars of the new economy

Marks of authenticity

Material "human-made" certificates as a key value in a world world flooded by AI. Analogue renaissance.

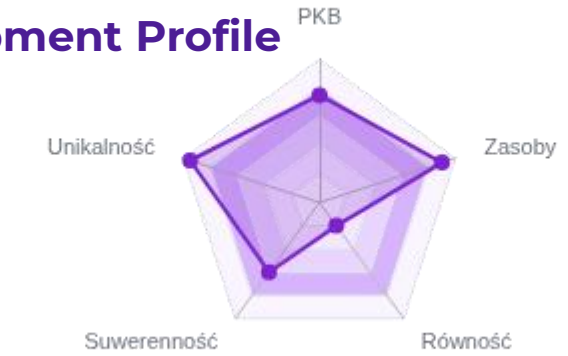
Compliance factories

Mass work model based on algorithmic supervision, supporting standard corporate processes.

New era guilds

Craft organizations controlling quality and access to the premium segment, replacing traditional associations.

Development Profile



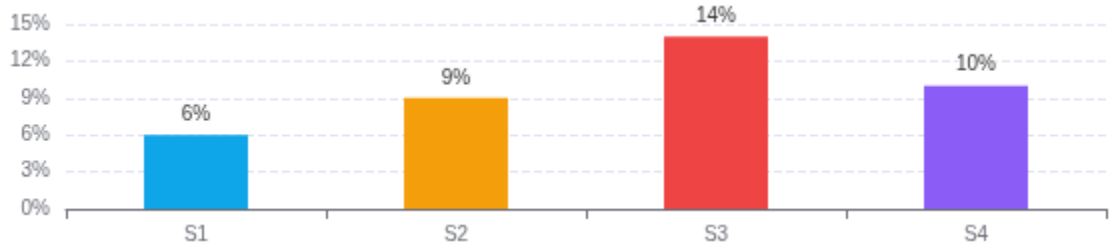
Strategic Synthesis

Comparison of Key Indicators (2040)

S1: Optimistic · S2: Transformational · S3: Dystopian · S4: Dualistic

	Polish paradox	Automation	Paradox	Techno-polarization
GDP per capita (EU)	85-90% Strong growth thanks to niches and deregulation	75-85% Rebound after the recession 2024-2028 2028	<60% Stagnation continued after the 2036 sho shock	70-80% 80% Strong income divergence
Social model	Work + Smart Specializations	UBI + Portfolio Career	"Work Always" (Coercion)	Occupational Dualism (Guilds)
Technological sovereignty	**High** Data/standards control	**Moderate** QaaS and interdependence	**Low** Outsourcing to Big Tech	**Selective** Niches + analog redundancy
Geopolitical position	Eurasia Bridge (Hub CPK)	Flexible Glocalization	Peripheral dependency	Regional networks and guilds

Unemployment forecast (2040)



Digital Sovereignty Index

Conclusions and strategic recommendations

Perspective: 2026-2040

Critical decisions (2025-2030)

2025-27

Migration to post-quantum cryptography (PQC)

Launch of a national program to exchange encryption standards in critical infrastructure and banking.

2026-28

Regulatory reform and digitalisation of administration

Implementation of "Smart Administration" to reduce state state service costs and free labor resources.

2025-30

Investments in logistics (CPK + Intermodal)

Construction of a resilient logistics hub that will play the role of the "Bridge of Eurasia".

Immediate actions (ASAP)

- **Dependency Audit: Full map of technological and supply chain risks.**
- **QaaS pilots: Implementation of Quantum-as-a-Service test programs in SP companies.**
- **Reporting Automation: Start of Real-Time Reporting pilot programs.**

Key areas

Human Capital and retraining

Need to retrain 100,000 employees per year. Support for SMEs in adapting the "Agility 2.0" model and digitizing processes.

Standards and data sovereignty

Developing national interoperability standards and regaining regaining control over the data storage infrastructure (Gov (Gov Cloud).

The main risk

Deindustrialization and Loss of Control
"Paradox" scenario - Poland as a passive technology consumer and contractor.

Main chance

Glocalization and Niches
Building a strong position in niches (games, agriculture) and the role of the logistics hub of the region.

Summary and discussion

Development scenarios 2025-2040

4 Paths

Decisions: 2025-30

Alternative paths to the future

Polish Paradox

Deregulation, CPK and work ethos. Success thanks to "smart specializations" and sovereignty.

Automation

Crisis as a catalyst. Glocalization, UBI and the "Agility 2.0" model after the recession.

The paradox of transformation

Loss of sovereignty, outsourcing of critical infrastructure and domination of external regulations.

Techno-polarization

Economic dualism. Corporate scale vs. craft guilds. The disappearance of the middle class.

Key strategic questions

- How to balance the pursuit of digital sovereignty with the need for integration within NATO/EU supply chains?
- How to finance mass reskilling (100,000+ people/year) and potential potential protective mechanisms (UBI) in the transition period?
- Which areas of critical infrastructure (AI, 6G, Quantum) must remain under remain under exclusive state control?

Next steps

- KPI definition for "Digital Sovereignty"
- Post-quantum migration timeline
- Pilot of the "Digital Reskilling" program
- Technological audit of state-owned companies

NAUKA DLA SPOŁECZEŃSTWA
Ministerstwo Nauki i Szkolnictwa Wyższego

The project is financed from state budget funds allocated by the Minister of Education and Science under the "Science for Society II" Program.
Funding: PLN 1,467,000, Total value: PLN 1,467,000