Growing Inequality:
a Novel Integration of
transformations research

What does the future hold?
The impact of technology, globalisation and migration on skill demand and inequality

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Future scenarios, their outcomes and policy implications

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GI-NI contributes to an inclusive Europe of shared prosperity by providing a better understanding of the changes and joint impact of three major transformations: technological progress, globalisation and migration; and offering policy and governance solutions to better equip citizens and companies for future challenges, securing more equal opportunities and outcomes. The project team uses a multidisciplinary research approach with international stakeholder engagement throughout the project.

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Contents

1. Why the EU needs less inequality and skill mismatches

The European Union is at a pivotal moment in its journey to navigate the digital transformation and escalating geopolitical tensions. In recent years, we have witnessed significant policy innovations related to equality, skills and artificial intelligence (AI). These initiatives are designed to promote a thriving and inclusive future for the EU. What does this future look like? Are the current strategies adequate, or is there a need for policymakers to adopt new approaches? If new strategies are necessary, what actions should be taken? What are the key elements for a prosperous future? This booklet provides insight into the influence of the transformations in technology, globalisation, and migration, offering possible future scenarios for policymakers to consider in addressing emerging labour market challenges and persistent inequality. It also suggests recommendations to tackle these issues. Intended for policymakers, social partners, and EU citizens, this publication aims to engage a broad audience in these vital discussions.

1.1 Primary findings

Over recent decades, the dynamics of inequality and skill requirements, both within Europe and globally, have undergone significant shifts. Digitalisation, globalisation, and migration have emerged as key forces reshaping demands and driving change. At the request of the European Commission, the Horizon2020 GI-NI project has delved into the effects of these transitions, aiming to formulate policy guidance. This booklet encapsulates our primary findings, offering insights into future challenges and reevaluating traditional policy approaches to skills and inequality.

This booklet outlines four distinct scenarios for the EU by 2030, presenting alternate futures that confront variations in digital transformation, globalisation, and workforce mobility or migration. The trajectory of these transitions remains uncertain, yet their influence on the labour market is undeniable. Our scenario analysis equips policymakers with options to proactively address future challenges, guiding them towards a path of collective prosperity. This booklet focuses on four critical questions:

- What are the alternate futures facing the EU, where dealing with digitalisation's progress or stagnation, globalisation or deglobalisation, and varying degrees of workforce mobility and migration becomes imperative?
- How will different scenarios affect skill demands and socio-economic, regional, and gender inequalities?
- Are the impacts of these scenarios uniform across all EU regions, or are region-specific responses needed due to the varying local effects of these transformations?

- What solutions and policy tools are available to address the challenges that may emerge?

Targeted at a broad spectrum of stakeholders, this booklet aims to catalyse a collective effort towards addressing the pressing challenges of our time, ensuring a future that benefits all within the EU.

1.2 Understanding our alternate futures: the role of foresight studies

Our alternate futures are the result of our comprehensive future study. But what exactly do we mean by "foresight studies"? It systematically explores possible future events and developments using established scientific methods. Foresight studies are not about predicting the future. Instead, they are a crucial tool for European governments, corporations, NGOs, international organisations, industry associations etc. They aim to anticipate and prepare for potential future scenarios, often through forecasts and extrapolations from past events. Today's world is marked by unprecedented complexity and uncertainty, with companies navigating myriad uncertainties that span demographic, economic, socio-cultural, technological, ecological, and political-legal spheres. In the face of such uncertainties and complexities, traditional planning and forecasting methods are proving less effective and insufficient for tackling future challenges.

Foresight studies, or the practice of exploring multiple potential futures, emerge as a valuable approach in this context. It utilises collective intelligence in a structured and systemic way to explore and anticipate possible developments shaping the preferable future. It is particularly useful for navigating the uncertain trajectories of digitalisation, globalisation, and migration, whose combined effects are complex and difficult to discern. Strategic foresight seeks to embed future insights into European Union policy-making, strategic planning, and preparedness. Engaging in strategic foresight does not aim to predict what will happen but rather to enhance preparedness for future possibilities. Through this exploratory process, policymakers, private sector actors, social partners, and EU citizens can better equip themselves for the unfolding future. Ultimately, it helps policy-makers to act in the present to shape the future.

1.3 How to navigate this booklet

We recommend reading the booklet in its entirety to thoroughly understand the scenarios discussed, their potential impacts, and their implications. This task can be comfortably completed in under an hour. For readers short on time but eager to grasp the essence of the scenarios and their expected impacts, focusing on Chapters 3 and 4 will provide a concise overview.

The booklet is structured into the following key chapters, each addressing a specific aspect of our future study:

2. Understanding the Scenarios:
Delve into the foundational elements and considerations that shape the scenarios.

3. Envisioning Future Scenarios:
A concise overview of the envisaged future scenarios, offering insights into possible developments.

4. The Impact on Skills and Inequality Across Scenarios:
An analysis of how each scenario could affect skill requirements and socio-economic disparities.

5. Regional Perspective:
Examines the scenarios from a regional standpoint, acknowledging that impacts may vary across different areas of the EU.

6. Policy Implications:
Discusses the ramifications of the scenarios for policy-making, offering guidance for future strategies.

Annex:
Provides a detailed account of each scenario and its potential impacts, offering deeper insights for interested readers.

Recommended reading:
Presents a selection of core publications used in the booklet.

This booklet aims to serve as a comprehensive guide, equipping readers with the knowledge and foresight to navigate the complexities of the future confidently.

Box 1. Definitions

Digital Transformation

Digital transformation encompasses the application of digital technologies — including artificial intelligence (AI), cloud computing, cyber-physical systems, and smart factories — particularly through their integration by businesses and organisations. This transformation involves strategically harnessing critical resources and capabilities to enhance the performance and reach of an entity substantially, be it an organisation, business network, industry, or society as a whole. The main focus of this booklet is the impact of new technologies on society, particularly through changes in the labour market.

Globalisation

Globalisation refers to the cross-border flow of goods, services, and investments, coupled with the innovative and operational functions employed by businesses and organisations to initiate, support, and manage these flows. It encompasses the economic exchanges and the exchange of ideas and cultural practices that facilitate and are facilitated by these economic transactions.

Migration and Mobility

Migration signifies the relocation of individuals from one country to another, intending to reside in the host country for a significant period. This movement can be motivated by various factors, including employment, family reunification, study, or fleeing from conflict, persecution, and disasters. Intra-EU mobility, as opposed to third-country migration, captures the free movement of labour within the EU as part of the four freedoms — goods, capital, services, and people — that underpin the European Single Market.

Skill Demand

Skill demand refers to the competencies and attributes that organisations require from their workforce to ensure effective and efficient operations, both now and in the future. Skills supply, on the other hand, relates to the personal qualities and traits individuals offer, which can be enhanced through training and development. The workforce is categorised into low, medium, and high-skilled workers based on the level of skills they supply.

Box 1. Definitions

Inequality

Inequality is manifested in various forms within society. This includes:

- **Socio-economic Inequality**: The unequal distribution of opportunities and resources across different segments of society, spanning from economic disparities (such as income and wealth) to differences in individuals' abilities and access to essential resources (like education and healthcare) that allow them to adapt to changes.

- **Gender Inequality**: The observed differences between the genders (e.g. men and women) on various social and economic indicators, such as pay and health, that are driven by gender bias and unequal gender rights, opportunities and treatments.

- **Regional Inequality**: The disparities in living standards and employment opportunities between various regions, focusing on the availability and accessibility of job opportunities.

2. Understanding the scenarios

2.1 Introduction

Policymakers face the reality that the future will not simply be an extension of the present. This realisation necessitates a critical examination: which future should we prepare for? Scenario planning aids policymakers in navigating this uncertainty by delineating potential futures from today's standpoint. Each envisioned future demands tailored responses from policymakers and stakeholders, representing diverse possibilities of what the future may entail.

2.2 Methodology

The scenarios are developed through a mixed-method foresighting approach, incorporating quantitative findings from the GI-NI studies[1] on the impact of digital transformation, globalisation, and migration on skills demand and inequality, alongside desk research and qualitative consultations with experts. These scenarios have undergone validation via interviews and workshops with international experts specialising in technology, migration, globalisation, skills, and inequality. Further details can be found in the work of Preenen et al. (2023).

To construct these scenarios, we focus on the two primary drivers of change: digital transformation and globalisation developments. We also consider developments in migration and mobility that could be associated with them. Migration, while significant, is viewed as a factor influenced by globalisation and the specific developments within each scenario, such as geopolitical tensions. Therefore, migration and mobility are discussed within the context of each scenario rather than as separate drivers. The scenarios explore the possible outcomes of accelerated or stagnant digital transformation alongside a world that could become more globalised or move towards deglobalisation.

2.3 Understanding the impact of two driving forces

The scenarios are organised around two main driving forces: digital transformation and globalisation (Figure 1). We will explain these further:

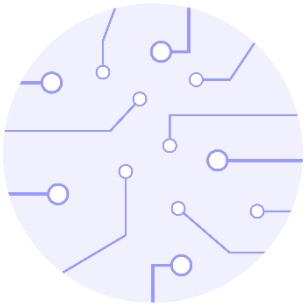
- **Digital transformation: acceleration or stagnation**: The pace of digital transformation is a primary uncertainty and revolves around the question of how rapidly it will continue to evolve. There is a broad consensus that digital transformation will persist, yet it is unclear whether its speed will increase or if we will begin to see signs of stagnation. A poignant illustration of this uncertainty is the development of Artificial Intelligence (AI). Up to the year 2000, many believed AI had hit a significant roadblock. However, the advent of graphic processing units (GPUs) enabled developers to pioneer new methods in pattern recognition and machine learning, propelling AI into new realms of capability. Therefore, digital transformation has the

[1] These publications can be found on the gini-research.org website.

potential to accelerate further, indicating a surge in technological advancements that continuously reshape jobs and companies. Conversely, it may also stagnate, indicating a slowdown in technological progress and a reduction in the adoption rate. The challenge of embracing advanced technologies is formidable, impacting various aspects of society and the economy.

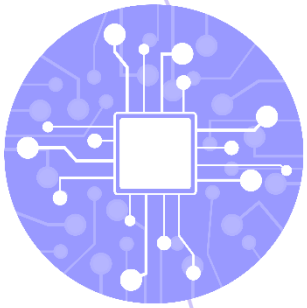
- **Globalisation or deglobalisation**: The trajectory of globalisation or its potential reversal, deglobalisation, represents the second transformation. This axis questions whether the trend towards increased global integration observed up to the pre-pandemic continues, or if we will see a stagnation, or even a retraction, as some recent developments may suggest. Until recently, globalisation persisted, with the World Trade Organisation (WTO) rules covering the vast majority of global trade. A globalised world is characterised by the robust flow of goods, services, and investment across borders, driven by the elimination of trade barriers and common rules applied to all players. This environment fosters relocation or outsourcing of production to regions where factors of production are most advantageous, leading to global value chains. Advanced economies might focus more on high-skilled activities such as research and development (R&D) and management while offshoring more routine "factory work" to regions like Eastern Europe, China, India, and others.

  However, the notion of deglobalisation is gaining traction amidst rising geopolitical tensions, including significant events like Brexit, conflicts (e.g., Ukraine/Russia, Israel/Palestine), and the US-China tensions. These developments have led to an increase in trade tensions and a reconsideration of global interconnectedness. The question for the future is how these international relations will evolve by 2030. A shift towards deglobalisation could mean decreased international trade, leading to less specialisation and increased self-reliance. It may also lead to higher prices as production may move back to domestic or regional locations, possibly enhancing efficiency and reducing costs due to lower transportation expenses.



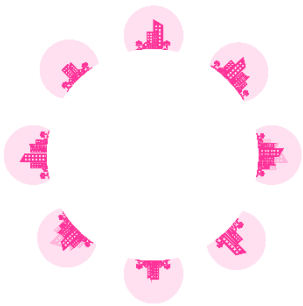
Digital transformation stagnates

Technological growth is declining with the further adoption of technologies occurring at a very slow pace. Embracing advanced technologies poses significant challenges across multiple levels



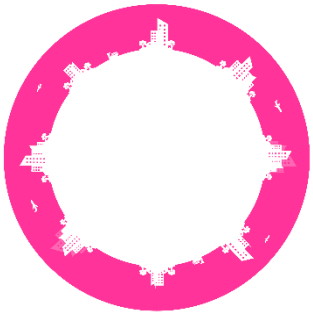
Digital transformation accelerates

Technological growth quickly increases and further reshapes all sectors



Deglobalisation

International trade between the major "blocks" decreases, leading to less specialisation and higher prices



Globalisation

There is an increasing inward and outward flow of goods, services, and investments across national and continental borders

Figure 1. The two driving forces are the acceleration or stagnation of digital transformation and globalisation or deglobalisation.

2.4 Interaction of the two drivers

Digital transformation and globalisation are deeply intertwined, each acting as a catalyst for the other. Digital advancements have historically promoted a more interconnected world, as seen in communication and satellite technology improvements. This interconnectedness drives innovation, with digital transformation playing a pivotal role. Globalisation expands businesses' access to diverse markets, while digital technologies enable efficient engagement with these markets, aiding the global expansion of operations.

Furthermore, the speed and direction of digital transformation are also influenced by globalisation, especially the amount of exchange between countries. A notable case where digital innovation has become a significant factor in geopolitical dynamics is the Dutch company ASML. ASML, a leader in producing lithography machines for the semiconductor industry, faces intense political pressure against supplying its most advanced equipment to China. This incident illustrates how technology can serve as a geopolitical tool and influence the dynamics of globalisation, particularly concerning free trade.

2.5 Four futures

Combining these dimensions allows us to identify four distinct futures (Figure 2). They are labelled as follows:

- **Empowered by Technology**: A scenario where digital transformation accelerates while globalisation recedes.
- **Techtopia**: Both digital transformation and globalisation accelerate, presenting a highly connected and technologically advanced future.
- **Economic Minimalism**: Digital transformation stalls and globalisation diminishes, leading to a more insular and technologically conservative world.
- **Analog Alliance**: Digital transformation stagnates, but globalisation persists, focusing on maintaining international ties without rapid technological advancement.

These futures will be further elaborated in the next section.

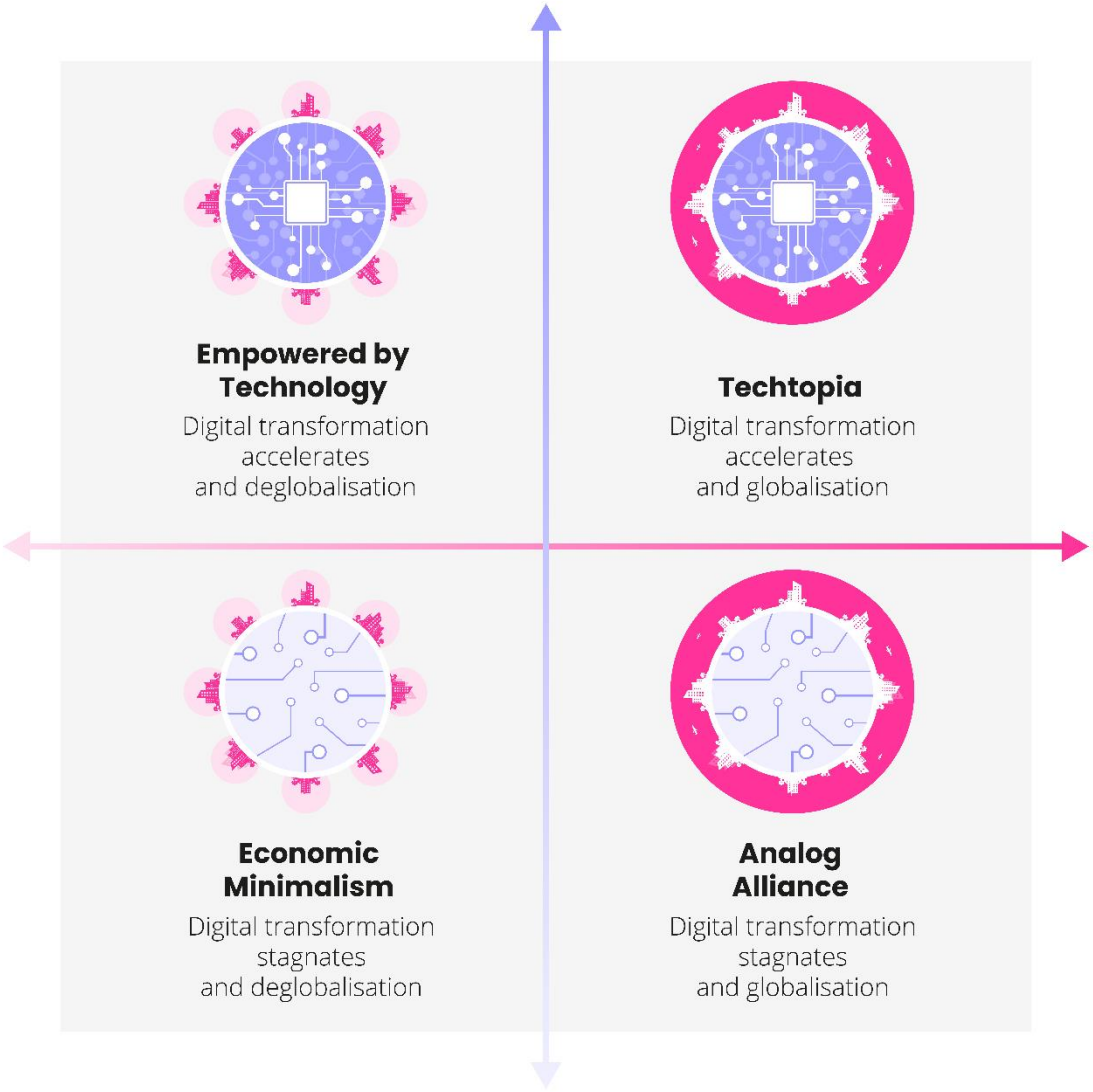


Figure 2. The four scenarios are based on two drivers: digital transformation (vertical axis) and globalisation (horizontal axis).

3. Envisioning future scenarios

We present four alternate futures, differentiated by their stance on digital acceleration versus digital stagnation, and globalisation versus deglobalisation. These scenarios offer diverse perspectives on the future, each with unique implications for economic growth, international cooperation, and labour market dynamics.

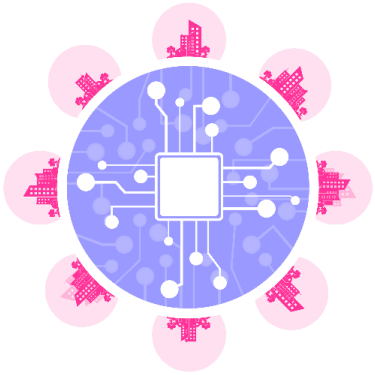
The possibility of these scenarios turning into reality varies, and by 2030, we might see a blend rather than a clear-cut instance of any single scenario. Utilising these scenarios to forecast potential futures is invaluable for informing policy development, even in a hybrid scenario context.

Below, we summarise each scenario's key developments, followed by a brief vision summary in table 1. The annexe provides an extensive scenario analysis.

3.1 Summaries of scenarios

Scenario 1: Empowered by Technology.

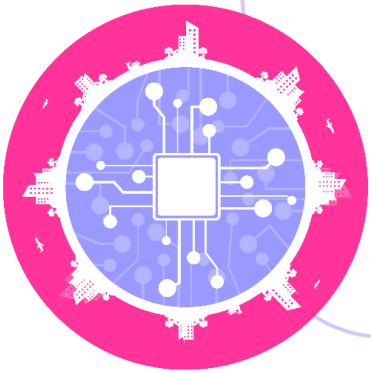
Digital transformation accelerates, and deglobalisation occurs.



This scenario imagines a world where digital transformation propels industries forward through swift technology adoption, against diminishing globalisation. Geopolitical dynamics result in economic blocs, creating tension and affecting global technology supply chains. Trade restrictions impact the global economy, yet the need to reduce dependencies and reshape trade relations increases linkages within each block. The EU sees moderate economic growth driven by domestic technological advancement and productivity enhancements. Work-related migration diminishes between blocs, though intra-bloc mobility sees an uptick.

Scenario 2: Techtopia.

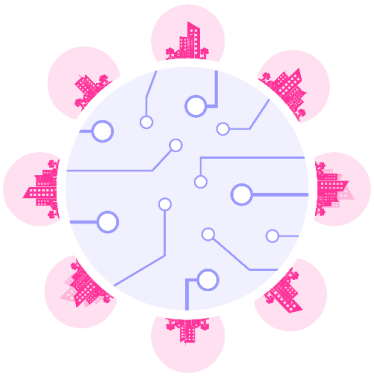
Digital transformation and globalisation accelerate.



Digital transformation and globalisation synergise with technological breakthroughs, especially in AI and robotics, boosting efficiency and productivity. This scenario heralds economic growth and enhanced welfare, with substantial investment in R&D creating numerous job opportunities and elevating wages. Global cooperation intensifies, spurring international trade and innovation. Industries across countries and continents become more specialised. Economic dynamism, openness, and the search for talent lead to more significant migration and mobility flows.

Scenario 3: Economic Minimalism.

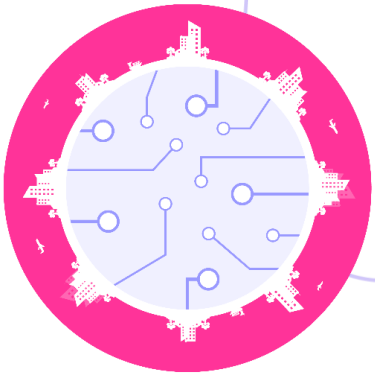
Digital transformation stagnates and deglobalisation ensues.



Envisioning a world with reduced cooperation and knowledge sharing between blocs, we see that the digital transformation stalls. The slowdown in technological progress diminishes labour productivity and global trade, triggering economic growth deceleration and contributing to broader global economic struggles. Escalating country tensions emphasises national sovereignty, curtailing migration between blocs and exacerbating polarisation within and across the EU. This environment of reduced digital innovation and diminished prospects for a prosperous future shifts the focus towards fostering a greater sense of community. This new focus presents opportunities for enhanced collaboration and a more engaged, cohesive labour force, which can spur alternative forms of innovation, such as in processes or products.

Scenario 4: Analog Alliance.

Digital transformation stagnates, and globalisation continues.



This scenario reflects diminished enthusiasm for rapid technological uptake, leading to a digital transformation plateau. Technological investments fail to deliver expected productivity boosts, slightly stalling economic growth and reducing EU labour demand. Nonetheless, productivity remains relatively stable due to productivity gains from thriving global trade, cultural exchanges, and increasing labour supply of migration.

3.2 The Impact of technology and globalisation on labour migration and the EU economy

These scenarios highlight how the future could vary significantly based on technology and globalisation paths. Table 1 summarises the impacts on labour migration and the EU economy. The first two scenarios, characterised by digital acceleration (with or without globalisation), predict moderate or large economic growth. In contrast, scenarios with digital stagnation, especially when paired with deglobalisation, indicate economic stagnation or even contraction. Labour migration patterns shift across scenarios, influenced by technological and geopolitical developments. Accelerated digital transformation coupled with globalisation fosters labour mobility, enhancing migration opportunities within and across blocs. Conversely, deglobalisation scenarios depict reduced migration, impacting labour mobility, with certain regions potentially facing increased mobility to address labour shortages, which is especially evident in scenarios of digital stagnation.

Table 1. Overview of the differences between the scenarios and the expected impact on labour migration and the EU economy.

	Labour migration	EU-economic impact
Scenario 1: Empowered by Technology	Deglobalisation divides the world into power blocks, making migration less obvious between blocks due to boundaries. Mobility within blocks increases, fostering knowledge exchange and cultural cohesion.	Export restrictions affect the entire global economy. Still, economic growth is moderately positive due to digitalisation's productivity gains.
Scenario 2: Techtopia	Globalisation triggers innovation and technological advancement. Technological change can cause scarcities and surpluses in segments of labour markets and trigger migration and mobility. Global migration increases. Labour migration is accepted and facilitated. EU sees influx, preferring controlled migration, prioritising skilled labour to fill shortages.	New technologies in a globalised world foster economic growth and welfare. Technological developments contribute to an efficiency boost and increased productivity.
Scenario 3: Economic Minimalism	Deglobalisation divides the world into power blocks, causing migration between blocks to decline. Mobility also decreases. Escalating tensions between countries cause international conflicts, increasing the focus on strengthening national sovereignty. A desire for a better life sparks migration from struggling regions, escalating tensions.	The combination of a deceleration in digitalisation, reduced labour productivity growth, and deglobalisation slows economic growth and causes global economic struggles.
Scenario 4: Analog Alliance	Global trade and cultural exchanges are thriving. More low-skilled work is relocated or outsourced to developing countries. There is a slight increase in highly educated migration and mobility to solve labour shortages.	Technological investments do not result in productivity improvements, leading to mild economic stagnation and reduced labour demand in the EU. However, productivity remains relatively stable due to the productivity gains of globalisation.

4. The impact on skills and inequality across scenarios

Each scenario unfolds unique dynamics affecting skills development and inequality. Their primary impacts are summarised below. At the end, a summary is also given in a table.

4.1 The impact per scenario

Scenario 1: Empowered by Technology

- **Skills demand**: This scenario is expected to require a substantial uplift in skills of the entire workforce, especially for those with higher academic backgrounds. The swift pace of technological advancement, particularly in AI, demands a broad spectrum of digital, analytical, and ethical skills to complement the technological shifts and organisational changes being implemented. AI applications, particularly generative AI, likely pose the greatest challenge to traditional high-skilled tasks, rendering them highly susceptible to change and potential substitution. This dynamic results in a redefinition of some high-skilled jobs and leads to a change of tasks, and it may even lead to job losses in certain sectors.

- **Inequality impact**: Rapid digitalisation is expected to exacerbate social unrest due to escalating inequality. Those already adept at utilising digitalisation, including generative AI, reap the most benefits. Workers in routine tasks and sectors with diminished trade face adaptation, further widening the gap. Job displacement impacts are felt more acutely by low-educated workers, women, and older individuals, intensifying gender inequality. Men tend to benefit more from the moderate economic growth driven by technological innovation than women. Furthermore, deglobalisation curtails women's economic empowerment, especially in the Global South, owing to barriers to digital services and education in digital skills, coupled with a lack of a global approach to gender equality that could mitigate gender discrimination.

Scenario 2: Techtopia

- **Skills demand**: The fusion of technological advancements and globalisation is expected to transform the EU job market, amplifying demand for high and medium-skilled workers. Integrating AI and automation technologies increases the need for a workforce proficient in technical, digital, and analytical skills, with a concurrent rise in remote work opportunities highlighting the importance of soft skills.

- **Inequality impact**: The benefits of globalisation are expected not to be distributed equally, leading to widening employment and wage gaps. This particularly disadvantages low and medium-skilled workers and poses challenges in transitioning to alternative employment. Gender inequality intensifies as men reap greater economic growth benefits than women, notably in high-routine and low-skilled jobs. The emergence of digitalised global platforms challenges the attainment of decent work conditions for low-skilled women. However, the scenario also presents opportunities for enhancing women's economic empowerment globally through increased demand for soft skills, broader access to education, a focus on gender equality, and more flexible work arrangements.

Scenario 3: Economic Minimalism

- **Skills demand**: Despite investments in innovation, the stagnation of technological growth is expected to dampen the urgency for acquiring new technical skills for all levels of workers. The necessity of job relocation and employment in different sectors compels certain worker groups to develop new skills.

- **Inequality impact**: High-skilled workers are expected to be most affected by the limited technological advancements, but they experience less negative impacts from changing labour market dynamics. For companies, it is always crucial to keep up with basic innovations. Therefore, they will still need high-skilled workers, and, in this period of economic struggles, high-skilled workers may take over the jobs of medium-skilled workers. Technological stagnation and factors like reshoring (reinstating some jobs for low-skilled workers) narrow socio-economic inequalities slightly. However, while potentially reintroducing some jobs, reshoring efforts do not uniformly improve labour market conditions. Although at a relatively slow pace, digitalisation and continued automation still replace routine tasks of particularly lower-skilled workers. Stagnating technological growth stabilises gender inequalities due to a shift away from demand for highly skilled, digitally skilled labour, where men are typically overrepresented. However, the weakening economy will, in particular, heighten employment barriers for vulnerable groups, including low-skilled workers, migrants, and women.

Scenario 4: Analog Alliance

- **Skills demand**: The plateau in technological advancement is expected to diminish the necessity for new digital skills, emphasising communication abilities and specialised knowledge more, particularly among medium and high-skilled workers.

- **Inequality impact**: A growing divide is expected to emerge between highly-skilled and low-skilled workers due to a scarcity of opportunities for the latter. However, the disparity between medium and high-skilled workers narrows as demand for medium-skilled roles increases. Barriers to entry, such as inadequate training, exacerbate inequality and complicate migrant integration efforts. This scenario has a more pronounced effect in Western Europe. The initial enthusiasm for AI-driven technologies shifts towards prioritising human-centred roles, which tends to benefit women more than men, especially in medium-skilled positions. Globalisation's impact on male workers in manufacturing sectors in Western Europe contrasts with the relative stability of sectors predominantly employing women, contributing to a reduction in gender wage inequality.

4.2 Navigating skills demand and inequality

Table 2 provides an overview of the scenarios' effects on skills demand and inequality in employment. These scenarios illuminate the intricate interplay between technological advancements and economic strategies in the labour market. A consistent theme across scenarios is the anticipated high demand for reskilling to align with the evolving labour landscape. While technical skills are emphasised, especially in digitally accelerating environments, soft skills, such as communication for global trade, are highlighted in globalising scenarios, suggesting a balanced skill set remains crucial.

The projections suggest there might be a trade-off between prosperity and inequality. Increasing economic prosperity deepens inequalities in three of the four scenarios, with "Techtopia" showing the most significant disparities. Low-skilled workers, women, and older workers could face challenges adapting to new market demands, resulting in broader employment opportunity gaps. In contrast, high-skilled workers are likely to have better access to opportunities, enabling them to navigate the changing demands more effectively.

Table 2. Overview of the differences between the scenarios and the expected impact on skills demand and inequality.

	Skills demand	Inequality
Scenario 1: Empowered by Technology	**Most need to learn new skills:** Cutting-edge technologies (like AI) require complementary and soft skills. All employees, especially those with higher academic education, must reskill. Due to mobility within power blocks, cultural sensitivity is important.	**Increased inequality in job opportunities**: Higher skilled workers - with specific skills, technological knowledge, and financial resources - benefit most in terms of job opportunities and job quality. Workers with routine tasks or in fields with reduced trade struggle to adapt. Highest risks for **widening of socio-economic gender inequality** across regions.
Scenario 2: Techtopia	**Most need to learn new skills:** The job market is reshaped, favouring high-skilled workers. Automation influences low-skilled jobs, emphasising the need for digital skills. Soft skills, including communication skills, are important. Due to mobility and migration, cultural sensitivity gains importance.	**Biggest inequality gap in job opportunities** (and perception of job quality): The gap between lower and higher-skilled workers increases. Higher-skilled workers have better working conditions. There is job displacement of low-skilled workers who often have difficulties adapting, resulting in unemployment and the struggle to secure alternative employment. Men benefit more from technological and economic growth, **exacerbating gender inequality.** Globalisation may lead to a **reduction in gender inequality** in certain disadvantaged areas.

	Skills demand	Inequality
Scenario 3: Economic Minimalism	**Least need for new skills:** The stagnant growth of technological developments creates little need and necessity for learning new skills. Employees from all skill levels face minimal pressure to acquire new skills.	**Job opportunity disparity slightly decreases**. Job quality decreases, mainly for highly skilled workers, due to less dynamic tasks and reduced investment in innovation. Reshoring does not always result in better labour market outcomes for low-skilled workers. Some of the tasks may have been digitalised or automatised. **Gender inequalities stabilise**, but **regional contrasts in gender gaps may widen** due to inward national culture focus.
Scenario 4: Analog Alliance	**Least need for new skills:** The stagnant growth of technological developments creates little need and necessity for learning new skills. Employees from all skill levels face minimal pressure to acquire new skills.	**Job opportunity disparity slightly decreases**. Job quality decreases, mainly for highly skilled workers, due to less dynamic tasks and reduced investment in innovation. Reshoring does not always result in better labour market outcomes for low-skilled workers. Some of the tasks may have been digitalised or automatised. **Gender inequalities stabilise** and may decrease in some regions due to a renewed focus on human-centred jobs.

5. Adding the regional perspective

Until now, we have mainly focused on the overarching implications of various scenarios at the European Union level. Yet, considering the EU's diversity and complexity, its regions face distinct challenges and could benefit from tailored policy approaches. Here, we outline general regional implications, offering insights for policymakers to formulate strategies that meet the specific needs of Europe's varied regions. One concern we want to address is the degree to which we can see convergence in impacts over European regions.

From a regional perspective, the analysis emphasises three primary dimensions: Business Clusters and Skill Levels, Endogenous Growth Engines, and Institutional Resilience. While these dimensions are present across various regions, their prominence and impact can differ significantly. These variations not only distinguish regions but also suggest diverse policy implications. For each dimension, we present examples intended solely for illustrative purposes; they should not be interpreted as predictive or indicative of the future.

- **Business clusters and skill levels**: Regions differ from each other in low-, medium-, or high-skilled job opportunities, influencing their competitive advantages. Regions with a concentration of high-skilled jobs attract workers and knowledge institutions, fostering innovation and growth. Conversely, regions characterised by low-skilled jobs attract workers seeking lower labour costs. The impact of the four scenarios varies; increased globalisation generally benefits both types of regions, while decreased globalisation is detrimental to both. The acceleration of digital transformation presents divergent outcomes: regions rich in high-skilled jobs thrive, whereas those with low-skilled jobs may see limited benefits.

Box 2. Examples of different regional business clusters and skills levels

Two examples that illustrate this are the German region Stuttgart and the Hungarian region Észak-Magyarország. Both have prospered from globalisation but for different reasons. Stuttgart in Germany excels with its high competence level and strong global connections, thriving under globalisation and technological shifts. In contrast, Észak-Magyarország in Hungary, while benefiting from foreign investments due to low labour costs, faces challenges in technological adaptation, indicating differing impacts of globalisation in interaction with digitalisation based on regional skill profiles.

Policy strategies in European regions need to be specifically designed to match their varying skill levels to optimise strengths and address challenges. High-skilled regions would probably benefit most from initiatives that boost innovation and technological development, such as R&D and partnerships with educational institutions. In medium-skilled regions, the emphasis should be on closing the skills gap. For example, with upskilling programmes and investing in technological capabilities. In contrast, low-skilled regions would probably need to focus more on economic diversification and workforce re-skilling to reduce dependency on unstable industries and improve adaptability.

- **Endogenous growth engines**: The ability of regions to generate sustainable economic growth from within—using internal resources and capabilities—varies significantly. While regional competition can intensify disparities, it also spurs overall growth within the EU. Regions characterised by entrepreneurial vigour, often referred to as "Entrepreneurial Regions" (like most major capital city-regions in the EU (e.g., London, Paris, Berlin)), thrive by demonstrating resilience in the face of digital transformation and globalisation. These regions adapt agilely to market fluctuations, harnessing their dynamic and competitive ethos to maintain stability and progress. In contrast, regions that lack such entrepreneurial spirit tend to struggle during economic downturns, showing a limited capacity to innovate or adapt.

Box 3. Example of an endogenous growth engine region

A prime example is the French region of Rhône-Alpes, recognised as one of France's economic powerhouses with a diverse and strong economy. Rhône-Alpes is less affected by global and technological shifts compared to other French regions because of its entrepreneurial spirit.

Policy strategies for "Entrepreneurial Regions" rich in innovation should focus on fostering R&D, strengthening partnerships between industries and educational institutions, and improving infrastructure to sustain growth amidst digital and global shifts, similar to the high-skilled regions. Regions with a strong entrepreneurial spirit will likely adapt relatively easily to changes. In contrast, regions lacking this spirit need targeted initiatives similar to those of low-skilled regions, focusing on economic diversification and workforce re-skilling to reduce dependency on unstable industries and enhance adaptability.

- **Institutional resilience**: Regions differ in their cultural and institutional capacities to evolve or capitalise on opportunities for global excellence. Regions with robust resilience may not change rapidly but provide social stability, even if they lag in certain performance indicators. High-skilled regions are generally more adept at embracing technological advancements than their low-skilled counterparts. While globalisation predominantly benefits high-skilled regions, their inherent resilience can cushion the negative impacts of reduced globalisation, especially in scenarios of technological advancement. However, low-skilled regions might experience heightened unemployment rates with decreased globalisation.

Box 4. Examples of institutional resilience in regions

The Finnish region of Länsi-Suomi illustrates the impact of institutional resilience. Following the 2011 collapse of Nokia, a cornerstone of its economy, Länsi-Suomi's recovery has been notable. The region's capacity for recovery was supported by its solid institutional frameworks and the collaboration among local government bodies, employment services, public authorities, universities, and private sector entrepreneurs. This cooperative effort facilitated adaptation and encouraged innovation, enabling a steady recovery. Investments in technology and a commitment to fostering a versatile economic environment have helped Länsi-Suomi not only to recover but also to evolve its economic landscape into a hub for information technology and biotech industries. This transformation showcases how regions can respond to economic challenges with growth and diversification. In contrast, the Spanish region Andalusia shows lower institutional resilience. The financial crisis of 2008 hit Andalusia's economy hard, and it still struggles with the lowest GDP per capita in Spain. The economic challenge is largely due to its region's economic structure, which relies heavily on the service sector and has little industry. The lower institutional resilience of this Spanish region limits the region's ability to fully capitalise on new economic opportunities and adapt to changes in digitalisation and globalisation.

Policy strategies to enhance institutional resilience should be customised to each region's unique cultural and institutional profiles. The specific strategies required to strengthen adaptability and innovation capabilities also vary significantly depending on the nature of the transitions being addressed. This could mean improving technological infrastructure and innovation capabilities to exploit globalisation and digitalisation benefits and buffer against its risks. This approach will likely best fit high-skilled regions. For low-skilled areas, the focus might be on developing vocational training centres that provide opportunities for reskilling and promoting industries that provide stable employment to reduce unemployment vulnerabilities.

These broad reflections do not precisely pinpoint the implications of the transformations for specific regions. They highlight how various regional characteristics can influence outcomes. The resultant effects are inherently diverse and complex because regions comprise a mix of these characteristics within a systemic framework.

EU policies can help navigate these scenarios by providing strategic support to regions lagging behind, or those most exposed to the impacts of digitalisation and globalisation, as well as through regulatory incentives to develop technological advancement and innovate. Addressing specific regional challenges presented under each scenario requires a blend of overarching EU strategy and localised policies to ensure equitable outcomes and tailored regional development.

6. Policy implications

The scenarios presented illustrate the intricate dynamics between technological advancement and globalisation and how they interact with labour migration. Each scenario brings opportunities but also challenges to shared prosperity and, in particular, to individuals and companies to develop skills and talent in a productive economy and more equal society. While featured by different developments, the scenarios all point to common challenges (though to a different degree). Even in a best-case scenario, where job and growth opportunities prevail driven by technological advancements and global openness, inequality is unlikely to reduce due to market dynamics. The same holds for labour market integration – skill needs in terms of up and re-killing are unlikely to be met without policy actions. Vulnerable groups -those with disadvantaged socio-economic backgrounds, women, older people and migrants- are likely to face greater challenges to access those opportunities. A resilient economy and an adaptable workforce are essential to navigate these challenges. These can only be achieved through a comprehensive regional, national, EU and global policy approach. A proactive approach in policymaking is vital, emphasising collaboration, integrating broader perspectives, and engaging stakeholders. With this in mind, we outline four main policy areas for action: skills and job quality, the welfare state, gender and the EU industrial policy.

6.1 Enhancing skills and job quality for shared prosperity

Policies must prioritise the development of people's skills while preserving job quality to ensure shared prosperity.

The ongoing digital transformation, alongside the green transition, underscores the need to bolster and diversify the skill sets of individuals exposed to job losses to facilitate labour market transitions and skills transfers across sectors and regions. Furthermore, digital transformation, including advancements in AI, is transforming tasks and job roles in diverse ways, shaping the future of work and revolutionising the organisational functioning of businesses. The demand for AI skills will evolve rapidly, and soft skills will continue to gain prominence as AI automates certain tasks, emphasising the importance of human-centric abilities. To meet these new evolving needs, both the EU and member states should focus on modernising education and training systems, incentivising industry-specific training in critical sectors, and supporting upgrading public and private employment services to facilitate skill matching. As the dynamics of the labour market shift, the importance of upskilling and reskilling becomes more pronounced. Policies should, therefore, focus on increasing occupational mobility in sectors with growing demand for skilled manual and science, technology, engineering, and mathematics (STEM) skills. This will boost productivity and generate viable pathways for vulnerable workers to secure employment. Developing customised learning programmes that equip workers to navigate technological changes and enable employers to incorporate new technologies competitively is critical for adapting to the future of work.

In recent years, job quality has emerged as a prominent issue in labour markets. Labour shortages in sectors traditionally characterised by poor working conditions and shifts in individuals' preferences toward higher-quality jobs have resulted in significant market disequilibria. Addressing the risk of deteriorating job quality requires the introduction of minimum wages, improvements in social protection policies, and strengthening social dialogue. These elements are fundamental aspects of the European social model. The European Pillar of Social Rights explicitly recognises the right of all workers to fair wages and adequate social protection, irrespective of their employment type or duration. The recently adopted EU Directive on minimum wages and the agreement on the platform work Directive exemplify policies that enhance job quality and extend social protection to workers in a weak negotiating position or under atypical contracts. Social dialogue, whose importance was recalled in the 2023 State of the Union speech by President Von der Leyen, plays a crucial role in establishing fair working conditions but also in enhancing productivity. Countries with high collective bargaining coverage, hence strong social dialogue, typically exhibit lower levels of low-wage workers and lower wage inequality. However, in recent years, collective bargaining coverage has declined in many member states partly due to challenges in organising workers in new sectors and the rise of atypical work arrangements. It is in this context that the European social dialogue takes even greater importance.

Business practices can also improve job quality, such as adopting a benchmark that prioritises job quality over its erosion. These models should strive to establish a new equilibrium in the distribution of production and market risks between firms and workers. Even amidst strategies like outsourcing, decentralisation, and enhanced production flexibility, businesses can uphold clear responsibilities towards their workers within their models. This approach fosters not only social responsibility but also prevents unfair competition against socially responsible companies that adhere to higher standards. Furthermore, job quality increasingly acts as a magnet for attracting high-skilled workers and new talent, who typically play a crucial role in driving productivity.

6.2 A welfare state that protects

The COVID-19 pandemic underscored the critical role of robust welfare systems in effectively weathering negative shocks. With the rapid pace of technological transformation and the imperative to transition to greener economies, there is a pressing need for policy interventions to prepare for and mitigate distributional impacts resulting from labour market adjustments. Welfare state policies are poised to play a pivotal role in safeguarding citizens and companies in this evolving landscape.

EU countries, which have a long tradition of effective welfare states, should adapt them to the challenges posed by post-industrial production, characterised by technological transformation and the green transition. Companies must be enabled to adjust and grow in a rapidly digitalising or globalising labour market. This is especially vital for companies that struggle with adaptation, such as small to medium-sized enterprises (SMEs). Financial support for the development of digital infrastructure is crucial. For companies navigating a stagnant technological landscape and reduced globalisation, policy support is needed to adapt and

transform business models, bolster local economies, and enhance supply chain resilience. This necessitates a shift away from a social protection system tied to employment status toward a more neutral approach, accommodating various forms of employment or self-employment.

The response to the COVID-19 crisis, notably through the SURE support to short-term work schemes covering many workers, including SMEs and self-employed, proved this is possible. SURE, which stands for Support to Mitigate Unemployment Risks in an Emergency, mobilised substantial financial resources to combat the adverse economic and social consequences of the coronavirus outbreak within their territory. Furthermore, already in 2019, the Council recommendation on access to social protection for workers and the self-employed recognised the need for social protection systems to evolve in tandem with labour market changes, ensuring the resilience of the European social model and enabling societies and economies to thrive in the future world of work.

6.3 Promoting gender equality to enhance inclusion and productivity

Ensuring equal access to job opportunities and working conditions for both men and women, across and within sectors, is imperative for improving social inclusion in the EU and fostering innovation and competitiveness in its industries. Persistent gender inequality remains a significant challenge in the EU, especially in some Member States. Women continue to be disproportionately overrepresented in industries and occupations with lower wages. They systematically experience inferior labour market outcomes and working conditions compared to men, often due to the enduring societal expectation of women as primary caregivers.

Efforts to promote gender equality should focus on expanding and strategic sectors, such as those in the STEM fields, where women are underrepresented. Policies affecting sectors with a predominantly female workforce should also address gender-related issues to recognise and fairly compensate women's contributions. The Gender Equality Strategy 2020- 2025 principles of gender mainstreaming and intersectionality, outlined in the Commission communication of March 2020d, provide a framework for addressing these challenges.

Last but not least, women continue to face barriers in accessing high managerial positions and often receive lower compensation than their male counterparts despite having comparable responsibilities. The 2023 EU Directive on equal pay for equal work is a critical response to address this issue.

More broadly, implementing initiatives to include vulnerable groups, such as women and migrants, in the labour market would effectively reduce inequalities and boost productivity. Comprehensive policies that provide equal access to employment and training opportunities are essential in this regard. Additionally, recognising foreign qualifications is critical to tapping into migrant talent and reducing labour market inequalities. Furthermore, promoting flexible working hours and offering accessible childcare help narrow the gender wage gap and support parents in balancing their work and family responsibilities.

6.4 An EU strategy that promotes openness and competitiveness

The EU is made up of trading nations. Any reduction in openness, whether due to external factors or by choice through policies (see different scenarios), will undoubtedly impact the EU's growth model and global role. As new economic powers emerge, underscoring the continued importance of trade and external economic relations in defining its global role. While geopolitical consideration and globally increased fragmentation will challenge the EU's traditional approach and call for less reliance on other countries, maintaining a commitment to openness remains crucial. This requires the design of an EU comprehensive policy strategy with actions on multiple fronts and shared by Member States. Such an approach should include 1) Rethinking production systems to mitigate supply chain risks and prioritise domestic production of strategic goods and services, 2) Enhancing energy efficiency, recognising that energy prices in the EU will not revert to pre-war levels, 3) Fostering technological innovation to reduce dependency on raw materials, and 4) Developing new trade partnerships while strengthening existing ones and engaging in the reform in the global multilateral system.

Implementing such a strategy requires coordination across different EU policies, including trade, internal market, and industrial policies. However, the absence of a valid EU industrial policy poses challenges. Today, the EU industrial strategy mainly consists of framework conditions to favour industrial competitiveness, and it is integrated into EU policies related to trade, the internal market, research and innovation, employment and environmental protection. However, it is not accompanied by a budget. To address this, options such as using EU funds to support a comprehensive industrial strategy should be explored. Importantly, any deviation from single market principles to allow governments to support domestic industry may exacerbate disparities among member states and regions, as industrial development may become more dependent on national public finances.

Finally, China demands special attention in formulating strategies to reduce vulnerabilities or, even more so, to implement a de-risking/decoupling strategy. The intricate connections of global value chains with China mean that diversification efforts may not succeed immediately, and even substantial shifts in production to alternative destinations may only lead to marginal decreases in China's global supply of exports. Consequently, achieving de-risking is likely a prolonged and costly process, potentially impossible in the short term, and expectations must be aligned accordingly.

6.5 Conclusion

As we explore the complexities of skill demand and inequality, the importance of proactive policymaking becomes evident. Leveraging the recommendations provided here can enable policymakers to foster shared prosperity and reduce inequalities in the labour market. Policymakers need to understand the alternate futures presented here and refine these recommendations to what they see coming.

Annex: Scenarios in-depth

Scenario 1: Empowered by Technology

Deglobalisation and digital transformation accelerates

Scenario description

Technological progress

Technological innovations are quickly adopted, with significant technological progress in the mid-2020s driven by labour shortages, compelling businesses to enhance productivity through substantial technological investments. The accelerated development of Artificial Intelligence (AI) by 2024 will facilitate its integration into nearly every facet of our lives and business processes by 2030. This surge in technology raises the demand for highly skilled workers to develop and adopt these advancements. Unlike previous technological disruptions, generative AI significantly impacts relatively higher-skilled workers. AI systems assist higher-skilled workers in specific complex tasks, leading to additional responsibilities such as real-time data analysis and process adjustments. As technology takes over more non-routine tasks, work becomes more efficient, contributing to higher labour productivity. Technological advancement, particularly through generative AI, may significantly enhance job quality for many high-skilled workers by allowing them to tackle more sophisticated tasks and improving working conditions, such as work-life balance and income. However, it also presents a considerable challenge to conventional high-skilled roles, making them more prone to changes and possible replacement. This situation can lead to the reevaluation of certain high-skilled positions and could result in job displacement within some industries.

The positive impact of technological progress on income levels is not universal. Changes in global trade patterns and labour-saving technological advancements beyond AI led to the automation of non-routine tasks. This transformation posed challenges for low- and middle-skilled workers in Western European countries, requiring them to relocate to new jobs.

Global Trade Decreases, Particularly Between the Major "Blocks"

Driven by economic and geopolitical factors, a trend towards deglobalisation has emerged. After numerous conflicts, tensions, and wars, the world has been divided into power blocks, primarily led by the EU/US and China. This division strongly requires governments to become more self-reliant in strategic sectors, including advanced technology, parts, and raw materials. Nations within the blocks collaborate to support combined technological efforts, with intense competition between power blocks to stay at the forefront of technology. Blocks are increasingly vying to acquire knowledge from each other through espionage and other illicit means, escalating conflicts and digital security threats. There is a significant trend of reshoring, with activities being brought back. However, it does not necessarily result in more jobs for low- and middle-skilled workers, as automation and robotics are deployed instead. Many countries are affected by numerous export restrictions across the power blocks imposed by governments, limiting the growth of the global economy.

Migration

Work-related migration between power blocks decreased due to strict agreements and boundaries. However, migration within power blocks increased, fostering the already increased knowledge exchange. This surge in migration within power blocks has not only led to a physical movement of people but also has profoundly impacted Europe's social and cultural dynamics. Migration flows have contributed to enhanced interaction among different communities, strengthening cultural ties in the EU.

Impact on skills demand and inequalities

Impact of 'Digital Transformation' on Skills Demand

The rapid evolution of technology changes the demand for jobs. Workers must continuously learn to stay relevant in an ever-evolving technological environment. The low-skilled workforce faces a significant skills mismatch as routine work, such as data entry, telemarketing, customer service, and assembly line work, is increasingly replaced by robot and AI technologies, necessitating the search for different jobs. Occupations with medium to high-skill levels are transforming as work processes change due to AI technology, creating a surge in demand for specialised skills. Cutting-edge technologies (like AI) require complementary skills and organisational change. AI assists higher-skilled workers in facilitating specific complex tasks. The skills required depend on the technologies prevalent within sectors and regions. Most new jobs require technological, digital, advising, and analytical skills, with broader acceptance of technologies like AI. All employees, especially those with higher academic education, must be familiar with these technologies. AI replaces jobs requiring intellectual knowledge, leading to additional responsibilities for academically educated employees, such as data analysis and process adjustments based on real-time data. In the digital era, skills in cybersecurity, data protection, and ethical considerations become crucial.

Low and medium-skilled employees in specific industries are encouraged to cultivate soft skills that machines lack, such as empathy, critical thinking, information literacy, and problem-solving. Academically educated employees engage in complex tasks requiring innovative solutions and strategic thinking, while cultural sensitivity and teamwork become increasingly valuable.

Box 5. What jobs can be performed by AI?

AI is deployed across various sectors, detecting fraud, recommending products, predicting service demand, and making diagnoses. Before AI, tasks a computer could do were limited to tasks that could be articulated with a well-defined set of rules: Routine tasks. AI can perform further cognitive functions for which it can infer rules by itself through examples (like observation, pattern recognition, reasoning, deductive conclusions, and forecasting). Through image recognition, AI identifies objects or organisms in photos or videos, while biometric facial recognition identifies individuals. In the workplace, image recognition can spot risky activities for safety monitoring.

The latest wave, generative AI, is capable of producing "new" output (This is limited by its training data). Examples include text and image generation engines, such as GPT-4 or DALL-e.

Impact of 'Deglobalisation' on skills demand

Reshoring often goes hand in hand with adopting advanced technologies and automation to enhance productivity. This can increase demand for employees with technological skills, such as programmers, technicians, and engineers. The increasing diversity in urban areas has fuelled innovation and creativity, bringing together diverse perspectives and areas of expertise. Skills like cultural sensitivity and effectively working in diverse teams will be valuable.

Impact on inequality

Digitalisation, while enhancing prosperity and work efficiency, contributes to social unrest due to rising inequality. New technologies lead to significant shifts in job structures, skills gaps, and increased inequality. Highly skilled workers are expected to benefit the most from the deployment of generative AI, especially those with specific skills, technological knowledge, and financial resources. Higher-educated individuals progress faster, invest in continuous learning, and might undertake additional tasks. Job opportunities may decrease in specific high-skilled occupations where AI can take over many tasks, such as accountancy.

Workers with routine tasks or in fields affected by trade changes struggle to adapt, which exacerbates disparities in income, employment opportunities and overall job quality. Low-skilled workers, women, and older workers, in particular, face difficulties finding suitable jobs, reducing self-confidence and social pressures. The challenge of job displacement and seeking alternative employment becomes high. Reshoring efforts sometimes fail to improve the situation for workers with routine tasks, as machines or computers take over instead of people regaining their jobs. Automation poses a significant risk to low- and medium-skilled

work, leading to increased unemployment periods and diminished opportunities for suitable employment.

Regional inequality

Regional disparities widen in a deglobalising world, particularly in non-Western, non-democratic, underdeveloped countries with traditional cultural values. This rise stems from an inward focus on national cultural values. The withdrawal from international collaborations disadvantages certain regions, especially companies that are losing revenue from outside Europe. Conversely, rapid technological evolution enhances access to remote and online education, providing flexible work arrangements. The acceleration of digital transformation will cause high-skilled regions to prosper more than low-skilled regions, driving inequality.

Gender inequality

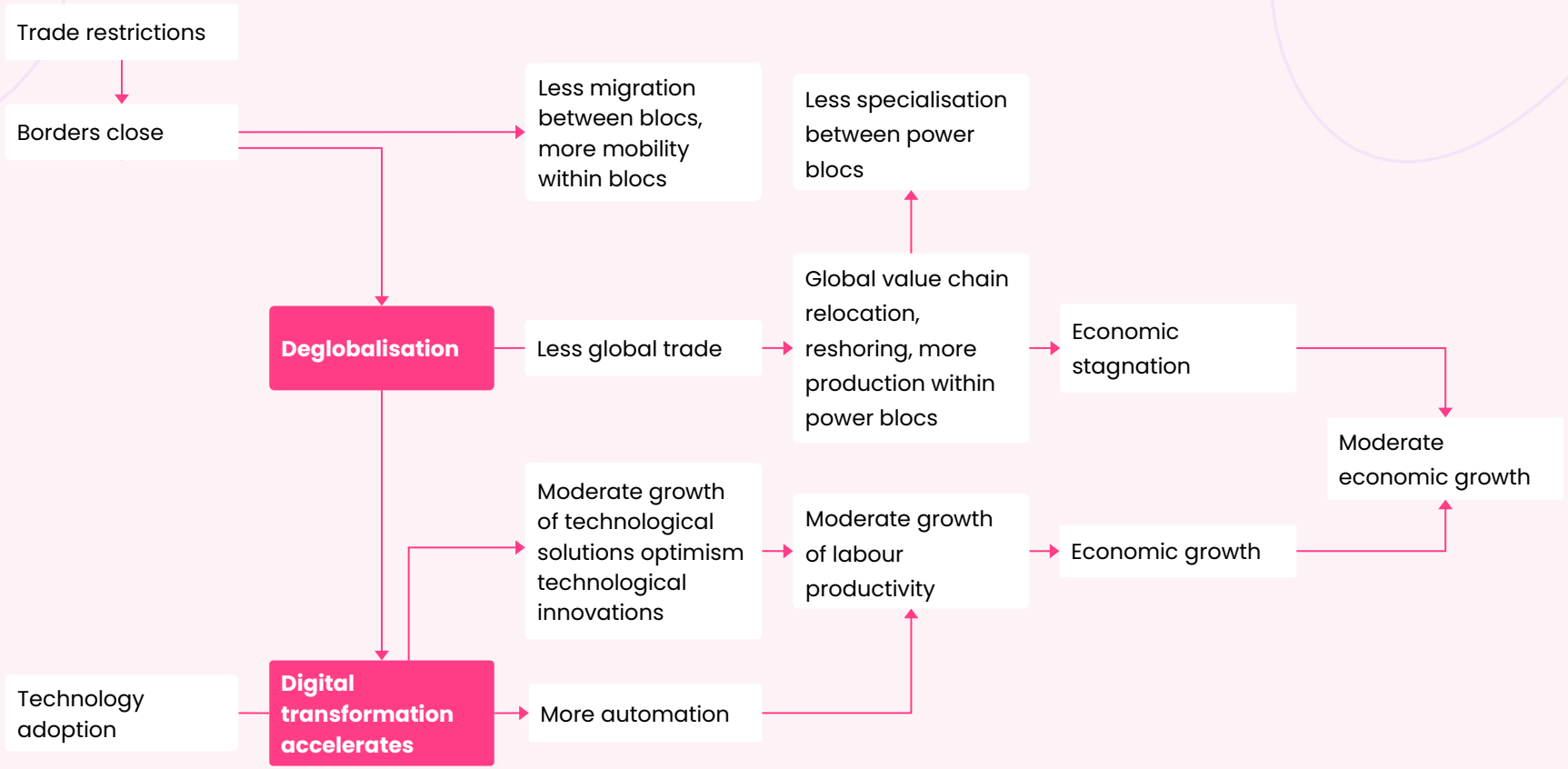
In a technology-driven labour market, gender inequality increases, even further so against the backdrop of deglobalisation. Gender inequality increases because women less often work in or enter high-paying, innovative firms that thrive in this scenario. Women are underrepresented in high-paying tech firms, paid lower wages, and face barriers to developing digital skills. In this scenario, gender bias accelerates in the design of AI technology itself, reproducing gender biases in inequalities in generative AI. Deglobalisation further stagnates women's economic empowerment, particularly in global south regions, due to digital access barriers and a lack of gender mainstreaming of human rights and economic protection acts.

Box 6. Robotisation: The changing skills demand

In accountancy, the rise of robotisation is evident, particularly in routine tasks like vetting grant applications and contract assessments. The auditing function and customer-centric approach are becoming increasingly important. Instead of performing manual tasks, employees now need to oversee the automated process and handle exceptions. This requires analytical skills to analyse exceptions and take action, technical skills to use advanced accounting software, feedback to developers, and data quality assurance. On the one hand, accountants are encountering increasingly complex tasks, while on the other hand, the number of job opportunities may decrease as AI takes over many tasks.

Figure 3 provides a comprehensive overview in a flow diagram, featuring the key factors shaping this scenario. The left side illustrates the precursors to, and the impact of, digitalisation and globalisation on productivity, migration, and economic growth. On the right, a concise summary highlights the effects on inequalities, including socio-economic disparities based on workforce job opportunities and gender.

Figure 3. Scenario description **Empowered by Technology** (technological growth increases and deglobalisation).



Scenario 2: Techtopia

Digital transformation accelerates and globalisation increases

Scenario description

Technological advancement

Between 2024 and 2030, technological growth has accelerated, driven by increasing global collaboration and open markets. There is widespread optimism surrounding technological innovations, with advancements in AI and robotics fulfilling their promises. Governments and companies have allocated significant budgets for research and development, fostering continued innovation. This has led to healthy competition and the breakup of tech giants like Google, Apple, and Meta. Organisations have become more resilient by being less reliant on specific suppliers. However, not every company can adopt the available technological solutions, as implementing technology involves restructuring costs for workers and firms competing globally.

The demand for new skills has risen, particularly for high-skilled jobs. Technology has automated specific tasks, altering the nature of occupations and fostering more employment opportunities in some industries and less in others. Advanced technology has notably enhanced working conditions by enabling digital work from anywhere, which supports the service economy, and allows technology to perform routine tasks, thereby creating more room for varied activities. However, the shift towards more digital work can reduce face-to-face interpersonal interactions, and the increasingly dynamic nature of workplaces may adversely affect job security.

Globalisation: Dynamic international trade

Global collaboration has rendered international trade dynamic and complex, with political and legal differences diminishing. There is a global understanding that prosperity cannot be achieved in isolation. China, the US, and the EU have promoted international trade, with companies focusing on profit generation and shareholder satisfaction. This pursuit of profit leads to more relocation or outsourcing of specific production processes to globally favourable locations, triggering innovation and technological advancement. Companies access foreign knowledge and face enhanced international competition. Tech companies flourish in this open-border environment, impacting global labour demand and economic dynamics. Countries and continents specialise in industries and specific activities.

Migration

Technological changes trigger scarcities and surpluses in labour market segments, thus influencing migration. Migration addresses skill shortages within ageing populations, leading to a global increase. Western Europe recognises the immense value of educated migrants as valuable human capital, enhancing the skilled labour pool and addressing high-skill occupation shortages. More work is available for cheaper labourers, especially in Eastern Europe, where more production work exists. Controlled migration is accepted within most European countries, focusing on desired migration flows. Western Europe faces challenges absorbing large inflows into their labour markets, leading to selective migrant acceptance

from outside the EU. Globalisation has diversified urban landscapes, influenced by various cultural traditions. Metropolises attract migrants, further strengthening urbanisation.

Impact on skills demand and inequalities

Impact on skills demand

Technological advancements and globalisation have significantly shifted job market dynamics in the EU, creating demand for high-skilled and medium-skilled positions. Due to automation and outsourcing, low-skilled workers face job losses and a skills demand mismatch. Anticipated technological advancements, especially in AI, increase the need for technical expertise. Automation and outsourcing enhance productivity, enabling flexible work arrangements and shifts to different roles, leading to a rise in remote digital work. However, significant skills mismatches are anticipated for low-skilled workforces, particularly in the manufacturing sector, while the demand for medium- and high-skilled jobs increases. With technology handling routine tasks, the importance of human interaction and soft skills rises. Burnout symptoms and mental resilience become more significant concerns as workers adapt to dynamic job market shifts. Due to globalisation, tech providers can build monopolies more easily and wield significant power, attracting high-skilled workers.

Box 7. Example of emerging jobs

In logistics, AI-driven data mining automates pattern detection in activities like goods receipt and order picking. AI facilitates demand forecasting, optimises inventory, and enhances overall data-driven logistics. Future AI systems promise predictive maintenance and process optimisation, aiding professionals in monitoring and analysing system data. Digital and computer skills, including confidence in AI-generated data, are increasingly vital. Working with advanced systems for data analysis is crucial.

Impact on inequality

This scenario sees the income and job opportunities gap between lower and higher-educated individuals widen due to international markets and technological developments. Higher-educated individuals benefit most from globalisation and technological change advantages. New technologies often displace low-skilled workers, who find adapting challenging, face higher unemployment risks and struggle to secure alternative employment. In low-educated job sectors, where migrants often concentrate, employers are less likely to invest in training, and accessible, affordable language courses for migrants are often lacking, widening inequality.

Regional inequality

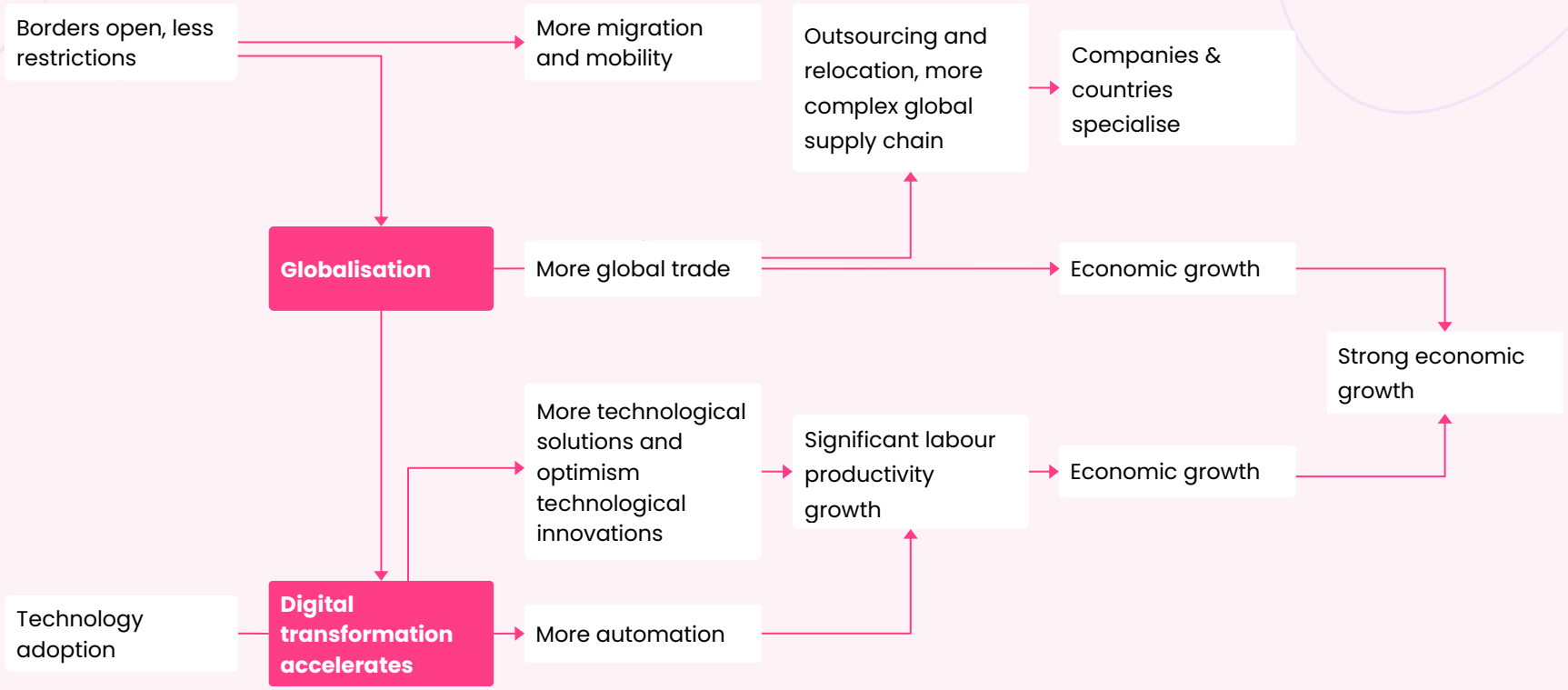
Globalisation exacerbates regional inequality, particularly in countries with significant manufacturing sectors, like Germany, affecting medium- and low-skilled workers. Digital transformation favours high-skilled regions, and increased globalisation benefits entrepreneurial areas more than resilient areas. Low-skilled regions may face unemployment due to decreased globalisation or low growth due to decreased technological development.

Gender inequality

In a technology-driven labour market, gender inequality is likely to increase but can be mitigated in a globalising world. Gender-segregated labour markets and gendered digital skills gaps cause men to benefit more than women, both in job opportunities and wages. Also, women face greater job vulnerabilities due to automation. The rise of digitalised global platform economies poses a greater challenge to employment security and decent labour conditions for women than men. At the same time, online global platforms provide a collective voice for women to advocate for equal rights. Global trade increases demand for human-centred soft skills, improving access to education and offering flexible work arrangements, which benefit women's economic empowerment, especially in developing economies in global south regions.

Figure 4 provides a comprehensive overview in a flow diagram, featuring the key factors shaping this scenario. The left side illustrates the precursors to, and the impact of, digitalisation and globalisation on productivity, migration, and economic growth. On the right, a concise summary highlights the effects on inequalities, including socio-economic disparities based on workforce job opportunities and gender.

Figure 4. Scenario description **Techtopia** (technological growth increases and globalisation).



IMPACT

Big increase in job opportunities inequality

- decrease low skilled
- stable medium skilled
- increase high skilled

Rise in gender inequality, certain regional decrease

Scenario 3: Economic Minimalism

Digital transformation stagnates and deglobalisation

Scenario description

Deglobalisation

A backlash against globalisation, characterised by a rise in protectionist policies, has been triggered by the intensification of trade and foreign direct investment. High interest rates, sustained inflation, geopolitical tensions, and the lingering effects of the COVID-19 pandemic have led to economic downturns, contributing to broader global economic struggles. Governments have restricted business freedom, and companies have reconsidered their sourcing strategies. Escalating tensions between countries are causing international conflicts, with a focus on strengthening national sovereignty. Populism and nationalism are rising globally, impacting elections and leading to exits from international alliances. The EU faces internal divisions, particularly regarding major transitions like energy and digital transformations, diminishing global cooperation. Both national and international borders are closing for trade and migration, reducing imports and exports and hindering the economy. Power blocks (US, China) emerge, collaborating on technological efforts, which demand more high-skilled workers. Relocation of global value chains within these blocks increases demand for (low- and) middle-class work in traditional industries.

Migration

Work-related migration between blocks is declining. The increased nationalistic parties and the desire for sovereignty have also caused divisions within Europe. However, the number of people desiring a better life increases in regions facing economic challenges, fuelling international tensions and non-work-related migration.

Technological stagnation

By the late 2020s, power blocks have significantly reduced the exchange of newly developed knowledge and resources. This diminished interaction between and within power blocks has decreased benefits from innovations and foreign knowledge, slowing technological advancements and stagnating labour productivity. Strict AI regulations and national restrictions have impeded technological progress, undermining consumer confidence and triggering economic contraction. Despite a decrease in total employment opportunities, employment rates rise slightly due to a shrinking labour force (ageing) and government intervention. Relocation and restrictions on outsourcing reinstate jobs for low- and medium-skilled workers, stabilising wages. This affects job demand. People experience reduced competitive pressure. Technological slowdown eases societal pressure, fostering a tendency towards de-urbanisation and a focus on family well-being. Communities bond over shared values, care, basic needs, and human-scale appreciation.

Impact on skills demand and inequalities

Impact on skills demand

Although firms still invest in innovations, the stagnant growth of technological developments creates less need and necessity to learn new (technical, digital, analytical, and cultural) skills. However, due to job relocation and the need for workers to seek employment in different sectors, certain groups of workers need to acquire new skills. The pace of development aligns with the speed at which individuals can readily learn new skills. While technological stagnation may imply a reduced to constant demand for highly educated workers, Western European countries continue to rely on such skilled individuals to drive advancements in research and development, marketing, and the service sector. Meanwhile, Eastern European countries with lower wages see a potential rise in the demand for low- and medium-skilled work in manufacturing, traditional industries, and manual labour. The demand for highly skilled individuals has plateaued, especially since the limited technological advancements most impact them.

Impact on inequality

Income disparity will slightly reduce because the demand for highly skilled individuals becomes lower than for low- and medium-skilled workers. However, this does not mean that highly skilled workers are the most disadvantaged in this scenario. In times of economic crisis, highly educated individuals take over some jobs from medium-skilled workers. Still, the job quality and the level of challenge decrease in general. This is mainly the case for highly skilled workers due to less dynamic tasks and reduced investment in innovation. Despite reinstating some jobs for low-skilled workers, reshoring does not always result in better labour market outcomes. Also, the relatively slow degree of digitalisation or automation may have replaced specific tasks, impacting the nature of work for lower-skilled individuals. Overall, economic stagnation contributes to reduced income and job opportunity inequality between low, medium, and high-skilled workers.

Regional inequality

Regional disparities grow in a deglobalising world, especially in non-Western, non-democratic, underdeveloped countries with traditional cultural values due to an inward focus on national cultural value systems. Strong nationalist positions and withdrawal from international collaborations disadvantage certain regions, particularly companies that lose revenue from outside Europe. Due to their flexibility, other entrepreneurial regions will benefit if companies gain revenue from their role in emerging power blocks and the changed market dynamics.

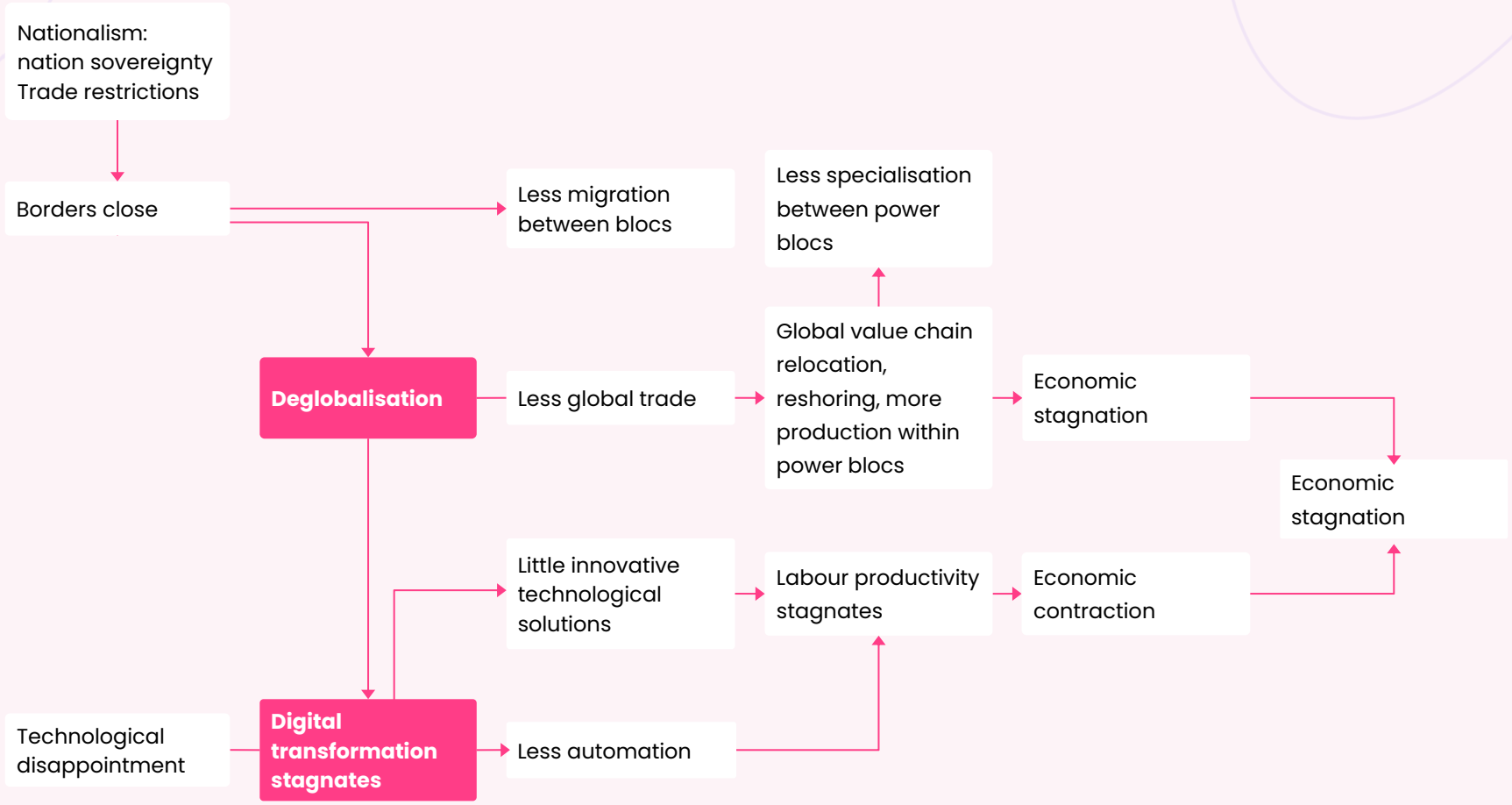
Gender inequality

Stagnating technological growth stabilises gender inequalities due to a shift away from demand for highly skilled, digitally skilled labour, where men are typically overrepresented. Women less often work in sectors vulnerable to technological stagnation. Continued demand for human-centred low- and medium-skilled labour attenuates gender gaps in employment opportunity and wage disparity. Regional contrasts in socio-economic gender inequalities may rise in this scenario due to a lack of global gender mainstreaming of human rights and

protection acts. Notably, women in developing countries that lack democratic political value systems and do not strictly adhere to global human rights protection acts become vulnerable.

Figure 5 provides a comprehensive overview in a flow diagram, featuring the key factors shaping this scenario. The left side illustrates the precursors to, and the impact of, digitalisation and globalisation on productivity, migration, and economic growth. On the right, a concise summary highlights the effects on inequalities, including socio-economic disparities based on workforce job opportunities and gender.

Figure 5. Scenario description **Economic Minimalism** (technological growth stagnates and deglobalisation).



Scenario 4: Analog Alliance

Globalisation and digital transformation stagnates

Scenario description

Globalisation

After years of economic restrictions due to conflicts in the early 2020s, globalisation is resurging, shifting focus towards international integration. While conflicts have receded, new challenges, such as national crises and issues in Russia, have emerged. Despite these, global trade and cultural exchanges are thriving, driven by the understanding that prosperity is a collective effort. China, the US, and the EU increasingly promote international trade and lift trade restrictions, allowing firms to relocate parts of their production processes to the most favourable locations worldwide. This drives specialisation between countries.

Caution in adopting technological developments

The initial enthusiasm for technological advancements, particularly in AI, has waned, leading to a reassessment of human-technology collaboration. Between 2020 and 2025, technological changes altered the nature of work, but promises of rapid advancements have fallen short. The development of new technologies has slowed, with heightened scrutiny leading companies to appraise potential repercussions more carefully before proceeding. This cautious approach has resulted in deferred or terminated innovative projects, impacting companies' innovation capabilities and financial standing. Governments and the EU now play a prominent role in technology development, emphasising societal impacts. This shift allows companies in less developed countries to catch up and implement technologies more efficiently. However, the slowdown in technological adoption impacts the EU's economy, with minimal growth between 2025 and 2030. Productivity remains stable, and wage growth lags behind expectations, leading to reorganisations and layoffs in tech companies, hindering innovation capabilities. The decline in technological advancements and innovation can lead to less variety and fewer challenging tasks in the workplace. Coupled with pressure on wages, it can decrease job quality.

Migration

Migration sees slight growth, particularly in Eastern Europe, as labour-intensive tasks regain importance over technology for solving intensive physical tasks. Western Europe recognises the value of educated migrants in addressing skill shortages. Still, with the technological slowdown, there is an effort to limit labour migration, reflecting the changing dynamics of the global workforce.

Impact on skills demand and inequalities

Impact on skills demand

With few technological advancements, there is less need and necessity to learn new skills. The pace of development allows individuals to learn new skills at a manageable rate. While technological stagnation suggests a reduced demand for highly educated workers, Western

European countries still rely on such skilled individuals to drive advancements in research and development, marketing, and the service sector. Meanwhile, Asia and, to a lesser extent, Eastern European countries with lower wages see a potential rise in demand for low- and medium-skilled work in manufacturing, traditional industries, and manual labour. The necessity for high-skilled workers persists, particularly for significant international trade requirements, indicating an increasing demand for reskilling or acquiring specific skills for sectors driven by international trade.

Impact on inequality

Globalisation boosts living standards worldwide but increases the gap within countries, leading to greater inequality between nations. Within nations, there is a more significant disparity between low-skilled and high-skilled workers, while the level of inequality between medium-skilled and high-skilled workers remains stable. The uneven distribution of gains contributes to skills inequality and job polarisation, particularly affecting low-skilled workers who face reduced job opportunities due to globalisation and routine task automation. Disappointing outcomes from tech companies result in fewer job opportunities, especially for low-skilled jobs due to relocation and outsourcing, and, to some extent, highly skilled workers due to technological stagnation.

Disparities in wages and job opportunities between natives and migrants increase as they are not equally distributed across occupations. In low-educated job sectors, where migrants often concentrate, employers are less likely to invest in training. Accessible and affordable language courses for migrants are also often lacking. These entry barriers to occupations and economic sectors contribute to inequality and hinder the integration of migrants into the labour. This always plays a role but is mainly the case in this scenario where there is (much) more migration, as it becomes a relatively more significant issue.

Regional inequality

Socioeconomic inequality is reduced in Eastern Europe, where demand for low-skilled jobs rises. However, low-educated workers in Western Europe face much competition and challenges due to outsourcing, relocation of low-skilled jobs, and further automation of routine tasks, creating greater inequality between highly—and low-educated workers.

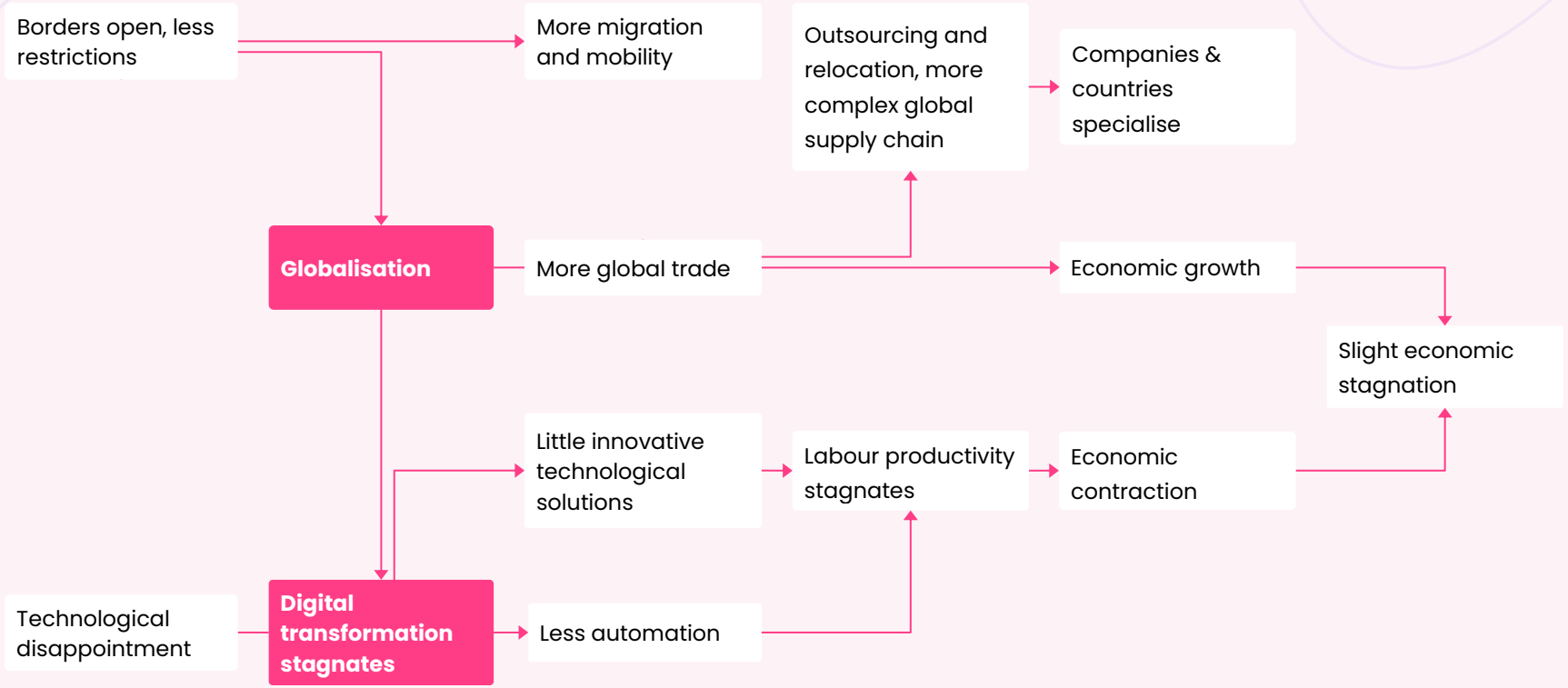
Gender inequality

Initial promises of digital innovations fade and shift towards human-centred jobs that benefit women more than men, especially in medium-skilled labour. Globalisation impacts male manufacturing workers in Western Europe more, reducing gender wage inequality while economic sectors in which women are overrepresented remain stable. Gender inequalities stemming from horizontal gender segregation decline in this scenario because digital skill demands in male-dominated technology-based sectors stagnate. In contrast, demand for soft skills and human-centred jobs remains stable. Globalisation fosters international trade, foreign investments, democratic values, and gender mainstreaming of human rights, improving women's economic positions worldwide. However, the rise of globalised, competitive, and specialised markets causes vertical gender inequalities to persist, especially in Western, highly educated, rich countries, where women, particularly those in low-skilled

and low-paid roles, face significant job security challenges and discrimination in high-powered leadership positions.

Figure 6 provides a comprehensive overview in a flow diagram, featuring the key factors shaping this scenario. The left side illustrates the precursors to, and the impact of, digitalisation and globalisation on productivity, migration, and economic growth. On the right, a concise summary highlights the effects on inequalities, including socio-economic disparities based on workforce job opportunities and gender.

Figure 6. Scenario description **Analog Alliance** (technological growth stagnates and globalisation).



IMPACT

Increase in job opportunities inequality

- decrease low skilled
- increase medium skilled
- stable high skilled

Gender inequality stabilises

Recommended reading

We refer to the gini-research.org website for the H2020 GI-NI publications. Here, we present a selection of core publications used in the booklet.

- Aldaz, L., Eguia, R., & Aizpurua, A. (2023). *Policy Brief #3: Migration in the European Union: nexus to inequality and skills. GI-NI research*. https://gini-research.org/wp-content/uploads/2023/09/SINN23_GINI_Policy_brief_III.pdf
- Dhondt, S., Alcidi, C., & Garmann Johnsen, H. (2022). *Policy Brief #1: The GI-NI project and the need for new policy to tackle inequality. GI-NI research*. https://gini-research.org/wp-content/uploads/2022/03/SINN22_GINI_Policy_brief_I.pdf
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- Los, B., de Vries, G., & Ye, X. (2023). *D6.1 Labour Market Inequalities: Impacts of Technology and The Changing Nature of International Trade: 2000-2014. GI-NI research*. https://gini-research.org/wp-content/uploads/2023/04/GI-NI_WP6_D6.1_Final_20230331.pdf
- Los, B., & Ye, X. (2023). *D7.2 Report: WIOD-based scenario approach. The Impact of Technological Progress, Globalisation and Labour Mobility on Employment Structures: Quantitative Scenario Analyses. GI-NI research*. https://gini-research.org/wp-content/uploads/2023/11/GI-NI_WP7_D7.2_Final_20231129.pdf
- Preenen, P. T. Y., Koen, J., van den Tooren, M., & van der Torre (in press). *D7.1: Report: Scenario methodology and trends and drivers assessment. GI-NI research*. In press.
- Rademakers, E., & Zierahn-Weilage, U. (2023). *Policy brief #2: New technologies: end of work or structural change? GI-NI research*. https://gini-research.org/wp-content/uploads/2023/09/SINN23_GINI_Policy_brief_II.pdf
- Seghir, M., Alcidi, C., Aldaz, L., Los, B., & Garmann Johnsen, H. (2022). *D2.1 Report on definition and measurement of GI-NI key concepts within EU data sources. GI-NI research*. https://gini-research.org/wp-content/uploads/2022/04/GI-NI_WP2_D2.1-Report-on-definition-and-measurement-of-GI-NI-key-concepts-within-EU-data-sources-20220329_B.pdf

Growing Inequality:
a Novel Integration of
transformations research

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