

Reshaping the Industrial Policy Framework of Türkiye: Integrating Exports at the Core of AI-Driven Development

Faruk Güven^a

^aDepartment of Business Administration, Abdullah Gül State University, Kayseri, Türkiye, ORCID: 0000-0002-2440-585X

Abstract

This study explores the evolving landscape of industrial policy amid deglobalization, protectionism, and the technological revolution driven by artificial intelligence (AI). The shift in industrial policies across the US and EU, driven by geopolitical tensions, climate change, and economic rivalry, has resulted in increased protectionist measures. The US, once an advocate of free-market principles, now implements policies like the CHIPS Act to enhance domestic manufacturing and reduce reliance on China. For developing countries like Türkiye, integrating exports into industrial policy is crucial. Despite Türkiye's significant export growth, challenges such as low R&D spending and a small share of high-tech exports persist. The article emphasizes the need for a dedicated institution, the Industrial Policy Institutes of Turkey (TEPE), to focus on innovation, competitiveness, and sustainable development. TEPE would encompass various sub-institutions dedicated to high technology, energy, defense, and digitalization. AI can play a strategic role in analyzing sectors, optimizing supply chains, and enhancing export competitiveness. By leveraging AI, Türkiye can transform its industrial policies and position itself more robustly in the global market, ensuring economic resilience and growth.

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1. Introduction

A specter is haunting the Western world—specifically the U.S. and EU, the pioneers of the free market and globalization. That specter is deglobalization.

Industrial policy has recently become one of the most controversial topics in the global arena. As interconnected and interdependent global trade has evolved, it has created trade surpluses for some countries while causing trade deficits for others. It is hardly possible to consider international trade independently of the geopolitical axis. Disruptive geopolitical events are pushing the world back into a commercial and political east-west polarization. Consequently, global economic challenges and geopolitical developments are bringing industrial policy back into focus for many countries (Yülek & Akkemik, 2023). To this contention, the massive technological revolution of artificial intelligence has been

added. This complex chain of events necessitates that developing countries, which have integrated into the world through globalization, reassess their own situations. Even developing countries that have not fully caught up with the industrial and subsequent electronic revolutions in recent centuries may succeed in leveraging the power of artificial intelligence (AI) technologies from risks into opportunities.

The debate between state intervention and free-market principles in industrial policy has intensified. As competition for economic superiority has become a priority, nations are increasingly adopting protectionist measures. The growing economic and technological rivalry between countries has led to a reassessment of the role of government in shaping industrial development. Traditionally a bastion of free-market ideology, the US has recently implemented numerous

regulations aimed at steering strategic investments toward domestic market, ranging from policies that promote manufacturing within the country to initiatives like the CHIPS Act. These measures reflect a shift in the US approach to industrial policy, recognizing the importance of government intervention in key sectors to maintain competitiveness and protect national interests (FT, 2024).

Protectionism has recently become a severe measure, particularly against China and Chinese products, imposed by the US and European trade barriers (FT, 2024). The US Treasury Secretary has stated that Chinese products pose a significant risk to factories worldwide. The EU appears to have some hesitation regarding these harsh measures, while the US blames China's industrial policy for this trade tension. China's industrial policy could prompt EV manufacturers to shift production to Europe and the US in response to recent trade barriers imposed by the US.

Promoting selected industries for the national security or economic competitiveness is defined as industrial policy (Siripurapu & Berman, 2023; Hillman & Manak, 2023). Industrial policy aims to advance the development of strategic industries through various measures, such as subsidies, tax incentives, and regulatory support. Reynolds (2024) underlines that the tools of industrial policy have not changed significantly over time which are subsidies, loans, tax incentives, tariffs, infrastructure development, R&D and regulation. However, apart from those tools, this article aims to focus on maybe not a new tool but an efficient tool for developing countries: export. Exporting is critically important for developing countries as it transforms a semi-closed and dependent country into open and resilient one with the paths from export to FDI.

In the light of these global changes and challenges, this study first examines recent policy changes in the context of industrial policy. It then explores how export should be positioned within industrial policy in the age of artificial intelligence. Finally, it presents arguments for the necessity of establishing a national industrial policy center to adapt to increasingly complex competitive environment.

2. The Return of Industrial Policy in the Western World

2.1 Recent Global Challenges

After green, digital, and geopolitical changes, industrial policy, a taboo since the 1970s, is back and vital for governments (Crisuolo & Lalanne, 2024). Climate change compels the world to take macro-level precautions and implement detailed plans. The Net-Zero Industry Act of the European Commission not only aims to comply with environmental challenges but also creates jobs and economic growth by turning climate policies into industrial opportunities, enhancing the EU's energy resilience (Deloitte, 2023; EU, 2024).

Trade policy uncertainty has become a viable source of economic uncertainty since 2016 (Handley & Limao, 2022).

Handley and Limao (2022) underline that the notable events such as Brexit and election of President Trump who challenged the trade with China for their argument. However, their analysis does not include recent great incidents such as Covid-19 pandemic and AI revolution that was triggered by OpenAI and its competitors.

In the western world (US & EU), opinions about industrial policy have changed due to recent significant developments (Aiginger & Ketels, 2024; Garcia-Herrero & Krystyanczuk, 2024; Reynolds, 2024; Juhasz, Lane & Rodrik, 2023):

- **Pandemic:** The fragility of global value chains led protectionism.
- **Climate Change:** Accelerated the green transition through regulations and industrial transformation.
- **Geopolitical Tensions:** Intensified by Ukraine-Russia and Israel-Palestine conflicts.
- **Rising GDPs of Developing Countries:** Increased the global trade share of developing countries like the BRICS.
- **Changing Demographics:** Demographical trends such as ageing society, middle-class squeeze and immigration change the priorities and policies of western governments.
- **New Technologies:** Technologies like AI create destructions in many layers of the industry
- **New Sector-Specific Subsidies and Tariffs:** The recent action of the US such as Inflation Reduction Act and CHIPS Act play significant role in the world trade balance and order. In 2024, the US has also increased EV tariffs against Chinese products.

2.2 Trade Policy Uncertainty and Protectionism

More than 80% of semiconductor chips are manufactured in Asia, which has become a critical concern for Western countries. The concentration of such a crucial industry in a single region brings significant risks to the global supply chain and national security for the western block. Disruptions and limitation of medical products during the Covid-19 pandemic also gave first signals of world-wide trade crisis. While China, South Korea, and Taiwan made significant investments in semiconductor sector, share of the US on semiconductor production capacity declined from 37% to 12%. In response, the US issued the CHIPS Act in 2022 to provide substantial incentives to support domestic production. The western block aims to reduce dependence on Asia (Gelsing, 2024).

As manufacturing operations moved overseas, the US lost its domestic critical skills, knowledge, and innovation capacity. Debates on the free-market economic model have been increasing while the level of protectionism in the Western world is on rise. The global success of Chinese companies, which was result of a well-designed industrial policy implementation, raised questions about the effectiveness of a free-market approach in western landscape (FT, 2024). The western block aims to reduce critical dependencies from China where this country implemented industrial policy for decades (Garcia-Herrero &

Krystyanczuk, 2024). China's emergence as 'the world's factory' initially stemmed from Western corporations' initiatives. This strategic move by Western companies laid the foundation for China's rapid industrial growth and global dominance in manufacturing. With the capability to manufacture millions of products quickly and distribute them globally in a fast and low cost, China has significantly exceeded the old paradigm of 'designed in the USA, made in China. China's manufacturing competences have evolved beyond simply being a low-cost production hub for Western designs. It has developed its industrial ecosystem through technology transfers from Western nations and a workforce that is both highly skilled and Western-educated. The quality perception of past Chinese products has undergone a total transformation, allowing Chinese brands to now compete effectively with established Western global players. In addition to Chips Act of 2022, the US government has recently taken new precautions against China by increasing tariffs (CNN, 2024).

The unpredictable nature of trade policies with the tools such as tariffs, quotas, and trade agreements significantly impact businesses' decision-making processes and investment strategies. For developing countries that are in the middle of this trade war, trade uncertainty is increasing.

3. The Call for Developing Countries

3.1 The Need for Strategic Industrial Policy

If the US aggressively focuses on the new 'Modern American Industrial Strategy' (Reynolds, 2024), which plays a vital role in the global economy, then the rest of the world will need to reconsider their industrial policies. In addition to rise of China, increasing economic inequality, challenges of climate change and Covid-19-based supply-chain shocks have changed the direction of free-market policies to governmental interventions in the US (Siripurapu & Berman, 2023). These factors have highlighted the need for targeted government support in critical sectors.

3.2 Export as Strategic Tool

The knowledge and competitive advantage of developed countries over developing ones are rapidly increasing due to several factors (McKinsey, 2023; World Bank 2024; Georgieva, 2024): The knowledge and competitive advantage of developed countries over developing ones are rapidly increasing due to several factors (McKinsey, 2023; World Bank 2024; Georgieva, 2024):

- i. The migration of advanced human and manufacturing capital to developed countries.
- ii. The use of complex AI as a strategic tool by globally dominant high-tech companies, which have gathered extensive data over decades. This data continues to grow exponentially as individuals and corporations contribute a diverse range of information, from Excel files to images and videos, for analysis.

- iii. Developing countries are still at some different stages of modern the industrial revolution and now face the additional challenge of adapting to the AI era.

Developed countries often offer better opportunities, higher wages, and a suitable environment for innovation, attracting highly skilled professionals and advanced manufacturing capabilities from developing countries. This situation widens the knowledge and technology gap between developed and developing nations. Tech giants in developed countries have a significant advantage in AI due to higher amount of data ownership and advanced computational resources. As individuals and companies generate more data, these tech companies enhance their AI expertise and dominance. Developing countries are still in the late industrial era and have not fully transformed their economies into knowledge-base one (Georgieva, 2024; World Bank 2024; McKinsey, 2023).

Developing countries can increase their economic competitiveness by promoting selected industries in export markets. Governments can use exports in their policy settings. Policy instruments on exports are divided into two subgroups (Evenett et al., 2024):

- Export barrier: export bans, tariffs and quotas, export licensing and other export-related trade barriers.
- Export incentives: tax-based export incentives, unit-based export subsidies, trade financing and other financial export promotion.

Industrial policy and export strategy are two crucial elements of a nation's economic development framework. Industrial policy focuses on promoting the development of specific industries within a country, while export strategy aims to increase the competitiveness of a nation's products in international markets (Holslag, 2016). The alignment between a nation's industrial policy and its export strategy is often imperfect in practice (Feng, Li & Swenson, 2017). Export strategy should be aligned with the priorities and objectives set out in a nation's industrial policy (Feng, Li & Swenson, 2017; Zhou & Wen, 2022; De Sousa, Disdier & Gaigne, 2020). By aligning their industrial policy and export strategy around AI and other emerging technologies, developing countries can position themselves to compete effectively in the global economy and bridge the knowledge and technology gap with developed nations (UNCTAD, 2023; Google, 2024).

Exporting provides valuable lessons in resilience, resistance, and survival within the competitive business landscape. Engaging in international trade not only strengthens a firm's capabilities but also significantly enriches the domestic market environment (Zhu & Ye, 2023; Cali et al., 2022; Economist, 2023):

Adaptability and Flexibility: With its rich variety of consumer preferences and competitive forces, export markets are different than the domestic market. Thus, firms that export can develop adaptability skills. By learning to adjust their offerings and strategies, firms can become more responsive to changes.

Risk Management: Operating in the international arena exposes firms to a variety of risks, including currency fluctuations, political instability, and supply chain disruptions. By learning to navigate these challenges, firms can significantly enhance their resilience.

Market Diversification: Exporting companies play a crucial role in diversifying the markets for their products.

Innovation: Participating in diverse international markets can significantly enhance a firm's capacity for innovation.

Cultural Competence: Business transactions and relationships with different cultures through exporting can enhance firms' negotiation capabilities, marketing strategies, and customer service.

Strategic Management: Operating in multiple countries necessitates thorough management. Firms that export are likely to develop more sophisticated strategic management capabilities.

Financial Strength: Sustainable exporting enhances the revenue and profit levels of firms. At macro and national level, inflow of foreign currency into the domestic economy empowers the trade balance and is very crucial for Türkiye which gives negative balance.

Powerful Networks: Interaction with multiple players from customers to suppliers can increase firm's capabilities in different assets and skills.

Knowledge Transfer: Through their international operations, firms grasp new methods and knowledge that they can bring these innovations back to their domestic operations, it can lead to productivity improvements and enhanced capabilities across the domestic supply chain.

Enhanced Quality: International operations necessitate higher level of quality standards. This uplift in quality standards can make the entire local industry more competitive both domestically and internationally.

Economic Growth: Firms that engage in exporting their goods and services tend to increase economic growth, productivity, and wages in the domestic market.

4. Industrial Policy and Integration of Exporting of Türkiye in the AI Era: a new Framework

Enhancing industrial policies and effectively integrating them with export strategies can significantly increase the competitiveness of companies (Juhász, Lane & Rodrik, 2023). This not only helps reduce imports but also provides the growth of the domestic market. In a developing economy like Türkiye, adopting such an approach is crucial. To reduce its reliance on foreign goods and enhance its competitive edge, Türkiye requires a novel framework.

The historical trajectory of Türkiye's industrial policy design and implementation highlights several missed opportunities. Both Türkiye and South began implementing industrial policies in the automotive industry around the same period. However, South Korea has significantly outpaced Turkey in this sector (Yülek et al., 2020). In Türkiye, import-substitution industrialization, which started with government support in the 1930s, was followed by development plans from

the 1960s onwards. By the 1980s, the focus shifted to export-led growth. Institutional reforms after the 2001 financial crisis enhanced the state's regulatory capacity. Despite these efforts, Türkiye's industrial policies aimed at promoting technology-intensive exports did not achieve the desired outcomes. This shortfall can be partly attributed to global macroeconomic instabilities and geopolitical issues (Toksoz, 2023). While South Korea transformed its state capacity through export orientation, becoming a global player, Türkiye did not effectively utilize the potential of exports to enhance its internal development and international position (Yülek et al., 2020).

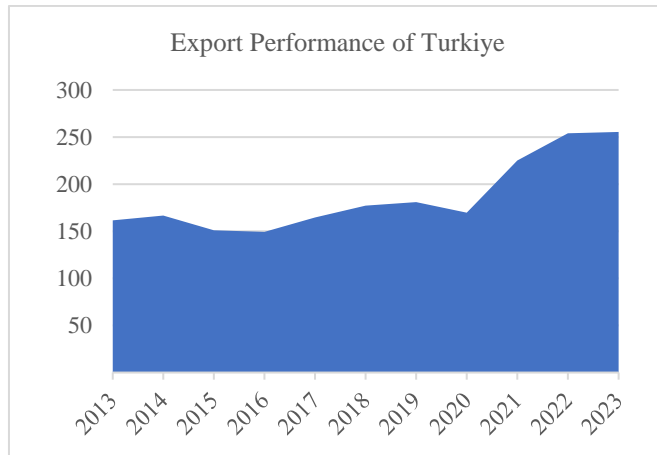
As the world faces transformative challenges like the COVID-19 pandemic, climate and energy crises, disruptions in global supply chains, demographic shifts, and emerging geopolitical conflicts, the security and prosperity of nations have been significantly impacted. To navigate these challenges effectively, countries need to prioritize the creation and strategic application of knowledge. The generation of scientific knowledge, coupled with its successful commercialization, is crucial for the survival and sustainable growth of national economies. By advancing innovation and knowledge production, nations can enhance their resilience against global crises (Fraunhofer, 2024). Japan's Ministry of Economy, Trade and Industry (METI) acknowledges that the highlighted issues above have led to a future outlook filled with growing uncertainty. Considering this increasingly unpredictable situation, METI has fundamentally been reassessing its conventional policies and formulating new economic and industrial policy approaches (METI, 2021). In addition to the developments listed above, Japan's lower growth compared to other advanced countries since the 1990s has also led a country specialized in industrial policies like Japan to reconsider these policies. Similarly, The Korea Institute for Industrial Economics and Trade (KIET), which is Korea's sole national policy research institute, enhances industrial resilience by synchronizing the Korean industry with global trade, in response to shifts in the global industrial landscape (KIET, 2024). Launched in April 2018 by the Department for Science, Innovation and Technology, UK Research and Innovation (UKRI) manages various institutes and councils in order to create synergy between research and innovation across the UK (UKRI, 2024).

4.1 Current Status of Türkiye's Exports

Share of Türkiye in global exports has been increasing continuously for decades (Statista, 2023). Türkiye's exports increased from 36 billion USD in 2022 to 256 billion USD by the end of 2023 (TIM, 2024). However, considering the export value per kilogram and Türkiye's share in global trade, there is a room to grow in export markets. Despite the defense industry's contribution, kilogram export value is around at 1.5 USD and Türkiye's share in global trade remaining at 1% levels, these figures have remained stagnant (Ekonomim, 2023). Additionally, the share of high-tech exports in Türkiye's total exports is only 4.6%. This ratio stands at 35-

40% in Vietnam, Malaysia, and South Korea (The World Bank, 2024). As shown in Table 1, Türkiye's export performance has increased in recent years, indicating its high potential.

Table 1. Türkiye's Recent Export Performance



Source: TUIK (2022). (Export figures in billion USD)

4.2 The Need for a New Framework:

Developing countries like Türkiye, lacking abundant natural resources, must optimize the utilization of their available assets. This necessitates the creation of a specific-dedicated institution in formulating industrial policies that promote economic growth and innovation. A proposed organization dedicated to industrial policy, akin to TÜSEB (TÜSEB, 2024), might be named the 'Industrial Policy Institutes of Türkiye' (TEPE - Türkiye Endüstri Politikaları Enstitüleri Başkanlığı). TEPE would be strategically focused on addressing the nation's industrial and technological needs, promoting innovation, and enhancing international competitiveness. It would actively involve the community and all stakeholders in the research and innovation ecosystem, ensuring the optimal use of national resources within a framework of strategic prioritization. TEPE's scope could encompass a range of institutes, including those specializing in high technology, energy technologies, defense and aerospace, and digitalization, as illustrated below (PSBT, 2023):

Sub-Institutions of TEPE:

1. Turkish Institute of High Technology:
 - Focuses on the research and development of next-generation technologies.
 - Main areas: artificial intelligence, robotics, nanotechnology, and biotechnology.
2. Turkish Institute of Automotive and Transportation Technologies:
 - Develops innovations in the automotive and transportation technology sectors.
 - Works on electric vehicles, autonomous driving systems, and smart transportation networks.
3. Turkish Institute of Energy Technologies:

- Focuses on developing renewable and sustainable energy sources.
 - Conducts projects in solar energy, wind energy, and hydrogen technologies.
4. Turkish Institute of Defense and Aerospace:
 - Enhances national capacities in defense and aerospace technologies.
 - Works on military equipment, satellites, and unmanned aerial vehicles.
 5. Turkish Institute of Material Science:
 - Develops new materials and improves existing ones.
 - Focuses on nanomaterials, composites, and performance materials.
 6. Turkish Institute of Industrial Transformation and Digitalization:
 - Integrates Industry 4.0 and further next-coming technologies.
 - Works on digital transformation, smart factories, and data analytics.
 7. Turkish Institute of Environment and Sustainability:
 - Develops eco-friendly technologies and reduces environmental impacts.
 - Researches waste management, recycling technologies, and environmental monitoring systems.

Given the relationship between education policy and industrial policy (Yülek & Akkemik, 2023), a top-level institution is needed to design industrial policy using a bottom-up approach, a task that will be challenging and demanding.

6. Conclusion

Recent global policy changes necessitate a new framework for Türkiye's industrial policy. Trends like deglobalization, protectionism and technological revolutions bring new risks and opportunities for developing countries. Developing countries need to integrate their exporting activities into their industrial policy framework with the help of AI and tools. For domestic companies, accessing to foreign markets is vital to develop their various skills from finance to marketing. Operating in heterogeneous markets will enhance the resilience of companies and their nations. For the case of Türkiye, a clear industrial policy framework can be built by a dedicated institution that provides strategic insight for the domestic market and foreign market expansion. Reshaping the industrial policy framework of Türkiye to integrate exports at the core of AI-driven development provides a promising pathway to economic resilience and global competitiveness. By leveraging traditional industrial policy tools, such as subsidies, tax incentives, and regulatory support, alongside a strategic focus on export promotion, Türkiye can transform its economic landscape.

The establishment of a dedicated institution like 'Industrial Policy Institutes of Türkiye' (TEPE) shall be beneficial to compete in a fragile world. This dedicated institution shall

increase innovation and high-tech development by using the national resources in an optimal way. By integrating AI and other emerging technologies into its industrial and export strategies, Türkiye can reduce the knowledge and technology gap with developed nations.

As a result, export-focused industrial policy can enhance Türkiye's global competitiveness by transforming industries, making them resilient and innovative with the utilization of AI. This approach seems a necessity to adapt to the rapidly changing world. Future research can present the practical implementation of this framework and impact on different sectors in a quantitative way.

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