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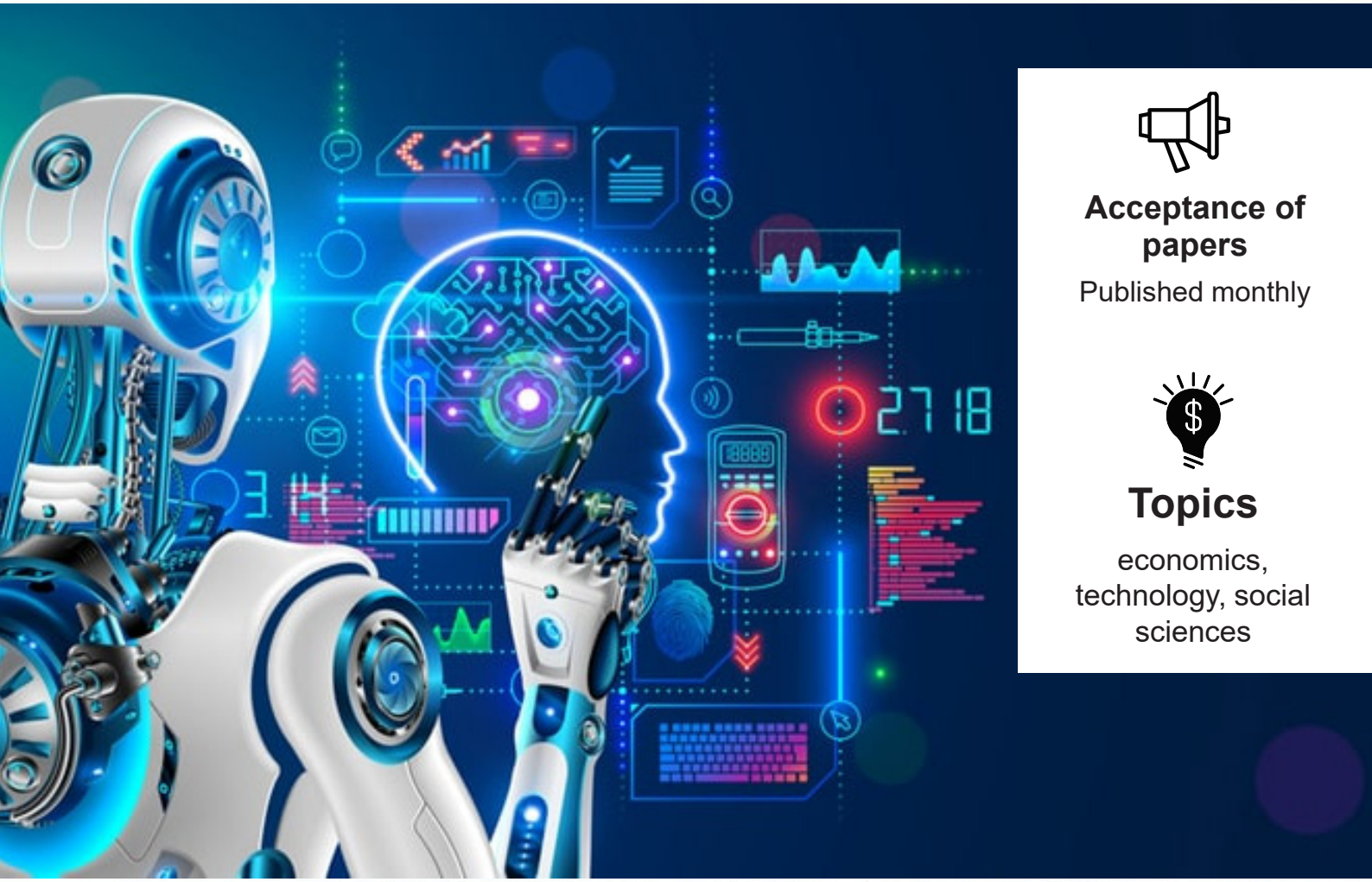

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THE INTERRELATIONSHIP BETWEEN MIGRATION AND THE INDUSTRIAL ECONOMY

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Abstract: This scientific study summarizes international experience confirming the close interrelationship between migration and industrial development through the mechanisms of employment, structural transformation of the labor market, labor productivity, and innovation.

Key words: migration, industrial economy, labor market, productivity, innovation, clusters, Germany, ILO.

Annotatsiya: Ushbu ilmiy ishda bandlik, mehnat bozori tarkibiy qayta tuzilishi, mehnat unumdorligi va innovatsiyalar mexanizmlari orqali migratsiya va sanoat rivoji o‘rtasidagi uzviy bog‘liqlikni tasdiqlovchi xalqaro tajriba umumlashtiriladi.

Kalit so‘zlar: migratsiya, sanoat iqtisodiyoti, mehnat bozori, unumdorlik, innovatsiyalar, klasterlar, Germaniya, XMT.

Аннотация: В данной научной работе обобщается международный опыт, подтверждающий тесную взаимосвязь между миграцией и промышленным развитием через механизмы занятости, структурной перестройки рынка труда, производительности труда и инноваций.

Ключевые слова: миграция, промышленная экономика, рынок труда, производительность, инновации, кластеры, Германия, МОТ.

INTRODUCTION

International experience unequivocally demonstrates the deep interconnection between migration processes and the development of the industrial economy. This section analyzes the key dimensions of this relationship, including the impact of migration on employment and labor market structure; its effects on labor productivity, workforce skill levels, and innovative activity; as well as the role of migrants in the formation of industrial clusters and the development of specific economic sectors. The analysis is conducted both at the level of migrant-receiving countries (i.e., how the inflow of foreign labor affects the host economy) and at the level of migrant-sending countries (the significance of labor outflows and inflows for industrial development in migrants' countries of origin).

One of the primary issues concerns how migrant inflows influence employment and labor market dynamics in industrialized economies. Empirical evidence shows that, when properly managed, migration often complements the domestic workforce by alleviating labor shortages, particularly in the context of population aging. For example, in Germany, employment growth between 2005 and 2023 was entirely driven by workers with a migration background: the number of employed migrants increased by 6.3 million, while employment among those without a migration background actually declined. This indicates that, without migration, Germany's labor market would not only have failed to grow but would have contracted, with negative consequences for industry and public finances. Similar patterns are observed in other European countries with low fertility rates, where migrants have effectively become "fresh blood" for labor markets.

At the same time, large-scale migrant inflows often generate concerns among native populations regarding competition for jobs. However, most economic studies do not confirm significant long-term displacement of local workers by migrants. The main reason is that migrants tend to fill vacancies for which there are insufficient local applicants, whether due to low wages, difficult working conditions, or the need for geographical mobility. As a result, labor market segmentation emerges: migrants concentrate in specific sectors and occupations, complementing rather than directly replacing the local workforce. For instance, the share of foreign workers is extremely high in construction and agriculture in many countries, while it remains very low in the public sector, education, and administrative occupations.

REVIEW OF LITERATURE ON THE SUBJECT

The interrelationship between migration and the industrial economy has long been a central theme in economics, economic geography, and labor studies. Classical economic thought already acknowledged labor mobility as a factor of industrial development. Alfred Marshall emphasized the importance of labor pooling and industrial districts, noting that the concentration of industries attracts workers and, in turn, benefits from a diverse and flexible labor force. This early insight laid the foundation for later analyses of migration as both a response to and a driver of industrialization.

In neoclassical migration theory, migration is primarily explained through wage differentials and employment opportunities between regions. Michael Todaro and John Harris argued that migration decisions are influenced by expected income rather than current wages, highlighting the role of industrial job creation in shaping migration flows. Industrial expansion increases the demand for labor, particularly in urban and manufacturing centers, thereby attracting migrants from less developed or agrarian regions. This framework has been widely applied to explain rural-to-urban migration during phases of rapid industrial growth.

Structural and institutional approaches have further enriched the understanding of migration–industry linkages. Simon Kuznets, in his work on economic growth and structural transformation, demonstrated that industrialization is typically accompanied by shifts of labor from agriculture to industry and services. Migration functions as the mechanism through which this reallocation occurs. Similarly, Arthur Lewis's dual-sector model described how surplus labor from traditional sectors is absorbed by the modern industrial sector, enabling capital accumulation and productivity growth. Although initially developed for developing economies, Lewis's model remains influential in contemporary analyses of industrial labor demand and migration.

More recent empirical studies focus on the role of migrants in enhancing industrial productivity and innovation. George Borjas examined the labor market impacts of immigration, showing that migrants often complement native workers by filling skill gaps, particularly in manufacturing and technology-intensive industries. While Borjas also emphasized distributional effects and wage competition in certain segments, subsequent studies by Gianmarco Ottaviano and Giovanni Peri demonstrated that immigration can increase overall productivity by fostering task specialization and skill complementarity within firms and industries. Their research on European and US economies provides strong evidence that migrant labor contributes positively to industrial output and competitiveness.

The relationship between migration and industrial innovation has been explored extensively by AnnaLee Saxenian. In her studies of Silicon Valley, she showed how highly skilled migrants played a decisive role in the development of high-technology clusters, not only as workers but also as entrepreneurs and transnational network builders. Migrants facilitate knowledge transfer between countries, linking industrial economies through global value chains and innovation networks. This perspective aligns with the work of Richard Florida, who emphasized the importance of human capital mobility for regional industrial dynamism and creative economic growth.

From a global perspective, international organizations have contributed significant analytical insights. The International Labour Organization has consistently highlighted the role of migrant workers in sustaining industrial sectors facing demographic decline and labor shortages, particularly in advanced economies. Reports published by the ILO stress that well-managed labor migration supports industrial resilience, productivity growth, and structural adjustment, especially in manufacturing, construction, and logistics. Similarly, the Organisation for Economic Co-operation and Development has documented how migration supports industrial upgrading by supplying both high-skilled and mid-skilled labor essential for modern production systems.

At the same time, scholars have examined the implications of migration for sending countries and their industrial development. Oded Stark's work on the "new economics of labor migration" argues that migration decisions are often made at the household level to overcome market imperfections. Remittances sent by migrants can finance small-scale industrial activities, support human capital formation, and stimulate local manufacturing. However, Dani Rodrik cautioned that without appropriate industrial and institutional policies, migration alone cannot guarantee sustainable industrial development in origin countries and may even exacerbate structural imbalances.

RESEARCH METHODOLOGY

This study applies a mixed-methods approach to examine the relationship between migration and the industrial economy. The research combines qualitative theoretical analysis with quantitative empirical methods to capture both structural mechanisms and measurable economic effects. The qualitative component is based on a systematic review of classical and contemporary economic theories on migration, industrialization, and labor markets. This analysis provides the conceptual framework for identifying key transmission channels

linking migration with industrial employment, productivity, and innovation. The quantitative analysis relies on secondary data from international sources such as the International Labour Organization, the OECD, and the World Bank. Panel data regression models are used to assess the impact of migration on industrial value added and labor productivity, while controlling for macroeconomic and demographic factors.

ANALYSIS AND RESULTS

Statistical evidence confirms that migrants occupy a substantial share of jobs in physically demanding industries. Globally, according to ILO estimates, approximately 26.7% of all migrant workers are employed in industry (including construction, mining, and manufacturing), about 7.1% work in agriculture, and the remaining 66% are engaged in the service sector. This structure differs markedly from that of the native population, for whom the share employed in industry is often lower. In some economies, migrants play a critical role in specific industries: for example, in the United States, migrants account for 25–30% of all construction workers (reaching 25.5% in 2023), more than 35% of workers in cleaning and care services, and around 15% in manufacturing. In the Gulf countries (such as the UAE and Qatar), the number of foreign workers vastly exceeds that of nationals, and their economies rely almost entirely on imported labor.

An important effect of migration is the smoothing of labor market imbalances. During periods of economic expansion, when industrial output grows, migrants can rapidly fill newly created vacancies, preventing labor market overheating and restraining excessive wage growth. Conversely, during economic downturns, migrants' mobility allows them to return to their home countries or relocate to regions with higher labor demand, thereby mitigating unemployment pressures in host countries. In this sense, migration functions as a shock absorber. A notable example is Spain during the construction downturn of 2009, when a significant share of Latin American and Moroccan workers left the country, partially returning as economic conditions improved.

For labor-sending countries (such as Uzbekistan, Tajikistan, and Bangladesh), labor outflows can reduce domestic unemployment pressures while simultaneously creating labor shortages in certain sectors at home, particularly among skilled workers. Achieving balance is crucial. The outflow of surplus labor is often beneficial for countries of origin, as it reduces hidden unemployment and generates income through remittances. However, large-scale emigration of skilled workers leads to the phenomenon of "brain drain." For the industrial development of donor countries, it is essential to create conditions for circular migration—where workers return with accumulated capital and knowledge—or, at a minimum, to ensure that migration primarily involves surplus labor resources that are not effectively utilized domestically.

There is also the question of migration's impact on wage levels. In theory, an influx of additional labor may restrain wage growth—particularly in the low-skilled segment—by intensifying competition for jobs. Some studies identify a moderate downward pressure exerted by migrants on the wages of low-skilled native workers, amounting to approximately a 1–2% decline when the share of migrants increases by 10%. However, these effects are limited in scale and are usually localized. Moreover, in many advanced economies where migrants have filled specific labor market niches, native workers have either moved into higher positions (for example, migrants take assembly-line jobs while locals become supervisors) or shifted to other sectors. As a result, overall unemployment often declines as immigration increases, contrary to intuitive fears. Comparative research across OECD countries shows that regions with higher migrant inflows do not experience a deterioration in employment outcomes for natives; on the contrary, migration frequently stimulates job creation through demand-multiplier effects.

Poland provides a clear example. The large inflow of Ukrainian workers after 2014 coincided with a decline to historically low unemployment levels in Poland (around 3% by 2019). Ukrainians filled vacancies in sectors where Polish workers were no longer willing or able to meet labor demand, such as construction, logistics, and care services. As a result, industrial growth accelerated, firms were not forced to relocate production abroad due to labor shortages, and the local population did not face rising unemployment. This case illustrates the principle of labor complementarity between migrants and native workers.

Naturally, the effects of migration are uneven across population groups. Low-skilled native workers may face stronger competitive pressures, while high-skilled workers tend to benefit from economic expansion. Therefore, to mitigate potential negative effects, migration policy should be accompanied by active labor market measures supporting domestic workers, including education and retraining programs, incentives for hiring nationals in specific sectors, and robust protection of labor standards to prevent wage dumping through the exploitation of migrants. Countries that successfully integrate migrants typically enforce minimum wage regulations, unified labor standards, and effective labor inspections, thereby avoiding the emergence of a "two-tier" workforce. For example, in Canada and Australia, migrants are protected by the same labor laws as citizens, which significantly reduces the risk of declining labor standards.

Overall, migration affects the labor market in both positive ways—by alleviating labor shortages, creating new jobs, and increasing market flexibility—and in ways that pose challenges, such as heightened competition in certain segments and the need for effective integration policies. The prevailing consensus in OECD and IMF research is that the overall impact of migration on native employment and unemployment is, on average, neutral or slightly positive, provided that sound macroeconomic policies are in place. The industrial economy, as a major employer, typically benefits from the inflow of additional labor, thereby increasing potential GDP.

Migration influences not only the quantity of labor supply but also the qualitative characteristics of the industrial economy, including labor productivity, the accumulation of knowledge, and the diffusion of new ideas and technologies. Several key channels of this influence can be identified.

First, the qualifications and skills of migrants merit attention. Migration flows are often polarized, consisting primarily of either highly skilled professionals or low-skilled workers. Both groups affect productivity, but in different ways. Highly skilled immigrants contribute directly to innovation. Numerous examples show that inflows of foreign scientists and engineers have strengthened the research capacity of host countries. In the United States, for instance, the share of foreign-born scientists in universities exceeds 50% in several technical disciplines, leading to higher levels of academic publications and patenting. Estimates suggest that migrants educated at U.S. universities made their inventions approximately 23% more productive after migration, measured by the increase in patents per inventor. Immigrant entrepreneurs have also founded a large number of technology companies, creating new products and jobs. This phenomenon is not limited to the United States; in Europe as well, firms founded by migrants—for example in the United Kingdom—have, on average, demonstrated higher growth rates.

Low-skilled migrants influence productivity indirectly by freeing local workers for more productive tasks. This is often described as the “labor reallocation” effect: when migrants take on routine jobs (such as cleaning or simple manual work in manufacturing), local workers can be reassigned to more complex, skill-intensive operations. As a result, overall productivity rises because human capital is used more efficiently. For example, the availability of migrant domestic workers enables highly qualified women in advanced economies to return to work after childbirth, thereby increasing the overall contribution of skilled labor to the economy.

Migration can also stimulate the diffusion of knowledge and technologies. As people move, they carry with them practices, experience, and ideas. In industry, this is evident when cross-border teams in multinational corporations bring together specialists from different countries, facilitating the exchange of best practices. Similarly, when workers from a sending country gain experience in foreign factories and later return home, they can help modernize domestic production. It is no coincidence that countries such as China and India actively encourage the return of citizens who have acquired education and professional experience in the West to support the development of domestic innovation clusters (for example, China’s “Thousand Talents” program and India’s initiatives to attract returning scientists). This form of return migration, or “brain circulation,” has positive effects on global science and industry by promoting the worldwide dissemination of knowledge.

With regard to labor productivity, migrants often display high motivation and strong work ethic, initially compensating for potential language or skill gaps. Many employers note that migrants tend to work harder, are more willing to take overtime, and acquire new skills more rapidly in order to secure their positions. OECD statistics indicate that migrants, on average, work more hours per year than native workers, partly due to multiple job holding or irregular working arrangements. This increases overall output. On the other hand, if migrants are employed in low-productivity activities (for example, manual labor instead of automated processes), their availability may reduce incentives for technological upgrading. Some researchers have observed that the abundance of cheap migrant labor has delayed robotization in sectors such as Southern European agriculture or construction in Gulf countries. In this sense, easy access to low-cost labor can potentially slow productivity growth driven by innovation. However, this is largely a matter of policy: advanced economies typically aim to attract migrants while simultaneously promoting technological adoption, as the two objectives are not mutually exclusive when supported by sound industrial policy.

Innovation and migration have been widely studied together. Quantitative indicators, such as patent counts, show a positive correlation with the share of immigrants. In the United States, around 36% of registered patents include at least one foreign-born inventor, a figure far exceeding immigrants’ share of the population (approximately 14%). This indicates that migrants are disproportionately active in inventive activity. The reasons include selection effects (those migrating on work visas are often already highly skilled), diversity effects (the combination of different ideas generates novel solutions), and dynamism (the determination and entrepreneurial spirit often associated with migrants). Silicon Valley is a classic example: without the inflow of talent from around the world, it would not have become a global innovation leader. Similarly, in Germany, growth in the IT sector is partly supported by migrants (such as engineers from India and Eastern Europe), contributing to the digital transformation of industry under the Industry 4.0 framework.

Another important dimension concerns industrial clusters and migration networks. Migrants can facilitate the establishment of international linkages between firms. For example, Chinese and Indian engineers who gained work experience in the United States later founded businesses that connected Silicon Valley with Asian markets, thereby stimulating two-way investment flows and trade. A World Bank study notes that a 10% increase in the size of a diaspora in country X leads, on average, to approximately a 1.5% increase in exports from country X to the diaspora's country of origin, driven by market knowledge and personal networks. This phenomenon is often referred to as "diaspora diplomacy" or the network effect of migration.

From the perspective of sectoral innovation, migrants play a dual role: they act both as consumers of new products—introducing diverse demand patterns—and as founders of startups, particularly in fields such as information technology and biotechnology. Many countries actively seek to attract migrant entrepreneurs through special visa programs, recognizing their contribution to technological development. For instance, France has launched the Tech Visa, and the United Kingdom offers the Global Talent visa to encourage the inflow of startup founders and highly skilled innovators.

For labor-exporting countries, the impact on innovation is twofold. On the one hand, the emigration of young talent (for example, a programmer leaving Uzbekistan to work in the United States) represents a loss for the domestic innovation ecosystem. On the other hand, some of this talent can contribute remotely or return later with enhanced skills and experience. In the era of globalization, remote work mitigates this dilemma: individuals can now work for foreign companies while remaining in their home countries. This emerging trend—whereby many IT specialists in developing economies work remotely for firms in advanced economies—generates income for the home economy and upgrades human capital without causing physical outmigration. This form of "virtual migration" also affects productivity and knowledge exchange.

Education and migration represent another critical aspect. Migrants often seek to upgrade their skills, and in several countries the children of migrants demonstrate strong academic performance when integration policies are effective. As noted in the German case, children of immigrants born in Germany have significantly improved their educational outcomes over the past two decades. This suggests that, in the long run, migration can increase a country's overall human capital by adding new cohorts of educated citizens. The industrial sector benefits accordingly through an expanded pool of skilled labor.

CONCLUSIONS AND SUGGESTIONS

In conclusion, migration affects the productivity of the industrial economy in a multifaceted manner. The inflow of labor with diverse skill levels optimizes task allocation and enables countries to focus on their comparative advantages—for example, highly skilled migrants strengthen knowledge-intensive industries, while low-skilled migrants support labor-intensive sectors without pushing them offshore. When effectively managed, these dynamics raise total factor productivity. Countries that have historically remained open to migration, such as the United States, Canada, and Australia, exhibit high rates of innovation and economic flexibility, in part due to the continuous inflow of new talent and motivated workers.

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