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Algorithmic Migration

How Digitalisation and Artificial Intelligence Are Reshaping Global Mobility

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Digital and artificial intelligence (AI)-based systems now shape all phases of international migration – from the pre-screening of applications and profiles to border management and the integration of migrants. States, international organisations, and private providers use digital platforms, biometric systems, and algorithmic processes to manage migration in a more targeted way. At the same time, migrants themselves use digital tools to obtain information, prepare decisions, and secure access to work or support. This development is changing migration not only operationally but also structurally: It enables new forms of digital labour mobility, shifts power relations and dependencies, and embeds migration into a global data economy. For Germany and the European Union (EU), the question arises as to how digitalisation and AI can be shaped in terms of migration, foreign, and development policy so as to deliver efficiency gains in administration and procedures, without undermining data protection, equal treatment, and human-rights standards.

International migration is increasingly being organised and controlled digitally. Digital identities, interoperable IT systems, automated verification procedures, and data-driven analysis and prioritisation tools are used throughout the entire migration process. As a rule, these systems do not replace formal sovereign decisions; rather, they are used for analysis, pre-structuring, and to support decision-making, and they shift political steering into upstream technical infrastructures.

The expansion of such tools follows political and economic priorities. Given the global shortage of skilled workers, rising mobility, and growing demands for efficient public administration, many countries are relying on digital procedures to manage migration more selectively and reduce transaction costs, for example in visa issuance, the recognition of qualifications, or labour-market integration. In Germany, too — with the ongoing digitalisation of visa and residence permit procedures and the planned digital Work-and-Stay Agency — migration-policy processes are increasingly being bundled digitally and partially automated.

Digital migration governance is thus becoming an instrument of economic competitiveness, security risk management, and foreign policy. However, there is still no coherent overarching strategy. It remains unclear how migration, foreign, develop-

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ment, and digital policy objectives will be systematically aligned and implemented, and what role non-state actors play — especially those providing key data-driven or AI-enabled applications.

Digital and AI-enabled applications along migration routes

The digitalisation of migration is now evident in all phases of the migration process: from information gathering and application submission, to mobility and border crossing, as well as to integration in the destination country and return. New interfaces are emerging between government agencies, international organisations, technology companies, and civil society actors. Migration is increasingly embedded in transnational digital infrastructures that connect administration, control, and support.

Pre-migration: Access to information, selection, and application

Even before migration takes place, digital and, in some cases, algorithmic systems shape key decision points in the migration process. States use them to standardise and expedite procedures to align them more closely with political objectives, in particular through upstream selection, ranking, and screening mechanisms.

A well-known example is Canada's Express Entry system. Prospective migrants create digital profiles that are automatically evaluated and ranked based on defined criteria such as qualifications, professional experience, or language proficiency. Migration is thus structured even before a formal application is submitted, with political objectives translated into data fields, point systems, and algorithmic selection mechanisms that determine whose profile is admitted for further review.

This form of digital advanced screening is also gaining importance at the European level. With the European Travel Information and Authorisation System (ETIAS), which is scheduled to go into operation in the last quarter of 2026 after previous delays, personal data from online applications, such as nationality and employment status, will be automatically cross-checked against existing EU databases. Rule-based and algorithmic procedures are used to assess security and migration-policy risks in advance and to categorise travellers even before they cross the border. Migration-policy control is thus increasingly shifting to upstream decision-making spaces.

In addition, many OECD countries use automated document and plausibility checks in digital visa procedures. Proof of identity, education, or employment is recorded digitally and checked for consistency and anomalies using automated systems, often before a formal official assessment.

These government instruments are complemented by digital offerings from non-governmental sources. Job placement platforms such as Upwork and freely accessible online self-assessment tools for estimating one's immigration prospects (such as point calculators for programmes such as Canada's) already influence migration decisions at an early stage by managing expectations and encouraging self-selection.

Information gathering, application submission, and pre-screening are therefore increasingly taking place online and in a semi-automated manner. This facilitates access to procedures and can speed up processes, but it also increases the importance of standardised personal, qualification, and procedural data, of criteria catalogues, and of technical assessment systems. Biased datasets, selective selection criteria, and limited opportunities for correction can systematically disadvantage certain regions of origin, education paths, or employment histories, for example if training or reference data primarily reflect certain profiles and classify others as "high-risk". In this way, existing inequalities are reproduced at an early stage of the migration process.

During migration: Infrastructure, management, and protection

During migration, digital and data-driven systems are primarily used to record, link, and manage mobility operationally, while also supporting and protecting migrants.

In the EU, large IT infrastructures form the backbone of the so-called smart border approach. These include databases such as Eurodac, which stores biometric data on asylum seekers and irregular migrants, and the planned Entry/Exit System (EES), which is scheduled for progressive rollout from 2025/26. These instruments aim to systematically record the movements of third-country nationals and link them via interoperable systems. The objective is to attribute identities more clearly, trace travel and stay histories, and identify security and migration-policy risks earlier.

Aggregated data on border crossings, registrations, or movement patterns will be used to identify changing migration routes, regional hotspots, or seasonal shifts, and to derive operational situational assessments. Building on this, data-driven analytical methods support the prioritisation of personnel, screening capacities, and control measures. In this way, such systems influence where authorities focus their efforts and which developments or cases are monitored more closely.

Beyond the analysis of existing movement patterns, predictive approaches are also gaining importance. Researchers, international organisations, and security agencies are increasingly experimenting with data-intensive models and machine learning to anticipate refugee and migration movements, for example in connection with conflicts, climate risks, or economic shocks. Such predictive models promise earlier planning and prevention, but they are methodologically highly controversial and heavily dependent on data availability and model assumptions. They also raise questions about responsibility, perverse incentives, and the political use of forecasts.

Digital and semi-automated procedures are also used in the asylum context, for example in registration, biometric identification, and the prioritisation of procedures. Country-of-origin analyses, security checks, and plausibility checks are in part supported by data-driven methods. This can speed up procedures, but it also increases reliance on data quality, assessment logics, and technical standards in a particularly sensitive protection context.

These developments are also being addressed politically at the EU level: The Commission plans to establish a "Forum for AI on Migration" in 2026 to systematically review and structure the use of AI in asylum, migration, and border management.

International organisations also use digital systems. The International Organization for Migration (IOM) deploys digital data-capture and analytical tools through MIDAS (Migration Information and Data Analysis System) to register border crossings and evaluate migration data, in particular in countries of origin and transit. The United Nations High Commissioner for Refugees (UNHCR) operates PRIMES (Population Registration and Identity Management EcoSystem), a global digital identity and registration system for refugees. This system combines biometric and biographic data to enable access to protection and assistance and to prevent multiple registrations.

Private technology companies are involved in the technical implementation of many of these systems. Consulting and IT service providers such as Accenture, and data-analytics companies such as Palantir, provide software for the integration, visualisation, and analysis of large volumes of data, thereby shaping the operational design of migration-policy management. Alongside state and international authorities, civil society and humanitarian actors also play an important role with their digital offerings. Apps and platforms such as RefAid support orientation, access to information, and networking with local support services.

This phase in particular highlights how closely administration, control, and protection are intertwined in digital migration

systems — the same infrastructures that enable access to assistance also structure the monitoring, categorisation, and prioritisation of mobility.

After migration: Integration, remittances, and return

After arrival in the destination country, digital and algorithm-based systems primarily shape how integration is organised, how access to the labour market is facilitated, and how conditions of stay are managed. A key area is the recognition of qualifications and access to the labour market. In Germany, for example, the relevant procedures are increasingly being handled digitally, for example via online portals such as "Anerkennung in Deutschland" (Recognition in Germany), which consolidates competent authorities, required documentation, and procedural steps. This speeds up processes, but it also shifts organisational responsibility onto migrants, who must provide documents digitally and actively manage procedures.

Building on this, algorithmic matching and recommendation systems are being deployed. Public employment services and private platforms use digital profiles, automated skills matching, and ranking logics to assign migrants to occupational fields or support measures. Private employers are not only users of these procedures but also indirectly involved in their design, for example through requirement profiles, selection practices, and the choice of platforms and systems. In countries such as Canada, administrative data are systematically evaluated to align integration programmes more closely with labour-market needs and to prioritise measures.

Digital identities now also play an increasingly central role. In countries with well-developed e-government structures, such as Estonia, they serve as a central point of access to administrative services, the labour market, health care, and banking services. Digital identity is thus effectively becoming a prerequisite for social participation.

In some countries, digital systems are also used for residence administration and compliance management. In the United Kingdom, for example, fully digital eVisas replace physical residence permits; migrants' rights and obligations are verified and checked via online systems. The legal security of residence status is thus increasingly dependent on reliable digital infrastructures.

Another key area for such applications is the financial sector. Digital service providers such as WorldRemit and Sendwave enable fast and inexpensive money transfers to countries of origin. This makes remittances more accessible, while at the same time generating detailed data on income, transfer behaviour, and transnational networks, which creates new dependencies on private payment platforms.

In the context of return and reintegration, international organisations such as the IOM — in Bangladesh, for example — also use digital databases to record support needs and plan interventions, among other things. Depending on the context, information from previous residence or asylum procedures may also be included. Such data integration can make reintegration programmes more targeted, but it also raises questions about purpose limitation, informed consent, and the handling of sensitive personal data.

Digital systems thus have a less visible but more structural impact after migration. They shape integration trajectories, access to work and services, and the conditions for legal security. They can facilitate access and speed up procedures, but at the same time create dependencies on platforms, data infrastructures, and algorithmic logics.

A shared pattern emerges across all phases of migration: Digital systems not only transform migration management through efficiency gains, but also embed it within upstream infrastructures, data models, and prioritisation logics. Unlike in largely analogue processes, selection, categorisation, and risk assessment are increasingly standardised, scaled, and technically pre-structured. This accelerates procedures, but it

also determines whose mobility becomes possible, visible, or administratively actionable, and it shifts political decisions in part into technical preliminary decisions.

How digitalisation and AI are structurally changing migration

Digital and AI-enabled systems are thus changing migration not only in specific areas, but also structurally by permanently influencing mobility, its governance, and the associated power relations. Three developments are particularly significant in this regard: the expansion of digital labour mobility, new power asymmetries, and the embedding of migration in a global data economy.

Digital labour mobility: From physical to virtual migration

Digital technologies are changing international migration by enabling new forms of transnational employment that, in some segments, can partially replace physical migration or restructure it. Digital platforms, cloud infrastructures, and algorithmic matching systems are making it increasingly possible to work, irrespective of location. In certain segments, activities that previously required physical mobility can now be offshored digitally — a process often described as "virtual migration".

Knowledge-intensive and standardisable activities, for example in the fields of IT, design, data processing, and digital services, are particularly suitable for virtualisation. For countries of origin, this can create new income opportunities without incurring the social and financial costs of physical migration. Countries such as India, the Philippines, and increasingly African countries have specifically built up digital service sectors that are integrated into global value chains, and they are benefiting from the growing demand for digital labour.

At the same time, this development can indirectly influence migration policy in destination countries. If labour for certain activities is available digitally, this can reduce political pressure to expand physical immigration pathways in certain segments, depending on the labour market and regulatory framework. Virtual labour mobility thus acts in part as a functional substitute for migration. However, this applies only where tasks can genuinely be virtualised and where companies, labour laws, and infrastructure enable this form of work.

However, a large proportion of economically relevant work remains location-bound. Jobs in health care, construction, agriculture, logistics, and personal services require physical presence and are heavily dependent on migrant workers in many destination countries. While knowledge-intensive activities can increasingly be delivered digitally, physical migration therefore concentrates more on non-virtualisable, often low- or medium-skilled activities, which are often associated with precarious working conditions and limited legal protection.

Virtual and physical migration are thus not developing in parallel but diverge along lines of work and skills profiles. Digital labour mobility shifts employment opportunities into the virtual space, while physical mobility remains indispensable in key sectors. This dynamic is changing migration patterns, exacerbating inequalities between different groups of workers, and raising questions about regulation, social protection, and fair participation.

New power asymmetries

Furthermore, the increased use of data-driven and automated systems in migration management is changing power relations and dependencies. Digital procedures structure access, priorities, and decision workflows and therefore do not operate neutrally but can affect different groups unequally, depending on their design.

For migrants, asymmetries vis-à-vis state authorities are intensifying. Decisions on mobility, residence, or access to services are increasingly based on complex data-processing and assessment systems whose functioning is often difficult to understand for

those affected. Opportunities to review, correct, or challenge such assessments effectively often remain limited, especially in transnational procedural phases and where transparency and justification requirements are weak.

At the same time, new dependencies on digital services are emerging. Platforms, apps, and automated systems are becoming central interfaces for information, procedures, and support services. Those who do not have access to these systems, or who lack sufficient digital skills, are structurally disadvantaged, regardless of their formal legal status.

Power relations between states are also shifting. Countries with well-developed data infrastructures and analytical capacities can capture, prioritise, and manage migration in a more targeted manner. States with limited resources, by contrast, tend to be more dependent on external systems, international organisations, or private technology providers, and they have less influence on technical standards, data use, and system design.

Lastly, dependence on private technology companies is increasing. External software solutions, data platforms, and analytical tools shape the operational design of migration-policy management, thereby influencing how selection, prioritisation, and assessment processes are technically implemented. This creates new, long-term lock-ins to individual providers because core infrastructures, data formats, and workflows are tailored to their systems. Switching can then be associated with high costs, risks, and loss of functionality. These actors thus exert influence over key instruments of migration governance without themselves being politically accountable — with consequences for transparency, accountability, and the state's capacity to exercise control.

Migration in the global data economy

With the ongoing digitalisation of migration processes, data itself is becoming a key resource for both political control and economic value creation. Information about identity, mobility, qualifications, or residence histories forms the basis of digital migration systems and is therefore systematically collected, linked, and evaluated. Migration is thus increasingly embedded in networked data infrastructures that extend beyond individual procedures.

In this logic, migration is shifting from a primarily administrative policy area to a data-driven domain of control. Countries and organisations that can capture, link, and evaluate large volumes of data gain structural influence over how mobility is shaped. Analytical capacities, technical standards, and interoperable systems become strategic resources that help determine political room for manoeuvre.

This data economy is organised transnationally. Migration-related data circulate across national borders and are used by states, international organisations, and private actors. Control over infrastructures and analytical capacities is concentrated in the hands of a few actors, while countries of origin and transit, in particular, often have only limited influence on usage, onward processing, and standard-setting.

For migrants, being embedded in this global data economy means increased visibility. Data can facilitate access to mobility, work, or services, but they also structure how people are categorised, assessed, and slotted into administrative templates. Questions of data sovereignty, purpose limitation, rights safeguards, and international accountability often remain largely unresolved and can only be regulated to a limited extent within national legal frameworks.

New governance challenges

These developments pose new challenges for existing forms of migration governance. This applies to countries of origin, transit, and destination alike, as well as to European and international cooperation.

On the one hand, new opportunities are emerging for countries of origin and transit,

for example through digital labour mobility and data-driven migration programmes. On the other hand, many of these countries have only limited capacity to control the technologies deployed, the data collected, and its onward use themselves. Key challenges here relate, in particular, to the development of domestic digital skills, the protection of personal data of (potential) migrants, and the regulation of external providers in a growing market for migration-relevant digital infrastructures.

New governance requirements are also emerging for destination countries, including Germany and other EU member states. The current EU migration strategy provides for a significant increase in investment in digital infrastructure and IT capacities. This heightens the need to link digital efficiency gains with rule-of-law and human-rights standards. Digital procedures increase the speed and scalability of migration management, but they require clear rules on transparency, accountability, and non-discrimination. Responsibilities become harder to trace when key procedural steps rely on externally developed systems or proprietary technologies. Digital migration governance is thus becoming a cross-departmental task at the interface of migration, labour, digital, and data policy.

At the European and international levels, there is a growing need for cooperation and common rule-setting. Digital migration systems operate across borders, for example through interoperable databases, shared platforms, or outsourced technical services, while regulation remains predominantly organised at the national level and has so far only kept pace with this technological development to a limited extent. This is particularly relevant in cooperation formats with countries of origin and transit, for example in the context of migration partnerships. In these settings, digital registration, data matching, and technical infrastructure are increasingly becoming part of practical cooperation and political negotiation processes.

In this context, international standard-setting processes are also gaining importance. Regulatory frameworks such as the EU AI Act of 2024, which will be implemented gradually from 2026, are not primarily designed for migration policy, but they do have an impact on migration-related applications, such as automated decision-making, risk-assessment, and matching systems. However, longer transition periods apply to large-scale information systems in the justice and home affairs domain — including ETIAS, EES, and interoperable databases — meaning that key AI rules will not become binding until 2030 in some cases. This creates a politically sensitive transition period in which digital migration systems are already operative while their AI-specific regulation has not yet fully taken effect. Germany and the EU are thus faced with the task of specifying such horizontal digital regulations into migration-policy practice and supporting implementation across public authorities and administration.

Recommendations for action

This gives rise to several starting points for Germany and the EU. First, transparency and legal protection in digital and AI-enabled procedures should be strengthened. Algorithmically influenced processes in visa, selection, and matching procedures should be documented in a comprehensible manner, identified as such, and subject to clear obligations to provide justification, while also offering effective options for review and challenge. This is a prerequisite for strengthening trust in digital procedures and limiting the risk of discrimination.

In addition, a coherent European framework is needed for the use of AI in migration management. The EU AI Act sets an important legal benchmark, but its full effect in key areas of justice and home affairs will unfold only gradually and, in some cases, only in the coming years. This makes it all the more important to actively shape the transition phase through sector-specific guidelines, clear allocation of responsibilities, and minimum standards

for transparency, data protection, and human oversight. Without such political and administrative support, there is a risk that digital migration systems will expand faster than the legal and institutional guardrails that are meant to contain them.

At the same time, Germany and the EU should strategically limit their dependence on private technology providers. Digital migration systems must be designed in such a way that public authorities retain control over core infrastructures and sensitive data. Key levers for this are public procurement, open technical standards, in-house digital skills that should be developed across public authorities and administrations, and binding requirements on data portability and exit strategies.

Digital tools should also be embedded more systematically in foreign, development, and migration-policy partnerships. They should be linked to minimum standards on data protection, purpose limitation, and independent oversight in order to limit misuse. In cooperation with countries of origin and transit, digital solutions can contribute to skills transfer, fair labour mobility, and cost-effective remittances. Development cooperation should focus even more than before on strengthening digital skills and infrastructures in order to avoid digital inequalities along migration routes.

Finally, a stronger evidence base is needed. The benefits and side effects of digital migration tools have so far only been examined to a limited extent empirically. Germany should expand its research, monitoring, and evaluation in this area and actively participate in international standard-setting processes, for example in the EU (including the implementation of the AI Act), in OECD and Council of Europe forums, and in migration-related processes of the United Nations, in order to help shape fair, transparent, and human-rights-compliant standards for the digitalisation of international migration.

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