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TECHNOLOGY DRIVEN GROWTH, MIGRATION AND SUSTAINABLE DEVELOPMENT

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ABSTRACT

In destination nations, especially high-income nations, highly skilled migrants make significant contributions to technology innovation, research, and development.For migrants and their communities, migration serves as a powerful engine for sustainable development, according to the 2030 Agenda for Sustainable Development. By transferring knowledge and resources, it improves the lives of populations back in their home countries, bringing considerable advantages in the form of skills, a stronger labour force, investments, and cultural variety. While some of these technologies are problematic for immigrant rights, others, like block chain, might have more useful uses. Every facet of migration is impacted by technology, especially the digital connectivity provided by mobile phones. For example, technology makes it easier for migrants to send money home and stay in touch with their relatives through facilitating remittances. Research and development (R&D) activity in destination nations is significantly influenced by Migrants and Diasporas, particularly highly skilled individuals.

The paper will address SDGs and the realisation of the 2030 Agenda for Sustainable Development by examining the technology-migration nexus. This will show that immigrants are essential for technical transformation and innovation processes in both origin and destination nations. Additionally, relying on technology and technical advancements is essential to both the migration process and efforts made by the government to control or restrict migration. Also it will be analysed that an essential conduit for exporting technology from destination countries back to home countries is diasporas and migrant communities.

Keywords: Migration, Sustainable development, Technology, Diasporas, Remittances

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Introduction

The Fourth Industrial revolution and artificial intelligence has made various changes in today's economy. International migration is increasingly being referred to as one of the defining issues of our day in conjunction with these changes, most visibly in the economic sphere (Hamel,2009).Technology has an important role in migration aspect and it plays an important role in various aspects related to it and sustainable development. One of the characteristics of the twenty-first century is migration, which has a major impact on global economic and social growth. Migration will therefore be essential to fulfilling the Sustainable Development Goals (SDGs). The relationship between migration and sustainable development are very important for the development of that nation (Piper,2017).

Issues related to migration, technology and development are listed in the sustainable development goals (SDGs). This goal reflects the importance of technological changes in overall increase in growth, reduction in poverty and standard of living. The Sustainable development Goals 10 explicitly talk about migrationi.e target 10.7. For transferring technology from back to the countries of origin from the destinations. A major route is the groupings of migrants and diasporas. This could be done by sharing expertise, sending money home, investing in the countries of origin, and supporting the growth of local businesses. Every facet of migration is impacted by the digital connectivity provided by technology since it facilitates remittances, allows for information access before, during, and after travel, and aids migrants in maintaining relationships with their families at the place of origin (Nicolai et al, 2017).

SDG 8 emphasizes the need of technology advancement for economic progress. The so-called "brain drain" of highly-skilled employees from low- and middle-income nations is one of the factors contributing to the global concentration of R&D and technological skills in high-income countries, which is the subject of Goal 9. The unequal distribution of technological capabilities between the global "North" and "South" is addressed by Goal 17, which focuses on global cooperation. The need to counteract the "brain drain" with "brain gain"—the return of highly skilled migrants to their home countries—and "brain circulation"—the transfer of knowledge and technology to home countries by migrants and diasporas, at least in part through temporary returns—is emphasised.Goal 10 outlines solutions to two particular issues that affect migrants: enhanced migration procedures and reduced remittance expenses. Access to new technology, particularly mobile and related digital technologies, is essential for addressing both issues. The target 10 of the sustainable development goals may be compromised by governments' use of technology to restrict borders and stop migration. Goals 2, 3, 5 and 7, which addressing the specific challenges of, environmental health consequences, gender equality,food security and agricultural productivity,energy poverty and water quality respectively are also equally important (Adger et al, 2019).

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The use of information and communication technology (ICT) by migrants during their migration travels has gained considerable attention in recent years. In part as a result of significant migration events, researchers, decision-makers, analysts, and law enforcement organisations have invested time and energy into determining how ICT is being used to promote migration (Collin and Kaesenti, 2012).

The relationship between migration and technology that emerges from pathways one and two is very strongly related to the knowledge aspect of technology. Migrants have made a significant contribution to innovation in their host countries. Migration is always an important concept whether it's a developing or developed country and it consequently increasing because of new opportunity in today's period of globalization.

Literature Review

Undocumented voluntary international migration usually puts sustainable development at risk, whereas documented migration often leads to it. Contrarily, whereas lack of sustainable development often leads to an increase in undocumented migration, sustainable development is likely to boost documented migration. An effective global migration strategy that may decrease voluntary international migration that is not documented and boost documented international migration is a sign of sustainable development, which can increase wealth, peace, and security on a worldwide scale, according to the study (Aniche, 2020).

One of the most obvious and important effects of globalization is increased migration, as more individuals are migrating cross borders and within countries in search of better lives and employment opportunities. Despite being generally viewed as a negative, migration supports sustainable development. Remittances increase security for homes in low-income areas, and with the backing of the right policies, they can support local economic development. Migrant workers represent a growingly significant portion of the labour force in industrialized nations with ageing populations, supporting national welfare systems. In addition to clearly protecting the rights of migrants, which are all too frequently disregarded in efforts to stop migration, national and international policy must take into account the contribution of migration to sustainable development (Tacoli, 2001).

Instead of focusing only on individual migration occurrences, it would be beneficial to include migration as one of the household's means of subsistence. Agricultural intensification, diversification, and migration are all possible means of enhancing livelihoods. These techniques may be alone used by households or may be combined by households, and it is likely that the strategies have an impact on one another. The likelihood of intensification and diversification is likely to be impacted by migration: emigration is likely to have an impact on agricultural

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practises, and remittances and/or returning emigrants are likely to alter these practices (McDowell &Haan, 1997).

Keeping people out and in processing migrants after they arriveThe migration management by governments relies heavily on information technology in keeping people out and in processing migrants after they arrive. Governments should place a high priority on the advancement of block chain technology for migrant financial inclusion, digital identity, and financial transactions. (Gelb& Krishnan, 2018).

Theories of transformation describe how societies might diverge from their current unsustainable trajectories. However, one of the shortcomings of these present models and conceptions is that they do not adequately take into account demographic changes, particularly migration. Contrarily, migration is conceptualised in migration transition theories as an integral component of greater societal transformation processes [1]. As a result, we contend that theories of transformation to sustainability will do a better job of describing current trends and possible leverage points if they take into account modern dynamics as well as the opportunities and difficulties presented by migration and related demographic shifts (Gavonel et al, 2021).

Material and Methods

This is a descriptive research study that draws on secondary sources created by many writers and researchers. The researcher has looked through a number of books, journals, and websites that are included in the reference section in order to get the necessary knowledge.

Objective of the Study

1. To analyze the technology affect the different aspects of migration.
2. To analyze how technology- migration nexus helps to achieve different goals of Sustainable development.
3. Technology use in migration management.
4. To analyze the role of technology in achieving the SDGs.

Technological Innovation and Migration

Today economy is being consistently transformed by internal and external migration. If the external migrants were to constitute a country it would most likely rank among the top globally. Coming from other place and using Information and communication technology (ICTs), migrants may choose to explore the different phases of migration as it plays a role of new ecosystem in migrant's life. ICT use offers new knowledge about a body of humankind on the move with a mobile phone in their pocket. The accesses to the Internet to guide them keep them in touch and

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maintain their life wherever they may be. The contribution to innovation by migrants in destination countries is substantial (Lissoni, 2018). This is because of difference in cultural diversity and it encourages unconventional and out-of-the-box thinking and discourages groupthink, adding to new ideas and knowledge creation. Unlike innovation, there is diffusion of technology from one place to another.The spread of already-developed technology requires the transfer of information, which depends on shared linguistic and cultural norms as well as local expertise when it happens outside. As a result, diasporas and migrants make a substantial contribution to the spread of technology from residences to countries of origin. The diffusion of technology involves high skilled people trained in science and technology. The diffusion of technology both inward and outward involves high skilled migration making migration policy an important tool of technological and industrial development and sustained economic growth.

Sustainable materials for use in new technologies are a significant element of the so-called "fourth industrial revolution," which, according to the World Economic Forum, is characterised by "a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres."15 of the top 25 US "tech companies" (mostly in ICT) were founded by first- or second-generation immigrants. Amazon, Google, and Facebook were among them, along with Apple and Ebay, PayPal, Tesla, and Yahoo (Molla, 2018). The chief executive officers of firms like Google, Microsoft, and Pepsi are immigrants". Young migrant tech entrepreneurs are also leading social innovations in destination countries that may have relevance for SDG targets in home countries and other developing nations. A good example is the UK-based company logically, which was established by a 21-year-old Indian immigrant. It is an artificial intelligence platform that enables citizens to obtain accurate information on how their government is operating (SDGs 5.b and 16). An open source web application called Taarifa was created by a group of young Tanzanian-Americans to help public officials respond to community concerns regarding sanitation services - SDG 6 (Gelb and Krishnan, 2018).

Governments of the destination countries should encourage highly skilled internal migration and labour mobility rather than limiting the options available to migrants through frequently observed restrictive foreign worker quotas, rigid labour market policies, and accreditation regulations. This will increase innovation, technological advancement, and productivity growth. There are many skilled immigrants frequently obliged to "down-skill"—for instance, doctors or engineers operating cabs without the opportunity to use theirprofession due to the absence of origin-country accreditationeducation and certification. According to SDG 17, there is a significant disparity in countries' capacities for technological advancement, and migration plays a significant role in both causing and sustaining that disparity (McGregor, 2020).

Some have suggested that richer countries unilaterally adopt quotas on highly skilled recruitment from poor countries because they believe that lower entry barriers in high-income destination

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countries would worsen the outflow of skilled workers from poorer countries where they are a scarce resource (Collier, 2013). Many others advocate for origin countries to use quotas or fees to attempt and limit out-migration. These opinions, as well as the metaphor of "brain gain against brain drain," are, however, being disputed more and more.

One argument is that people with migration aspirations may actually increase their demand for education and skills to improve their migration abilities, which would result in a net increase in skills in their countries of origin since many newly skilled people would ultimately choose to stay rather than leave.The ability of emigrants and diaspora communities to return technology and other forms of knowledge to their home countries as well as to increase those countries' "absorptive capacity," or their capacity to advance technology through local innovation or diffusion, which depends on strong institutions and skill pools, may be a more compelling set of arguments. Metaphors like "brain circulation" and "brain banks," rather than the binary terms "brain gain" and "brain drain," may be more appropriate for describing the contributions of migrants and diaspora to the transmission of technology. There are three main ways that immigrants and those living abroad might aid in the technical advancement of their home countries: Direct technical and knowledge transfers, diaspora investment and remittances that foster economic development and change in origin countries, and encouragement of local entrepreneurship are all examples of direct technological and knowledge transfers. In order to encourage or incentivize diaspora networks to help local development through knowledge transfer, many nations (including Scotland and India) have established government ministries or agencies.

Remittances are one-way transactions or transfers with no commensurate return of economic value to the sender and are based on an interpersonal link between the sender and recipient (often a household). In contrast to homes, businesses, government entities, or non-governmental organizations receive diaspora investment. These exchanges or transactions are two-way and involve the recipient returning an item of equal value to the sender(s). There are many different ways that remittances and diaspora investments are made, and in many cases, information and technology are transferred along with the actual financial resources (Taylor, 1999).

In many low- and middle-income countries, remittances sent by both wealthy and poor migrants account for a sizeable share of the GDP and have an impact on macroeconomic conditions as well as households and microbusinesses. Remittances from low-skilled migrants are mostly used to meet the basic requirements of families "back home," but they can also be used to help families invest in homes or education. Particularly in underprivileged communities, these investments support the spread of technology and the improvement of skills (and absorptive capacities).

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Beyond remittances, diaspora investment uses the savings of other, wealthier migrants and the diaspora and can take many different forms, such as equity in businesses in the source nation or loans and bonds issued in the source nation to attract funding from destination nations for particular projects. Diaspora investors seek a financial return, thus they or the project promoter will work to increase profitability, frequently through the adoption of new technologies. Incentives to improve financial institution capacities and regulation in the countries of origin are created by the financial investments made by migrants and the diaspora, particularly remittances (Cohen, 2011).

Return migration is a typical method of migrant assistance for business growth and technical advancement, especially in rapidly emerging nations with sizable diasporas like India, China, or Korea. **(**Wang, 2015; Kuznetsov et al., 2006). The entrepreneurial spirit, technology, marketing expertise, and business networks of returning immigrants serve as a source of funding for investments as well. Digital Green and the Escorts Heart and Research Centre in India are two instances of new SDG-related technologies being disseminated in origin nations as a result of return migration. A returning immigrant who had previously immigrated to the US launched the app-based business Digital Green, which uses technology and partnerships at the local level to empower smallholder farmers in India.

Role of technology in providing facilities for Migrants

Technology is used by individual migrants and refugees in a variety of ways to facilitate and support their migration process. A "game changer for migration" is the combination of mobile devices, the internet, and social media, collectively known as "digital connectedness".

1. Knowledge about the standard of living and economic prospects available abroad, which influences ambitions, migration decisions, and migration plans, including preferences for destination countries.
2. Important planning and travel information for the journey such as details on modes of transportation (both legal and unofficial, including people smugglers), expenses, translation, and safety, such as how to avoid troublesome borders.
3. Access to personal or family financial resources for the journey through mobile money systems, both during transit and once at the destination.
4. Advice on how to use migrant networks and local knowledge to help with resettling in the destination country after arrival.
5. Maintaining connections with families and networks in their nation of origin through social network apps for mobile phones, voice calls, and texting.

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Migration management and Technology

A policy, programme, legislative measure, development project, or performance of an international or state actor (such as border agencies, immigration services, or international organisations) related to international migration procedures and services, border control, migrant protection (such as countertrafficking, protection of rights of migrants, and their families), as well as cross-border migration is referred to as international migration management.

Despite the fact that the total number of foreign migrants has increased since the 1960s, their proportion to the global population has consistently fluctuated at or near 3%. (Migali et al. 2018). 272 million migrants lived in the world in 2019 (about 3.5% of the world's population) (UN DESA 2019). Because of technological advancements drastically lower migration costs, intercontinental travel has increased.

Migration management technology and SDGs

The uncontrolled deployment of AI systems could actually hinder the fulfillment of SDG 10.7 and increase inequality between different communities within and between nations. Other targets, such as attaining gender equality (SDG 5), promoting full and productive employment (SDG 8), and creating inclusive human cities and settlements, could be severely impacted by AI solutions (SDG 11). Artificial intelligence (AI) can be used to avoid and alleviate both sudden natural disasters and the long-term effects of climate change. First and foremost, the implementation of technologically advanced solutions calls for a strong legislative framework that adequately protects migrants' rights, particularly their right to be treated fairly.

SDGs	Link to Migration
Goal 8 Decent work and economic growth 8.2 Achieve higher levels of economic productivity through diversification, technological upgrading and innovation.	Highly-skilled migrants participate in innovation and R&D in destination countries. Return migrants and diaspora networks support diffusion of new/improved technology into origin countries and R&D there.
Goal 9 Industrial innovation and infrastructure 9.5 Enhance scientific research and upgrade technological capabilities in all countries. 9.b Support domestic technology development, research and innovation in developing countries. 9.c Significantly increase access to information and communications technology (ICT).	Highly-skilled migrants and diaspora members engage in R&D and technology production and diffusion in both destination and origin countries, with spillovers to other people and to institutions in both locations.

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Goal 10 Reduced inequalities 10.7 Facilitate orderly, safe, regular and responsible migration and mobility of people, including through the implementation of planned and well-managed migration policies. 10.c By 2030, reduce transaction costs of migrant remittances.	Digital apps and other mobile telephony technologies facilitate migration journeys and integration and are especially important for lower-skilled migrants and for refugees. Digital technologies may support government migration management but can increase migrants' risks. Technologies are used to close borders. Financial technology ('fintech') apps can reduce remittances costs and increase security of transactions, and support migrants' financial inclusion, as well as financial development in origin countries.
Goal 16 Peace, justice and strong institutions 16.9 Provide legal identity for all, including birth registration	Blockchain technology can expand provision of secure and portable birth certificates and documents.
Goal 17 Strengthen global partnerships for sustainable development 17.6 Enhance regional and international cooperation in science and technology and innovation. 17.7 Promote environmentally sound technologies for developing countries . 17.8 Enhance capacity building mechanisms and enabling technology, in particular ICT . 17.16 Enhance the Global Partnership for Sustainable Development.	Migration and diaspora networks contribute to technological partnerships for 'south' countries

Second, creating AI systems is not just a technological issue but also an ethical one. While using datasets, AI systems can assist in developing convincing causal mechanisms, they can also infer causal relationships where none exist. In refugee resettlement procedures, where data analysis determines where the specific refugee would be most likely to acclimate or achieve economic success, incorrectly identified cause-and-effect relationships between some variables may lead to incorrect decisions being made using AI (Bansak et al. 2018). Algorithmic systems in international migration management are fueled by a vast amount of data from a variety of sources, including border security agencies, law enforcement, health records open sources,

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international organizations (e.g., Migration Data Portal managed by IOM's Global Migration Data Analysis Centre), and private companies (e.g., social Accordingly, the viability of data supply chains affects how well migration management systems operate (Papadopoulos et al. 2016). It is critical to take into account how AI systems may affect the achievement of the SDGs, particularly attaining orderly, safe, regular, and responsible migration, as they become more significant in migration management (SDG 10.7).

Suggestions

Our research has demonstrated how crucial the technology-migration nexus is to achieving numerous SDGs (Table 1). Based on this, we establish a number of general findings and give policymakers in the countries of origin and destination practical, focused advice on how to best use migration and technology. Destination countries should reduce costly and lengthy visa application processes and also ease restrictive quotas on the numbers of highly-skilled foreign workers allowed to enter. Prevent highly skilled immigrants from "down-skilling," so they can contribute as much as possible to their host country. To increase job chances for highly talented immigrants, destination countries can improve skill-matching and other placement programmes. The use of technology to destination applied migration management. It is necessary to complement countries of origin or transit. Through accountability procedures to completely protect immigration rights. The development and distribution of fintech apps for migrants that would reduce remittance transaction costs to 3%, in line with the aim in SDG 10.c, should be supported by governments in both the country of origin and the country of destination using public resources. This should include assistance in ensuring that the applications' and the transactions conducted through them in accordance with applicable financial system regulations.

Conclusion

Especially in high-income countries, highly skilled migrants significantly contribute to technological innovation, demonstrating the value of group variety in generating fresh concepts and new information.

States must take into account this component of their migration policies as the use of AI systems in managing international migration increases in order to "facilitate orderly, safe, regular and responsible migration and mobility of people, including through the implementation of planned and well-managed migration policies" (SDG 10.7). Even while not all states currently use AI systems for migration management, gathering and disaggregating data is a crucial first step in future system adaptation (Sivakumar et al, 2021).

Through direct knowledge transfers, remittances, financial investments, and support for firm development as well as for research and scientific institutions in origin countries, migrants and

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diaspora groups represent an important avenue for transmitting technology back to those nations. Technology, especially mobile digital connectivity, has an impact on all aspects of migration. Governments significantly rely on information technology to manage migration, both to keep people out and to process migrants once they arrive. This raises questions about the rights of migrants, but certain cutting-edge technologies, like blockchain, may have more promising uses for migrants and migration. Governments significantly rely on information technology to manage migration, both to keep people out and to process migrants once they arrive. This raises questions about the rights of migrants, but certain cutting-edge technologies, like blockchain, may have more promising uses for migrants and migration.

Migration is a mechanism for development, but it is controlled by the nation state, in laws that have an impact on various areas inside nations, and by controlling the movement of people internationally. Here, we make the case that public policy and decision-making can take into account the sustainability and transformation dynamics of migration. Overall, migration that boosts general wellbeing, lessens inequality and, consequently, discrepancy between places, regions, and societal sectors, and lessens environmental costs would support sustainability transitions.

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