

Migrant Employment Integration and Artificial Intelligence (AI)

Nataliya Berbyuk Lindström,^[1] Dina Koutsikouri,^[1] Jonas Stier^[2] and Matilda Arvidsson^[1]

¹ University of Gothenburg, Gothenburg, Sweden

² Mälardalen University, Sweden

nataliya.berbyuk.lindstrom@ait.gu.se; dina.koutsikouri@ait.gu.se;
jonas.stier@mdh.se and matilda.arvidsson@law.gu.se

Abstract. Employment integration is a cornerstone of migrant integration into host society. Though many AI initiatives targeting migrants have been initiated, research is limited on the design, outcomes and effectiveness of such initiatives. Today, there is a lack of effective implementation protocols and opportunities to assess whether these technologies constitute successful intervention tools and actually contribute to migrant integration. This four-year interdisciplinary research project seeks to gain a deeper understanding of the challenges and opportunities that artificial intelligence (AI) entails for facilitating migrant employment integration and workplace inclusion. We address the following research questions: 1. How is AI used by migrants, their co-workers and the actors involved in their employment integration process? 2. How does AI enhance migrant professional competences? and 3. What are pathways to success of AI interventions for integration and inclusion purposes?

A combination of qualitative and quantitative research methods (interviews, focus groups, shadowing and interactive workshops) is used. In six work packages (WPs) we analyze and identify the challenges and opportunities that AI entail for facilitating migrant employment integration. Apart from contributing to theorizing migrant integration and AI, we also aim at providing a robust evidence-base for ‘good’ policy-making, regulatory guidelines and administration of profession-oriented integration process. Finally, we want to contribute to better understanding of how AI can contribute to overcoming prejudice and discrimination, which, in turn, can lead to mutual learning and building sustainable, welcoming and secure communities.

Keywords: AI, migrant, employment, discrimination.

1 Introduction

Today, migrants comprise 3.5 percent of the world population [1], which makes international migration and migrant integration global issues that require solutions. Artificial Intelligence (AI) defined as “a growing resource of interactive, autonomous, self-learning agency, which enables computational artifacts to perform tasks that otherwise would require human intelligence to be executed successfully” [2], is already contributing to managing the international migration process [3]. Algorithmic decision-making in immigration and asylum determination [4] and facial recognition technology (FTA) for law enforcement and border-management purposes [5] are some examples of AI interventions in this domain.

Upon reaching their destinations, many migrants are striving to integrate into the host society. Migrant integration is “a two-way process of adaptation by migrants and host societies...[and implies] consideration of the rights and obligations of migrants and host societies, of access to different kinds of services and the labor market, and of identification and respect for a core set of values that bind migrants and host communities in a common purpose” [6]. Labor market (employment) integration, often perceived as a cornerstone of migrant integration [7], is the focus of this project.

Though many migrants are highly educated people [8], many professionals from third-world countries are unable to secure employment in the profession for which they are qualified. In Sweden, the rate of employment among the foreign-born population is 15.4%, compared to 3.8% for the domestic-born population. Supporting migrants to enter the labor market is consequently an important issue for consideration. Further, employment integration does not cease after obtaining employment. Upon entering an organization, the interplay of a migrant employee with organizational cultures, employers and co-workers is fundamental for integration and workplace inclusion, which is often complicated due to language problems, cultural differences, and prejudice, leading to discrimination and exclusion practices [9].

As integration in general, and employment integration in particular requires enormous efforts and resources from both migrants and host societies, the question that arises is *How can AI support migrant employment integration?*

In this 4-year interdisciplinary research proposal, we seek to gain a deeper understanding of the challenges and opportunities that AI entails for supporting migrant employment integration in Sweden. We will empirically examine the ways in which AI interventions are used in different phases of the migrant employment process. We will also identify the structural constraints that determine a migrant’s chances for competence development and the social, political, and economic conditions necessary for such interventions to succeed. Further, we will design and develop a set of criteria against

which the success of technologically led interventions can be measured and discussed, which will help inform innovations in AI interventions for migrant integration and inclusion purposes.

2 Aim and specific questions

Against this background, we address the following research questions:

1. How is AI used by migrants, their co-workers and the actors involved in their employment integration process?
2. How does AI enhance migrants' professional competence?
3. What are the pathways to success for AI interventions for migrant integration and inclusion purposes?

3 State-of-the-Art

AI technology is penetrating the domain of migrant integration. Job supply, demand and matching are three crucial factors to migrant labor market entry [10]. One of the emerging application areas is matching migrants' professional skills with locations which have similar demands to identify the best prospects for obtaining employment. Some prominent examples of AI implementation in this area are the Swiss Immigration Policy Lab (IPL) algorithm program and the American Annie MOORE (Matching and Outcome Optimization for Refugee Empowerment) software, which assess migrant's competencies and enable officials to situate them in parts of the country which best fit their profiles [11, 12]. As research about the outcomes of these interventions is limited, questions concerning the complexity of validating migrants' professional backgrounds such as formal/informal competence and prior learning using AI algorithms remain unanswered. Validation of a migrant's professional skills has an enormous impact on their chances for the labor market entry in host country [13], and failures in validation procedure can have devastating effects for them. Accordingly, exploring the affordances and limitations of AI in this area is vital for integration.

Another domain of AI application is in human resource management, in areas such as recruitment, selection, training and HR planning, for example, prescreening candidate profiles and preparing interview questions. Some companies use recruitment chatbots such as Olivia/Paradox (<https://www.paradox.ai/>) for contact with job applicants. Despite the benefits of using chatbots such as objectivity and time effectiveness, issues such as their insensitivity to language variations and the limited capacity of current technology to understand complex relationships and contexts tends to create communication breakdowns when communicating with job seekers are common [14]. The language variations aspect may be especially important in relation to migrant job seekers with limited language competence, which, in combination with the mentioned limitations, can lead to understanding problems and the unmotivated exclusion of candidates.

For labor market entry, learning a language and the cultural patterns of the host society as well as networking with locals are essential prerequisites for success [7, 15]. In digital foreign language learning, AI elements are becoming increasingly used in providing opportunities for personalized language courses [16], enabling instant and non-judgmental feedback to learners [17] as well as supporting teachers by taking over some time-consuming tasks [18]. Machine translation, in spite of its drawbacks, still provides opportunities for handling everyday interactions for people with limited language skills (e.g. Google Translate is extensively used by newly arrived migrants in Sweden [19, 20]). Research has shown that though digital language learning tools are becoming increasingly used in training courses for migrants [21, 22], they are not always adapted to their needs. Frequently these kinds of tools lack information about the cultural values, rules and regulations of the host society, which results in migrants perceiving them as too abstract and not useful for integration purposes [23]. Further, cultural preferences concerning the design of digital tools are not addressed. Our study of the Swedish mobile application *Welcome!* which matches migrant professionals and locals with similar educational backgrounds for exploring employment opportunities showed that some migrant users perceived chat as being too impersonal [24, 25]. In addition to this, although many migrants have access to digital tools, e.g. smartphones and laptops, digitalization is an additional barrier in terms of the digital skill gap that many senior and lower-educated migrants must overcome to integrate in the Swedish labor market [26]. Thus, considering migrants' needs and accounting for intercultural variations in language, norms and values as well as digital readiness affecting the uptake and use of a new technology are essential for developing AI technologies.

Emerging research focuses on inherent cultural as well as ideological biases in algorithms and artificial intelligence. In turn, such biases are both inherent in and reproduced by language and materialize in meanings, concepts and ideals about desirable skills and competencies associated with labor market employability. Similarly, they impact on views of gender, career, work ethics, time conception and planning [9]. Inequality and discrimination thus risk being embedded in tech-oriented solutions aimed at providing equal opportunities [27] – inclusive of migrants. Thus, we need to attend to risks of embedded and enhanced discrimination through such new technologies and equally account for the need for both culture-specific and intercultural competencies for potential job-seekers, as well as for employers and recruiters in particular.

Concerning the use of AI for workplace integration, an example of a job training intervention (though not developed specifically for migrants) is the Honeywell Connected Plant Skills Insight Immersive Competency, a VR/AR tool for transferring skills from retiring to new employees, to support the inclusion of junior trainees [28]. Though AI technologies

are believed to have potential to change the future of work and maximize workers' potential, limited knowledge is available on the role of AI technologies for supporting communication in and management of a culturally diverse workplace [29], for preventing racism and lowering cultural barriers. In addition, research on the potential of AI tools for continuous language learning and developing intercultural communication skills, sharing experiences and cooperation in a diverse workplace is an undeveloped area.

From a societal perspective, an important issue concerns the legal aspects regarding the introduction of AI-driven technologies for the purposes of integrating migrants into the labor market including those of discrimination in the labor market as well as technology-embedded biases and discrimination. Yet, they also include questions of data collection and storage as regulated by the General Data Protection Regulation (GDPR), Directive (EU) no 2016/679. AI-driven technologies within this field often require users to submit sensitive personal data. The use of such data is strictly regulated by the GDPR. Furthermore, when Swedish public authorities – such as municipality actors, the Swedish Public Employment Service, or the Swedish Migration Authority – are involved additional legal provisions of confidentiality (sekretesslagen) apply, circumscribing public actors to share data between themselves and with private actors. From the migrants' perspective, though some recent evidence suggests that migrants might be cautious using digital tools due to surveillance risks [30, 31], there is limited detailed investigation of how their technology use is influenced by confidentiality issues. Thus, though AI presents a unique opportunity to challenge how we think about solving complex social problems for example unemployment, illiteracy and poverty [32], there is uncertainty for organizations, and especially so public institutions on how to manage AI and its implications for social good. The urgency to develop knowledge on how we can leverage on AI capabilities for the purposes of enabling sustainable pathways to improve employment integration cannot be underestimated [33].

The focus of this project proposal, AI for migrant workplace integration purposes is currently an undeveloped area, and limited empirical research concerning AI and migrant employment integration is available. Such interventions are often not designed on the basis of research, and, as a result, there is a lack of effective implementation protocols and base to assess whether these technologies actually contribute to migrant integration and what constitutes a successful intervention. Further, in the design of such interventions and AI-tools the question of in-built cultural and social biases is more seldom addressed. These reasons call for empirical and theoretical research in this area.

4 Research design

As the project will explore complex social and organizational phenomena, it will use a mixed methods approach [34] allowing for enhanced data accuracy and reliability. We will employ a combination of observation (shadowing [35]), interviews, focus group interviews as well as recordings of interactions in selected workplaces, studying such practices as recruitment, language, networking, mentorship, internship before and after migrants enter an organization. Our case studies will be conducted in the Gothenburg, Stockholm and Malmö areas, and, upon availability, in smaller cities. We will focus on highly educated newly arrived migrants (0-5 years in Sweden) with backgrounds in health, social care and social resilience, engineering and education, educated outside the EU/EES. The project will also take into account gender and age perspectives. As migrant women's integration in the labor market is taking longer time than men's [10, 36], their digital skills are of particular interest to us to establish how to support their employment integration. Further, some professions are traditionally male-dominated (e.g. engineering) and this can present an additional challenge for migrant women. Other professions may be more female-dominated (e.g. educational sector) which may present challenges for male migrants. Concerning age, in our previous research, we have found that many senior migrants experienced more problems using digital tools than younger migrants, which resulted in them being excluded [19, 24]. Thus, one of the contributions of this project will be to provide insights into how AI can support senior skilled migrants in employment integration.

We are aware of the sensitivity of our research. An application to the Ethical Review Board will be submitted and the project will be conducted in line with the ethical guidelines recommended by the Swedish Research Council.

The project will be undertaken over 4 years and includes six work packages (WPs) described in more detail below.

Year 1-3

WP1. Literature study. Mapping of AI initiatives: In the literature review, we will particularly draw upon the theoretical underpinnings of migrant integration, digitalization and AI. We will also map the existing AI initiatives in the field. Mapping activities and literature study will continue throughout the project to keep abreast of new publications and resources.

WP2. Labor market entry: Migrant professionals and the actors who support them in the preparation process for entering the labor market will be followed in field studies. Within this WP, two case studies will be initiated (Case study 1. Public Employment Service initiatives and Case study 2. Social-enterprise initiatives). We will choose 5-8 migrant professionals and follow them in their contacts with Public Employment Service staff and social-enterprise initiative, focusing on which

and how AI technologies are used in the projects to prepare the participants to enter the labor market. Focus group interviews will be conducted with migrants and the relevant actors about using AI in relation to labor market integration. We will focus on the professionals' needs and competencies and how they are assisted by AI (RQ2), the practices and patterns of usage (RQ1) and how equality and non-discrimination are operationalized and infused into AI technologies developing suggestions for AI intervention at this stage (RQ3).

WP3. Workplace inclusion: Three case studies will be undertaken in selected sectors, such as health, social care and social resilience, engineering and education, by following migrants who entered the labor market and their integration practices during internship and/or employment. The case studies will focus on the migrants' needs and professional competencies, how they are supported by digital technologies (RQ2), as well as their practices and patterns of usage (RQ1). This involves managing contacts and work-related communication in both formal (e.g. medical consultations for health care professionals, project meetings for engineers) and informal settings (e.g. coffee breaks at work and outside work). By using shadowing, focus group interviews and questionnaires with migrants, their co-workers and superiors, we will explore the use of AI for workplace integration and potential areas for AI implementation (RQ3).

Data analysis for WP 2 and 3: The recordings of interviews, focus group interviews and work-related activities will be transcribed verbatim and analyzed using Thematic Content Analysis [37] using deductively and inductively developed categories.

Year 3-4

WP4. A societal perspective. We will map the social, political, legal, economic and structural constraints influencing migrants' life chances in relation to employment and the use of AI. It will also identify the cultural, social, political, legal and economic conditions that are necessary for such technology-led interventions to succeed. Legal regulatory frameworks (national and EU) and policy document analysis, mass media analysis, business and corporate discourse analysis (including recruitment, HR and mission statements), and a scientific and popular literature analysis will be conducted and discussed at interactive workshops with advisory board and practitioners. In addition, national and international best practice cases will be collected and analyzed.

WP 5. Synthesizing the results. In WP 5, we will draw data from WPs 1-4, and by conducting a series of interactive data synthesis workshops, will iteratively develop a set of criteria against which the success of technologically led interventions can be measured and critiqued (RQ3). After each workshop, criteria will be brought back to the research team for discussion and feedback. At the end of WP5, we will present the criteria and suggest concrete and user-friendly model(s) for successfully led technical interventions. Data analysis will be carried out iteratively both during and after the data collection phase. We will perform coding relying on thematic analysis using qualitative analysis software. Throughout this process, our goal is to remain sensitive to our theoretical bases while also being heedful of data driven codes to ensure a holistic depiction of the empirical data. This work package will generate substantive and actionable policy recommendations consistent with the political and legal realities of migration as migrants experience them.

WP 6. Dissemination of results and Integration, AI (IDE-AI) lab. WP will be undertaken throughout the course of the project. We will initiate the virtual IDE-AI lab, a platform for cooperation between researchers and practitioners, in which we will address the issues emerging from all WPs, working together with tech-for-good companies, practitioners working with migration, integration, software developers, etc. We will also make conference presentations, organize interactive workshops and publish in open access peer-reviewed journals.

5 Contribution to theory and societal impact

The project explores an underdeveloped research area in regard to migrant employment integration using AI as a bridging tool, aiming at advancing understanding of the ways that AI can support migrant professionals, and how AI tools need to be designed and managed in different phases of the employment process. By focusing our studies on selected professional fields, we hope that the outcomes will be transferable to other professional groups.

Recognizing migrants' skills through dignified or high-status work will help address inequalities. This appreciation of skills is a prerequisite of social cohesion. Because it is the most effective antidote to anti-migrant discourse, it is imperative that the wider community are able to relate to immigrants as equals who are making and seen to be making economic and social contributions to society. Access to employment opportunities becomes the foundation for challenging stereotypes of immigrants as unskilled, low-agency victims who are dependent on state handouts and charity, and reduce the occurrence of intimidation in the workplace. The insights from our project will contribute to overcoming prejudice and discrimination with the support of AI, which can lead to mutual learning and to building sustainable, welcoming and secure communities.

References

1. United Nations (UN). Migration 2020 [Available from: <https://www.un.org/en/sections/issues-depth/migration/index.html>].
2. Taddeo M, Floridi L. How AI Can Be a Force for Good. *Science*. 2018;361(6404):751-2.
3. Chui M, Harryson M, Manyika J, Roberts R, Chung R, van Heteren A, et al. Notes from the AI Frontier. Applying Artificial Intelligence for Social Good. Washington D.C: McKinsey Global Institute; 2018.
4. Molnar P, Gill L. Bots at the Gate: A Human Rights Analysis of Automated Decision-Making in Canada's Immigration and Refugee System. Toronto: University of Toronto; 2018. Available from: <https://it3.utoronto.ca/wp-content/uploads/2018/10/20180926-IHRP-Automated-Systems-Report-Web.pdf>.
5. European Union Agency for Fundamental Rights (FRA). Facial Recognition Technology: Fundamental Rights Considerations in the Context of Law Enforcement. Vienna; 2019. Available from: https://fra.europa.eu/sites/default/files/fra_uploads/fra-2019-facial-recognition-technology-focus-paper.pdf.
6. International organization for migration (IOM). Iom and Migrant Integration. Geneva; 2011. Available from: <https://www.iom.int/files/live/sites/iom/files/What-We-Do/docs/IOM-DMM-Factsheet-LHD-Migrant-Integration.pdf>.
7. Degler E, Liebig T. Finding Their Way. Labour Market Integration of Refugees in Germany. Paris; 2017.
8. Ford R, Mellon J. The Skills Premium and the Ethnic Premium: A Cross-National Experiment on European Attitudes to Immigrants. *Journal of Ethnic and Migration Studies*. 2020;46(3):512-32.
9. Stier J. Revisiting the Man-Society-Technology Nexus – Intercultural Communication Studies as a Looking-Glass for Scientific Self-Scrutiny in the Digital Human Sciences. *Digital Humanities: New Objects – New Approaches*. Stockholm Stockholm University Press; 2020.
10. Forslund A, Liljeberg L, Åslund O. Flyktning- Och Anhöriginvandrades Etablering På Den Svenska Arbetsmarknaden [Refugee and Family Reunification Immigrant Establishment in the Swedish Labour Market] Uppsala: Institutet för arbetsmarknads- och utbildningspolitisk utvärdering (IFAU) 2017.
11. Bansak K, Ferwerda J, Hainmueller J, Dillon A, Hangartner D, Lawrence D, et al. Improving Refugee Integration through Data-Driven Algorithmic Assignment. *Science*. 2018;359(6373):325-9.
12. Trapp A, Teytelboym A, Martinello A, Andersson T, Ahani N. Placement Optimization in Refugee Resettlement. Department of Economics School of Economics and Management; 2018. Available from: https://pdfs.semanticscholar.org/7d69/d65a8d4a723abc31d3203cc2cd937e00fa5a.pdf?_ga=2.111007936.435074179.1585473859-1159223671.1583098596.
13. Nowicka M. Migrating Skills, Skilled Migrants and Migration Skills: The Influence of Contexts on the Validation of Migrants' Skills. *Migration Letters*. 2014;11(2):171-86.
14. Schildknecht L, Eißer J, Böhm S. Motivators and Barriers of Chatbot Usage in Recruiting: An Empirical Study on the Job Candidates Perspective in Germany. *Journal of E-Technology*. 2018;9(4):109-23.
15. Ndofor-Tah C, Strang A, Phillimore J, Morrice L, Michael L, Wood P, et al. Home Office Indicators of Integration Framework 2019 Home Office Research Report 109. Home Office; 2019. Contract No.: 109, Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/835573/home-office-indicators-of-integration-framework-2019-horr109.pdf.
16. Peranandam C. AI Helps Duolingo Personalize Language Learning. *WIRED*. 2019. Available from: <https://www.wired.com/brandlab/2018/12/ai-helps-duolingo-personalize-language-learning/>.
17. Crace A. Kaizen's AI Tutors Provide Context to Language Learning. *The Pie News*. 2019. Available from: <https://thepienews.com/news/kaizens-ai-tutors-provide-context-language-learning/>.
18. Pokrivčáková S. Preparing Teachers for the Application of AI-Powered Technologies in Foreign Language Education. *Journal of Language and Cultural Education*. 2019;7(3):135-53.
19. Berbyuk Lindström N, Sofkova Hashemi S, Bartram L, Bradley L. Mobile Resources for Integration: How Availability Meets the Needs of Newly Arrived Arabic-Speaking Migrants in Sweden. In: Borthwick K, Bradley L, Thoušný S, editors. *CALL in a Climate of Change: Adapting to Turbulent Global Conditions, Short Papers from EUROCALL 2017*: Voillans, France: Research-publishing.net.; 2017.
20. Berbyuk Lindström N, Rodríguez Pozo R. Perspectives of Nurses and Doulas on the Use of Information and Communication Technology in Intercultural Pediatric Care: Qualitative Pilot Study. *JMIR Pediatr Parent*. 2020;3(1):e16545-e.
21. Bradley L, Berbyuk Lindström N, Sofkova Hashemi S. Integration and Language Learning of Newly Arrived Migrants Using Mobile Technology. *Journal of Interactive Media in Education* 2017;1(3):1-9.
22. Kukulska-Hulme A. Mobile Language Learning Innovation Inspired by Migrants. *Journal Of Learning For Development - JL4D*. 2019;6(2).
23. Sofkova Hashemi S, Berbyuk Lindström N, Bartram L, Bradley L, editors. *Investigating Mobile Technology Resources for Integration: The Technology-Pedagogy-Language-Culture (Tplc) Model*. mLearn: The 16th World Conference on Mobile and Contextual Learning; 2017; Larnaca, Cyprus: Association for Computing Machinery (ACM).
24. Berbyuk Lindström N, Sofkova Hashemi S. Mobile Technology for Social Inclusion of Migrants in the Age of Globalization: A Case Study of Newly Arrived Healthcare Professionals in Sweden. *The International Journal of Technology, Knowledge, and Society*.. 2019;15(2):1-18.
25. Berbyuk Lindström N. Cross-Cultural Design for Employability: Mobile Support for Healthcare Professionals. In: Rau PL. (Eds) *Cross-Cultural Design. Methods, Tools, and Users*. Lecture Notes in Computer Science. 10911. Springer, Cham2018.
26. Ebberts WE, Jansen MGM, Deursen Av. Impact of the Digital Divide on E-Government: Expanding from Channel Choice to Channel Usage. 2016;33(4):- 692.
27. Martin N. Are AI Hiring Programs Eliminating Bias or Making It Worse? *Forbes*. 2018.
28. Marr B. The Amazing Ways Honeywell Is Using Virtual and Augmented Reality to Transfer Skills to Millennials. *Forbes*. 2018. Available from: <https://honeywell.lookbookhq.com/skillsinsightimmersivecompetency/immersive-competency>.
29. Blom T, Du Plessis Y, Kazeroony H. The Role of Electronic Human Resource Management in Diverse Workforce Efficiency. *School of Management Publications*. 2019;132.
30. Jumbert MG, Bellanova R, Gellert R. Smart Phones for Refugees: Tools for Survival, or Surveillance?, *Prio Policy Brief*. Oslo: PRIO; 2018. Available from: <https://www.prio.org/Publications/Publication/?x=11022>.
31. Latonero M, Poole D, Berens J. Refugee Connectivity: A Survey of Mobile Phones, Mental Health, and Privacy at a Syrian Refugee Camp in Greece. Harvard University; 2018. Available from: <https://reliefweb.int/report/greece/refugee-connectivity-survey-mobile-phones-mental-health-and-privacy-syrian-refugee>.
32. Majchrzak A, Markus ML, Wareham J. Designing for Digital Transformation: Lessons for Information Systems Research from the Study of Ict and Societal Challenges. *MIS Q*. 2016;40(2):267-77.
33. Vial G. Understanding Digital Transformation: A Review and a Research Agenda. *The Journal of Strategic Information Systems*. 2019;28(2):118-44.
34. Neuman WL. *Social Research Methods: Qualitative and Quantitative Approaches* 6th ed. ed. Boston: Pearson/Allyn and Bacon; 2006.
35. Czarniawska B. *Social Science Research: From Field to Desk*. London: Sage; 2014.
36. Nordic Council of Ministers. Nyanlända Kvinnors Etablering En Komparativ Studie Av Nyanlända Kvinnors Etablering På Arbetsmarknaden I Norden Och De Etableringspolitiska Insatserna Copenhagen; 2018. Available from: <https://oxfordresearch.se/wp-content/uploads/2018/04/Nyanl%C3%A4nda-kvinnors-etablering.pdf>.
37. Braun V, Clarke V. Using Thematic Analysis in Psychology. *Qualitative Research in Psychology*. 2006;3(2):77-101.