

The Human Side of Digital Technology: Supporting the Inclusion of Refugees in Higher Education Through Blockchain-backed EQPR

Plinio Limata¹, Federico Ceschel², Chiara Finocchietti³, Lucia Marchegiani² & Serena Spitalieri^{2,3}

¹ Department of Law, Economics, Politics and Modern Languages, University of Rome "LUMSA", Rome, Italy

² Department of Business Economics, University of Rome Tre, Rome, Italy

³ CIMEA-NARIC – Information Centre on Academic Mobility and Equivalence, Rome, Italy

Correspondence: Federico Ceschel, Department of Business Economics, University of Rome Tre, Via Silvio D'Amico, 77, 00145 - Rome, Italy. Tel: 39-34-9542-3763. E-mail: federico.ceschel@uniroma3.it

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Abstract

The spectrum of digital technologies that impact Higher Education (HE) is broad. This study explores the potential of Blockchain (BC) technology in the personalized learning path creation and data exchange in the learning processes. The flexibilization of education and digitizing student data through Blockchain may contribute to a more inclusive and sustainable HE system. According to the EU, the Blockchain supports sustainability in four main aspects: cybersecurity, accountability, transparency, and traceability. These aspects are also a driver of social impact and a higher capacity to include disadvantaged groups, such as refugees. Therefore, it is essential to start a debate between scholars and professionals about how the actors in the HE system engage in a collective meaning-making effort to sustain the adoption, diffusion, and use of BC for HE. The paper focuses on the experience of CIMEA *DiploMe* and EQPR for the recognition of refugees' qualifications. Through a collective consensus-making and awareness-raising effort, the blockchain-backed EQPR could be perceived as a critical tool to foster inclusion within the HEIs and enhance their social outreach.

Keywords: blockchain, higher education institutions, EQPR, recognition of qualifications, refugees, social inclusion

1. Introduction

The European Digital Education Action Plan (EDEAP 2021-2027) has prioritized defining digital education and training to be high-quality, inclusive, and accessible. This priority is also central to the European Green Deal and the UN Agenda 2030 for sustainability. Therefore, digital technologies may be decisive in fostering inclusion in higher education. This can be significantly true for refugees since global data show that their enrollment in higher education is extremely low, especially compared with primary and secondary education data (Finocchietti & Lantero, 2023). These contextual factors impel higher education institutions (HEIs) to adopt digital technologies and conceive digital transformation as a meaningful organizational action that offers high-quality service that encompasses all three sustainability dimensions (economic, social, and environmental). The spectrum of digital technologies that impact HE is wide. It covers a) new learning spaces, b) new learning methods, c) new ways of organizing the learning path of individual students, and d) new opportunities for recording and exchanging data on education. While the first two have already been extensively studied (e.g., virtual learning environments, digital platforms, online learning, and blended learning), we address the remainder. According to the EU (2020), the Blockchain (BC) supports sustainability in four main aspects: cybersecurity, accountability, transparency, and traceability. In particular, automatic recognition of academic qualifications and periods of study within the European Higher Education Area is encouraged by applying agreed and secure digital certification and communication systems, such as Blockchain (EHEA, 2020). BC introduces unique identifiers in HE and disrupts the current academic qualification system. These aspects could lower the barriers that hinder access to HE programs for disadvantaged people, such as refugees, who lack the recognition of their qualifications, primarily due to a lack of documentation to prove their qualifications. Thus, the social impact of BC adoption is particularly relevant to raise the social impact of HE. Blockchain's theoretical applicability to humanitarian relief and development can be broken down into two main components: 1. Empowering the individuals needing assistance. 2. Empowering humanitarian organizations (Connolly et al., 2023). BC technology enables the portability, sharing, exchange, and verification of credentials and learners' ownership of their data in a secure manner without the

control of any third party. With micro-credentials, individuals become the custodians of their official education records to easily share their credentials with all interested parties (Han et al., 2018). Worldwide, there is increased pressure to ensure the legitimacy and authenticity of certifications and diplomas without getting them recognized by official entities (Castro & Au-Young-Oliveira, 2021). By their very definition, refugees and asylum seekers are victims of an intermediary that cannot be fully trusted (Connolly et al., 2023).

As a digital technology for higher education, BC requires enabling governmental, institutional, and individual factors (Ceschel et al., 2023). Thus, the paper challenges BC as an instrument to restore justice and hope for the marginalized and give refugees a better perspective on integration. The study analyzes the case of the adoption of BC for the digitization of student data and for micro-credentials, which is represented by the CIMEA *DiploMe* experience for the recognition of qualifications held by refugees (EQPR). Our study provides a case study focusing on the *DiploMe* experience, aiming to detect the collective understanding and sensemaking of HE experts on the social impact of BC on the HE system and to provide evidence on its effective use by analyzing data of the *DiploMe* usage.

2. Literature Background

After being discussed mainly in academic discourse and by professionals and policymakers, digital education has become a strategic priority at national and European levels. The European Digital Education Action Plan (EDEAP 2021-2027) defines as a priority the need to reset education and training for the digital age for high-quality, inclusive, and accessible digital education in Europe. In particular, one of EDEAP's priorities is providing high-quality learning content, user-friendly tools, and secure platforms that respect privacy and ethical standards (EDEAP, 2020). The Communication on European Education Area (EEA) (EC, 2020) clarifies that the EEA will enable learners to move quickly between education systems in different countries and help create a culture of lifelong learning. For HE, two significant trends are foreseen: the flexibilization of education – focusing on micro-credentials – and the digitization of student data and the recognition process.

As a result, digital ecosystems become relevant, providing the framework for a new organizational model based on digitally enabled interactivity, interconnectedness, and interoperability (Ceschel et al., 2023). Therefore, standardized assessments are needed to enable the functioning of such a system, and the European Qualification Passport for Refugees (EQPR) is one of these. It is important to note that an optimal standardization process should balance the costs of reducing the diversity of educational systems with the benefits of making it easier for people to move and use their credentials across Europe. This means finding a balance between reducing innovation that comes from competition among highly differentiated systems and making it easier for people to move and use their skills across the continent. Moreover, a holistic and proactive approach to improving higher education's social dimension further accelerates progress in attaining the UN Sustainable Development Goals - SDGs (EHEA, 2020). Indeed, SDG n. 4 (Note 1) may play a vital role as an enabler to fulfill the others.

In addition, the Incheon Declaration for Education 2030 sets the vision and the strategic Framework (Note 2) at the international level, recognizing refugees as vulnerable subjects to be included since the right and access to education are often denied because of the situation they are experiencing. Meanwhile, at the EU level, the COVID-19 pandemic has threatened to disrupt the progress in programs for young newcomers and refugees (Ahad et al., 2020), whose access has become even more challenging (Stapleton, 2020). Thus, recognizing qualifications and the official assessment of their abilities, especially for refugees, becomes a fundamental element of social inclusion (Dobson et al. 2021). UNHCR (1984) has long acknowledged that proper identification is essential to personal and public life. Legal identity "is a basic human right and a prerequisite to the realization and enjoyment of several other civil, political, economic, social and cultural rights, including health and education" (UNHCR and Norwegian Refugee Council 2021: 5).

As a distributed ledger technology (DLT), BC technology offers new opportunities for creating the EEA while challenging the traditional HE system. Although the BC was initially deployed within the financial sector (Akgiray, 2019), there are already implications and potential applications in other sectors as well as in the field of education (Grech & Camilleri, 2017; Tapscott & Kaplan, 2019; Fedorova & Skobleva, 2020; Raimundo & Rosario, 2021). The specific design of BC, i.e., a mix of cryptography, governance model, distributed computer network, and individual economic incentives, makes it an enabler for trusted transactions (Catalini & Gans, 2017). The absence of intermediaries and a robust anti-tempering system makes a transaction system without central authority possible. In the HE system, this translates into the opportunity for more flexible learning paths and the empowerment of students who may complete their learning programs across different institutions. Several examples worldwide exist where blockchain-supported systems verify diplomas and education credentials (Tan et al., 2023).

In education, BC technology applications can be classified into 12 categories (Note 3), providing several benefits (Alammary et al., 2019) and foreseeing further practical applications (Bhaskar et al., 2021). Kwok and Treiblmaier

(2022) explore how BC technology can transform education, focusing on the social inclusion of students with limited access to educational resources and those typically designated unreachable. International organizations such as the WFP "Building Blocks" blockchain initiative (Zambrano et al., 2018) and other United Nations agencies have been at the forefront of digital identity efforts in partnership with private corporations such as Microsoft and Accenture (Connolly et al., 2023). Another example is provided by the Rohingya Project (Thayer and Hern, 2018), which aims to establish a digital identity to provide access to social programs, legal rights, education, and health care and avoid financial exclusion. Lizcano et al. (2020) investigated BC's role in acquiring students' competencies. In addition, Palma et al. (2019) discussed the Ethereum BC as a helpful technology for registering students' academic history and enabling *smart contracts* with significant cost reduction. Haugsbakken and Langseth (2020), who also discussed competitiveness, trust, and legal issues, have underlined the benefits of speed, efficiency, and transparency. According to Alavi et al. (1997), higher learning experience and increased student interactions are associated with the structured electronic transaction data exchange across universities.

Instead, HEIs are facing this disruptive scenario, challenging their central role through innovative forms of competence certification enabled by BC, and are adopting a wait-and-see approach to understand BC's real benefits against its potential risks (Ceschel et al., 2023). For instance, the EU launched the European Blockchain Services Infrastructure (EBSI) to provide a secure and interoperable system infrastructure with a proof-of-authority consensus that utilizes new digital technologies such as digital wallets, verifiable credentials, and decentralized identifiers. These technologies are expected to change how government services are organized between citizens and service providers (Tan et al., 2023). As of 2022, there are seven EBSI use cases (i.e., the European Self-Sovereign Identity Framework (ESSIF), diploma, notarization, asylum process management, European social security pass, small-medium enterprise (SME) financing, and trusted data sharing) in different stages of development. Among these, the ESSIF and diploma use cases are at the most advanced level of deployment (Tan et al., 2023).

This decentralized system allows the emergence of new actors in the HE system. First, informal education actors, other than formal HEIs, deliver educational programs that develop skills and competencies in a lifelong learning path. Second, digital technologies are disrupting traditional documentation procedures, and the development of the Digital Academic Certification System (Cuel et al., 2021) is creating new scenarios.

Although most studies have focused on the perspective of either students or faculty members, only a few studies consider the HE ecosystem as a whole (Shen & Ho, 2020), looking at the BC as a part of the ecosystem (Cuel et al., 2021). Higher education institutions must be proactive in adapting their missions, structures, and practices to maintain viability and sustainability in an uncertain future, as stated by Williams (2019, p.113). Therefore, all ecosystem actors are responsible for promoting the adoption and diffusion of BC technology through constructive collective awareness-raising efforts. BC requires a holistic assessment of institutional, organizational, technological, and regulatory dimensions for digital transformation (Tan et al., 2023). Its adoption in the education sector may be affected by numerous technical, organizational, cultural, and environmental challenges (Castro & Au-Young-Oliveira, 2021; Mohammad & Vargas, 2022; Limata, 2023).

Moreover, HE Institutions' role in the social inclusion of refugees is poorly understood (Abamosa, 2021), and the lack of interoperable standards and privacy, validity, and time is a significant problem (Tapscott & Kaplan, 2019). Understanding how these issues can find proper solutions is essential to boost the nascent HE digital ecosystem and the social inclusion of refugees. Although some studies have mapped experiences regarding refugees in HE (e.g., de Wit and Altbach, 2016), a rigorous discussion is lacking on the process of consensus building and collective sensemaking, mainly due to the unavailability of data on the outcomes of initiatives, number of beneficiaries, and other relevant data (Streitwieser et al., 2019).

Forecasting the adoption path of new technologies has been widely investigated through technology acceptance models and institutional theories. However, a fascinating emerging stream of research has applied the sensemaking theory to account for the sensing behavior of pivotal organizational actors, who may formulate assumptions and expectations on a given technology and then shape their decisions and actions. In particular, Wang et al. (2019) discuss BC adoption by adopting the sensemaking approach investigating how supply chain experts perceive the potential impact of BCs on their sectors. When radical innovations such as BC technology disrupt a whole industry, enabling the emergence of a new ecosystem, sensemaking through social processes is a valuable lens to analyze how collaborative sensemaking drives the adoption of the latest technology (Gattringer et al., 2021). Collective sensemaking is revealed through the conversations between people "in an ongoing, iterative manner where actors shape each other's meanings in repeated cycles of sensemaking." (Maitlis & Christianson, 2014, p. 95). Therefore, the paper aims to reveal the collective sensemaking dynamics through the consultation with a panel of experts and analysis of the data of *DiploMe*

adoption to answer the following RQ:

"How do HE experts perceive the potential social impact of BC on the HE system, particularly on the inclusion of refugees, and what are the blocking issues with blockchains' further diffusion in the HE system"?

3. Empirical Setting and Results

3.1 Methodology and Context of Analysis

This paper adopts a mixed method based on a two-stage approach.

First, an action research approach applies, with some co-authors being HE experts or close to HE experts. The method of gathering opinions by experts has been extensively used in the literature about the adoption and diffusion of new technologies, as experts are 'likely to have reasonably well-grounded appraisals of the state of affairs in the topics of concern' (Scapolo & Miles, 2006, p. 682). From January 2021 to December 2022, a series of personal interviews were conducted with the executives of the Italian Information Centre on Academic Mobility and Equivalence (Note 4) (CIMEA), a leading organization in higher education for the recognition of qualifications. We collected information from the President (three personal interviews), the Deputy Director (two personal interviews), and one Senior Credential Evaluator (two personal interviews).

CIMEA has developed a deep knowledge of higher educational systems worldwide, focusing on digitalizing students' data, BC for education with the development of the *DiploMe* application, and micro-credentials. Through its *DiploMe* service, it has developed a "Wallet" for each holder of academic titles where it is possible to upload one's own qualifications using BC technology. This generates a qualification document management system that is decentralized, transparent, certified, and unchangeable, with the scope of making it progressively more accessible for a student, a graduate, or a professional to enroll in a foreign university or to enter the labor market in a foreign country. This expertise has been included in the study to gain in-depth insights into how HE practitioners make sense of the adoption and usage of BC technology in the HE system.

The second stage of the research is based on the analysis of data stored in the *DiploMe* database. The research analyses the data on 'recognition flows,' i.e., the number of requests of recognition of qualifications received by CIMEA in 4 years, from April 2019 to April 2023, and the related statements of comparability and statements of verification awarded in this period. The first section of the research presents the overall figures, while the second focuses on the statements related to the recognition of refugee qualifications. This statistical section offers evidence-based analysis on the use of BC for recognition of qualifications, highlighting several recognition requests received at CIMEA, nationality of the qualifications, level of the qualifications assessed, and scope of recognition.

3.2 Results

3.2.1 Results From the Interviews With a Panel of Experts

DiploMe is a global ecosystem that can be used by authorities and institutions, which issue and certify qualifications for various reasons, to register these documents securely and unchangeably, guaranteeing their transferability and authenticity. Implementing a digital education ecosystem joined by higher education institutions, awarding authorities, and certifying authorities would create a secure and suitable environment for fair and smooth recognition of qualifications in the evaluation process, in line with the Lisbon Recognition Convention principles. Implementing a digital ecosystem using BC technology could also make managing digital students' data quicker, more consistent, reliable, and secure in recognition, limiting the risk of fraudulent documents.

Furthermore, the fulfillment of platform integration may create synergies among different actors, producing positive ripple effects at the social level, especially for the most vulnerable categories. With regards to this, the example of the EQPR can be taken into consideration: through this initiative led by the Council of Europe, refugees or persons in a refugee-like situation with limited documentation can be provided with a specific Qualification Passport, giving access to further education or employment opportunities in the countries of arrival.

From a purely technological viewpoint, *DiploMe* is a service that, even based on BC technology, aims to provide a simple and frictionless interface to any participating entity. The service is composed of four building blocks:

4. The front-end layer: the user interface whose aim is to avoid any impact on usability by utilization of well-established technologies and a captivating User Experience (UX);
5. The back-end layer: the middleware service engine based on open technologies that runs and integrates the BC and Artificial Intelligence (AI) subsystems with the user interface, decoupling the two from their specific and sometimes contrasting characteristics;

6. The infrastructure layer: the blockchain-based interoperable and accessible service where information is securely stored, guaranteeing data protection and portability;
7. The management layer (enterprise network) is the interface used by all players running and managing the certification services.

The narrative of the *DiploMe* service helps understand the perception of the potential social impact of Blockchain on the HE system (RQ). The digital qualification recognition procedure has been applied to EQPR starting in 2021. It was launched in 2017 by the Council of Europe, involving four countries in a pilot project that was then extended to 11 countries. Being one of the pioneering countries, Italy provides a best case of the EQPR with the support of MIUR, the coordination of CIMEA, and the active involvement of 34 higher education institutions in the National Coordination for the Evaluation of Refugee Qualifications (CNVQR). The EQPR provides an assessment scheme and a methodology for assessing refugees' qualifications even when these cannot be fully documented, and it aims to have the assessment accepted across borders. In the first phases, the EQPR foresaw a protocol based on the desk analysis of available documentation and a structured interview with the refugee.

In the words of an expert from CIMEA, *"The EQPR has the purpose of easing the access to higher university education, and it changes the concept of qualification. Ultimately, it affects the third mission of Universities and Higher Education Institutions because it is more inclusive"*.

The deployment of EQPR has required massive training and information exchange for teaching and non-teaching staff at the universities involved. Regarding RQ, the perceived benefits and challenges related to the digital education ecosystem are mostly reported as safety, fully digitalized workflow, and interoperability. On the other hand, challenges shall be taken into consideration. One of the most critical concerns is data protection compliance with national legislation. The BC ecosystem used by *DiploMe* follows the "Privacy by Design" and "Privacy by Architecture" approaches: the wallet created during registration is wholly owned by the user, who has the right to use it for his personal use. Moreover, the wallet's public keys or addresses on a BC may be considered personal data since they are in complete control of the user, and the data stored in the related wallet and smart contract cannot be read without the user's explicit action.

As the Deputy Director of CIMEA reported, *"The creation of a digital education ecosystem hence represents an important cultural shift that would benefit all the actors involved throughout the entire process of recognition of qualifications."*

During the November 2020 ministerial conference hosted by Italy, benefits and challenges were discussed collectively by the ministers of education from the 49 member countries of the European Higher Education Area, who adopted the Rome Communiqué (Note 5).

In the communiqué, the ministers committed to reviewing legislation, regulations, and practice to ensure fair recognition of qualifications held by refugees, displaced persons, and persons in refugee-like situations, even when they cannot be fully documented, in accordance with Article VII of the Lisbon Recognition Convention. They expressly welcomed the EQPR and stated that they "will support further broadening its use in our systems." (CIMEA Director)

Based on the insights gathered from interviews with experts, it was determined that HEIs had to make a significant organizational effort HEIs to adopt the BC for the EQPR. The adoption of the BC for EQPR necessitates an organizational-wide commitment to the processes and procedures outlined therein. As such, HEIs must ensure that the requisite infrastructure and resources are in place to support the implementation of the BC.

"The EQPR assessment methodology involves both teachers and technicians as various questions, administrative and on didactic aspects (to verify that that qualification has actually been obtained) [...] We needed to gather several commissions (CIMEA, VQR, national coordination) with activation of a specific network on this, grouping universities by geographical proximity." (CIMEA credential evaluator)

Shifting to a blockchain-based recognition system required the development of a shared ontology. The HEI involved in the EQPR was forced to use categories of abstraction to identify *a priori* all the metadata of the academic documentation that could be released by the different institutions and at different levels. From an organizational perspective, this requires that a more horizontal organizational logic is pursued throughout each HEI, but this is a challenging process.

"The Italian experience testifies to a remarkable level of awareness among higher education staff, both administrative and academic, who participate in training sessions with professional credentials evaluators." (Deputy Director)

3.2.2 Results From the *DiploMe* Database

Since its foundation in 1984, CIMEA has provided information on the recognition of qualifications. In the second decade (since 2012) of the 21st century, CIMEA started to offer, alongside information provision, a service of statement of comparability in line with activities of other centers of the ENIC-NARIC networks. The introduction of comparability statements was also meant to support Italian higher education institutions in carrying out their assessments of foreign qualifications submitted by candidates who intend to apply for enrollment in their courses.

Individuals who need their qualifications recognized in Italy could apply for an individual assessment of their qualifications. After the assessment is carried out, the individual receives a document, the so-called 'statement of comparability,' a sort of cross-certification giving the essential information on the qualification in the home education system (such as workload, duration, accreditation of the qualification, and the awarding institution, etc.), the level according to international classification standards such as the European Qualification Framework (Note 6) (EQF) and the level of the Framework for Qualifications of the European Higher Education Area (Note 7) (QF-EHEA), and the comparison with a qualification of the receiving country, Italy in this case.

In April 2019, CIMEA introduced a new type of statement that confirms the authenticity of the assessed qualification. Along with this, CIMEA successfully digitalized its recognition workflows across all three dimensions of input, throughput, and output. As a result, since April 2019, CIMEA has provided a fully digitalized assessment service. The digitalization process was positioned on three main cornerstones: 1) a complete shift in redesigning the process from a digital perspective – this was the most human-capital-intensive part of the job; 2) defining the ontology and the metadata needed for the system, particularly qualifications; 3) emission of the statement of comparability, as the final output of the process which was awarded using BC technology – this was both a technologically intensive and a human-intensive part of the job to gain a complete understanding of the concept of digital maturity of data (Note 8) and the basic concept of BC technology.

The entirely digitalized qualification evaluation process has been designed to guarantee maximum usability and flexibility to the owner of the qualification applying for recognition, who can, therefore, request the evaluation of his/her qualification both from abroad and from Italy within a decentralized, transparent, certified and unalterable qualifications management system. The analysis of the data and the flow of mobility and recognition (illustrated as follows) shows how the introduction of the *DiploMe* online BC system in 2019 significantly affected how individuals access verification and comparability services. It signifies a shift towards a more efficient and user-friendly approach, with the following implications:

1. *Streamlined Processes*: The digital platform *DiploMe* has allowed quicker and more efficient delivery of recognition decisions. Qualification holders have the opportunity to make use of a digitalized, transparent, and paperless service in which they can find, for every education system in the world, all the information regarding the documentation necessary for the assessment of their academic or secondary school qualifications and at the end of the evaluation procedure, have their wallet through which to share their Statement of Comparability in a digital format with any institution in the world.
2. *Enhanced Security*: Integrating BC technology in the *DiploMe* system has enhanced the security and reliability of the issued statements. This ensures that credentials are tamper-proof and can be readily verified by institutions and employers.

3.2.3 Results: Trends in Requests for Comparability and Verification Statements: A Comprehensive Review of CIMEA's Data (2019-2023)

The following sections show data regarding the recognition flows, i.e., the statements awarded by CIMEA. While the first section regards the overall figures, the second focuses on the statements related to refugees. The trends in the requests for statements of comparability and verification awarded are presented for the four years available, from April 2019 to April 2023. Data on mobility flows are widely studied, while data on recognition flows represent an underexplored area. One of the key differences between the two flows is that in the mobility flow, the data is about the citizenship of the moving individual, while in the recognition flow, the focus is on the citizenship of the qualification.

Data on request for recognition are presented below according to the following indicators:

- a. The number of requests shows the total request, the requests per type (comparability or verification), and the purpose.
- b. Nationality of the qualifications. This is the primary indicator, showing which system qualifications come from.

- c. Level of the qualifications assessed. The parameter expresses the level of education, if it is school or higher education, and if it is higher education, from which level (Note 9).
- d. Scope of recognition (whether for academic recognition or not, and if it is for academic recognition, at what level).

a) Number of requests, showing the total request and the requests per type (either comparability or verification)

Table 1. Total Requests Trend

Total Requests	2019-2020	2020-2021	%change1	2021-2022	%Change2	2022-2023	%Change3	Grand Total
	1925	5583	190%	934	68.08%	18861	101.0%	35753

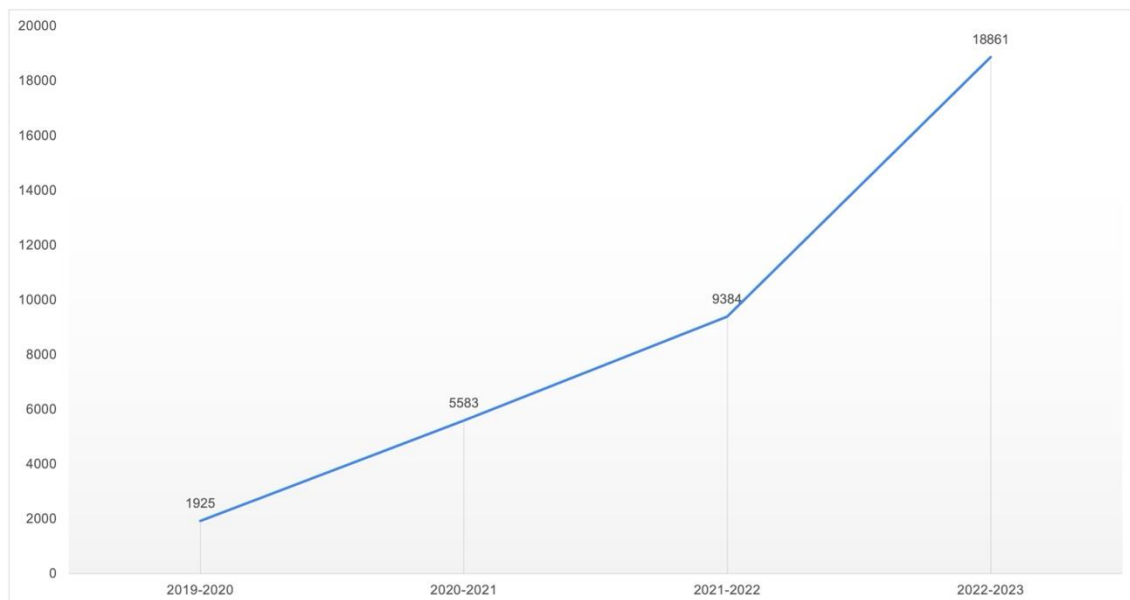


Figure 1. Total Requests per Year

The total number shows how the number of recognition requests has been increasing constantly since 2019 (Figure and Table 1). The total requests increased substantially, from 1,925 in 2019-2020 to 18,861 in 2022-2023.

Table 2. Total Requests per Type Trend

Type/Year	2019-2020	2020-2021	%Change	2021-2022	%Change	2022-2023	%Change	GrandTotal
Comparability	1532	3948	157.7%	6597	67.10%	12674	82.1%	24751
Verification	393	1635	316.0%	2787	70.46%	6187	122.0%	11002
Grand Total	1925	5583	190.0%	9384	68.08%	18861	101.0%	35753

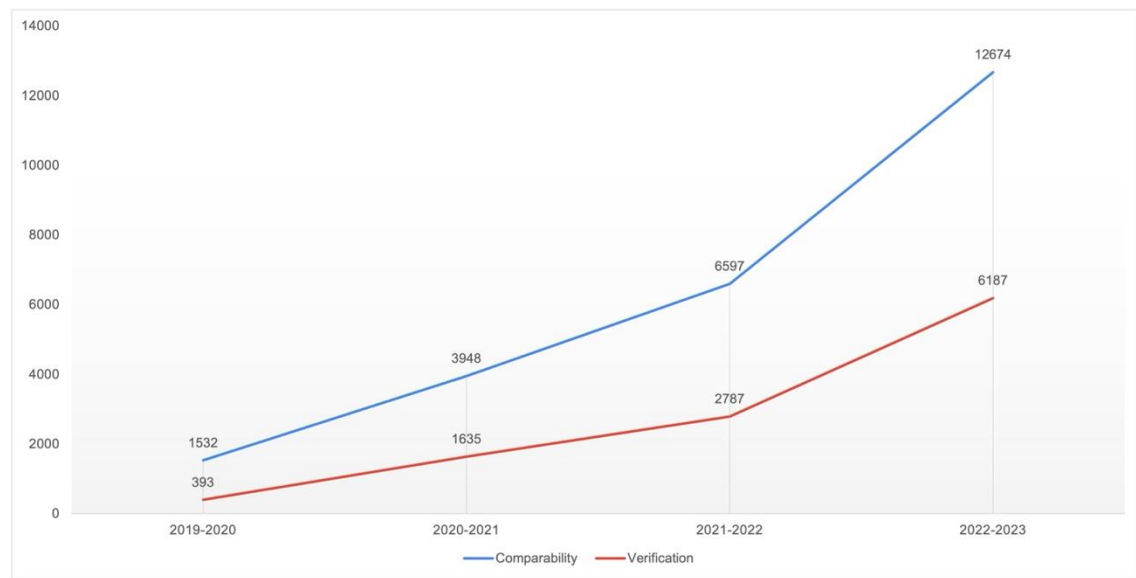


Figure 2. Total Requests per Type and Year

The total Requests per Year and Type of service (Comparability or Verification) provide valuable insights into how the demand for these two services has evolved over the years (Figure and Table 2).

The table above illustrates the number of requests for comparability and verification services for 2019-2020, 2020-2021, 2021-2022, and 2022-2023. When comparing the growth of comparability and verification services, it is evident that comparability requests have consistently surpassed verification requests in terms of volume and growth rate.

Comparability services have seen a tremendous increase in demand over the past few years. From 2019 to 2020, CIMEA received 1,532 requests for comparability services. This number more than doubled the following year, with 3,948 requests received in 2020-2021, indicating a 157.7% increase. The upward trend continued in 2021-2022, with 6,597 requests received, a 67.10% increase from the previous year. By 2022-2023, the demand for comparability services had reached an all-time high of 12,674, representing a remarkable 92.1% increase compared to the previous year. This significant surge in comparability requests highlights the growing need to assess foreign qualifications to ensure they meet domestic educational standards.

Looking at the number of verification requests, it is evident that the demand for verification services has been steadily increasing over the years. In 2019-2020, the number of requests for verification services was 393. This number increased significantly to 1,635 in 2020-2021, which is an impressive 316.0% increase. The trend continued in 2021-2022, with the number of verification requests reaching 2,787, showing a 70.46% increase from the previous year. In 2022-2023, the demand for verification services reached 6,187, which is a remarkable 122.0% increase compared to the previous year.

While comparability requests have also shown substantial growth, the growth rate of verification requests is notably higher than comparability, reflecting the demand for authenticating educational credentials and fighting fraud.

b) Nationality of the Qualification

Table 3. Total Requests per Nationality – Trend

Nationality of Qualification	2019-2020	% of Total	2020-2021	% of Total	1% Change	2021-2022	% of Total	2% Change	2022-2023	% of Total	%3 Change	Grand Total	% of Total
United States	239	12.4%	878	15.7%	267.4%	1161	12.4%	32.23%	1530	8.1%	31.8%	3808	10.7%
United Kingdom	264	13.7%	628	11.2%	137.9%	939	10.0%	49.52%	1116	5.9%	18.8%	2947	8.2%
Pakistan	36	1.9%	139	2.5%	286.1%	455	4.8%	227.34%	2046	10.8%	349.7%	2676	7.5%
India	148	7.7%	365	6.5%	146.6%	748	8.0%	104.93%	1315	7.0%	75.8%	2576	7.2%
Bangladesh	15	0.8%	92	1.6%	513.3%	452	4.8%	391.30%	1786	9.5%	295.1%	2345	6.6%
Iran	12	0.6%	101	1.8%	741.7%	161	1.7%	59.41%	1264	6.7%	685.1%	1538	4.3%
China	223	11.6%	201	3.6%	-9.9%	258	2.7%	28.36%	443	2.3%	71.7%	1125	3.1%
Brazil	64	3.3%	280	5.0%	337.5%	306	3.3%	9.29%	408	2.2%	33.3%	1058	3.0%
Mexico	27	1.4%	203	3.6%	651.9%	296	3.2%	45.81%	348	1.8%	17.6%	874	2.4%
Cameroon	5	0.3%	96	1.7%	1820.0%	138	1.5%	43.75%	574	3.0%	315.9%	813	2.3%
Other Countries	892	46.3%	2600	46.6%	191.5%	4470	47.6%	71.92%	8031	42.6%	79.7%	15993	44.7%
Grand Total	1925	100.0%	5583	100.0%	190.0%	9384	100.0%	68.1%	18861	100.00%	100.99%	35753	100.0%

Data about the requests per year and the nationality of the qualification allow us to detect the countries that represent the most (Table 3).

Table 4. Total Requests per Nationality per Year

Nationality of the Qualification: Top 10 countries over the years				
Rank	2019-2020	2020-2021	2021-2022	2022-2023
1	United Kingdom	United States	United States	Pakistan
2	United State	United Kingdom	United Kingdom	Bangladesh
3	China	India	India	United States
4	India	Brazil	Pakistan	India
5	Brazil	Mexico	Bangladesh	Iran
6	France	China	Brazil	United Kingdom
7	Greece	France	Mexico	Ukraine
8	Spain	Spain	China	Cameroon
9	Venezuela	Pakistan	France	Afghanistan
10	Pakistan	Colombia	Romania	Turkey

In addition, it may be helpful to break down the information year by year and analyze the changes in the top 10 countries and the trends for the countries in the top 10 from 2019 to 2023 (Table 4).

The top 10 countries in terms of overall requests received in the four years considered, which include the United States, United Kingdom, Pakistan, India, Bangladesh, Iran, China, Brazil, Mexico, and Cameroon, collectively account for 55.3% of the total requests. The United States and the United Kingdom emerged as the primary contributors,

representing 10.7% and 8.2% of the Total, respectively. This data underscores their robust engagement in transnational education, suggesting that qualifications from their education systems are widely offered overseas and pursued by students worldwide. The "Other countries" category encompasses all nations outside the top 10. This category contributes to 44.7% of the total requests. While individual countries within this group may have smaller percentages, their combined demand is substantial.

Table 5. Total Requests per Nationality per Year, all countries

Rank	Nationality of the qualification	2019-2020	% of the Total	2020-2021	% of the Total	%1 Change	Change %1	2021-2022	% of the total	%2 Change	2022-2023	%3 Change	Grand Total	% of the Total
1	Pakistan	36	1.9%	139	2.5%	286.1%	455	4.8%	227.34%	2046	10.8%	349.7%	2676	7.5%
2	Bangladesh	15	0.8%	92	4.8%	513.3%	452	4.8%	391.30%	1786	9.5%	295.1%	2345	6.6%
3	United States	239	12.4%	878	45.6%	267.4%	1161	12.4%	32.23%	1530	8.1%	31.8%	3808	10.7%
4	India	128	7.7%	365	19.0%	146.6%	748	8-0%	104.93%	1315	7.0%	75.8%	2576	7.2%
5	Iran	12	0.6%	191	5.2%	741.7%	161	1.7%	59.41%	1264	6.7%	685.1%	1538	4.3%
6	United Kingdom	264	13.7%	628	32.6%	137.9%	939	10.0%	49.52%	1116	5.9%	18,80%	2947	8.2%
7	Ukraine	21	1.1%	67	3.5%	219.0%	104	1.1%	55.22%	583	3.1%	460.6%	775	2-3%
8	Cameroon	5	0.3%	96	5.0%	1820.0%	138	1.5%	43.75%	574	3.0%	315.9%	813	2.2%
9	Afghanistan	5	0.3%	15	0.8%	200.0%	104	1.1%	593.33%	558	3.0%	436.5%	682	1.9%
10	Turkey	16	0.8%	43	2.2%	168.8%	154	1.6%	258.14%	489	2.6%	217.5%	702	2.0%
11	China	223	11.6%	201	10.4%	-9.9%	258	2.7%	28.36%	443	2.3%	71.1%	1125	3.1%
12	Brazil	64	3.3%	280	14.5%	337.5%	306	3.3%	9.29%	408	2.2%	33.3%	1058	3.0%
14	Mexico	27	1.4%	203	10.5%	651.9%	296	3.2%	45.81%	348	1.8%	17.6%	874	2.4%
15	Colombia	33	1.7%	131	6.8%	297.0%	154	1.6%	17.56%	305	1.6%	98.1%	623	1.7%
17	France	51	2.6%	172	8.9%	237.3%	247	2.6%	43.60%	275	1.5%	11.3%	745	2.1%
19	Spain	42	2.2%	153	7.9%	264.3%	198	2.1%	29.41%	257	1.4%	29.8%	650	1.8%
21	Romania	36	1.9%	105	5.5%	191.7%	201	2.1%	91.43%	193	1.0%	-4.0%	535	1.5%
26	Greece	47	2.4%	38	2.0%	-19.1%	88	0.9%	131.58%	132	0.7%	50.0%	305	0.9%
34	Venezuela	42	2.2%	88	4.6%	109.5%	89	0.9%	1.14%	86	0.5%	-3.4%	305	0.9%
	Other countries	599	31.1%	1788	92.9%	198.5%	3131	33.4%	75.11%	5153	27.3%	64.6%	10671	29.8%
	Grand Total	1925		5583		190.0%	9384		68.08%	18861		101.0%	35753	

Over four years, from 2019 to 2023, four countries—the United Kingdom, the United States, Pakistan, and India — have exhibited unwavering performance regarding qualification requests. Despite experiencing minor fluctuations in their rankings from year to year, these nations have consistently maintained a strong presence among the top 10 contributors.

In contrast, other countries, such as China, France, and Brazil, also in the top 10 during the first three years, fell out of the rankings in 2022-2023. This made way for new entrants like Ukraine, Cameroon, Afghanistan, and Turkey. It is interesting to analyze the trends of the top 10 countries over the years, as shown in Table 5.

c) Levels of qualifications assessed

Table 6. Levels of qualifications assessed

Level	2019- 2020	% of the Total	2020- 2021	% of the Total	%1 Change	2021- 2022	% of the Total	%2 Change	2022- 2023	% of the Total	%3 Change	Grand Total	% of the Total
3rd cycle QF-EHEA/ EQF level 8	4	0.3%	14	0.4%	250.0%	19	0.3%	35.7%	148	1.2%	678.9%	185	0.4%
2nd cycle QF-EHEA/ EQF level 7	170	12.1%	438	11.9%	157.6%	620	10.0%	41.6%	936	7.9%	51.0%	2164	11.9%
1st cycle QF-EHEA/ EQF level 6	762	54.0%	2107	57.2%	176.5%	3449	55.7%	63.7%	6529	54.8%	89.3%	12847	57.1%
Short cycle QF-EHEA/ EQF level 4	13	0.9%	28	0.8%	115.4%	60	1.0%	114.3%	82	0.7%	36.7%	183	0.8%
School leaving qualification/ EQF level 4	460	32.6%	1093	29.7%	137.6%	2034	32.8%	86.1%	4207	35.3%	106.8%	7794	29.6%
Grand Total	1410	100.0%	3686	100.0%	161.4%	6195	100.0%	68.1%	11921	100.0%	92.4%	23212	100.0%

The data in Table 6 above reveal various insights into the trends and distribution of comparability requests across different education levels from 2019 to 2023. The overall trend is one of growth, with the grand total of requests escalating by 92.4% from 2019-2020 to 2022-2023. This growth, however, comes with a nuanced shift in the contribution of individual levels. While qualifications classified under the first cycle (EQF Level 6) remain paramount, their proportional contribution to the grand total experienced a slight decline, indicating a diversification in the types of qualifications seeking comparability.

Levels with the Highest Number of Requests

In the initial year, 2019-2020, qualifications classified under the first cycle (EQF Level 6) dominated the landscape with 762 requests, preserving their dominance in the following years. The data clearly show that those qualifications consistently had the most significant portion, making up more than 50% of the total requests yearly. Nonetheless, a subtle decline in its percentage from 54% in 2019-2020 to 54.8% in 2022-2023 hints at a potential shift in the distribution dynamics. In particular, an exciting development emerged in 2022-2023, where school leaving qualifications (EQF Level 4) witnessed a significant surge of 106.8%.

Trends Over the Years

Qualifications classified under the third cycle (EQF Level 8) experienced remarkable growth, leaping from a mere four requests in 2019-2020 to 185 in 2022-2023, showcasing a staggering change of 678.9%. On the other hand, while maintaining its position, first-cycle qualifications (EQF Level 6) displayed a decreasing change percentage over the years, suggesting a potential stabilization in demand. EQF Level 4's substantial increase is noteworthy, reflecting a growing need for comparability in school leaving qualifications.

In conclusion, the data paints a dynamic picture of evolving educational demands, with shifts in the prominence of different levels over the years. The surge in third-cycle qualifications (EQF Level 8) requests and the notable rise of

school leaving qualifications suggest a complex landscape that warrants further exploration into the driving forces behind these trends.

d) *Scope of recognition*

Table 7. Total Requests per Purpose - Trend

Purpose	2019-2020	2020-2021	%Change1	2021-2022	%Change2	2022-2023	%Change3	Grand Total
Access for Studies evaluation	1801	5211	189.3%	8915	71.08%	18082	102.8%	34009
Non-academic evaluation	123	371	201.6%	418	12.67%	779	86.4%	1691
Not provided	1	1	0.0%	51	5000.00%	0	-100.0%	53
		5583	190.0%	9384	68.08%	18861	101.0%	35753

It is also noteworthy to explore the distribution of requests based on the purpose of recognition, whether for access to academic studies evaluation or non-academic recognition. This data provides insights into the changing needs of individuals seeking educational recognition services (Table 7).

The data reveals distinct trends in the number of requests for "Access for Studies Evaluation" and "Non-Academic Evaluation" over the years. The trend regarding access to Studies Evaluation is consistently growing. Requests for non-academic evaluation purposes, starting from a lower base, also experienced significant growth.

3.2.4 Results: Trends in Refugee Requests for CIMEA Comparability Statements (2021-2023)

According to the UNHCR, the global refugee enrolment rate in higher education is around 7% (Note 10). The global average for higher education enrolment among non-refugees was 40%. More than 140,000 refugees were enrolled in higher education in 98 countries, with 69% enrolled in universities. Research in the field identified several challenges refugees face when accessing higher education. Issues include language barriers, knowledge of the host country's higher education system, finances, difficulties in recognition of qualifications, and lack of educational documentation (Abamosa, 2021; Atesok et al., 2019; Crea, 2016; Loo, 2021; Streitwieser et al., 2019; de Wit & Altbach, 2016).

The following section focuses on the link between digitalization and recognition of refugees' qualifications, presenting data on requests for recognition received at CIMEA through an ad hoc channel for refugees. According to data evidence, the aim is to explore if and to what extent digitalization can support overcoming one of the obstacles in accessing Higher Education, i.e., difficulties in recognizing qualifications.

CIMEA has a standing commitment, together with the actors of the Italian Higher Education System, to support the assessment and recognition of qualifications held by refugees, even in the case where their educational documentation is missing (Finocchietti, 2022). In line with the Lisbon Convention and the application of a specific Italian legislative scheme, i.e., Legislative Decree 251/2007, art 26, paragraph 3 bis, that asks public administration in Italy to recognize refugee qualifications even in cases the educational documentation is partial or missing CIMEA activated on its initiative a channel dedicated to holders of refugee status or subsidiary protection status through which those entitled can request the Comparability service on their foreign qualification free of charge.

Table 8. Refugees' requests by year

Years	2021-2022	2022-2023	%Change	Grand Total
Refugees Requests	133	527	296.2%	660

CIMEA's experience in digitally transforming its services has been endorsed by the Council of Europe, which, starting in 2017, has been issuing the European Qualifications Passport for Refugees in digital format using the model and tenets of the *DiploMe* blockchain platform, adapted to the specific needs and characteristics of the EQPR project (Table 8).

CIMEA's role in supporting and facilitating the recognition and evaluation of refugees' qualifications is instrumental in promoting academic inclusion and integration. Digitalization plays a pivotal role in streamlining these processes and enhancing refugee accessibility. Adopting digitalization, mainly through the *DiploMe* service, has significantly contributed to this growth.

Over the years, the number of refugee requests submitted to CIMEA has significantly increased. In the academic year 2021-2022, CIMEA received 133 refugee requests. However, in the following academic year, 2022-2023, this number increased to 527, marking a remarkable 296.2% growth. The data suggests that digitalization has played a significant role in supporting the recognition of refugee qualifications from the point of view of requests received.

Table 9. Total Requests by Year and by Purpose of Recognition (Academic or Non-Academic)

Purpose	2021-2022	% of the Total	2022-2023	% of the Total	%Change	Grand Total	% of the Total
Access for studies evaluation	115	86.5%	448	85.0%	289.6%	563	85.3%
Non-academic evaluation	18	13.5%	79	15.0%	338.9%	97	14.7%
Grand Total	133		527		296.2%		

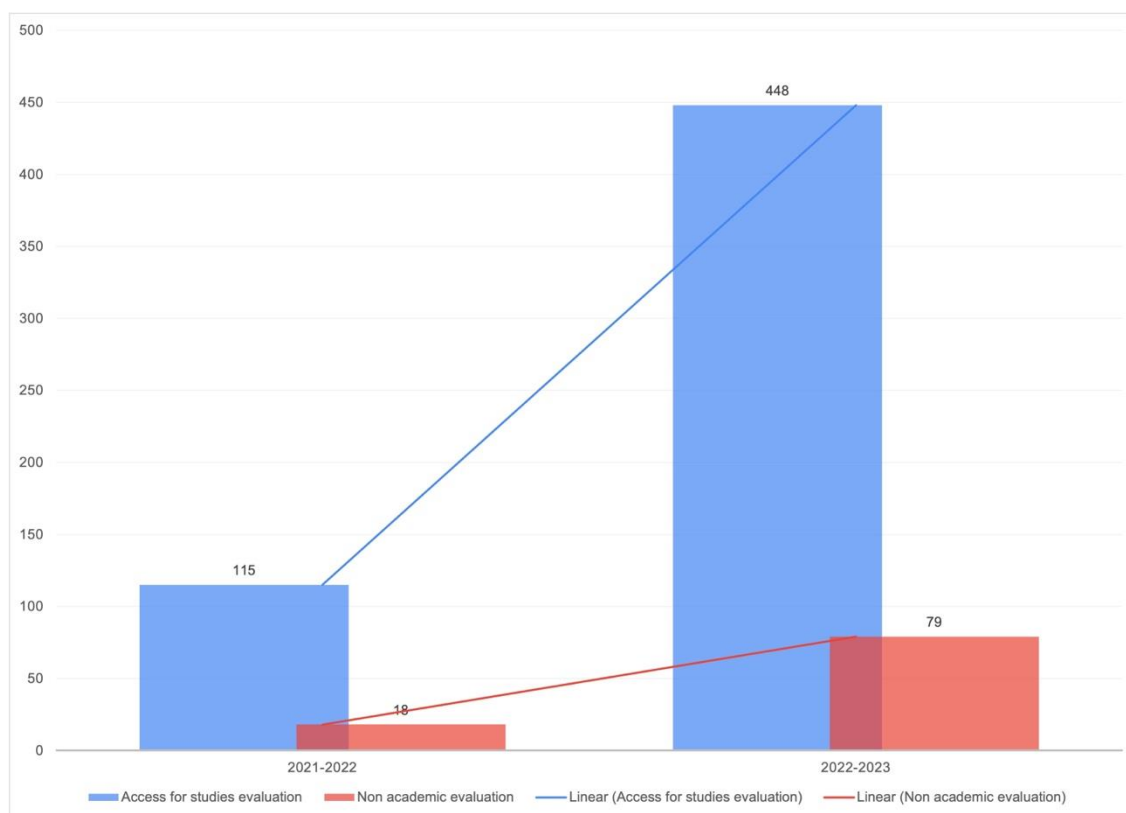


Figure 3. Refugees' requests per year per purpose

Requests for a statement of comparability can be divided into two main categories according to the purposes for which the recognition of the qualification in Italy is sought, namely: "Access for studies evaluation" (i.e., academic recognition) and "Non-academic evaluation." (Table 9 and Figure 3)

According to the analysis, there is a clear trend in the primary purpose for refugees who request CIMEA comparability statements and recognition of their qualifications in Italy. The data shows that refugees primarily seek academic recognition for their qualifications. However, it is worth noting that the number of requests for Non-Academic Evaluation has significantly increased from 18 in 2021-2022 to 79 in 2022-2023. Although the academic requests are still considerably higher, there has been a substantial rise in requests for "Access for Studies Evaluation" and "Non-Academic Evaluation" over the years.

These trends indicate that refugees predominantly seek academic recognition and are likely to access educational opportunities in Italy. The significant surge in "Access for Studies Evaluation" requests demonstrates the strong motivation among refugees to pursue further studies in Italy, reflecting their resilience and determination to continue their educational journeys in a new environment. This highlights the critical role that academic recognition plays in the lives of refugees, as it opens doors to higher education and fosters their integration into the Italian education system.

Table 10. Refugees' Requests by Program of Interest

Type of Programme of Interest	2021-2022	% of the Total	2022-2023	% of the Total	%Change	Grand Total	% of the Total
Laurea	47	35.3%	155	29.4%	229.8%	202	30.6%
Laurea Magistrale	20	15.0%	76	14.4%	280.0%	96	14.5%
Master Universitario di Primo livello	1	0.8%	22	4.2%	2100.0%	23	3.5%
Corso di perfezionamento o Altro corso	0	0.0%	13	2.5%	1300.0%	13	2.0%
Master Universitario di secondo livello	7	5.3%	6	1.1%	-14.3%	13	2.0%
Dottorato	3	2.3%	6	1.1%	100.0%	9	1.4%
Diploma accademico di Primo livello (AFAM)	2	1.5%	3	0.6%	50.0%	5	0.8%
Diploma accademico di Secondo livello (AFAM)	0	0.0%	3	0.6%	300.0%	3	0.5%
Corso di perfezionamento o Master (AFAM)	1	0.8%	1	0.2%	0.0%	2	0.3%
Not Provided	52	39.1%	242	45.9%	365.4%	294	44.5%
Grant Total	133		527		296.2%	660	

From the data collected, it becomes evident that refugees who apply for comparability statements and recognition of their qualifications exhibit a variety of academic interests and, consequently, educational backgrounds in terms of levels of their qualifications (Table 10).

The data provides insights into their academic objectives, summarized by the following observations.

- *Laurea (First Cycle of the Bologna Process in the University Sector):*

In 2021-2022, 35.3% of refugee requests expressed interest in Laurea programs, representing the most significant portion of course preferences. In 2022-2023, although slightly reduced to 29.4%, it remains the top preference among refugees. The demand for Laurea programs has shown a noteworthy 229.8% growth.

- *Laurea Magistrale (Second Cycle of the Bologna Process in the University Sector):*

Refugee applicants demonstrated substantial interest in Laurea Magistrale programs, representing 15.0% of their course preferences in 2021-2022. In 2022-2023, their interest increased to 14.4%, securing the second most preferred course type. The interest in Laurea Magistrale courses exhibited a significant growth of 280.0%.

- *Master Universitario di Primo Livello (One-Year Professionally-Oriented Program in the University Sector):*

In 2021-2022, this category represented a modest 0.8% of course preferences. In 2022-2023, it demonstrated

substantial growth, reaching 4.2%, making it the third most requested course type. The demand for Master Universitario di Primo Livello programs grew by 2100.0%.

- *Other Categories (University Sector):*

Refugee applicants initially showed limited interest in "Other" programs in the University sector in 2021-2022. However, their preferences witnessed a steady increase in 2022-2023. These "Other" programs include "Corso di Perfezionamento," "Master Universitario di Secondo Livello" (second-level master's programs), and "Dottorato" (doctorate programs, Third Cycle of the Bologna Process).

- *Other Categories (AFAM Sector - High Arts, Music, and Dance Education):*

Refugee applicants showed slight interest in AFAM system programs in both years, representing a smaller portion of course preferences. The preferences for this category exhibited a minor increase in 2022-2023.

- *Not Provided:*

Notably, a significant percentage of applicants (39.1% in 2021-2022 and 45.9% in 2022-2023) did not specify their course of interest. While this data is a substantial portion of the total requests, it is essential to acknowledge that many applicants may still be exploring their academic options or applying for various programs.

Table 11. Refugees' Requests by year by nationality – Trend

Nationality of the Qualification	2021-2022	% out of the Total	2022-2023	% out of the Total	% Change	Grand Total	% out of the Total
Afghanistan	52	39.1%	197	37.4%	278.8%	249	37.7%
Ukraine	1	0.8%	133	25.2%	13200.0%	134	20.3%
Venezuela	6	4.5%	23	4.4%	283.3%	29	4.4%
Pakistan	9	6.8%	18	3.4%	100.0%	27	4.1%
India	10	7.5%	16	3.0%	60.0%	26	3.9%
Iran	1	0.8%	16	3.0%	1500.0%	17	2.6%
Cameron	6	4.5%	7	1.3%	16.7%	13	2.0%
Nigeria	1	0.8%	11	2.1%	1000.0%	12	1.8%
Syria	30	2.3%	8	1.5%	166.7%	11	1.7%
Iraq	4	3.0%	6	1.1%	50.0%	10	1.5%
Other countries	40	30.1%	92	17.5%	130.0%	132	20.0%
Grand Total	133		527		296.2%	660	



Figure 4. Requests per year per Nationality

The study also explores how geopolitical crises and regional dynamics have influenced the trends and the number of requests from various countries. The data correlates between political, social, and economic factors and the demand for qualification recognition services (Table 11 and Figure 4).

Table 12. Contextual factors driving the requests’ trend

Driver	Country	Description
War	Ukraine	Following the onset of the war in Ukraine in February 2022, there has been an exponential 13.200% rise in requests from this country. It secured the second position regarding the total number of requests, indicating the high demand caused by the current crisis.
	Syrian Arab Republic	The ongoing civil war in Syria, which began in 2011, has led to a severe humanitarian crisis, causing a substantial influx of Syrian refugees seeking refuge and recognition. This protracted conflict ignited during the “Arab Spring” has significantly exacerbated the living conditions of civilians, leading to government repression, political dissent, and a dire need for international recognition. As a result, CIMEA has witnessed a surge in requests from Syrian refugees, further exemplifying the impact of geopolitical crises on the trends in refugee requests. Data for the Syrian Arab Republic reflects this trend, with the number of requests increasing from 3 in 2021-2022 to 8 in 2022-2023, a significant change of 166.7%.
Geopolitical turmoil	Nigeria	Nigeria’s requests for recognition saw a 1000% increase in 2021-22, partly attributed to issues such as the ongoing Boko Haram threat and protests in 2020. In June 2023, a military coup added to the instability and likely prompted more requests.
	Pakistan	Pakistan has witnessed a significant increase in requests through the CIMEA refugee channel. This growth was notable, with a 100% increase from 2021-22 to 2022-23. Several internal and external factors, including the negative GDP growth rate due to the COVID-19 pandemic, political instability, and the country’s vulnerability to climate change, have contributed to this increase in demand for educational recognition.
	Venezuela	Venezuela faces a severe economic and political crisis characterized by

		hyperinflation, shortages of essential goods and services, and a struggling healthcare system. The country’s political turmoil, stemming from a disputed 2018 presidential election, has resulted in widespread protests and power disruptions. These challenges have triggered a significant exodus of Venezuelans seeking stability. Despite many official refugees residing in neighboring countries, there has been a noteworthy increase in CIMEA requests via the refugee channel, with 23 requests in 2022-23, reflecting the persistent pursuit of education amid adversity.
Setback in human rights and Economic crisis	Afghanistan	The year 2021 marked a turning point for Afghanistan, with a 278.8% increase in requests from 2022 to 2023. The Taliban’s return to power resulted in setbacks in human rights, access to education, and economic growth. These shifts in Afghani society drove the continuous increase in applications received by CIMEA in recent years.
	Iran	Iran saw a substantial increase of 1500% in requests in 2022-2023. The country’s international isolation from 2017-2018 onwards, along with protest movements, including nationwide protests in 2022, likely contributed to this growth. The economic crisis, marked by high inflation and soaring youth unemployment, also drove the increase in requests.
	Cameroon	As the sole African country in the top ten for 2022-2023, Cameroon witnessed a growth in requests of 16.7% in 2022-2023, accounting for 2.0% of the total.

All the countries listed saw an increase in requests due to several factors, such as ongoing war (Ukraine and Syria) and political turmoil (Nigeria, Pakistan, Venezuela), setbacks in human rights, access to education, and lack of economic growth (Afghanistan, Iran, and Cameroon) (Table 12).

These insights demonstrate the intricate relationship between geopolitical crises, regional dynamics, and the demand for qualification recognition services. It highlights the need for flexible and responsive recognition mechanisms to support individuals in turbulent times. In this sense, data shows that digitalization can play a role in facilitating access to recognition procedures.

Table 13. Refugees’ Requests vs. Comparability Statement - trend

	Request	Statement	% Request Leading to Statement
2021-2022	133	84	63.2%
2022-2023	527	231	43.8%
Grand Total	660	315	47.73%

Finally, a crucial aspect of refugee requests is the issuance of comparability statements, which confirm the comparability of foreign qualifications to Italian qualifications (Table 13).

In 2021-2022, out of the 133 refugee requests received, 84 (or 63.2%) resulted in the issuance of comparability statements. However, in 2022-2023, although the number of requests significantly increased to 527, the percentage resulting in comparability statements decreased to 43.8%.

4. Discussion of the Results

Despite the extensive experience of the actors involved in the qualification recognition process, as revealed by the experts' interviews, the implementation of EQPR and the adoption of blockchain technology through the *DiploMe* initiative demanded significant organizational efforts from CIMEA, as well as from teaching and non-teaching staff from the universities involved.

This also drove a collective consensus-making of all the metadata of the academic documentation that could be

released by the different institutions and at different levels, further resulting in a commitment of institutions to reviewing legislation, regulations, and practice to ensure fair recognition of qualifications held by refugees, displaced persons, and persons in refugee-like situations to comply with Article VII of the Lisbon Recognition Convention.

From an organizational perspective, it means a more horizontal logic that engages the entire HE ecosystem. The efforts have been repaid by the concrete results achieved. The Annual Growth Rates show these:

- **2019-2020 to 2020-2021:** There was a remarkable surge of 190.0% in requests from 2019-2020 to 2020-2021. This substantial increase could be attributed to various factors, including the introduction of the new online system *DiploMe* that simplified the request process, fully digitalizing it, increased awareness of the services offered by CIMEA, and a growing demand for credential evaluation aimed at academic and non-academic recognition.
- **2020-2021 to 2021-2022:** Although the growth rate decreased to 68.08% from 2020-2021 to 2021-2022, it still represents a significant increase. This might indicate a continuation of the upward trend but at a slightly slower pace. It could be associated with the ongoing demand for comparability and verification services and a more established presence of CIMEA in the field. The decrease could also be due to COVID-19, which impacted Italy starting in March 2020.
- **2021-2022 to 2022-2023:** The requests increased by 101.0% from 2021-2022 to 2022-2023, marking another substantial growth.

The increasing demand for recognition of foreign qualifications may be attributed to various factors, including the impact of internationalization strategies at both national and higher education institution levels. In particular, the growing awareness that the evaluation of foreign qualifications represents an essential screening for selecting and attracting “genuine students,” as well as an ever-increasing awareness of the need to adopt digital solutions that can combat the phenomenon of fraud in education and that the recognition of qualification cannot ignore the verification of its authenticity. Despite the challenges posed by the COVID-19 pandemic, the digital platform *DiploMe* allowed CIMEA to continue providing comparability and verification certificates. This was crucial at a time when national and international mobility was severely restricted due to the pandemic. The data indicates that the growth trend was sustained even during this challenging period, thanks to the availability of *DiploMe*.

As regards the service, either comparability or verification, data show that comparability services have historically seen higher demand and have consistently recorded more requests than verification services. This indicates that individuals seeking equivalency assessments for their foreign qualifications constitute a more significant proportion of the total requests. However, it is essential to note that the growth in verification requests has been more pronounced, with a higher percentage increase from year to year. The preference for comparability services may be driven by the increasing internationalization of education and the need for students and professionals to ensure that their foreign qualifications are recognized. On the other hand, the remarkable growth in verification requests highlights the growing importance of authenticating educational credentials in an increasingly mobile world.

Regarding comparability purposes, “Access for Studies Evaluation” has consistently accounted for the majority of requests, reflecting the continued trend of individuals seeking academic recognition for educational mobility. The growth in this category is substantial, emphasizing the importance of recognizing foreign qualifications for further education. This is also due to the nature of CIMEA, which is focused on academic recognition.

On the other hand, “Non-Academic Evaluation” requests, though starting from a smaller base, have also shown significant growth. This trend indicates a rising awareness among individuals of the need to assess their qualifications for non-academic purposes, such as employment and professional recognition. The 86.4% growth in 2022-2023 suggests that this category is becoming increasingly important, with a notable increase in demand for recognizing qualifications for non-academic pathways.

The study of the refugees’ requests is insightful as regards not only the trend but also the academic programs and the nationality:

- Academic programs, particularly Laurea and Laurea Magistrale, are the most requested course types, accounting for many course preferences. The increasing interest in professionally oriented one-year Master Universitario di Primo Livello programs suggests their growing popularity among refugee applicants. Additionally, the “Other Categories” preferences have increased considerably, primarily in the University sector, encompassing “Corso di Perfezionamento,” “Master Universitario di Secondo Livello,” and “Dottorato” (doctorate programs, Third Cycle of the Bologna Process). While the AFAM sector, including “Diploma Accademico di Primo Livello (AFAM),” “Diploma Accademico di Secondo Livello (AFAM),”

and “Corso di Perfezionamento o Master (AFAM),” demonstrated a stable trend with minor variations, they represent a smaller portion of course preferences among refugees.

- The study shows that geopolitical crises and regional dynamics have influenced the trends and the number of requests from various countries. The data correlate political, social, and economic factors with the demand for qualification recognition services.

More interestingly, the gap between the number of requests made by refugees and the number of comparability statements issued by CIMEA for the two years under analysis is an important indicator, shedding light on the challenges refugees face in gaining recognition for their qualifications despite the advancements in technology and CIMEA’s efforts to facilitate the process. Several factors may contribute to this gap:

- **Language Barriers:** Language can be a significant obstacle for refugees, affecting their ability to understand and follow instructions. Many refugees may not be proficient in Italian or English, the primary language of instruction for CIMEA’s services. This linguistic challenge can hinder the submission of accurate and complete documentation.
- **Legal Status:** Refugees might face hurdles in obtaining official refugee status in Italy, a prerequisite for accessing certain services, including issuing comparability statements. This legal barrier can result in requests being submitted without proper authorization or recognition.
- **Document Inconsistencies:** Some refugees may struggle to provide comprehensive and reliable academic documentation for the evaluation process. The lack of access to original academic records, transcripts, and certificates, often due to displacement or conflicts in their home countries, can result in incomplete submissions.
- **Safety and Contact Concerns:** To protect refugees’ privacy and avoid jeopardizing their safety, CIMEA may choose not to contact the awarding institutions directly for safety reasons.

Data evidence shows that recognition of refugee qualifications remains challenging and fragmented even in theoretically very favorable conditions (a completely digitalized environment for recognition, no costs required for procedure, translation, etc.). Given the persistent gap between the number of requests and the issuance of comparability statements, it is essential to recognize the need for further investigation. This includes conducting surveys or interviews with refugees who have gone through the process to understand their specific challenges better.

Addressing these issues requires a comprehensive approach, including potential changes to language support, simplification of procedures, and a review of the criteria for accepting and processing refugee requests. Ultimately, understanding and addressing these challenges is vital for ensuring that refugees have equitable access to recognition of their qualifications, promoting their integration into Italian society, and harnessing their skills and potential.

Investigating the underlying causes of this gap and taking proactive steps to mitigate these challenges is critical to supporting fair recognition of refugee qualifications. Further research and cooperation with relevant stakeholders will be critical in ensuring the effectiveness and inclusivity of this recognition process.

5. Conclusions

Our study delved into the intricacies of the Italian higher education ecosystem, examining how various organizations and institutions navigate the complex landscape of international conventions and legislation to promote inclusivity and social outreach within higher education. We conducted an in-depth analysis of the methods employed by Italian HEIs to align with global standards for inclusivity and outreach and evaluated their effectiveness in promoting a more equitable and socially responsible HE system. Our findings provide valuable insights into the challenges and opportunities that exist within the ecosystem and offer practical recommendations for improving the effectiveness of efforts to promote inclusion and social responsibility within higher education.

The EQPR program aims to facilitate access to higher education and redefine the concept of qualification. It is designed to help people who have been forced to flee their homes due to conflict or persecution to continue their education in Europe. The program significantly impacts the third mission of universities and HEIs, which is to make education more inclusive. By recognizing the qualifications of refugees, EQPR aims to make it easier for them to access higher education and increase their chances of integrating into society. It allows them to continue their education, develop their skills, and contribute to their adopted communities. The EQPR is a significant step towards creating a more equitable and just society where everyone has access to education and the opportunity to succeed.

Adopting the EQPR demands significant organizational effort, which must be carried out within the institutional and organizational ecosystem. Based on the experience and results of CIMEA DiploMe, it is evident that realizing this goal

is achievable. However, it requires the active participation of all actors involved in the higher education system. A collective consensus and awareness-raising effort is necessary to sustain the adoption, diffusion, and use of a digital education ecosystem that relies on fully digitalized workflow and interoperability, including blockchain technology. It should be noted that this new ecosystem goes beyond traditional HE borders and requires a complete overhaul of the existing system. The adoption of EQPR will require institutions to develop new technologies that can support blockchain technology and interoperability. However, it also presents an opportunity to improve the quality of education, reduce costs, and create a more efficient system. Therefore, it is essential to prioritize the adoption of EQPR to ensure that the future of higher education is secure and accessible to all.

The study meticulously scrutinizes and evaluates the multifaceted and complex barriers that may impede attaining higher education inclusive policies in Italy. The research looks closely at the institutional, organizational, and individual factors such as bureaucracy, lack of resources, and social stigmas that may hinder the successful implementation of such policies. The primary objective of the study is to gain a deep understanding of the underlying causes of these factors and to propose practical and effective solutions to overcome them. Given the current challenges we face, it is crucial to conduct in-depth research to explore and understand how other countries have tackled similar issues. Additionally, the research should explore the effectiveness of these measures and identify any shortcomings or areas for improvement. By understanding how other countries have addressed similar challenges, we can gain valuable insights and knowledge to help us make informed decisions and develop effective strategies to address our own challenges.

Our research focuses on a specific case study that examines a systemic experience built with an organizational approach called "learning by doing." By analyzing this case in detail, our research aims to help professionals in the sector gain a deeper understanding of both the strengths and challenges of this approach. In today's evolving educational landscape, it is critical to consider the European Digital Education Action Plan goals, particularly for various European countries that are not yet part of EQPR but are expected to join soon. Our research suggests that the "learning by doing" approach may be particularly relevant in achieving these goals. Our ultimate objective is to create a structured, cohesive, uniform, and interconnected ecosystem that enhances people's education and circulation, leaving no one behind. We believe we can contribute to developing such an ecosystem by identifying the critical elements of successfully implementing the "learning by doing" approach. Therefore, our research delves into the details of this approach, including its strengths, weaknesses, and potential for scalability and adaptability.

List of Abbreviations

Abbreviation	Meaning
AI	Artificial Intelligence
BC	Blockchain
CIMEA	Information Centre on Academic Mobility and Equivalence
CNVQR	National Coordination for the Evaluation of Refugee Qualifications
DLT	Distributed Ledger Technology
EBSI	European Blockchain Service Infrastructure
ESSIF	European Self-Sovereign Identity Framework
EQF	European Qualification Framework
EQPR	European Qualification Passport for Refugees
HE	Higher Education
HEIs	Higher Education Institutions
MIUR	Italian Ministry of Education, University and Research
QF-EHEA	Framework for Qualifications of the European Higher Education Area
SDG	Sustainable Development Goals
UNHCR	United Nations High Commissioner for Refugees
UX	User Experience

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Authors' contributions

Prof. Limata, Prof. Ceschel and Prof. Marchegiani were responsible for study design and revising. Dr. Finocchietti and Dr. Spitalieri were responsible for data collection and analysis. Prof. Limata, Prof. Ceschel drafted the manuscript and Prof. Marchegiani revised it. All authors read and approved the final manuscript.

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Competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Obtained.

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Data sharing statement

No additional data are available.

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Notes

Note 1. “Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all” -<https://sdgs.un.org/goals/goal4> – Accessed on Nov. 8, 2023.

Note 2. https://uis.unesco.org/sites/default/files/documents/education-2030-incheon-framework-for-action-implementation-of-sdg4-2016-en_2.pdf – Accessed on Nov. 9, 2023.

Note 3. 1. Certificates management, 2. Competencies and learning outcomes management, 3. Evaluating students’ professional ability, 4. Protecting learning objects, 5. Securing collaborative learning environment, 6. Fees and credits transfer, 7. Obtaining digital guardianship consent, 8. Competitions management, 9. Copyrights management, 10. Enhancing students’ interactions in e-learning, 11. Examination review, 12. Supporting lifelong learning.

Note 4. CIMEA – Information Centre on Academic Mobility and Equivalence was established in 1984, and it is the organization leader in the HE for recognition of qualifications. Since 1986, it has operated based on an agreement with the Italian Ministry of Education, University and Research (MIUR). It is the Italian center within the NARIC network (National Academic Recognition Information Centres), ENIC network (European Network of National Information Centres on Academic Recognition and Mobility), and MERIC network (Mediterranean Recognition Information Centres). The MIUR has entrusted CIMEA with the task of conducting the activities of the National Information Centre concerning the procedures of qualification recognition currently in force in the Italian higher education system and the qualifications awarded at the national level.

Note 5. EHEA Ministerial Conference 2020, for further information, see <https://ehea2020rome.it/> - Accessed on Nov.15, 2023.

Note 6. For further information see <https://europa.eu/europass/en/europass-tools/european-qualifications-framework> - Accessed on Nov.15, 2023.

Note 7. For further information see <https://www.ehea.info/page-qualification-frameworks> - Accessed on Nov.15, 2023.

Note 8. Digitalization of credential evaluation workflows. Practical guidelines for the ENIC-NARIC Networks. Nuffic,

<https://www.nuffic.nl/sites/default/files/2023-09/digitalisation-of-credential-evaluation-workflows.pdf> - Accessed on Nov.15, 2023.

Note 9. The levels are meant as levels in the qualification framework, and more precisely as levels in the Qualification Framework of the Bologna Process (QF-EHEA) and in the European Qualification Framework EQF, i.e., 1st cycle (QF-EHEA)—Bachelor level, Level 6 EQF; 2nd cycle—Master level, Level 7 EQF; 3rd cycle—Ph.D. level degree, 8-level EQF.

Note 10. For further information, <https://www.unhcr.org/what-we-do/build-better-futures/education/tertiary-education>. Accessed on Nov.15, 2023.