Comparative Migration Studies

ORIGINAL ARTICLE Open Access

Im/mobility in a disruptive time: the impact of Covid-19 on the size and directional flow of international student mobility

Merve Zayim-Kurtay[1*], Sevgi Kaya-Kasikci[1,2], Yasar Kondakci[1], Betul Bulut-Sahin[1], Anita Kéri[3], Antonina Levatino[4], Giorgio Marinoni[5], Elena Ovchinnikova[6,7], Yakup Öz[8], Cristina Sin[9], Tijmen Weber[10] and Umar Bin Qushem[11]

The author Betul Bulut-Sahin's affiliation has changed after the study was completed; it is now TED University.

*Correspondence:
Merve Zayim-Kurtay
mkurtay@metu.edu.tr

Full list of author information is available at the end of the article

Abstract

The share of internationally mobile students has risen exponentially for the last two decades until the disruptive COVID-19 period, leading to a more diverse and multipolar network structure. However, the COVID-19 pandemic has caused restrictions across the globe. This systematic review aims to explore how COVID-19 has affected the magnitude, flows, and direction of internationally mobile students. A total of 57 studies, retrieved from several databases after extensive search, were analyzed regarding the dimensions of size, flow, direction, and pattern in international student mobility during the pandemic. The review suggests that following the pandemic, international student mobility was still dominated by the top-tier countries due to their swift actions and incremental policies, while some other countries gained visibility for international students and attracted more international students owing to students' safety concerns and revised international student policies of the countries. Further, students' study abroad decisions from source countries seemed to be shaped by the policies and regulations implemented during the pandemic, the political environment of the destination country, and personal concerns about safety and getting the most out of the study abroad experience. These factors reshaped the directional flow of international student mobility and study modality, particularly concerning regionalization and digital transformation for higher education institutions.

Keywords International student mobility, Flow, Size, Pattern, COVID-19

Introduction

Since the late 1980s, international student mobility (ISM) has evolved into different forms and has become a global phenomenon, experiencing a substantial expansion both in numbers and significance. The count of degree-seeking students has surged from 2.8 million in 2005 to 6.8 million in 2022 (UIS 2022), while more than 16 million

students have engaged in Erasmus+[1] mobility in 2024 (European Commission 2024). This notable growth is closely related to the assumed advantages of ISM for students, institutions, and governments. At the micro level, students often aspire to access quality higher education, potentially leading to rewarding careers and better life opportunities (Kratz & Netz 2016; Wiers-Jenssen 2008). At the meso-level, higher education institutions (HEIs) aim to attract more international students (IS) to increase their revenue, gain global visibility and reputation with better standing in international rankings, diversify their learning environment, and enhance cultural exchange (e.g., Knight 2012; Shields 2013). At the macro-level, ISM has gained heightened attention from governments, as it has been a tool for exerting soft power (Altbach & de Wit 2017). Given this background, ISM cannot be restricted simply to students' cost-benefit calculations and utility maximization motivations. Instead, it is a complex and multilayered phenomenon influenced and shaped by economic, social, and political factors, in addition to rational decisions of individuals.

However, not every country and HEIs equally benefit from the gains of ISM (Macrander 2017). The scholarship analyzing the size and direction of ISM at the global level before the COVID-19 period had consistently indicated the dominance of Western and Anglophone countries, such as the USA, UK, France, and Canada (Barnett et al. 2016; Chen & Barnett 2000), with some nuanced shifts in the volume and direction of the phenomenon. In other words, the global ISM flows were dominantly Western-oriented (e.g., van Mol & Michielsen 2015), originating from developing countries (senders) and targeting developed ones (receivers). However, Kondakci et al. (2018) highlighted the importance of contemporary economic, cultural, geographic, and historical factors that revealed diverse mobility patterns originating in peripheral countries and targeting new emerging educational hubs, such as China, Malaysia, Russia, South Korea, South Africa, and Türkiye. This finding enlarged the ISM literature by diverting attention towards the impact of push-pull factors in addition to a well-established center-periphery model, which means that some developing countries, being emergent or planned hubs, could also attract IS. In addition to emergent hubs, studies that utilize relatively recent mobility datasets showed that ISM has been shifting from a centralized to a more multipolar structure (Glass & Cruz 2022; Yin & Yeakey 2019), giving more room to emerging countries to develop internationalization policies to recruit more ISs. In this sense, China, Türkiye, the United Arab Emirates, and Russia, for instance, have increasingly heightened their regional hub profiles while lowering their sender profiles. Further, this regionalization trend has gained momentum due to the cost of mobility, quality higher education opportunities, and political reasons in semi-peripheral countries (Hou & Du 2020).

Regarding the size of ISM, there has been a threefold increase in the size of mobility at a global scale over the last two decades spanning from 1999 to 2000 to 2018–2019, but this growth is not only in terms of quantity but also density, referring to the fact that there are more countries connected in a more multipolar network (Glass & Cruz 2022). Overall, the ISM scholarship depicts that while ISM has been expanded, it has been more diverse and less monopolized by Western countries. There are various external factors shaping these changes in ISM, classified by Choudaha (2017). The first wave

[1] "Erasmus + is the EU's programme to support, through lifelong learning, the educational, professional and personal development of people in education, training, youth and sport, in Europe and beyond" (EC 2004).

in this classification referred to how ISM was affected by the terrorist attacks of 9/11 and subsequent visa restrictions, while the second wave covered the impact of the global financial crisis. The last wave, the third wave in the classification, pointed out the impact of economic and political factors on ISM: the economic recession in China, Brexit, and the election of Trump. The onset of COVID-19 coincided with this shifting process, yet it has paralyzed this global connectedness by causing immobility in every sense of our daily lives, which would inevitably impact ISM.

Parallel to this prospect, some studies (Jensen et al. 2022; Santiago et al. 2021) unpacking the effects of COVID-19 on internationalization indicated how the pandemic precluded mobility due to travel bans accompanied by tight policies. Also, other studies have highlighted various policies and alternative solutions that governments and HEIs have developed in response to the ongoing pandemic (Raby & Zhang 2022; Sidhu et al. 2021), which are likely to impact the flows and size of ISM. More precisely, while acknowledging the nonsignificant difference in the credit mobility student numbers between the pre-pandemic and 2021–2022 academic year, Di Pietro and Perez-Encinas (2023) reported about 62.7% decrement in the 2020–2021 academic year due to the pandemic effect. For degree-seeking students, UIS (2022) indicates a similar decreasing trend on a global scale from 2020 to 202; however, these statistics alone fall short of explaining in which countries these changes were observed or how the pandemic shaped this declining trend, a gap this study aims to address. Furthermore, it is uncertain whether the pandemic marks the continuation of Wave III of the classification of Choudaha (2017), being one of the most comprehensive frameworks that highlights the shaping factors impacting ISM on a global scale. Alternatively, if the pandemic signifies the beginning of Wave IV (Choudaha & Van Mol 2022), a question prompting the need for conducting this systematic review. Despite the growing research on the impact of COVID-19 on mobility across countries and HEIs, this literature remains fragmented on how the COVID-19 pandemic influences globally increasing ISM. There is also a need to capture how different national policies shape the push and pull factors during this disruptive time, which was addressed in this study.

In this regard, the following research questions have been scrutinized:

1. How has the COVID-19 pandemic impacted the magnitude and pattern of ISM?

1a. What were the national/governmental, institutional, and individual responses during COVID-19 that shaped ISM?

Overall, with mobility restrictions now completely lifted in many countries worldwide and realizing the diverse policies and reactions each country implemented concerning ISM during the pandemic, it gains importance to systematize the existing research findings concerning the impact of COVID-19 on global ISM flows and the resulting consequences. Therefore, this systematic review aims to identify, assess, and synthesize all relevant studies conducted on the impact of COVID-19 on global ISM.

Method

The focus of the review and definitions

This study is designed as a systematic review to identify, analyze, and synthesize the existing body of literature (Petticrew & Roberts 2006) on the impact of the pandemic on the size and patterns of ISM. With this purpose, we first clarified what size and pattern mean. In the present study, 'size' was used broadly to cover the number of inbound and

outbound students globally without making any geographical restrictions. Similarly, we used the term 'pattern' to refer to varieties in mobility type (degree & credit), modality of international study (face-to-face, virtual, hybrid), and direction of mobility flows. With ISM flows, we refer to the mobility of students from one country to another for education purposes at the higher education level or return to their home countries due to the pandemic and resulting conditions. The review protocol was created based on the given definitions.

Inclusion and exclusion criteria

For the current study, the following inclusion and exclusion criteria were used: (1) studies that focus on ISM in a higher education setting were included, while the ones conducted in other educational settings were excluded; (2) only studies published in English were included; (3) given the very limited amount of published studies at the time of corpus creation, articles, grey literature (reports & theses), and conceptual papers (literature-based studies & policy-based country comparisons) were included; (4) studies carried out in the course of the pandemic were included; (5) studies were not excluded based on their research design or examined mobility type/modality; thus, studies utilizing qualitative, quantitative, and mixed-method and focusing on any mobility and immobility (referring to the studies in the literature that examined IS's choices after border closures) were included.

Search process

We conducted an electronic search on the five databases with strong coverage across disciplines: EBSCOHost, Eric, ProQuest, Scopus, and Web of Science. The initial electronic search was based on the title, abstract, and keywords (TAK). Later, it was extended to include full texts to ensure that it did not overlook any relevant resources. The search was done between March and mid-July 2022, and the manuscripts published between the beginning of the pandemic (March 2020) and mid-July were included in the provisional corpus. However, the corpus has been expanded with backward and forward searches conducted covering the duration from the beginning of the pandemic to May 2023[2].

Key terms and synonyms for the electronic search were identified through group consensus following a preliminary literature scan. After four major categories of key terms referring to IS, ISM, pandemic, and the mobility flows were created, Boolean operators of "AND" and "OR" were used to combine the key terms and join their synonyms or alternatives in the creation of search strings (e.g., "International student" OR "Mobile student" AND "Mobility" OR "Study abroad" AND "Covid-19" OR "Coronavirus" AND "size") (see Additional file 1). The search strings created were assigned to the different pairs of the research group, and each member was expected to search independently in at least two databases to minimize subjectivity bias, enable cross-checking, and enrich the corpus.

[2] The year refers to the print publication date of the articles, not the online-first publication date.

The process of identifying relevant studies

The electronic search yielded 751 results, of which 632 were removed immediately from the provisional corpus because of the misfit with the inclusion criteria. Due to the fact that the initial search in TAK yielded a limited number of studies, a full-text search was conducted to ensure inclusiveness in content. However, a full-text search gave out a considerable number of irrelevant studies that focused on mobility but not in a higher education context or reflecting student perspectives. Also, the full-text search provided mainly magazines and news, which are the paper types decided to be excluded from the corpus. In conclusion, topical and contextual irrelevance stemming from the full-text search explained the reason for the elimination of an excessive number of studies in the identification stage. Therefore, we screened 119 studies for the retrieval stage. Of the screened studies, 32 were eliminated because they were published in languages other than English, were duplicates, and were incompatible with the selected document types. As a result, we retrieved 88 studies, and their abstracts were reviewed closely for the subsequent stages. With this examination, 56 studies were omitted because of duplication, topical irrelevance, poor and inadequate method-related information, and unmatching document types. Thus, we ended up with 32 studies eligible for full-text reading, of which nine were excluded due to similar concerns. Eventually, we selected 23 studies from the database search to be included in the final corpus. The grey literature search was conducted in two stages. First, responsible pairs from the research group searched the grey literature by visiting the websites of well-known organizations, such as the OECD, Erasmus Student Network, and the International Association of Universities, which yielded 26 reports. Second, a practitioner in the field of ISM from the team added 11 reports to the corpus by searching the following websites: UK Research Council, CORDIS, IIE, IIE OpenDoors, UNESCO-IESALC, ESN, Eurobarometers, HESA, British Council, DAAD, and CampusFrance. Thus, the grey literature search ended up with 37 reports. Of those, nine were omitted as they were irrelevant to the purpose of the study based on the inclusion criteria. As a further attempt, the backward and forward citation search was performed, which entails searching the references of the selected papers and other papers citing them back, respectively. This process also produced an additional 24 studies. The absence of those papers in the initial database search might be attributed to their later publication dates. After the screening and thus eliminating 18 of them with the reasons of incompatibility with the established inclusion criteria, six studies were selected for the coding stage (five articles and one report).

Several actions were taken to ensure the quality of the selected papers. First, articles published in peer-reviewed journals and reports published by well-known organizations were selected to include scientifically grounded works. Second, responsible researchers within the research group cross-checked one another for electronic search and identification consistency. Finally, to ensure high scientific standards, at least two researchers did the full-text reading of each paper to decide potential methodological problems (lack of information about the methodology employed in the studies or controversial or inadequate information concerning sample characteristics, sample selection, and measurement, which cast doubt on the validity of the results produced) and their exclusion from the corpus. In total, 57 studies were selected to be included in the final corpus, 28 of which were articles, and 29 were reports. The PRISMA Flowchart on the Study selection process (see Fig. 1) depicts the details of the electronic search process.

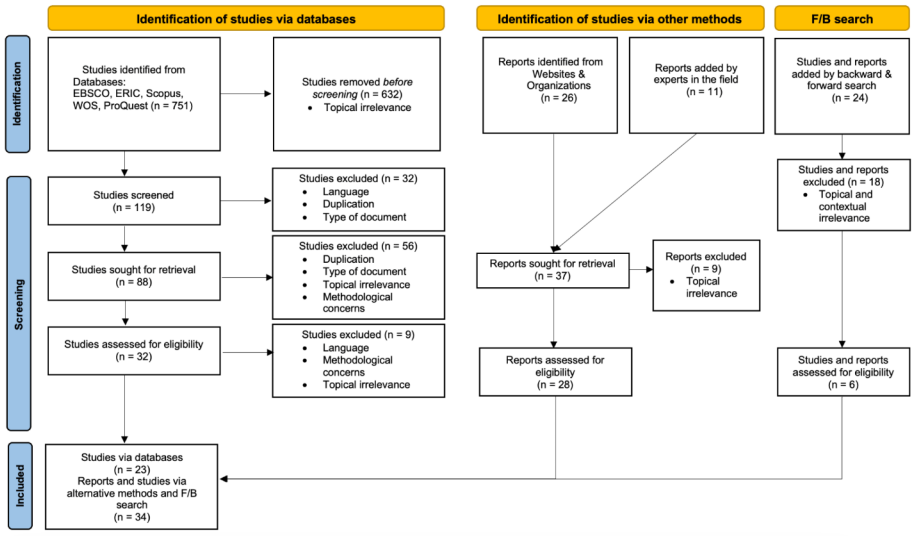

Fig. 1 PRISMA Flowchart on the Study Selection Process. F/B = forward and backward search

Data Analysis

The final corpus was analyzed using an initial coding frame created through a group discussion. The aim of creating such a frame was to guide the coders and ensure standardization of the codes across them. This coding frame not only included variables referring to the different sections of the paper to be checked but also code options under the selected variable (e.g., "research design" as the variable to be checked and quantitative, qualitative, mixed-method, and others as the code options to be used). In addition, guided by the main research questions, the other relevant parts of each paper were extracted for inductive coding, including results referring to ISM size, flows, and directions, as well as implications, limitations, and recommendations. Each group member was assigned about ten papers to retrieve the information stated in the coding frame (see Additional file 2).

The extracted data were analyzed descriptively and inductively. The relevant segments were assigned to and analyzed descriptively by the already created pairs for the descriptive part. Thus, through frequencies, those descriptively analyzed parts enabled us to map the field. For the inductively coded section, an initial code list was created as a group to ensure a transparent coding process, and two researchers were held accountable for coding certain sections of the data. These two researchers coded all papers in parallel and independently by following and extending the initial code list. Then, separately created code lists were merged to create a common code list through discussion and consensus, which was used to create themes to be reported. MAXQDA was used as the software in the inductive coding process, and a coding agreement was reached among group members to ensure trustworthiness.

Mapping the field

Of the included 57 studies, based on the date of publication (online first publication date is used unless the study is published in print), 16 were published in 2020, and as expected, mainly in the form of reports ($n = 15$). However, the majority of our corpus was published afterward (25 in 2021, 13 in 2022, and 4 in 2023). Naturally, the number of articles published has increased considerably since then. In total, in our corpus, we

have a balanced distribution across types of publications, with 28 articles and 29 reports. As for the disciplinary distribution of the journal articles, the majority represented education ($n = 16$), including the manuscripts focusing on international student mobility, higher education, and policy. There were only a handful of studies covering the literature stream of humanities; such as broader mobility, gender, and sustainability. The studies in the final corpus predominantly failed to report a theoretical framework but still the push-pull framework appeared to be the dominant one.

Regarding the design choice, quantitative studies ($n = 29$) outnumbered the qualitative ones ($n = 15$). Only one study in our corpus implemented a mixed design, while 11 were conceptual studies and relied on the results drawn from other primary sources to reach conclusions. Only one study did not use empirical data, as the conclusions were drawn from the results of two existing reports and reinterpreted in a complementary fashion (i.e., IAU & ESN 2020).

There was a variety of mobility types (e.g., 'degree mobility' refers to relocating to another country to earn a degree, and 'credit mobility' is a short-term mobility in an institution different from the one awarding the degree (Brooks & Waters 2011)) examined, with the primary emphasis on the degree of mobility ($n = 25$). However, 12 studies either failed to identify any specific type of mobility or referred to beneficiary students broadly as IS; thus, the mobility type on the target could not be determined. Only four studies dealt with exchange students or credit mobility, while seven addressed credit and degree-seeking students together. Two studies, additionally, utilized a broader perspective and focused on multiple groups (degree and credit seeking, guest students, and other international studies).

Results

The reviewed studies indicate that COVID-19 had a significant negative effect on the internationalization practices of countries and HEIs and eventually on the immediate and future mobility plans, directions, and flows of IS (e.g., Abdellatif et al. 2021; Anas et al. 2022; Balan & Radu 2021; British Council 2021; Santiago et al. 2021). Although a limited number of studies did not find an effect or change for some individuals or institutions (e.g., British Council 2021; Mok et al. 2021; Van Vugt et al. 2020), other studies delineated this effect as "disruptive" (Gabriels & Benke-Åberg 2020) or "destructive" (Yu 2021). However, this effect was not experienced in the same way or to the same degree but varied across regions, countries, and institutions (Marinoni et al. 2020; Santiago et al. 2021). This variation is equally apparent in the individual responses to the pandemic itself and the changing conditions. Overall, three main patterns emerged from the data analysis: (1) reversed dynamics and shifted pull-push factors, (2) fluctuating volumes in the ISM, and (3) flow trends.

Reversed dynamics: pulling to stay, pushing to go back home

National/Governmental responses

COVID-19 caused an unprecedented mobility restriction and reshaped the classical understanding of push and pull factors with national/governmental responses. The reviewed studies showed that countries' reaction to the pandemic was initially centered around safety concerns to control the spread of the virus. In so doing, a notable number of studies (see Table 1) referred to lockdowns, travel bans, suspension of visa services,

Table 1 Classification of reviewed studies addressing National and Institutional responses

Themes	Codes	*n*	Studies
National/ Governmental responses	Travel bans, suspension of visa services, lockdowns, border closures	27	Abdellatif et al. 2021; Almukhambetova &, Kuzhabekova 2022; Anas et al. 2022; Baer & Martel 2020; Blumenthal 2021; Brunner 2022; Firang & Mensah 2022; IAU 2020; IAUP & Santander 2021; Loo 2020; Mason 2021; Martel 2020a; 2020b; 2021; Martel & Baer 2021; Minaeva & Taradina 2022; Mok et al. 2021; Nakasato & Kayashima 2021; Obadire et al. 2020; Pavlikova et al. 2021; Qi & Ma 2021; Raby & Zhang 2022; Santiago et al. 2021; Shen et al. 2023; Shijian & Agyemang 2022; Sidhu et al. 2021; Sustarsic & Zhang 2022; Tikhonova et al. 2021
	Support mechanisms	6	Balan & Radu 2021; Brunner 2022; Martel 2021; Mason 2021; Qi & Ma 2021; Shijian & Agyemang 2022
Institutional responses	Mode of study	23	Almukhambetova & Kuzhabekova 2022; Baer & Martel 2020; Blumenthal 2021; Brunner 2022; Cairns et al. 2021; Cao & Chieu 2021; IAU 2020; IAU & ESN 2020; IAUP & Santander 2021; Jensen et al. 2022; Marinoni et al. 2020; Martel 2020b; 2020c; Martel & Baer 2021; Mason 2021; Minaeva & Taradina 2022; QS 2020; Obadire et al. 2020; QS 2020; Pavlikova et al. 2021; Roth 2020; Schulmann & Trines 2020; Studyportals 2020
	Communication	8	Baer & Martel 2020; IAU & ESN 2020; Martel 2020a; 2020b; Martel & Baer 2021; Minaeva & Taradina 2022; Studyportals 2020; Ye 2022
	Procedural-technical	7	Baer & Martel 2020; Martel 2020a; Martel & Baer 2021; Minaeva & Taradina 2022; QS 2020; Santiago et al. 2021; Studyportals 2020
	Basic needs-related	12	Baer & Martel 2020; IAU 2020; Martel 2020b; 2021; Martel & Baer 2021; Mason 2021; Minaeva & Taradina 2022; Nam & Jiang 2021; Qi & Ma 2021; Sidhu et al. 2021; Studyportals 2020; Taylor et al. 2021a

and border closures that eventually interrupted and/or halted the physical mobility of students (e.g., Almukhambetova & Kuzhabekova 2022; Nakasato & Kayashima 2021; Shen et al. 2023; Shijian & Agyemang 2022) and ended up with return to their home countries (Martel 2020a; 2020b). More specifically, Martel (2020b) pointed out that 138 HEIs from their sample, representing 31%, reported that 3144 IS, predominantly from Asia, could not travel to the USA in 2020 due to travel bans. A similar decrease in the number of ISs has been reported in Canada and the UK as well (e.g., Anas et al. 2022; Blumenthal 2021; Brunner 2022). This immobility pattern caused by the COVID-19 pandemic is not solely restricted to the receiving countries but is also evident globally. For instance, Tunisia, Palestine, and Morocco halted ISM, so that IS had to return to their countries (Abdellatif et al. 2021). In addition to border closures, governments took other safety precautions by arranging extra flights for their citizens to return home, restricting mobility to some destinations due to health and safety concerns, and therefore encouraging regional mobility (Anas et al. 2022; Mok et al. 2021). These findings indicated a shift in the dynamics of push and pull factors in a way that influenced home countries to retain domestic students and deter their departure. Simultaneously, they shed light on host countries' endeavors to repatriate IS and discourage their mobility.

After the first shock of the unexpected global crisis and realizing the negative consequences of the early-implemented policies on individuals and institutions, governments adjusted their policies to maintain or increase the incoming students by revising the pre-pandemic practices and turning them into more flexible and human-centered versions. Six studies showed that these novel practices primarily foresaw financial and psychological support aiming to ameliorate the status of IS, which positively impacted their numbers. More specifically, Balan and Radu (2021) reported how Australia, Belgium, France, Germany, Ireland, Japan, Sweden, and Norway provided financial support for IS. These

amendments at the national level paved the way for reconstructing the institutional responses as well.

Institutional responses

The national-level responses had repercussions on the policies and reactions of the institutions. Based on the reviewed articles, the institutional responses were classified into five categories: policy, mode of study, communication, procedural-technical, and basic needs-related responses (See Table 1). Our results showed that HEIs had to cancel their study programs and close campuses due to safety concerns in the first phase of the pandemic. However, in the later stages, most of them revised their policies and strategies, ending up with different study modes, internationalization at home options as well as contingency plans to manage the ongoing crisis (e.g., Balan & Radu 2021; Cao & Chieu 2021; Marinoni et al. 2020; Pavlikova et al. 2021; Raby & Zhang 2022). In addition to in-class learning, emergency remote learning, virtual mobility options, and hybrid modes of study were adapted to the teaching and learning process. Martel and Baer (2021) stated the variety in implementation as 20% of the institutions allowed online learning, while 16% provided both in-person and online mobility options. Furthermore, not every country reacted to this global crisis in the same way and speed (Cairns et al. 2021). According to Jensen et al. (2022), HEIs in the USA and private HEIs were the most reactive in taking action, while universities in Africa were less responsive in revising their internationalization strategies.

At the communication level, most HEIs diversified their strategies to reach out to IS by creating emergency hotlines to provide virtual support, utilizing social media to disseminate the information published in different languages (e.g., IAU & ESN 2020; Martel 2020b; Minaeva & Taradina 2022), and ultimately aimed for an extensive, open, and timely dialogue with them. Moreover, regarding the procedural-technical dimension, the student recruitment process supported by information technologies was adapted by ensuring flexibility in deadlines, applications, enrollments, payments, and study options, as seven studies declared (e.g., QS 2020; Santiago et al. 2021; Studyportals 2020).

Finally, institutions took some precautions and made arrangements to meet the psychological and financial needs of IS and minimize health and safety concerns. Baer and Martel (2020) indicated that all the participating institutions enacted safety protocols and that they remarked on the increased attention of institutions about IS's health and well-being, which was further supported by 12 studies in the corpus (e.g., IAU 2020; Mason 2021; Nam & Jiang 2021; Sidhu et al. 2021; Studyportals 2020).

Individual responses

As for student responses, two patterns emerged: ceased mobility and continued mobility (See Table 2). First, concerning ceased mobility, sixteen studies revealed that deferral was one of the most immediate reactions displayed. In their study, Singh et al. (2021) reported that one out of four Indian students postponed their plans, while three out of four considered taking a year off to decide how to progress further. The top destinations seemed to be influenced by the changing plans of students, particularly in the initial phase of the pandemic. For instance, Baer and Martel (2020) showed 40,000 deferrals in enrollments in USA institutions to a later term. Likewise, the crisis led students to cancel their plans, which also gave rise to ceased mobility, as documented by 12 studies

Table 2 Classification of reviewed studies addressing individual responses

Themes	Codes	*n*	Studies
Ceased mobility	Deferral	16	Almukhambetova & Kuzhabekova 2022; Baer & Martel 2020; Blumenthal 2021; British Council 2021; Cheng & Agyeiwaah 2022; Gabriels & Benke-Åberg 2020; IAU 2020; Loo 2020; Martel 2020a; 2020c; Minaeva & Taradina 2022, QS 2020; Schulmann & Trines 2020; Shen et al. 2023; Singh et al. 2021; Van Vugt et al. 2020
	Cancellation & Studying in the home country	12	Abdellatif et al. 2021; Almukhambetova & Kuzhabekova 2022; Anas et al. 2022; Blumenthal 2021; Gabriels & Benke-Åberg 2020; IAU 2020; Loo 2020; Marinoni et al. 2020; Mok et al. 2021; Shen et al. 2023; Shulman & Trines 2020, Van Vugt et al. 2020
Continued mobility	Virtual, face-to-face, & hybrid study modalities in home or host countries	16	Abdellatif et al. 2021; Almukhambetova & Kuzhabekova 2022; Baer & Martel 2020; Blumenthal 2021; Gabriels & Benke-Åberg 2020; Loo 2020; Martel 2020a; 2020b; 2020c; 2021; Martel & Baer 2021; Mason 2021; Nakasato & Kayashima 2021; Pavlíková et al. 2021; Shen et al. 2023; Van Vugt et al. 2020
	Change in the destination	7	Blumenthal 2021; Cheng & Agyeiwaah 2022; IAU 2020; Loo 2020; Mok et al. 2021; Shen et al. 2023; Van Vugt et al. 2020
	No change in mobility plans	6	Almukhambetova &, Kuzhabekova 2022; British Council 2021; Cheng & Agyeiwaah 2022; Mok et al. 2021; Shen et al. 2023; Van Vugt 2020
Other responses	Uncertain	3	Martel 2020a; 2020c; Singh et al. 2021

(e.g., Mok et al. 2021; Shen et al. 2023; Van Vugt et al. 2020). Thus, for some students, studying in their country of origin and being immobile became a more attractive option during the pandemic (e.g., Blumenthal 2021; Loo 2020).

For some prospective and already mobile students, stopping physical mobility was the only option. However, for others, mobility continued, particularly after the initial phase of the pandemic, but mostly took a different shape or occurred in a different destination, which emerged as the second pattern named continued mobility. Driven by the concern of keeping existing students and attracting more, many institutions shifted their provisions to online education. This option provided opportunities for already mobile IS to remain in the host country and continue mobility, whereas others stayed in their home countries while studying internationally through virtual mobility options, as revealed by 16 studies (e.g., Baer & Martel 2020; Gabriels & Benke-Åberg 2020; Pavlíkova et al. 2021). Thus, online study options helped many IS to stay on track and maintain their mobility plans to a certain extent (Shen et al. 2023; Van Vugt et al. 2020). As shown by seven studies, change in destination choice was the second pattern observed under the continued mobility theme. However, it did not appear as the most prominent option, as the number of IS who resorted to this solution was reported to be relatively lower (e.g., Loo 2020; Van Vugt et al. 2020). Therefore, for some studies, neighboring countries seemed to be the most attractive options mainly due to the safety and well-being related reasons, which seemed particularly valid for Chinese students (e.g., Cheng & Agyeiwaah 2022; Mok et al. 2021). Blumenthal (2021) additionally expanded on the reasons for changing destinations and reported that migration and post-graduation employment opportunities were influential for Hong Kong students to consider alternative destinations during COVID-19. This suggests that not only the pandemic and resulting actions taken but also long-lasting life and career prospects might affect mobility patterns.

Changing volume of ISM

Although there was an instant assumption of the devastating impact of COVID-19 on ISM flow, the results of the reviewed scholarship revealed the changing volume of ISM,

reflecting decrease, increase, and stability patterns throughout the pandemic. First, as Table 3 displays, the majority of studies reported a decreasing trend in IS numbers in different contexts (e.g., DAAD 2021; Di Pietro 2023; Nakasato & Kayashima 2021). However, this consistency in the findings mainly reflected the first phase of the pandemic, as many countries were affected by the governmental regulations listed above and could not proceed with the enrollment process due to uncertainty. As one of the traditional destinations, the USA was sharply and negatively influenced by COVID-19, as students from China, India, Japan, and Taiwan could not travel to the USA in 2020 (Martel 2020b). This downward trend was similarly observed in Finland and Canada (Balan & Radu 2021; Buckner et al. 2022).

Second, 12 reviewed studies highlighted a growing trend, particularly notable in Germany, the Czech Republic, Lithuania, the Netherlands, and Switzerland, where the share of IS increased (Santiago et al. 2021). In addition, Martel (2021) remarked the rebound in 2021 both in the enrollments and number of IS in the USA with a significant increase, which is similar to Germany (DAAD 2021; Mason 2021). Considering these results, it can be argued that the rate of decrease has slowed down after the first year of the pandemic, and for some countries, the numbers have started to revert back to the level before the pandemic.

Third, there are a few studies ($n=6$) drawing attention to stable numbers, especially at the institutional level (e.g., DAAD 2021; Marinoni et al. 2020; Mason 2021). At this point, the results showed that these fluctuations and variations in the volume of the ISM are not only related to the phase of the pandemic but also to the mobility and institution type, degree level (undergrad, master/Ph.D.), and some other external factors. Of the studies reviewed, 17 indicated that the decline in the number of IS is anticipated to be higher among those pursuing undergraduate degrees, attending two-year colleges, and

Table 3 Classification of reviewed studies addressing volume of ISM

Themes	Codes	*n*	Studies
Change in Volume	Decreasing trend	30	Abdellatif et al. 2021; Baer & Martel 2020; Balan & Radu 2021; Blagg 2020; Blumenthal 2021; Buckner et al. 2022; DAAD 2021; de Wit & Marinoni 2021; Di Pietro 2023; IAU 2020; Jensen et al. 2022; Loo 2020; Marinoni et al. 2020; Martel 2020a; 2020b; 2020c; Martel & Baer 2021; Mason, 2021; Minaeva & Taradina 2022; Mok et al. 2021; Nakasato & Kayashima 2021; Pavlikova et el. 2021; Santiago et al. 2021; Shijian & Agyemang 2022; Sidhu et al. 2021; Studyportals 2020; Taylor et al. 2021a; 2021b; Tikhonova et al. 2021; Van Essen-Fishman 2022
	Increasing trend	12	British Council 2021; DAAD 2021; Jensen et al. 2022; Loo 2020; Martel 2020c; Martel 2021; Martel & Baer 2021; Mason 2021; Mok et al. 2021; Santiago et al. 2021; Studyportals 2020; Van Essen-Fishman 2022
	Stable	6	DAAD 2021; Marinoni et al. 2020; Martel 2020c; Martel & Baer 2021; Mason 2021; Van Essen-Fishman 2022
External factors effecting the volume of ISM	Type of mobility (credit vs. degree-seeking)	14	DAAD 2021; de Wit & Marinoni 2021; Gabriels & Benke-Åber 2020; IAU & ESN 2020; IAUP & Santander 2021; Jensen et al. 2022; Marinoni et al. 2020; Martel 2020; Mason 2021; Minaeva & Taradina 2022; Nam & Jiang 2021; Nakasato & Kayashima 2021; Pavlikova et el. 2021; Tikhonova et al. 2021
	Degree (undergraduate vs. graduate, student characteristics)	3	Blagg 2020; Buckner et al. 2022; Loo 2020
	Type of institution and field of study	6	Blagg 2020; Buckner et al. 2022; DAAD 2021; Martel 2021; Martel & Baer 2021; Mason 2021
	Political and economic factors	4	Di Pietro 2023; Mason 2021; Minaeva & Taradina 2022; Van Essen-Fishman 2022

Table 4 Classification of reviewed studies addressing outcomes of changing patterns and volumes

Themes	Codes	*n*	Studies
Change in popularity	Stability (France, Italy, Spain, the Netherlands, UK, Canada, USA, Australia, New Zealand, Germany, Japan)	10	British Council 2021; Loo 2020; Martel 2020c; Martel & Baer 2021; Mok et al. 2021; Nakasato & Kayashima 2021; Sidhu et al. 2021; Singh et al. 2021; Van Essen Fischman 2022; Van Vugt et al. 2020
	Increase (Japan, Taiwan, Hong Kong, Singapore, Costa Rica, East Asian countries)	4	Balan & Radu 2021; Martel & Baer 2021; Mok et al. 2021, Sidhu et al. 2021
	Decrease (New Zealand, Canada, Australia, USA)	2	Loo 2020; Mok et al. 2021
Regionalization		7	Balan & Radu 2021; IAU 2020; James 2023; Mok et al. 2021; Nakasato & Kayashima 2021; Obadire et al. 2020; Yu 2021
Revenue loss		7	Cheng & Agyeiwaah 2022; de Wit & Marinoni 2021; Firang & Mensah 2022; IAU 2020; Marinoni et al., 2020; Martel 2020b; Minaeva & Taradina, 2022

credit-seeking, compared to graduate sector and degree-seeking students. More precisely, some studies remarked that short-term mobility could not be realized in the first phase of the pandemic, which is reflected in a sharp decline in numbers of short-term mobility in all regions (e.g., de Wit & Marinoni 2021; Jensen et al. 2022; Pavlikova et al. 2021). Furthermore, one study (Martel 2021) drew attention to the size of the institution, reporting that the decline in IS was much sharper in small institutions due to their limited capacity to host students, while another study (DAAD 2021) highlighted the differences in the volume of the ISM by the field of study, referring the increasing trend in the college of art and music compared to applied sciences. Further, four studies suggested the influence of economic and political dimensions, referring to (un)welcoming policies of countries towards IS concerning residency and work opportunities in addition to the pandemic-related factors. For instance, Van Essen-Fishman (2022) asserted that the coincidence of COVID-19 and Brexit would sharpen the decrease in IS for the UK, while Mineave and Taradina (2022) underlined that the size of the IS in Russia was influenced by the political and economic roughness in the neighbor countries.

Flow trends: outcomes of changing patterns and volumes

The natural byproduct of the changes in mobility preferences and practices and fluctuating volumes resulted in changes in the popularity of countries in attracting IS. The reviewed studies showed three major patterns in terms of popularity: stability, increase, and decrease (see Table 4). Traditional top destinations maintained their appeal, such as the USA (e.g., Loo 2020; Singh et al. 2021) and the UK (e.g., British Council 2021; Van Essen-Fischman 2022) during the pandemic. Australia, the Netherlands, Canada, Germany, and New Zealand also remained strong in attracting IS even though the number of studies addressing them was more limited in comparison to the USA (e.g., Sidhu et al. 2021; Van Vugt et al. 2020). Martel and Baer (2021) additionally documented the sustained popularity of traditional European destinations such as France, Italy, and Spain as study-abroad host countries for students from the USA during the pandemic.

COVID-19 also caused some study-abroad destinations to gain popularity and paved the way for new markets (James 2023), as discussed in four studies reviewed (e.g., Martel & Baer 2021; Sidhu et al. 2021). Japan, South Korea, Costa Rica, and New Zealand

emerged as four non-European study-abroad destinations for USA students (Martel & Baer 2021), while East Asian countries, Hong Kong, Japan, and Taiwan, received mounting attention from Chinese students (Mok et al. 2021). The desire to study in neighboring countries (Cheng & Agyeiwaah 2022; IAU 2020) and the decline of interest in traditional destinations, mainly due to discriminatory attitudes against IS (Almukhambetova & Kuzhabekova 2022; Cheng & Agyeiwaah 2022; Mok et al. 2021; Shen et al. 2023), explained why such alternative destinations became popular among Chinese students. This shift in the flows accelerated the regionalization of ISM, as discussed by seven studies, which is expected to continue after the pandemic and appears to provide an opportunity, particularly for East Asian countries, to increase their IS share on a global scale (Balan & Radu 2021). The same trend echoed in the African region. That is, African countries, including Kenya, Uganda, and Egypt, at the time of the pandemic, capitalized on the opportunity to increase their IS shares through the protocols signed for increased sub-regional student mobility, which contributed to the same trend (Obadire et al. 2020).

Also, two studies demonstrated that some top destinations, including the USA (Loo 2020), Australia, and Canada (Mok et al. 2021), received relatively less attention compared to the pre-pandemic period even though they remained in the popularity rankings of destination countries. The reason behind the continuous popularity of traditional destinations was accounted for by the English language (Loo, 2020) and better coping with the pandemic (Loo 2020; Sidhu et al. 2021; Vugt et al. 2020. However, the unwelcoming residence and employment policies, as well as the problems in visa processing (Loo 2020), seemed to act as the reverse push factors mitigating their appeal in this process. Further, the shifts in IS numbers and resulting popularity change loss came at a cost for the countries relying their survival on the number of IS enrollments and fees (e.g., Cheng & Agyeiwaah 2022; Firang & Mensah 2022).

Discussion

This systematic review aimed to understand the impact of the COVID-19 pandemic on ISM in the sense of magnitude, directional flow, and patterns by analyzing 57 scholarly works. The consolidated research findings revealed a complex picture. Our results showed that the size and directional flow of ISM during COVID-19 have been affected by multiple and nested factors, mainly driven by the responses of governments and HEIs, as well as changes in students' decisions based on these responses. This confluence resulted in traditional pull factors acting initially as push factors because previously encouraging governmental policies turned out to be restrictive of study abroad during this disruptive time.

Regarding our research question about changes in the size of ISM in terms of the number of IS, first, our synthesis indicated that there was not a consistent decrease in the size of the ISM at a global scale, and that there were diverse factors influencing and shaping the increasing or decreasing trend regarding the phase of the pandemic, responses taken by the governments and HEIs, and characteristics of the country, HEIs, and students. For this reason, arguing that there has been a devastatingly decreasing trend in ISM due to the pandemic and safety concerns is a cursory glance, which overlooks numerous influential shaping factors affecting ISM and offers a superficial understanding. Recently, emerging scholarship (Altbach & de Wit 2022) demonstrates the rebound in IS numbers, and based on this fact, some scholars concluded that the impact of COVID-19 was a

temporary barrier to the growth of ISM. However, ISM seems to have deviated from its pre-pandemic trajectory due to the implementation of different actions, policies, and strategies, which aimed to manage the pandemic and subsequently regain IS. All these actions played a significant role in the resulting size and directional flow trends. Consequently, even if the size of the ISM returns to the pre-pandemic level, the scene and proportional distribution have not remained the same. Although the picture of favorite destinations remained rather similar during the pandemic, there has been a decline in the popularity of some countries, manifesting itself in the decreasing share of IS. This is especially valid for the USA. Thus, COVID-19 has temporarily changed the positions of some top-receiving countries while some others stand out, particularly with their successful way of managing the repercussions of the pandemic and a safer environment created. For instance, Germany cemented its position in ISM by recording an increase in IS numbers during the pandemic.

A second main finding of this review is the further intensification of the pre-pandemic regionalization trend (Glass & Cruz 2022; Hou & Du 2020). Our review indicated that this regionalization particularly favored Asia and Africa during the pandemic due to the interplay of restrictive policies and practices of top receiving countries, students' concerns, and rising discriminatory discourses. In this respect, we argue that the COVID-19 crisis emerged as an unexpected opportunity for countries seeking to increase their appeal to IS.

This review also highlighted a major shift to virtual provisions of programs and courses. Thus, the pandemic created an imperative for many HEIs to speed up their digitalization process, necessitated by the existential need for lowering enrollments and the risk of revenue loss. Although the pandemic triggered greater engagement of institutions, academics, and students with online and distance education (Bozkurt 2022), their unfavorable attitudes towards such practices have a long history that predates the pandemic (Sadykova 2012). Thus, virtual or hybrid study options were not a panacea, and avoiding them served as a factor causing postponements and cancellations of mobility plans for some (e.g., IAU 2020; Mineave & Taradina 2022). However, for many traditional (students who study outside their home countries with a student visa) and non-traditional IS (immigrants or refugees whose admission procedures are different given the unverifiable credentials or lack of documents and language needs), virtual options turned out to be a more convenient and inclusive way to continue their study abroad experience (e.g., Blumenthal 2021; Loo 2020). Therefore, it is beyond dispute that the agility of institutions in digital transformation eventually expanded their repertoire of responses to crises and pushed them to a paradigm change. However, contrasting findings, referring to how digital study options temporarily withheld IS from study abroad, challenged the potential of virtual mobility before it was totally exploited.

Finally, considering the discussed influences of the pandemic, it can be argued that the COVID-19 period could be classified as Wave IV as an extension to Choudaha's (2017) three waves of ISM. Unlike Choudaha and Van Mol's (2022) discussion on whether the pandemic constitutes an extension of Wave III or the beginning of Wave IV, our systematic review provided evidence for the latter. We postulate that distinct from the factors in Wave III, in which the impact on ISM was mainly shaped by the policies of the destination countries affecting their bilateral relations with source countries, COVID-19 had a global impact on ISM, eventually creating fluctuations in numbers and accelerating

the regionalization. Choudaha (2017) remarked that Wave III was formed by the rise of nationalism accompanied by anti-immigration discourse, the cost-benefit analysis regarding mobility, and demographic shifts, overall causing an urge for traditional source countries. In so doing, in addition to inheritance from Wave III, of which impact was reflected in our review as economic and political dimensions, COVID-19 led to health and safety concerns for multiple stakeholders that caused a limbo for ISM at first sight and afterward exacerbated a national and institutional desire to attract IS. This desire begat a shift in the size, flows, and teaching modality of ISM, and increased the requirement for implementing policies not only to preserve institutional sustainability, revenue, and a traditional country image but also to reply to IS's needs beyond higher education, such as renewing employment and immigrant policies.

Limitations and recommendations

The findings of this study should be interpreted carefully given the heterogeneity of data in terms of the level of analysis (findings from national, institutional, or individual perspectives), undefined sample characteristics and home and host countries, or skewness to top sending and receiving countries. Those limitations of data mainly derived from the limited scope of the sample as the target groups in the reviewed studies were dominantly selected from a single HEI or in a single area (e.g., Sustarsic & Zhang 2022) and focused on Asian, and often specifically Chinese IS (e.g., Mok et al. 2021; Nam & Jiang 2021; Sidhu et al. 2021). Therefore, the generalizability of the findings to the global scale is limited, and findings fall short of providing evidence on the effect of the pandemic on the countries from the Global South, such as Kenya, Egypt, Brazil, Indonesia, Sudan, and Central Asian countries.

Also, studying ISs from a limited number of countries of origin poses an additional gap in the literature (e.g., Tikhonova et al. 2021). In this respect, future research should make use of more diverse samples regarding students' demographics and countries of origin. The analysis of geopolitical factors could also result in a better understanding of higher education internationalization (Mok et al. 2021). Further studies are also recommended to explore the size and flows of ISM on a global scale during and post-pandemic periods, relying on global data from the same source with the same level of analysis. Moreover, as our results documented that virtual mobility is an option to continue international study or a way to ensure inclusivity, future studies are needed to unpack the virtual mobility experiences of the students during the pandemic to provide evidence to strengthen the future prospect of this underutilized mobility option. The study also provided significant insight into the new destinations like Taiwan that emerged through students' preferences during the pandemic. However, it is still a crucial question to understand how these emerging countries' reactions shape these relatively new mobility patterns. Finally, to better understand the degree of the sustainability of changes in policy and practices and the long-term effects of the pandemic, the post-pandemic IS policies of different countries, educational provisions, and virtual mobility practices could be investigated.

Abbreviations

HEI Higher Education Institution
IS International Students
ISM International Student Mobility

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s40878-025-00431-5.

Additional file 1

Additional file 2

Acknowledgements
This article is based upon the work from COST Action CA20115 'European Network on International Student Mobility: Connecting Research and Practice', supported by COST (European Cooperation in Science and Technology).

Author contributions
All authors contributed to the following tasks: conception of the review, search, identification, and selection of studies, retrieval of the data for the coding stage, and descriptive analysis of the different dimensions of the reviewed literature reported in the manuscript. [YK] and [BBS] participated in the inductive coding stage for the larger project, and [YK] contributed to naming the themes and arguments in the discussion section. [MZK] and [SKK] led the review team, compiled and edited the different authors' contributions in the sections ***method***, ***descriptive results***, and ***limitations***, and wrote the introduction, result, and discussion sections. All authors approved the final version of the manuscript.

Data availability
The literature review corpus and the data extraction form will be made available upon reasonable request.

Declarations

Competing interests
The authors declare that they have no financial or non-financial competing interests.

Author details
[1]Middle East Technical University, Ankara, Türkiye
[2]Center for International Higher Education, Boston College, Chestnut Hill, USA
[3]Faculty of Economics and Business Administration, University of Szeged, Szeged, Hungary
[4]Department of Didactic and Educational Organization, Universitat de Barcelona, Barcelona, Spain
[5]International Association of Universities, Paris, France
[6]Catholic University of the Sacred Heart, Center for Higher Education Internationalization, Milan, Italy
[7]New Economic School, Moscow, Russia
[8]Karamanoglu Mehmetbey University, Department of Educational Sciences, Karaman, Türkiye
[9]Interdisciplinary Research Centre for Education and Development (CeiED), Lusófona University, Porto, Portugal
[10]HAN University of Applied Sciences, Arnhem, The Netherlands
[11]Turku Research Institute for Learning Analytics, Faculty of Science, University of Turku, Turku, Finland

Received: 31 March 2024 / Accepted: 10 February 2025
Published online: 17 March 2025

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Note: * shows the papers used in the literature review, not included in the systematic review corpus.

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