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A Descriptive and GIS-Based Study Mapping the Living Environments for International Students at IEQAS Excellent Accredited Universities in South Korea

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ABSTRACT

This study explores the institutional characteristics and spatial accessibility of International Education Quality Assurance System (IEQAS) Excellent Accredited Universities in South Korea. While IEQAS evaluates universities based on their capacity to recruit and manage international students, limited attention has been given to the external living environments surrounding these institutions. To address this gap, this study applies a Geographic Information Systems (GIS)-based approach to analyze both institutional profiles and spatial accessibility conditions. A total of 35 IEQAS Excellent Accredited Universities were examined. First, a descriptive profiling analysis was conducted to summarize institutional characteristics, including accreditation continuity, university type, regional distribution, international student enrollment, and language-related indicators. Second, spatial accessibility was evaluated through nearest-distance analysis to major transportation hubs (international airports and KTX stations) and facility-count analysis within a 1 km walkability buffer, including large-sized marts & supermarkets, hospitals & clinics, and pharmacies. The findings reveal significant variations in spatial accessibility among universities despite their shared accreditation status. Universities located in metropolitan areas demonstrate higher accessibility to transportation and daily life facilities, while those in suburban or regional areas show relatively limited access. These results indicate that institutional excellence does not necessarily guarantee favorable living environments for international students. This study highlights the importance of integrating spatial accessibility into discussions of international student support and higher education internationalization. The findings provide theoretical contributions by extending accessibility concepts to higher education contexts and offer practical implications for universities and policymakers seeking to improve international student living conditions.

1. Introduction

The internationalization of higher education has become a key policy priority worldwide, as countries increasingly compete to attract and retain international students. In this context, South Korea has actively expanded its global education strategies through initiatives such as the Study Korea 300K Project, which aimed to host 300,000 international students by 2027 and position Korea among the world's leading study destinations (Ministry of Education Republic of Korea, 2023). Notably, this policy goal was achieved earlier than expected, as the number of international students exceeded 300,000 prior to the target year. According to official statistics, as of March 31, 2026, the total number of international students in Korea reached 329,760, including 243,656 D-2 (degree-seeking) students and 86,104 D-4 (language training) students (Ministry of Justice Republic of Korea, 2026). This rapid growth reflects Korea's increasing attractiveness as a destination for international education and highlights the growing importance of providing adequate living environments to support this expanding student population.

To ensure the quality and sustainability of international student recruitment, the Korean government operates the International Education Quality Assurance System (IEQAS), which evaluates universities based on their capacity to recruit and manage international students (Study in Korea, 2026). Universities designated as IEQAS "Excellent Accredited" institutions are recognized for their academic standards, administrative systems, and institutional management. However, while IEQAS focuses on internal institutional quality, it does not explicitly consider the external spatial conditions surrounding universities, which are critical for supporting international students' daily lives.

This distinction is important because the international student experience is shaped not only by institutional support inside the university but also by the accessibility of essential services outside the campus. Previous studies have shown that international students' adjustment and well-being are influenced by practical living conditions, including housing, transportation, healthcare, and access to local services(Arthur, 2017; Kusek, 2015; Smith & Khawaja, 2011). Therefore, even when universities meet national quality standards, their surrounding environments may differ significantly in terms of transportation convenience, healthcare availability, and daily-life facilities. Evaluating the spatial accessibility of university environments can thus provide an additional perspective for understanding how well IEQAS Excellent Universities support the practical living needs of international students.

Accessibility is a fundamental concept in spatial analysis and geography, referring to the ease with which individuals can reach desired services, activities, and destinations (Hansen, 1959). Previous studies have emphasized that accessibility is shaped by the interaction between land use, transportation systems, and service distribution (Geurs & van Wee, 2004). For international students, accessibility extends beyond academic environments to include transportation infrastructure and essential daily-life facilities. For example, access to airports and KTX stations is essential for international mobility, while access to hospitals, pharmacies, and supermarkets is necessary to ensure stable living conditions in a foreign environment.

Geographic Information Systems (GIS) provide an effective methodological framework for evaluating spatial accessibility and identifying inequalities in service distribution. In the Korean context, GIS-based studies have been widely used to assess accessibility to healthcare and social infrastructure. For example, Kim et al. (2018) enhanced healthcare accessibility measurement using GIS in Seoul, while Yhee et al. (2021) proposed a GIS-based evaluation method for social infrastructure facilities. More recent studies have applied GIS to optimize the placement of public systems for vulnerable populations (Lee et al., 2024) and to analyze spatial distributions of environmental risks (Kim et al., 2023). These studies demonstrate the effectiveness of GIS in identifying spatial disparities and supporting evidence-based planning.

Although GIS has been widely applied to accessibility research, its application to international student living environments remains limited. Previous GIS studies have examined access to public facilities, healthcare services, schools, campus spaces, and urban infrastructure, demonstrating the usefulness of GIS for identifying uneven service distribution and spatial inequality (Abulibdeh et al., 2024; Jamal & Naharudin, 2025; Pan et al., 2026). However, these studies have rarely connected spatial accessibility with university location, surrounding living infrastructure, and international student support within a national higher education quality framework such as IEQAS. This indicates a need to examine whether universities recognized for international education quality are also located in environments that provide sufficient access to essential services for international students.

At the same time, existing international student research has mainly focused on adjustment, acculturation, satisfaction, and institutional support. These studies show that international students' experiences are affected not only by academic factors but also by accommodation, health and safety, support services, sociocultural experiences, and local living conditions (Ammigan, 2019; Wu et al., 2025; Yılmaz & Temizkan, 2022). However, this literature generally relies on students' subjective perceptions and gives less attention to the objective spatial conditions surrounding universities. This gap is particularly important for D-2 students, who usually stay in Korea for longer periods for degree programs, and D-4 students, who require accessible environments during their early language-training and adaptation period. Therefore, combining international student research with GIS-based spatial accessibility analysis can provide a more comprehensive understanding of the living environments surrounding Korean universities.

Accordingly, this study first conducts a descriptive profile analysis of selected IEQAS Excellent Universities in Korea and then evaluates their living accessibility for international students, particularly those holding D-2 and D-4 visas, using a GIS-based approach. Rather than focusing only on institutional quality, this study examines whether the surrounding environments of IEQAS Excellent Universities provide practical access to transportation infrastructure and essential daily-life services. By linking the IEQAS framework with spatial accessibility analysis, this study contributes to international higher education research by offering an objective, location-based perspective on the living conditions that support international students' adaptation and long-term stay in Korea.

2. Literature Review

2.1. International Students and University Living Environments

International student mobility has become an important component of higher education internationalization, as universities and governments increasingly compete to attract students from abroad (Feyissa & Sherpa, 2025; Sherpa et al., 2026). Unlike domestic students, international students experience higher education within a new cultural, linguistic, academic, and administrative environment, which creates adjustment challenges beyond ordinary academic adaptation (Andrade, 2006; Smith & Khawaja, 2011; Limbachia & Tao, 2025). These challenges often include language barriers, cultural adjustment, social isolation, discrimination, homesickness, and psychological stress (Oduwaye et al., 2023; Wu et al., 2015). Therefore, international students' university experience should be understood not only as an academic experience but also as a broader process of adapting to a new institutional and living environment (Gutema et al., 2024; Russell et al., 2010).

Because international students have different needs from domestic students, the institutional characteristics of universities become important. Previous studies have shown that academic advising, language support, student services, social resources, and institutional responsiveness play important roles in international students' adjustment and satisfaction (Arthur, 2017; Martirosyan et al., 2019). At the same time, universities differ in their capacity to host and support international students depending on their institutional type, location, size of international student enrollment, student composition, and language-support environment (Ammigan & Jones, 2018). These characteristics are important because they reflect how internationalization is organized across different institutions and regions.

However, institutional characteristics alone do not fully explain the international student environment, because students' daily lives are also shaped by their ability to access essential services and opportunities around the university. Accessibility studies emphasize that access depends on the relationship between people, service locations, transportation systems, and spatial opportunities, making the surrounding environment an important part of university-based international student support (Huisman et al., 2022).

2.2. Spatial Accessibility and GIS-based Evaluation

Accessibility is a key concept in geography, transportation planning, and urban studies. Hansen (1959) defined accessibility as the potential opportunity for interaction between places, while later studies explained that accessibility is shaped by land use, transportation systems, service distribution, and individual needs (Geurs & van Wee, 2004; Handy & Niemeier, 1997). Thus, accessibility refers not only to physical distance but also to how easily people can reach opportunities, services, and activities.

In higher education, spatial accessibility is important because a university's location can influence students' access, participation, and overall educational experience (Brownie et al., 2025). Location is not merely a physical attribute but a factor related to educational opportunity and institutional competitiveness, as students actively consider spatial environments when choosing a university (Aydın, 2013). This spatial perspective is particularly critical for international students. Because they often enter unfamiliar local environments and lack private transportation, access to healthcare, accommodation, safety, and local services is a fundamental factor in their adaptation and well-being (Andrade, 2006; Smith & Khawaja, 2011; Huisman et al., 2022).

To comprehensively understand the spatial environment of international students, accessibility must be examined through two major dimensions: transportation and daily life. Transportation accessibility determines how easily students can reach the campus and connect with surrounding urban areas (Geurs & van Wee, 2004). Barriers in transportation can limit campus participation and affect travel behavior (Allen & Farber, 2018; De Vos et al., 2025). Furthermore, daily life accessibility is equally important, as students need to reach essential services such as hospitals, pharmacies, supermarkets, and banks. Daily accessibility, influenced by the built environment and the variety of reachable opportunities, supports everyday activities directly linked to health, safety, and quality of life (Su & Goulias, 2023).

To empirically evaluate these dimensions of spatial accessibility, Geographic Information Systems (GIS) provide the most effective methodological framework. GIS enables researchers to calculate distances, define buffer areas, and visualize spatial inequality (Kim et al., 2025). It has been widely applied in studies evaluating spatial accessibility to healthcare, public services, and transportation planning (Liu & Zhu, 2004; Neutens, 2015). In university contexts, previous studies have successfully used GIS to analyze public transport accessibility and socio-spatial inequalities around campuses (Sun et al., 2018; Zannat et al., 2020). Building on this literature, this study applies GIS-based spatial analysis to examine the transportation connectivity and daily life service accessibility of IEQAS Excellent Accredited Universities in South Korea.

3. Methodology

This study applied descriptive profile analysis and GIS-based spatial analysis to evaluate the accessibility of IEQAS Excellent Accredited Universities in Korea from the perspective of international students. The study focused on whether universities officially recognized for their internationalization capacity also provide favorable spatial environments for international students' mobility and daily life. The research subjects were limited to 35 general universities designated as IEQAS Excellent Accredited Universities as of 2026. Junior colleges and other non-general higher education institutions were excluded from the analysis in order to maintain consistency in institutional type and comparison.

The list of Excellent Accredited Universities was obtained from the International Education Quality Assurance System (IEQAS). IEQAS is a national quality assurance and certification system of the Republic of Korea, jointly operated by the Ministry of Education and the Ministry of Justice. It evaluates universities based on their internationalization capacity, including their ability to attract, manage, and support international students.

Therefore, IEQAS Excellent Accredited Universities were selected as suitable research subjects for examining the spatial and institutional characteristics of internationalized universities in Korea. This study focused specifically on IEQAS Excellent Accredited Universities, rather than all IEQAS-accredited universities in Korea. Excellent Accredited Universities represent a more selective category of institutions that have been recognized for relatively stronger internationalization capacity and international student support systems. Therefore, limiting the research subjects to this group allowed the study to examine whether universities with high levels of international education quality also provide favorable spatial accessibility environments for international students.

Before conducting the GIS-based spatial accessibility analysis, this study first conducted a descriptive profile analysis of the selected universities. The profile variables included accreditation continuity from 2023 to 2025, institutional type, regional location, total international student enrollment, D-2 and D-4 student numbers, and language proficiency indicators. This preliminary analysis provided contextual information for understanding the institutional and internationalization-related characteristics of IEQAS Excellent Accredited Universities.

Spatial data were collected from the Korean Public Data Portal at https://www.data.go.kr/en/index.do. The collected data included international airports, KTX stations, large-sized marts and supermarkets, hospitals and clinics, and pharmacies. These variables were selected to reflect two key dimensions of accessibility. International airports and KTX stations were used to represent transportation accessibility, while large-sized marts and supermarkets, hospitals and clinics, and pharmacies were used to represent daily life accessibility. Transportation accessibility reflected the ease of national and regional mobility, whereas daily life accessibility reflected the convenience of everyday living and settlement conditions for international students.

For the spatial analysis, the location of each university was converted into geographic coordinates using Gimi9 Geocoder. The official address of each university was used as the input address for geocoding. Therefore, each university campus was represented as a single point based on its official address, rather than a specific internal campus location such as the main gate, administrative building, or central campus area. The geocoded datasets were then imported into QGIS 3.44 for spatial analysis and map visualization.

The analysis consisted of two stages. In the first stage, nearest-distance analysis was conducted to calculate the distance from each university to the nearest international airport and KTX station. This allowed the study to compare the level of transportation accessibility among IEQAS Excellent Accredited Universities. In the second stage, daily life accessibility was measured by counting the number of large-sized marts and supermarkets, hospitals and clinics, and pharmacies located within a 1 km walkability buffer around each university. Based on previous studies, the 1 km buffer was adopted as a practical walking-distance threshold for assessing access to essential daily facilities (Carson et al., 2023; Liao et al., 2020; Ogryzek et al., 2022). The number of each facility type was calculated separately, and the total number of daily life facilities within the 1 km buffer was also computed as an overall indicator of daily life accessibility.

The results were visualized through thematic maps using QGIS 3.44. An integrated daily life accessibility map was produced by combining the total number of these facilities. This methodological approach enabled a spatial understanding of how IEQAS Excellent Accredited Universities differ in terms of transportation convenience and everyday living conditions for international students.

4. Results

4.1. Descriptive Profile of IEQAS Excellent Accredited Universities

Table 1 presents the basic profile of the 35 IEQAS Excellent Accredited Universities included in this study. The table summarizes each university's accreditation continuity, institutional type, region, international student enrollment, visa-related student composition, and language proficiency indicators from Korean Educational Development Institute (2025). Continuous Excellent Accreditation 2023–2025 indicates whether the university maintained Excellent Accredited University status for three consecutive years. 15 universities maintained continuous excellent accreditation from 2023 to 2025, while 20 universities did not show three-year continuous accreditation.

Institutional type was classified as private, national, public, or special act corporation. Private universities accounted for the largest proportion, with 29 institutions. In comparison, there were four national universities, one public university, and one special act corporation. This indicates that IEQAS Excellent Accredited Universities are predominantly composed of private universities.

In terms of regional distribution, Seoul had the largest number of IEQAS Excellent Accredited Universities, with 17 institutions. This was followed by Gyeonggi with five universities, Busan and Chungnam with three universities each, and Daegu with two universities. Incheon, Daejeon, Ulsan, Gyeongbuk, and Jeju each had one university. These results indicate that IEQAS Excellent Accredited Universi-

ties are highly concentrated in Seoul and the surrounding metropolitan area.

The table also reports the total number of international students, D-4 students, and D-2 students. D-4 students generally represent language training or non-degree training students, whereas D-2 students represent degree-seeking international students. In addition, language-related indicators were included to describe the academic readiness of international students. TOPIK Level 4 or higher students indicate students who meet the Korean language proficiency criterion, while TOEFL iBT 59 or higher students represent English-track students who meet the minimum English proficiency criterion. Therefore, this table provides an overall understanding of the institutional and internationalization-related characteristics of IEQAS Excellent Accredited Universities before conducting the spatial accessibility analysis.

Table 1. Basic descriptive profile of IEQAS excellent accredited universities

University	Continuous Excellent Accreditation 2023–2025	Institutional Type	Region	Total International Students	D-4 Students	D-2 Students	TOPIK Level 4 or Higher Students	TOEFL iBT 59 or Higher (English-Track Students)
Konkuk University	Yes	Private	Seoul	2,228	1,415	813	752	0
Konyang University	No	Private	Chungnam	430	92	338	30	44
Kyungpook National University	Yes	National	Daegu	1,660	632	1,028	441	0
Kyungsung University	No	Private	Busan	1,966	1,788	178	48	1,571
Kyung Hee University	No	Private	Seoul	3,535	2,486	1,049	1,286	197
Keimyung University	Yes	Private	Daegu	3,044	1,406	1,638	584	46
Korea University	No	Private	Seoul	4,471	2,929	1,539	2,136	421
Dankook University	No	Private	Gyeonggi	956	713	218	183	41
Duksung Women's University	Yes	Private	Seoul	571	157	414	97	0
Dongguk University	Yes	Private	Seoul	2,691	1,180	1,511	679	0
Pusan National University	Yes	National	Busan	1,134	594	540	403	111
Busan University of Foreign Studies	No	Private	Busan	1,192	810	382	185	0
Seokyeong University	Yes	Private	Seoul	1,077	688	389	310	0
University of Seoul	Yes	Public	Seoul	725	251	474	239	0
Seoul Theological University	Yes	Private	Gyeonggi	407	14	393	7	0
Seoul Women's University	No	Private	Seoul	1,131	704	427	240	0
Sunmoon University	No	Private	Chungnam	2,200	1,167	969	443	254
Sungkyul University	No	Private	Gyeonggi	388	47	341	32	0
Sungkyunkwan University	No	Private	Seoul	3,911	2,270	1,634	1,942	45
Sungshin Women's University	Yes	Private	Seoul	890	141	749	98	15
Sejong University	No	Private	Seoul	2,844	1,630	1,214	282	901
Sookmyung Women's University	No	Private	Seoul	520	160	360	69	26
Ajou University	No	Private	Gyeonggi	2,411	937	1,474	524	9
Ulsan National Institute of Science and Technology	No	Special Act Corporation	Ulsan	84	62	22	0	54
Ewha Womans University	Yes	Private	Seoul	2,089	1,344	745	729	68

Inha University	No	Private	Incheon	1,954	1,093	778	263	502
Jeju National University	No	National	Jeju	331	155	175	99	0
Joongbu University	No	Private	Chungnam	971	748	223	38	533
Chung-Ang University	Yes	Private	Seoul	4,257	2,233	2,024	1,435	6
Chungnam National University	No	National	Daejeon	674	299	375	138	64
Pohang University of Science and Technology	Yes	Private	Gyeongbuk	47	0	47	0	0
Korea Aerospace University	No	Private	Gyeonggi	194	191	3	47	61
Hansung University	No	Private	Seoul	506	263	243	187	0
Hanyang University	Yes	Private	Seoul	3,988	2,112	1,876	1,307	224
Hongik University	Yes	Private	Seoul	1,394	937	457	706	0

4.2. Transportation Accessibility Based on Nearest-Distance Analysis

Table 2 presents the transportation accessibility of the 35 IEQAS Excellent Accredited Universities based on the nearest-distance analysis. The distances from each university to the nearest international airport and KTX station were calculated in kilometers using QGIS 3.44. In this study, a shorter distance indicates a higher level of transportation accessibility, as international students can more easily access major transportation infrastructure for arrival, domestic travel, and regional mobility.

Overall, the results show clear differences in transportation accessibility among the universities. For airport accessibility, Kyungpook National University showed the shortest distance to the nearest international airport at 2.792 km, followed by Korea Aerospace University at 6.695 km and Jeju National University at 8.202 km. In contrast, Konyang University, Pohang University of Science and Technology, and Joongbu University showed relatively longer distances to the nearest international airport, indicating lower airport accessibility compared with other institutions.

For KTX accessibility, the University of Seoul showed the shortest distance to the nearest KTX station at 1.137 km, followed by Sookmyung Women's University at 1.216 km, Kyungpook National University at 1.651 km, and Kyung Hee University at 1.853 km. These universities can be considered to have relatively strong railway accessibility. On the other hand, Jeju National University showed the longest distance to the nearest KTX station because Jeju Island does not have a KTX railway network. Inha University and Joongbu University also showed relatively longer distances to KTX stations compared with the other universities.

Table 2. Nearest-distance analysis results for transportation accessibility of IEQAS excellent accredited universities

University	Region	Distance to Nearest International Airport (km)	Distance to Nearest KTX Station (km)
Konkuk University	Seoul	24.633	5.082
Konyang University	Chungnam	68.469	3.134
Kyungpook National University	Daegu	2.792	1.651
Kyungsung University	Busan	14.052	5.598
Kyung Hee University	Seoul	22.539	1.853
Keimyung University	Daegu	14.676	5.734
Korea University	Seoul	20.450	1.981
Dankook University	Gyeonggi	39.415	8.208
Duksung Women's University	Seoul	21.398	8.239
Dongguk University	Seoul	17.798	2.666
Pusan National University	Busan	13.520	8.204
Busan University of Foreign Studies	Busan	15.501	9.515
Seokyeong University	Seoul	19.396	5.044
University of Seoul	Seoul	23.059	1.137
Seoul Theological University	Gyeonggi	9.759	10.899
Seoul Women's University	Seoul	26.526	3.858
Sunmoon University	Chungnam	38.532	3.113
Sungkyul University	Gyeonggi	23.524	5.610
Sungkyunkwan University	Seoul	17.150	4.059
Sungshin Women's University	Seoul	19.703	2.779

Sejong University	Seoul	24.145	4.028
Sookmyung Women's University	Seoul	14.650	1.216
Ajou University	Gyeonggi	37.968	4.447
Ulsan National Institute of Science and Technology	Ulsan	49.060	5.225
Ewha Womans University	Seoul	13.251	2.111
Inha University	Incheon	17.551	21.067
Jeju National University	Jeju	8.202	N/A
Joongbu University	Chungnam	58.609	14.997
Chung-Ang University	Seoul	15.363	2.903
Chungnam National University	Daejeon	40.716	7.570
Pohang University of Science and Technology	Gyeongbuk	62.897	6.272
Korea Aerospace University	Gyeonggi	6.695	2.931
Hansung University	Seoul	18.509	3.476
Hanyang University	Seoul	21.880	2.478
Hongik University	Seoul	11.231	4.027

4.3. Daily Life Accessibility Based on Facility Counts within a 1 km Walkability Buffer

Table 3 presents the daily life accessibility of the 35 IEQAS Excellent Accredited Universities based on the number of essential facilities located within a 1 km walkability buffer. The analysis included three types of facilities: large-sized marts & supermarkets, hospitals & clinics, and pharmacies. A higher facility count indicates a more convenient daily living environment for international students, as these facilities are closely related to everyday shopping, health care, and basic settlement needs.

Overall, the results show substantial differences in daily life accessibility among the universities. Konkuk University recorded the highest total number of daily life facilities within the 1 km buffer, with 257 facilities, followed by Kyungsung University with 238 facilities and Hongik University with 215 facilities. These universities can be interpreted as having highly convenient daily living environments due to the strong concentration of nearby medical and commercial facilities. In particular, the high number of hospitals and clinics around Konkuk University and Kyungsung University suggests strong access to basic health care services.

Several universities also showed relatively high daily life accessibility. Hansung University recorded 175 facilities, Chung-Ang University recorded 171 facilities, and Sungshin Women's University recorded 170 facilities within the 1 km buffer. The University of Seoul and Seoul Theological University each recorded 155 facilities, indicating that these universities are also located in areas with well-developed daily life infrastructure. These results suggest that universities located in dense urban areas tend to provide better access to essential facilities.

In contrast, some universities showed very limited daily life accessibility within the 1 km walkability buffer. Joongbu University recorded no nearby facilities, while Pohang University of Science and Technology recorded only one facility. Ulsan National Institute of Science and Technology, Jeju National University, and Korea Aerospace University each recorded only two facilities. These results indicate that some IEQAS Excellent Accredited Universities are located in more suburban, rural, or campus-centered environments where essential facilities may not be concentrated within walking distance.

Table 3. Daily life accessibility of IEQAS excellent accredited universities based on facility counts within a 1 km walkability buffer

University	Region	Large-sized Marts & Supermarkets	Hospitals & Clinics	Pharmacies	Total Daily Life Facilities
Konkuk University	Seoul	4	194	59	257
Konyang University	Chungnam	0	4	2	6
Kyungpook National University	Daegu	0	106	35	141
Kyungsung University	Busan	1	200	37	238
Kyung Hee University	Seoul	3	81	48	132
Keimyung University	Daegu	0	8	13	21
Korea University	Seoul	0	34	23	57
Dankook University	Gyeonggi	0	39	12	51
Duksung Women's University	Seoul	0	61	26	87
Dongguk University	Seoul	0	116	35	151
Pusan National University	Busan	2	60	16	78

Busan University of Foreign Studies	Busan	0	6	0	6
Seokyeong University	Seoul	1	106	34	141
University of Seoul	Seoul	1	107	47	155
Seoul Theological University	Gyeonggi	1	102	52	155
Seoul Women's University	Seoul	0	6	5	11
Sunmoon University	Chungnam	0	11	3	14
Sungkyul University	Gyeonggi	1	27	8	36
Sungkyunkwan University	Seoul	0	41	19	60
Sungshin Women's University	Seoul	2	129	39	170
Sejong University	Seoul	2	87	37	126
Sookmyung Women's University	Seoul	1	104	39	144
Ajou University	Gyeonggi	1	63	25	89
Ulsan National Institute of Science and Technology	Ulsan	0	1	1	2
Ewha Womans University	Seoul	0	84	38	122
Inha University	Incheon	2	58	25	85
Jeju National University	Jeju	0	2	0	2
Joongbu University	Chungnam	0	0	0	0
Chung-Ang University	Seoul	1	123	47	171
Chungnam National University	Daejeon	0	12	4	16
Pohang University of Science and Technology	Gyeongbuk	0	1	0	1
Korea Aerospace University	Gyeonggi	0	1	1	2
Hansung University	Seoul	1	120	54	175
Hanyang University	Seoul	1	37	25	63
Hongik University	Seoul	1	174	40	215

Figure 1 illustrates the overall daily life accessibility of IEQAS Excellent Accredited Universities based on the total number of essential facilities within a 1 km walkability buffer. The circle size represents the combined count of large-sized marts & supermarkets, hospitals & clinics, and pharmacies near each university. Universities with larger circles are interpreted as having stronger daily life accessibility because international students can access more essential services within walking distance. The map reveals a clear spatial variation in daily life accessibility across Korea. Universities in highly urbanized areas generally show larger circles, indicating a denser concentration of daily life facilities, whereas universities in suburban, rural, or campus-centered locations show smaller circles. These findings indicate that IEQAS accreditation does not necessarily imply the same level of everyday convenience for international students, highlighting the importance of considering spatial and local living conditions in discussions of international student support.

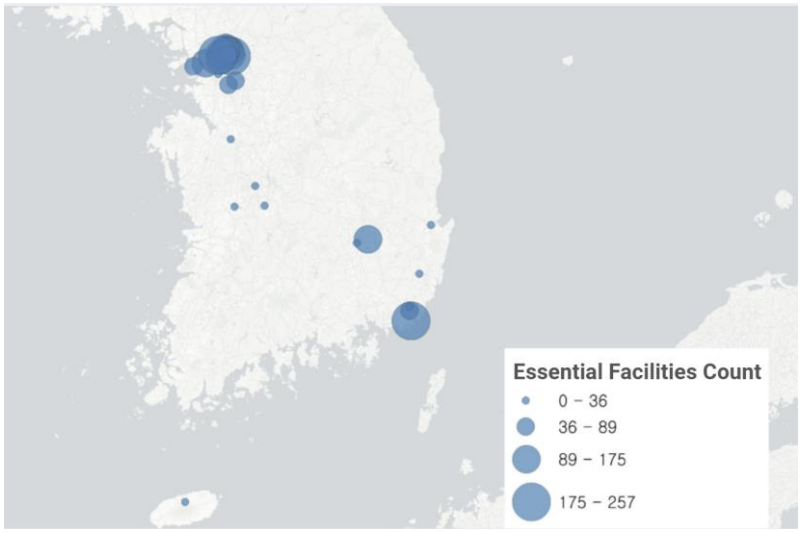

Figure 1. Daily life accessibility around IEQAS excellent accredited universities within a 1 km walkability buffer.

5. Discussion and Conclusion

This study explored the characteristics and accessibility of 35 IEQAS Excellent Accredited Universities in South Korea from the perspective of international students. The findings reveal that while all selected institutions have been officially recognized for their internal capacity to manage and support international students, their external spatial environments vary drastically.

First, the results of the institutional profile analysis showed that IEQAS Excellent Accredited Universities are highly concentrated in Seoul and the surrounding metropolitan area. Private universities also accounted for the majority of the selected institutions. This finding indicates that internationalized higher education institutions in Korea are not evenly distributed across regions. From an international student perspective, this regional concentration may create differences in educational choice, settlement convenience, and daily living conditions. Universities located in metropolitan areas may benefit from dense transportation networks and commercial infrastructure, while universities in suburban or regional areas may provide stronger campus-centered environments but weaker immediate access to daily life facilities.

Second, the transportation accessibility results revealed clear differences in access to major transportation hubs. Some universities, such as Kyungpook National University, the University of Seoul, Sookmyung Women's University, and Kyung Hee University, showed strong accessibility to airports or KTX stations. In particular, Kyungpook National University showed high airport accessibility based on physical proximity to Daegu International Airport. However, this result should be interpreted as geographical accessibility rather than overall international arrival convenience, because Daegu International Airport has more limited international service compared with Incheon International Airport, which is often the main gateway for international students entering Korea. These locations may be advantageous for international students because transportation hubs are important for arrival, domestic travel, and international mobility.

In contrast, universities such as Joongbu University, Pohang University of Science and Technology, and Jeju National University showed lower accessibility to certain transportation facilities. In particular, Jeju National University was excluded from the KTX-distance comparison, reflecting the unique geographical condition of Jeju Island, where railway infrastructure is unavailable. These results suggest that transportation accessibility should be interpreted in relation to regional context rather than distance alone.

Third, the daily life accessibility analysis showed substantial variation in the number of essential facilities within a 1 km walkability buffer. Konkuk University, Kyungsung University, and Hongik University showed the highest levels of daily life accessibility, with many nearby hospitals, clinics, pharmacies, and supermarkets. These universities are located in dense urban environments where students can easily access health care and commercial services. This type of environment may support international students' adaptation by reducing practical difficulties in daily life. In contrast, Joongbu University, Pohang University of Science and Technology, Ulsan National Institute of Science and Technology, Jeju National University, and Korea Aerospace University showed very low numbers of nearby daily life facilities. These results indicate that some IEQAS Excellent Accredited Universities may require stronger internal campus services or local transportation support to compensate for limited walkable infrastructure.

5.1. Theoretical Implications

This study contributes to international student research by expanding the concept of student support beyond the internal university environment. Previous studies have mainly explained international students' experiences through adjustment, acculturation, institutional satisfaction, academic support, and social support services (Andrade, 2006; Smith & Khawaja, 2011; Arthur, 2017; Ammigan, 2019). However, this study suggests that university characteristics and the surrounding spatial environment should also be considered important factors in understanding international students' living conditions. In this regard, the study extends previous international student research by linking institutional characteristics, such as university type, region, student composition, and language-support indicators, with external accessibility conditions around universities.

This study also contributes to accessibility and GIS-based higher education research. Accessibility theory explains that access is shaped by the relationship between people, service locations, transportation systems, and spatial opportunities (Hansen, 1959; Handy & Niemeier, 1997; Geurs & van Wee, 2004; Neutens, 2015). Building on this perspective, this study applies GIS-based analysis to IEQAS Excellent Accredited Universities and shows that transportation accessibility and daily life accessibility differ substantially across institutions. By using nearest-distance analysis and 1 km walkability buffer analysis, this study demonstrates that GIS can provide objective evidence of spatial inequality in university living environments, supporting previous studies that emphasized the usefulness of GIS for evaluating accessibility to public services, transportation, and campus environments (Liu & Zhu, 2004; Sun et al., 2018; Zannat et al., 2020; Yhee et al., 2021).

5.2 Managerial Implications

The findings of this study offer practical implications for universities, policymakers, and local governments involved in international student recruitment and support. First, universities should recognize that international student support extends beyond campus-based academic and

administrative services. Students' daily lives are influenced by their ability to access transportation, hospitals, pharmacies, supermarkets, and other essential facilities. Therefore, universities with low daily life accessibility should provide additional support services, such as campus shuttle buses, multilingual maps, health care guidance, emergency service information, and partnerships with nearby clinics or pharmacies. These efforts can help reduce practical difficulties for international students, especially those who are newly arrived in Korea.

Second, universities located in suburban, rural, or campus-centered areas need to compensate for limited walkable facilities. The results showed that some universities have very few daily life facilities within a 1 km buffer. For these institutions, it may be necessary to strengthen on-campus infrastructure, such as convenience stores, medical consultation rooms, student support centers, and international student help desks. Universities can also provide regular transportation to nearby commercial areas, hospitals, or transportation hubs.

Third, universities with high spatial accessibility can use their location advantage more strategically in international student recruitment. Institutions located near major transportation hubs or dense daily life facilities can emphasize these advantages in promotional materials. For example, universities may highlight convenient access to airports, KTX stations, hospitals, supermarkets, and urban services as part of their international student support environment. This can help prospective international students and their families better understand the practical benefits of studying at a particular university.

Lastly, local governments should work with universities to improve international student living environments. International students are not only members of universities but also residents of local communities. Therefore, improving accessibility to local services can support both student satisfaction and regional internationalization. Local governments can provide multilingual service information, improve public transportation connections near universities, and support international student-friendly facilities in areas with large foreign student populations.

5.3. Limitations and Future Studies

This study has several limitations. First, this study is exploratory in nature and mainly aimed to identify the institutional characteristics and spatial accessibility patterns of IEQAS Excellent Accredited Universities. Therefore, the findings do not explain causal relationships between university characteristics, spatial accessibility, and international students' outcomes, such as satisfaction, adjustment, loyalty, or university recommendation intention. Future studies should develop and test a more comprehensive research model to examine how institutional characteristics, including university type, region, international student enrollment, D-2 and D-4 student composition, and language-support indicators, together with transportation and daily life accessibility, influence international students' satisfaction, loyalty, and behavioral intentions.

Second, accessibility was measured mainly through distance and facility counts, but these indicators do not fully reflect service quality, affordability, language support, or actual student experience. In addition, the study used a 1 km buffer, but real walking accessibility may differ depending on road networks, hills, pedestrian safety, weather, and public transportation conditions. Future research could use network-based distance analysis and combine GIS data with surveys or interviews to better understand how both university characteristics and objective accessibility are connected to students' perceived convenience, satisfaction, adjustment, loyalty, and university recommendation intention.

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