

# auri research brief

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## Development of a Building Stock Index to Support a Shift Toward Maintenance-Oriented Architectural Policy

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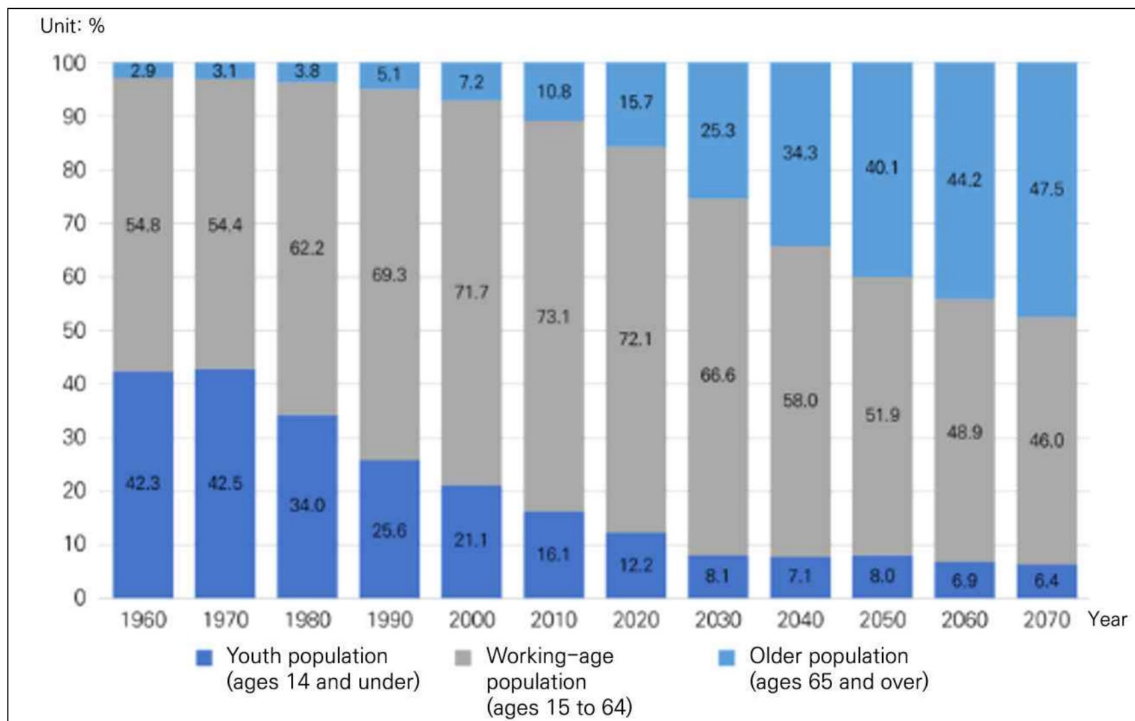
Declining birth rates and rapid population aging are reducing the working-age population. As regional economies contract and demand for buildings decreases, problems such as vacant houses and empty commercial spaces are becoming more severe. In response, architectural policy must shift from a focus on new construction toward maintenance and management of the existing building stock. However, current building statistics do not adequately support a systematic approach to building stock management.

This study develops a Building Stock Index that allows intuitive comparison of building stock levels by city, county, and district, as well as by building use. The index sets the nationwide ratio of gross floor area by building use to population at a base value of 100. It then expresses each region's building stock level relative to this standard. The Building Stock Index makes it possible to understand the status of local building stock at a higher resolution than conventional statistics and provides foundational data for designing region-specific architectural policies that reflect demographic conditions.

● **Need for Integrated and Converged Statistics to Support Region-Specific Building Stock Management in an Era of Population Decline**

Due to low fertility and aging, Korea's working-age population (ages 15 to 64) peaked in 2019 and has already entered a period of decline (Statistics Korea, 2023a). The decrease in the working-age population is leading to regional economic contraction and reduced demand for buildings. This has caused growth in the number of vacant houses and empty commercial buildings, which has emerged as a major urban issue.

Population Structure by Age Group



Source: Prepared by the research team based on Statistics Korea (2023b)

As trends in the architectural sector shift from new construction to maintenance of existing buildings, the policy paradigm must also transition toward the management of building stock. However, current building statistics are limited to simple aggregate data that do not reflect regional characteristics or social conditions, making them insufficient for addressing increasingly diverse policy

needs.

Data-driven policy development requires indicators that capture the current status of buildings comprehensively and support forecasting of future trends. In particular, region-specific architectural and urban policy needs call for the development of new statistics that integrate and connect data from multiple domains.

### ● Current Production and Use of Building-Related Statistics

Major national approved statistics in the architectural sector include the Building Statistics and the Building Permit, Start, and Completion Statistics. Building Statistics provide information on the status of buildings, including their use, number of floors, and other attributes. They aggregate the number of buildings and total floor area by attributes such as use, number of floors, area, and ownership type. The Building Permit, Start, and Completion Statistics track trends in construction investment and economic activity and serve as basic data for national income estimates, construction administration, and the supply and production of building materials. Monthly data are produced by province and building use, summarizing the number of buildings and total floor area for permits and construction starts (Ministry of Land, Infrastructure and Transport, 2025a, 2025b).

Article 30 of the Building Act requires permitting authorities to report building statistics to the Minister of Land, Infrastructure and Transport or to provincial governors. However, current statistics are produced as report-based statistics generated from administrative information in the national building administration system, Seumteo. Building Statistics are produced annually at the national level, for 17 provinces, and for cities with populations over 500,000. They classify buildings by area, ownership type, use, and number of floors, and provide the corresponding counts and total floor area. The Building Permit, Start, and Completion Statistics are produced monthly by aggregating newly permitted, started, and completed buildings nationwide and by province.

Current building statistics are provided through the Ministry of Land, Infrastructure and Transport's Statistics Nuri, Statistics Korea's KOSIS, and the e-National Index. The Ministry also publishes building statistics each year in the

National Land and Transport Statistical Yearbook. In addition, to respond to policy needs, social issues, and emerging topics, supplementary press releases are issued containing processed information derived from building administration data related to buildings and construction activity.

**Building Statistics and Building Permit, Construction Start, and Completion Statistics**

Statistic	Publication Cycle	Building Statistics	Building Permit · Construction Start · Completion Statistics	
Building Statistics (8)	Annual	Status of Buildings by Floor Area (National) / Status of Buildings by Floor Area (Cities with populations over 500,000)	Under 100㎡, 100–200㎡, 200–300㎡, 300–500㎡, 500–1,000㎡, 1,000–3,000㎡, 3,000–10,000㎡, over 10,000㎡	
		Status of Buildings by Ownership Type (National) / Status of Buildings by Ownership Type (Cities with populations over 500,000)	State or public, individual, corporation, other	
		Status of Buildings by Use (National) / Status of Buildings by Use (Cities with populations over 500,000)	Residential, commercial, industrial, educational and social, other	
		Status of Buildings by Number of Floors (National) / Status of Buildings by Number of Floors (Cities with populations over 500,000)	1 floor, 2–4 floors, 5 floors, 6–10 floors, 11–20 floors, 21–30 floors, 31 floors or more, other	
Building Permit, Construction Start, and Completion Statistics (8)		Annual Status of Construction Starts	By structure type (concrete, steel, steel-concrete, masonry, wood, other) By use (residential, commercial, industrial, educational and social, other) ※ Number of buildings and total floor area	
		Annual Status of Building Permits		
	Monthly	Monthly Status of Construction Starts by Number of Buildings and Floor Area		
		Monthly Status of Building Permits by Number of Buildings and Floor Area		
		Monthly Status of Building Completions by Number of Buildings and Floor Area		
		Status of Construction Starts by Region		Permit type (new construction, extension / renovation / relocation / major repair, change of use)
		Status of Building Permits by Region		Structure type (concrete, steel, steel-concrete, masonry, wood, other)
Status of Building Completions by Region	※ Number of buildings and total floor area by region and use (29 types)			

Source: MOLIT Statistics Portal (<https://stat.molit.go.kr/portal/cate/partStts.do?stts=0120000>, search date: 2024.3.7.); National Statistics Portal (<https://www.k-stat.go.kr/metasvc/msba100/statsdccta?orgld=116&statsConfmNo=116011&kosisYn=Y>, search date: 2024.3.7.)

Press release from the Ministry of Land, Infrastructure and Transport related to building statistics



Source: Ministry of Land, Infrastructure and Transport (2024); Ministry of Land, Infrastructure and Transport (2023)

Building statistics serve as foundational data for developing national and local architectural policies, including Architectural Policy Master Plans, Regional Architectural Master Plans, and Urban and County Master Plans. However, current building statistics are limited to simple aggregates of the existing building stock and are published only at the national and provincial levels. These limitations make it difficult to use them for high-resolution architectural policy development.

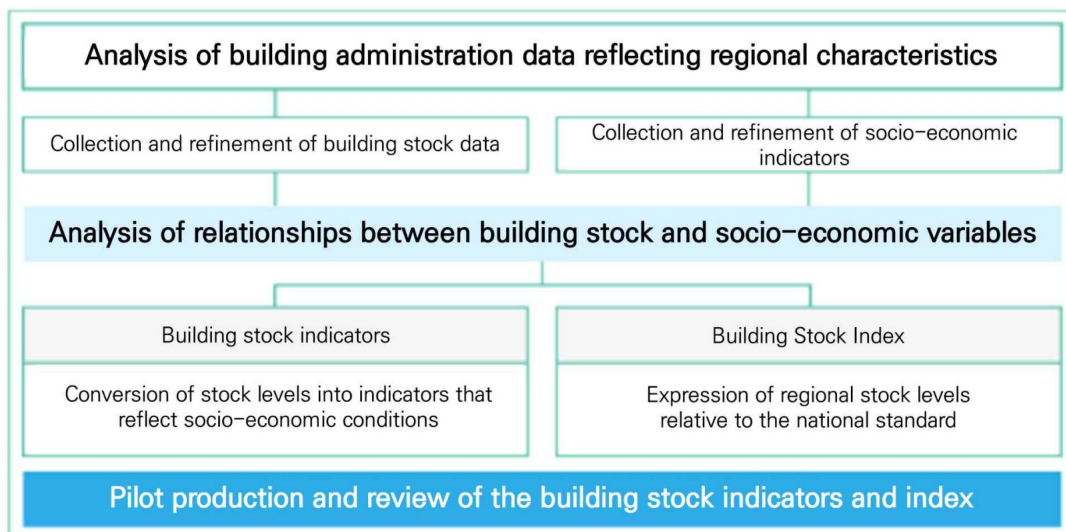
● Development of the Building Stock Index

The Building Stock Index is designed to provide an intuitive understanding of a region's building stock. It enables easy comparison of stock levels across different regions or building uses and allows users to interpret and apply the results without specialized architectural or statistical knowledge. The index sets the nationwide ratio of gross floor area by building use to population at a base value of 100. Each region's building stock level is expressed as a relative ratio compared to this national standard. By definition, the national index value is 100, and index values for provinces and cities or counties are presented as percentages relative to the national level. Population data for the index are based on the registered resident population.

The index uses building ledger data as its primary source, and the unit of measurement for building stock is gross floor area rather than the number of buildings. This approach ensures objectivity and comparability by aggregating building stock based on area regardless of the size or number of individual

structures. The research team then collected socio-economic indicators related to building demand and compared them with building stock levels through correlation analysis. Although many indicators showed strong correlations with total or use-specific building stock, these correlations weakened significantly after controlling for population. This indicates that the observed correlations resulted primarily from their relationship with population rather than from the independent effects of each socio-economic indicator. Based on these findings, the registered resident population was selected as the sole reference variable for comparing building stock levels.

**Building Stock Index Development Process**



● **Regional Building Stock Patterns Identified Through the Building Stock Index**

Using the Building Stock Index, the study assessed use-specific building stock levels across all 17 provinces as of the end of 2022. Three distinct patterns emerged. The first pattern is a notably low industrial building stock index. Four provinces, Seoul, Daejeon, Gangwon Special Self-Governing Province, and Jeju Special Self-Governing Province, recorded industrial stock indices below 60. The second pattern is a high industrial building stock index. Five provinces, Ulsan, Chungcheongbuk-do, Chungcheongnam-do, Gyeongsangbuk-do, and Gyeongsangnam-do, showed relatively high levels of industrial building stock. The third pattern shows a relatively balanced distribution of stock indices across uses.

Eight provinces, Busan, Daegu, Incheon, Gwangju, Sejong Special Self-Governing City, Gyeonggi-do, Jeonbuk Special Self-Governing Province, and Jeollanam-do, exhibited use-specific indices that were clustered within a similar range.

#### Building Stock Index by Region and by Building Use

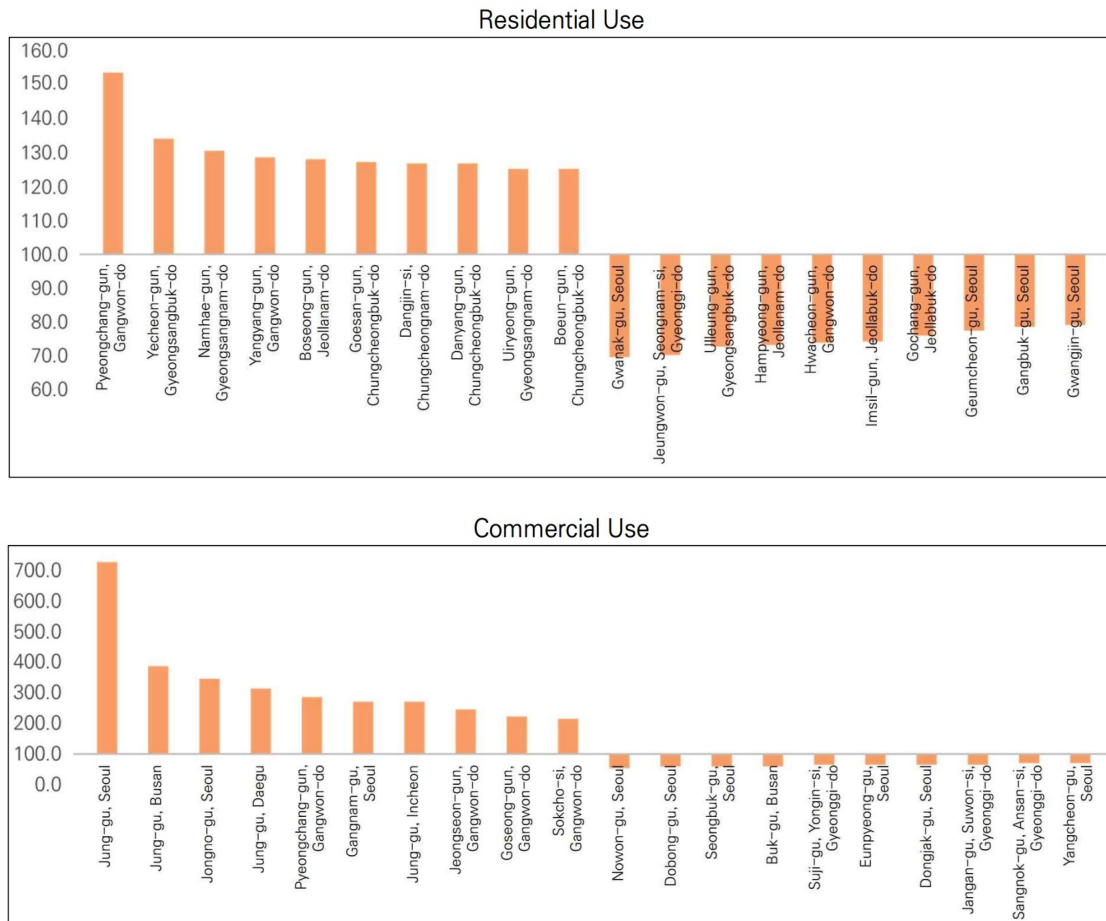
Region	Building Stock Index by Use				
	Use	Residential	Commercial	Industrial	Educational and social
Nationwide	100.0	100.0	100.0	100.0	100.0
Seoul Metropolitan City	77.5	87.2	109.8	17.0	87.7
Busan Metropolitan City	94.3	100.0	104.2	68.6	92.1
Daegu Metropolitan City	90.8	105.0	90.9	78.2	96.1
Incheon Metropolitan City	90.1	92.9	99.2	96.5	86.1
Gwangju Metropolitan City	92.5	108.9	92.3	66.5	111.1
Daejeon Metropolitan City	95.6	105.6	97.7	44.3	143.2
Ulsan Metropolitan City	105.5	106.3	94.2	175.3	93.9
Sejong Special Self-Governing City	100.9	110.5	86.6	89.6	120.1
Gyeonggi-do Province	97.5	96.7	93.2	113.4	86.9
Gangwon Special Self-Governing Province	115.2	111.9	122.5	55.3	133.4
Chungcheongbuk-do Province	126.1	113.3	98.4	211.3	121.3
Chungcheongnam-do Province	130.3	109.6	101.1	206.7	120.7
Jeonbuk Special Self-Governing Province	122.1	106.6	100.5	122.0	134.7
Jeollanam-do Province	127.5	107.9	103.4	131.7	126.1
Gyeongsangbuk-do Province	128.9	111.4	94.2	202.2	120.8
Gyeongsangnam-do Province	109.4	108.6	93.8	153.7	96.2
Jeju Special Self-Governing Province	104.9	99.0	145.8	14.4	116.5

The Building Stock Index was next calculated for 226 cities, counties, and districts nationwide as of the end of 2022. The results show clear regional characteristics in building stock levels across different uses. For residential buildings, the index reveals substantial regional differences in residential stock relative to population. The Seoul metropolitan area recorded relatively low residential building stock index values, while most non-metropolitan regions recorded higher values. Pyeongchang-gun in Gangwon-do Province had the

highest residential building stock index at 153.4, whereas Gwanak-gu in Seoul recorded the lowest value at 69.5. Although both population size and total residential floor area are higher in Gwanak-gu than in Pyeongchang-gun, the relative ratio shows that Gwanak-gu stands at about 70% of the national level while Pyeongchang-gun stands at about 150%. This indicates that the available residential floor area per person is intuitively much smaller in Gwanak-gu than in Pyeongchang-gun.

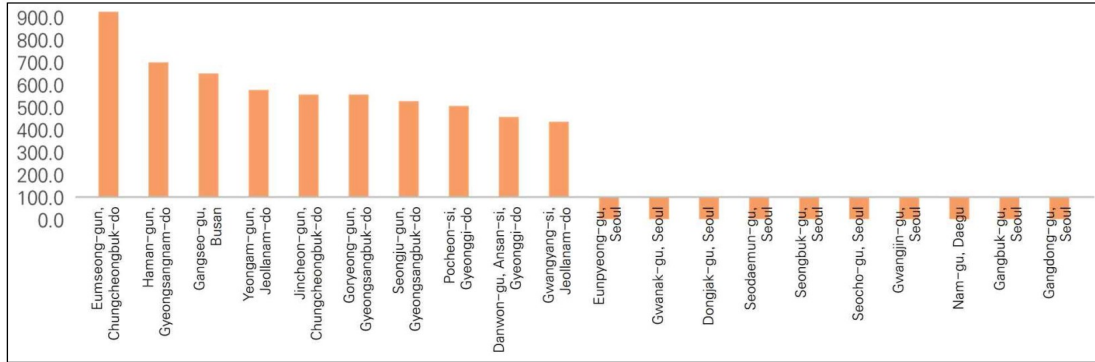
For commercial, industrial, and educational and social facilities, regional variation was even greater than for residential buildings. Seoul Jung-gu recorded the highest commercial building stock index at 727.9. Eumseong-gun in Chungcheongbuk-do had the highest industrial building stock index at 932.2, while Seoul Jongno-gu recorded the highest index for educational and social facilities at 290.4. These values represent large deviations from the national level.

**Building Stock Index by City/County/District (Top 10 Regions)**

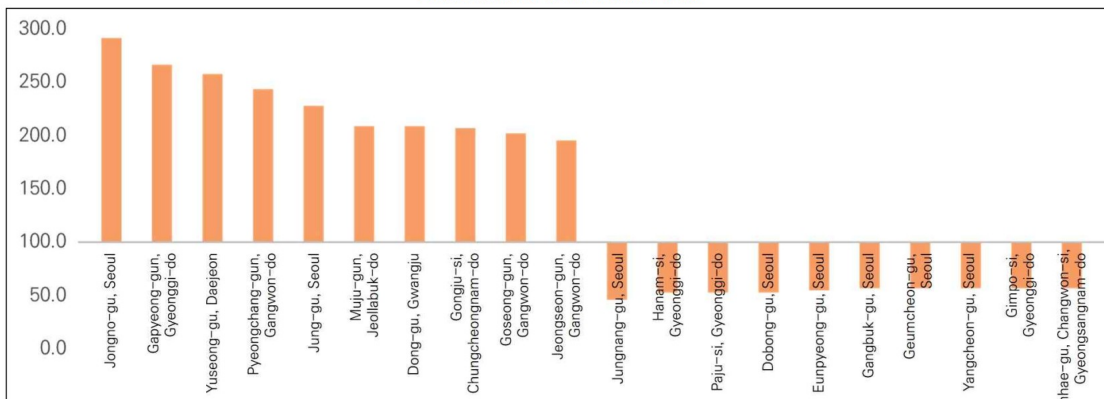


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Industrial Use

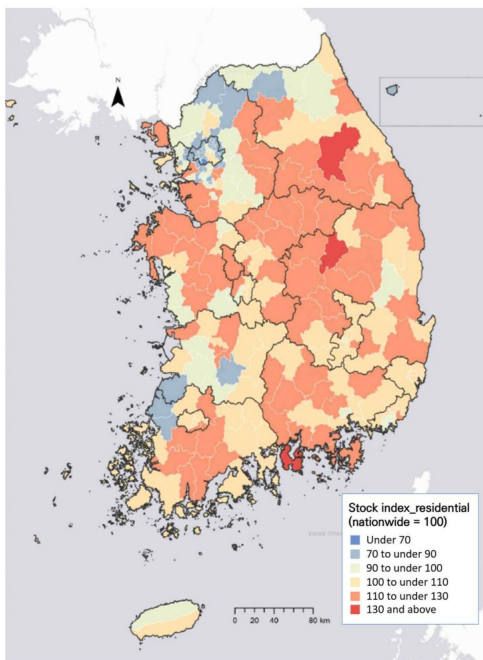


Educational and Social Use

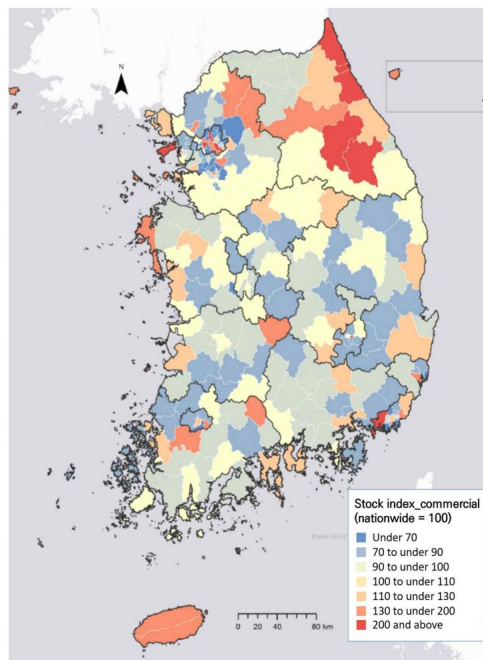


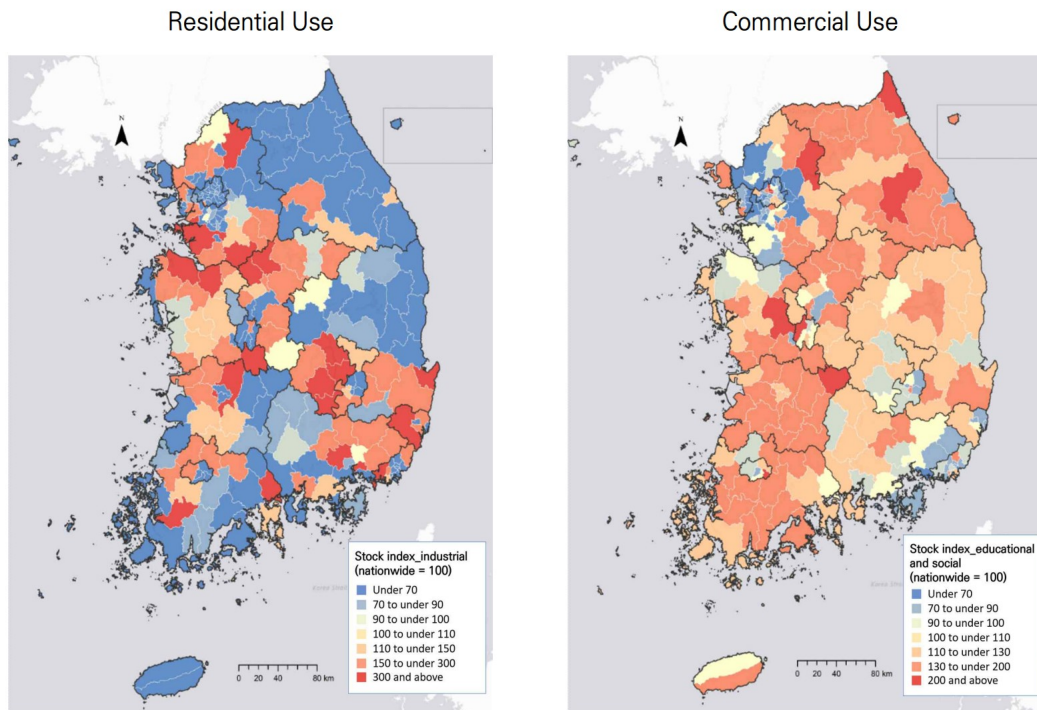
Building Stock Index Map by Region

Residential Use



Commercial Use





- **Significance of the Building Stock Index and Future Directions**

The Building Stock Index enables a more detailed analysis of building stock at the level of cities, counties, and districts, surpassing the provincial-level statistics available in current building data. By converting building stock into an index that incorporates population statistics rather than relying solely on building counts or total floor area, the index reflects the social context and presents building stock levels in a more intuitive way. This approach aligns with the reality that regional differences in population structure, including population decline, aging, and urban over- or under-density, directly influence building demand. As such, the index can serve as an important foundation for future building management policies and planning.

For more refined architectural policy development, it will be necessary to incorporate additional socio-economic indicators such as daytime population and per capita GRDP. This would allow for analysis of the complex factors that influence regional building demand and supply. In this study, building uses were grouped into four broad categories: residential, commercial, industrial, and educational. Future work should classify buildings more granularly by function, including medical, cultural, welfare, religious, and lodging facilities. A more

detailed classification system would make it possible to assess the distribution and balance of each building type within regions with greater precision.

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