A Study on Smart City Policy and Technology Status Analysis for Overseas Smart City Technology Export

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I . Introduction

Background and Purpose

Backg-round

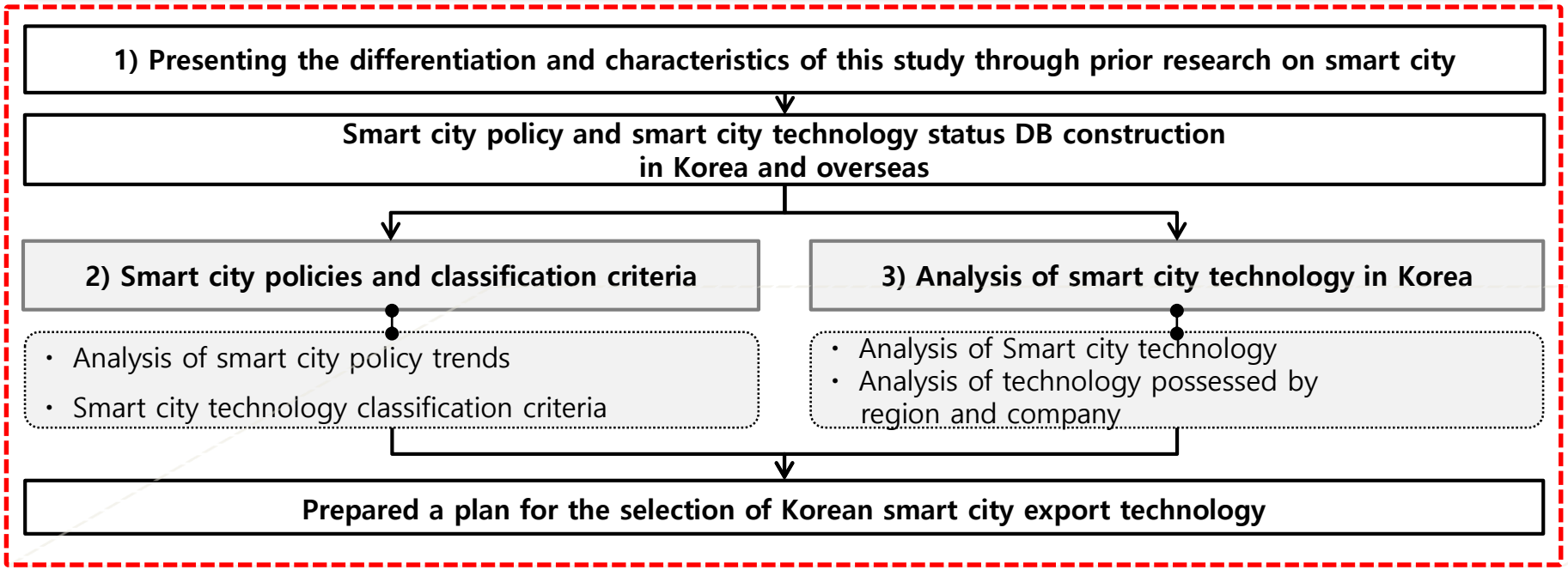
- Recently, Korea is promoting cooperation with various countries, centering on ASEAN countries, with the aim of exporting Korea smart cities for the globalization of smart cities.
- In particular, smart cities aim to solve urban problems by combining big data and ICT in the urban field.
- It is important to lay the foundation for smart city exports by discovering smart city technologies such as smart transportation systems, smart city logistics, smart finance, smart disaster prevention by specialized companies.

Purpose

- This study is to analyze domestic and foreign smart city policies, and to prepare a plan for selecting Korea smart city export technologies through analysis of smart city technologies and business status of Korean companies.

Flow of this study

- Through prior research, the implications were derived through research on the existing smart city.
- Next, established a smart city policy analysis and smart city technology classification criteria through korea and overseas smart city policy and korea smart city technology status DB.
- And the big data of smart city technology possessed by korea companies and a plan for selecting a smart city export technology was prepared through analysis by region and company.



Prior research related to this study

No.	Classification	Contents
1	Jung Chang Mu (2012)	As a long-term overseas development strategy, establishing a cooperative system be tween ministries and establishing a support system for public-private networks, improving fund linkage and financing systems, and suggesting legal and overseas ex pansion models
2	Lee Jae Yong et al (2018)	Classify the range of rapidly changing smart cities by type and propose customized smart city strategies based on them
3	Lim Si Yeong et al (2018)	Presenting the role and strategy of spatial information to leap to a hyper-connected smart city through literary research and establishment of spatial data experiments to review the role change of spatial information
4	Kim Jae Ho et al (2020)	Introducing the research contents of smart city data hub and reviewing how to effectively provide city data flow and utilization through description of its use cases
5	Seo Chang Soo et al (2020)	Presenting the types of big data that should be built first for the activation of sustainable smart city services
6	Bang Seol Ah (2020)	Analyzes ASUS and ASCN to understand the direction and demand for ASEAN urban development, and proposes a plan for the Korean ODA to link with ASEAN smart city development

II. Smart city policies and classification criteria

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Smart city policies of korea

- **In the first stage, the first comprehensive U-City plan was established, starting with the enactment of the 「Ubiquitous City Construction Act (U-City Act)」.**
- **In the second stage, the 2nd U-City Comprehensive Plan was established, and the term "ubiquitous" was changed to "smart", and the basis for overseas expansion of smart cities was established.**
- **In the third stage, the smart city promotion strategy was announced through the presentation of the seven policy directions for smart city and the basic concept of smart city.**

Stage 1	Stage 2	Stage 3
(2008.03~2012.05)	(2013.02~2017.03)	(2018.01~2019.07)
• U-Cities Act(Act on the construction, etc. of UBIQUITOUS Cities • The 1st Comprehensive Plans for U-Cities • Partial Amendment of the U-Cities Act	• The 2nd Comprehensive Plans for U-Cities • Partial Amendment of the U-Cities Act • Act on the Promotion of Smart City Development and Industrial(Smart City Act)	• Implementation Strategies for realizing Smart Cities • Partial Amendment of the Smart City Act • The 3rd Comprehensive Plans for U-Cities

Overseas Smart City Strategy and Status

<Overseas smart city-related strategies and status>

Classification	Classification
USA	- 2015, Smart Cities Initiative Announcement: Invested USD 160 million to resolve regional problems related to traffic congestion, crime prevention, economic growth promotion, and public services. - 2016, US Department of Transportation (DOT) Smart City Challenge project started: Selected by Columbus City
EU	- 2013, Smart City and Community Innovation Partnership Strategy Action Plan announced: European Commission(EC) Policy management with an emphasis on solving traffic problems
Japan	- 2014, The 4th Energy Basic Plan: Announced a plan to build a smart city, including life support systems such as energy efficiency improvement and care for the elderly - In connection with the public-private strategic project 10, smart city policies are being promoted centering on new industries such as IT, AI, IoT, and big data.
China	- Invested KRW 90 trillion over five years from 2011 to 2015, and an additional investment of 2 trillion yuan ($33 billion) by 2025 - China's smart city policy aims at accelerating urbanization and solving the energy shortage problem
India	- 2014, the new prime minister pledged to construct 100 smart cities and invest a total of 19 trillion won by 2020

https://www.korea.kr/special/policyCurationView.do?newsId=148863564

Smart city technology field classification

- The smart city technology field was classified into 21 categories including construction, employment and labor, factories, tourism, education, transportation, green energy, and finance.

No.	Classification	No.	Classification	No.	Classification
1	Construction	8	Finance	15	Welfare
2	Labor employment	9	Agriculture	16	Business
3	Factory	10	Culture and art	17	Citizen participation
4	Tourism	11	Water management	18	Refuse disposal
5	Education	12	Logistics	19	Medical·Health
6	Traffic	13	Crime prevention	20	E-government
7	Green·Energy	14	Disaster Prevention	21	Communications technology

Classification of smart city service types

- The service type classification was classified by combining the service types of core technologies frequently used in real smart city solutions, such as AI, cloud, autonomous driving, and platforms.
- Smart city service types were classified into a total of 39 categories.

No.	Classification	No.	Classification	No.	Classification	No.	Classification	No.	Classification
1	3D	9	IoT	17	Drone	25	Big data	33	Eco-friendly commercial vehicle
2	AI	10	LTE·5G	18	Digital twin	26	Biometrics	34	Consulting
3	AR	11	MR	19	Robot	27	Sensor	35	Contents
4	BIM	12	NFC	20	Module	28	Water treatment system	36	Cloud
5	CCTV	13	RFID	21	Modular	29	New renewable energy	37	Kiosk
6	DRM	14	SI·SM	22	Mobile	30	Edge Computing	38	Program
7	ESS	15	VR	23	Blockchain	31	Fuel-cell	39	Platform
8	GIS·GPS	16	COM*	24	Bluetooth	32	Automatic Driving	-	-

*COM: Construction·Operation· Maintenance

Company size definition

- The smart city-related companies were classified into five types by size.
- Small and medium-sized enterprises, medium-sized enterprises, and large enterprises are classified according to sales and total assets.
- Public institutions and non-profit corporations are classified according to the investing institution.

Classification	Definition
Small and medium-sized enterprises	- Companies with average annual sales of less than 40 billion to 150 billion won and total assets of less than 500 billion won
Medium-sized enterprises	- Companies that exceed the sales of small and medium-sized enterprises and do not correspond to corporate groups (large corporations) restricted by mutual investment and do not correspond to public institutions
Major company	- An enterprise that belongs to a publicly disclosed corporate group with total assets of 5 trillion won or more or a mutually restricted corporate group with total assets of 10 trillion won or more
Public institution	- Institutions donated or supported by the government for the purpose of public interest, divided into public enterprises, quasi-governmental institutions, and other public institutions.
Non-profit corporation	- Divisions and foundations for the purpose of non-profit business

Classification of companies

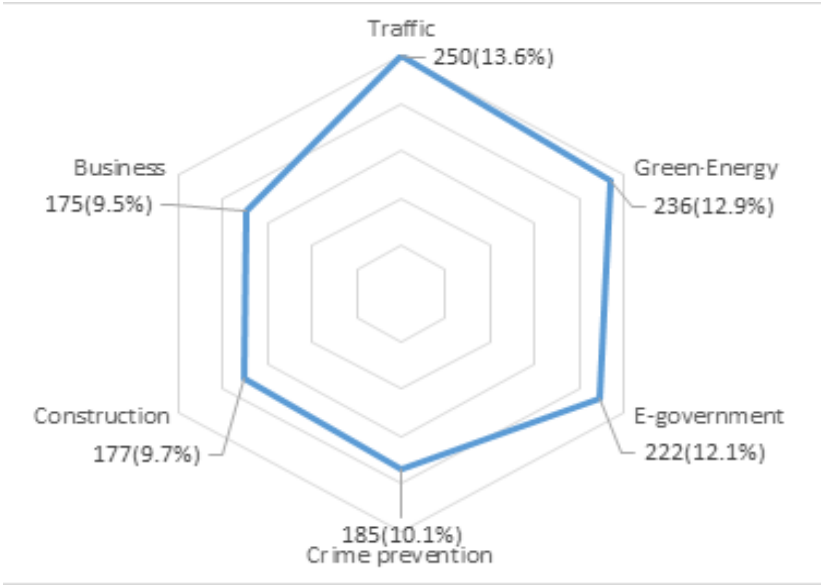
- Smart city-related companies were classified by capital stock, sales amount, history, and number of employees.

No.	Capital stock(won)	Sales amount(won)	History(years)	Number of employees
1	Less than 100 million	Less than 1 billion	Less than 5 years	Less than 10 people
2	100 million to less than 1 billion	1 billion to less than 10 billion	5 to less than 10 years	10 people to less than 20 people
3	1 billion to less than 10 billion	10 billion to less than 100 billion	10 to less than 20 years	20 people to less than 100 people
4	10 billion to less than 100 billion	100 billion to less than 1 trillion	20 to less than 30 years	100 people to less than 1,000 people
5	100 billion to less than 1 trillion	1 trillion to less than 10 trillion	30 to less than 50 years	1,000 people to less than 10,000 people
6	1 trillion to less than 10 trillion	10 trillion to less than 100 trillion	50 years or more	10,000 people to less than 100,000 people
7	10 trillion or more	10 trillion to less than 100 trillion	-	100,000 or more

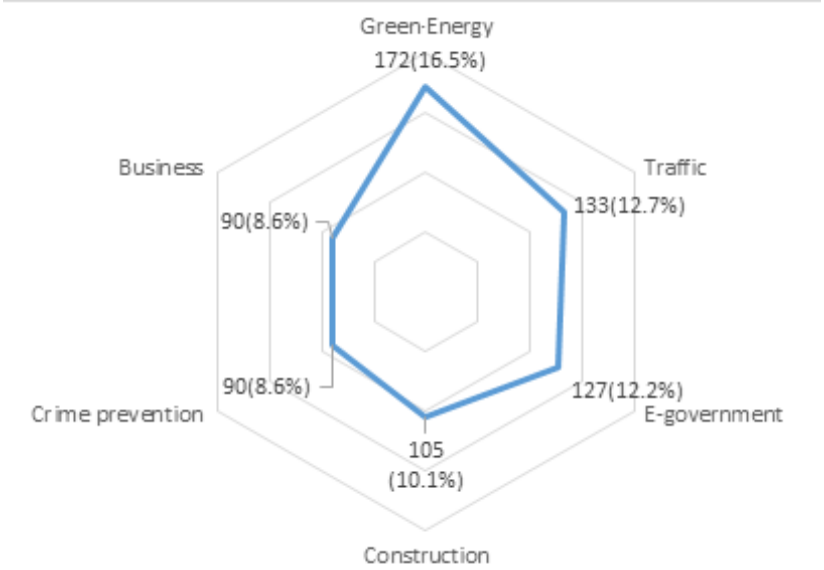
Ⅲ. Analysis of smart city technology

Technology field

- As for the technologies possessed by the smart city, a total of 1,847 technologies (1,044 if overlapping is excluded) including overlapping technologies were analyzed.
- Compared to the top 30% in the field of smart city technology.



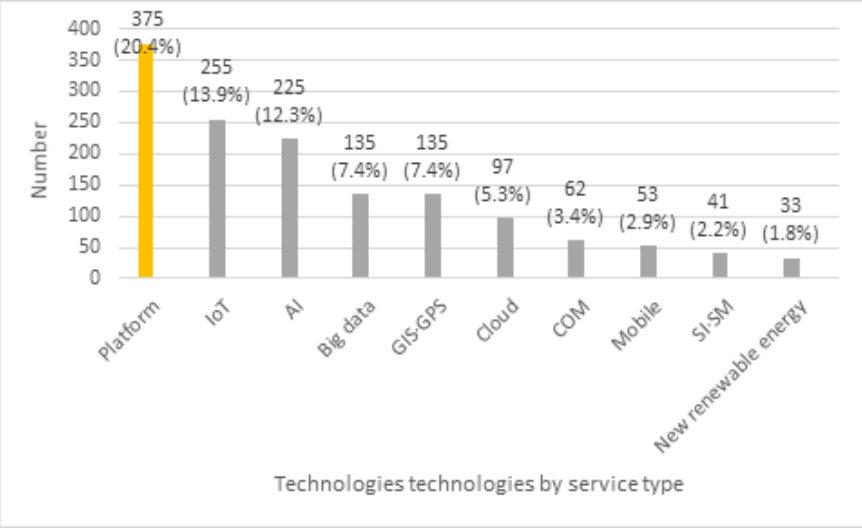
Smart city technology field (Duplicate)



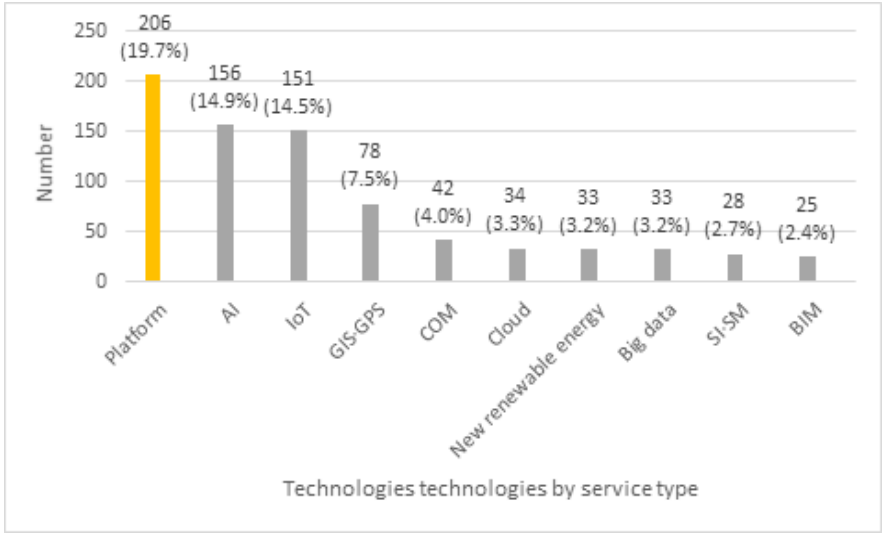
Smart city technology field

Technology by service type

- In smart city technology, the most service type was 375 platforms (20.4%), followed by IoT 255 (13.9%), AI 225 (12.3%), big data 135 (7.4%), GIS·GPS 135(7.4%) and 97 Clouds (5.3%).
- Comparison of the top 10 technologies by service type.



Technology by service type(Duplicate)



Technology by service type

Smart city technology and company status by region

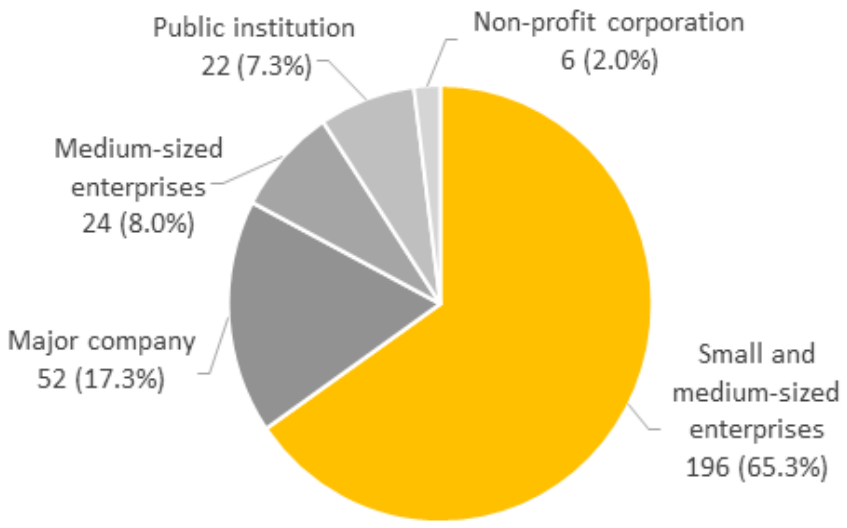
- As for smart city technology, 530(50.8%) in Seoul and 304(29.1%) in Gyeonggi-do showed the most
- The number of Company is 148(49.3%) in Seoul and 86(28.7%) in Gyeonggi-do, and three-quarters of the enterprises were located in the metropolitan area.

Region	Technology		Company	
	Number(N)	Ratio(%)	Number(N)	Ratio(%)
Seoul	530	50.8	148	49.3
Busan	12	1.1	5	1.7
Daegu	11	1.1	5	1.7
Incheon	55	5.3	8	2.7
Gwangju	12	1.1	4	1.3
Daejeon	18	1.7	8	2.7
Ulsan	1	0.1	1	0.3
Sejong	10	1.0	8	2.7
Gyeonggi-do	304	29.1	86	28.7
Gangwon-do	40	3.8	4	1.3
Chungcheongbuk-do	1	0.1	1	0.3
Chungcheongnam-do	5	0.5	2	0.7
Jeollabuk-do	11	1.1	5	1.7
Jeollanam-do	2	0.2	2	0.7
Gyeongsangbuk-do	18	1.7	6	2.0
Gyeongsangnam-do	9	0.9	5	1.7
Jeju-do	5	0.5	2	0.7
Total	1,044	100.0	300	100.0

Number and ratio of companies by size

- The largest number of smart city companies are SMEs with 196 (65.3%).
- The next was 52 large companies (17.3%), 24 medium-sized companies (8.0%), 22 public institutions (7.3%), and 6 non-profit corporations (2.0%).
- In particular, the reason for the large number of SMEs is that there are many companies with patents for individual smart city technologies.

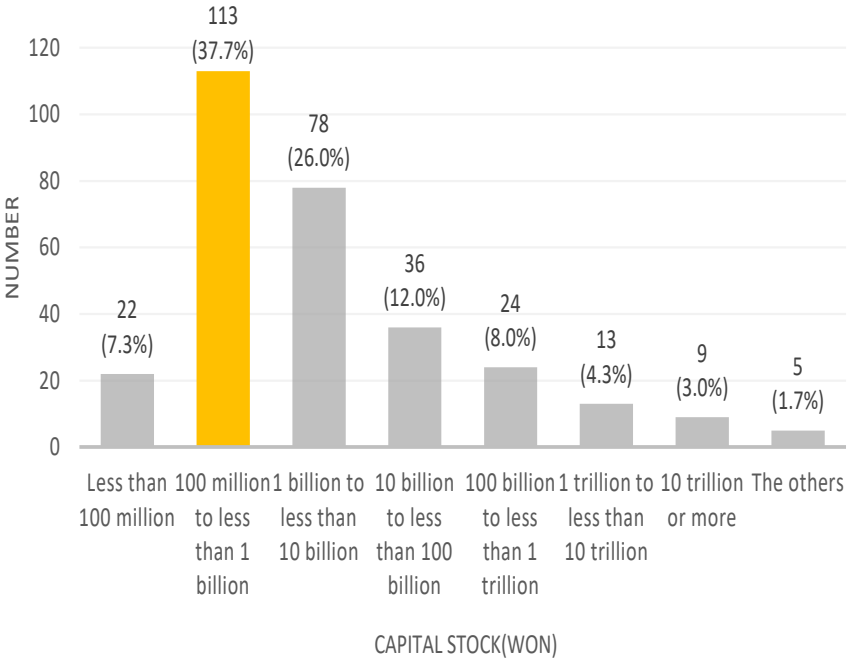
Classification	Company	
	Number(N)	Ratio(%)
Small and medium-sized enter prises	196	65.3
Medium-sized enterprises	24	8.0
Major company	52	17.3
Public institution	22	7.3
Non-profit corporation	6	2.0
Total	300	100.0



Number and ratio of companies by capital stock

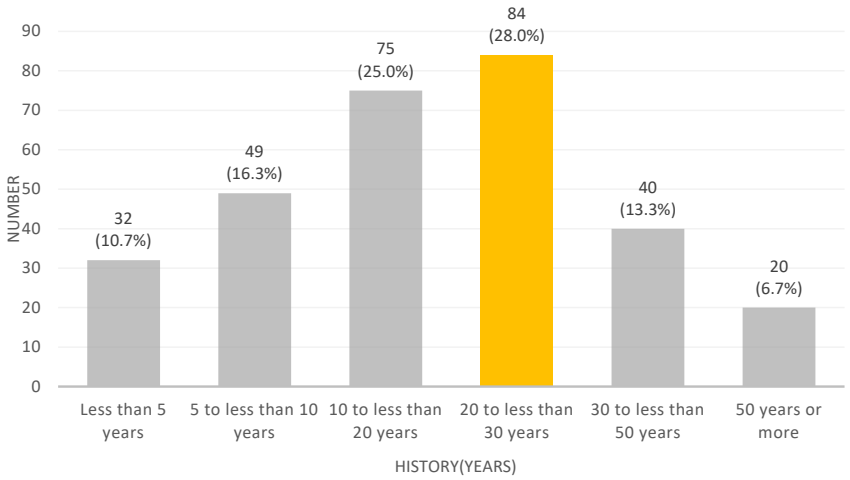
- The capital stock is **100 million to less than 1 billion** companies accounted for the largest number with **113(37.7%).**

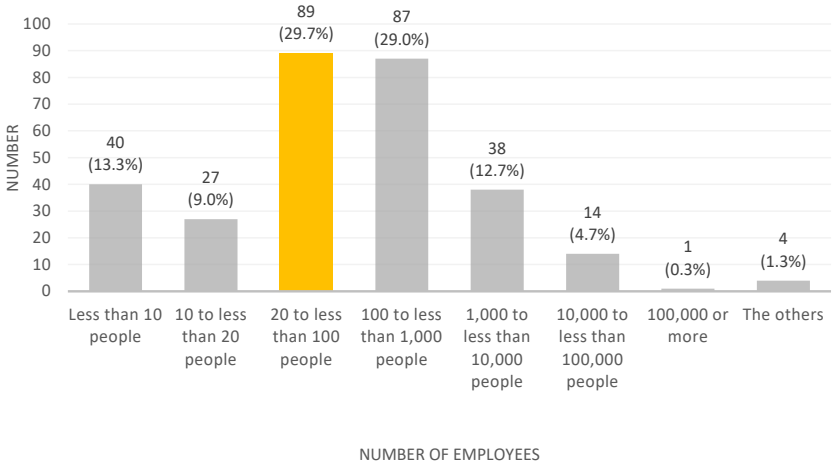
Capital stock(won)	Company	
	Number(N)	Ratio(%)
Less than 100 million	22	7.3
100 million to less than 1 billion	113	37.7
1 billion to less than 10 billion	78	26.0
10 billion to less than 100 billion	36	12.0
100 billion to less than 1 trillion	24	8.0
1 trillion to less than 10 trillion	13	4.3
10 trillion or more	9	3.0
The others	5	1.7
Total	300	100.0



Number of companies by history and number of employees

- As for the history, 84 companies(28.0%) with 20 to less than 30 years are the most.
- As for the number of employees, 89 companies(29.7%) with 20 to less than 100 numbers are the most.





Ⅳ. Conclusion

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Result

- To need activate the technology possessed by Korean companies and to export overseas.
- Therefore to need financial support and tax incentives that secure a pathway to export specialized smart technologies of SMEs, along with citizen participation and institutional supplementation.

Conclusion and Implication

- The smart city technology fields with the highest utilization in Korea were traffic, green energy, e-government, crime prevention, and construction.
- And the service types were platform, IoT, AI, big data, and GIS/GPS.
- These technologies are expected to contribute to building a platform for overseas smart city technology exports.

Thank you!

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