

# KVIC MarketWatch

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KVIC MarketWatch has been prepared by Korea Venture Investment Corp. (KVIC). It is a periodical publication intended to spur investments in SMEs and startups, and to bring about a more sophisticated industrial structure by reporting the performance of Korea Fund of Funds and other funds managed by KVIC. The publication ultimately aims to serve public interest and support balanced economic growth.

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# An Introduction to **KVIC & Korea Fund of Funds**



# Fund Manager:

## Korea Venture Investment Corp.

Korea Venture Investment Corp. (KVIC) was established with the aim of stimulating investment for the growth and development of small and medium-sized enterprises (SMEs) and startups. KVIC serves as a general partner (GP) of government-backed funds of funds and direct co-investment funds pursuant to the Act on Special Measures for the Promotion of Venture Businesses.

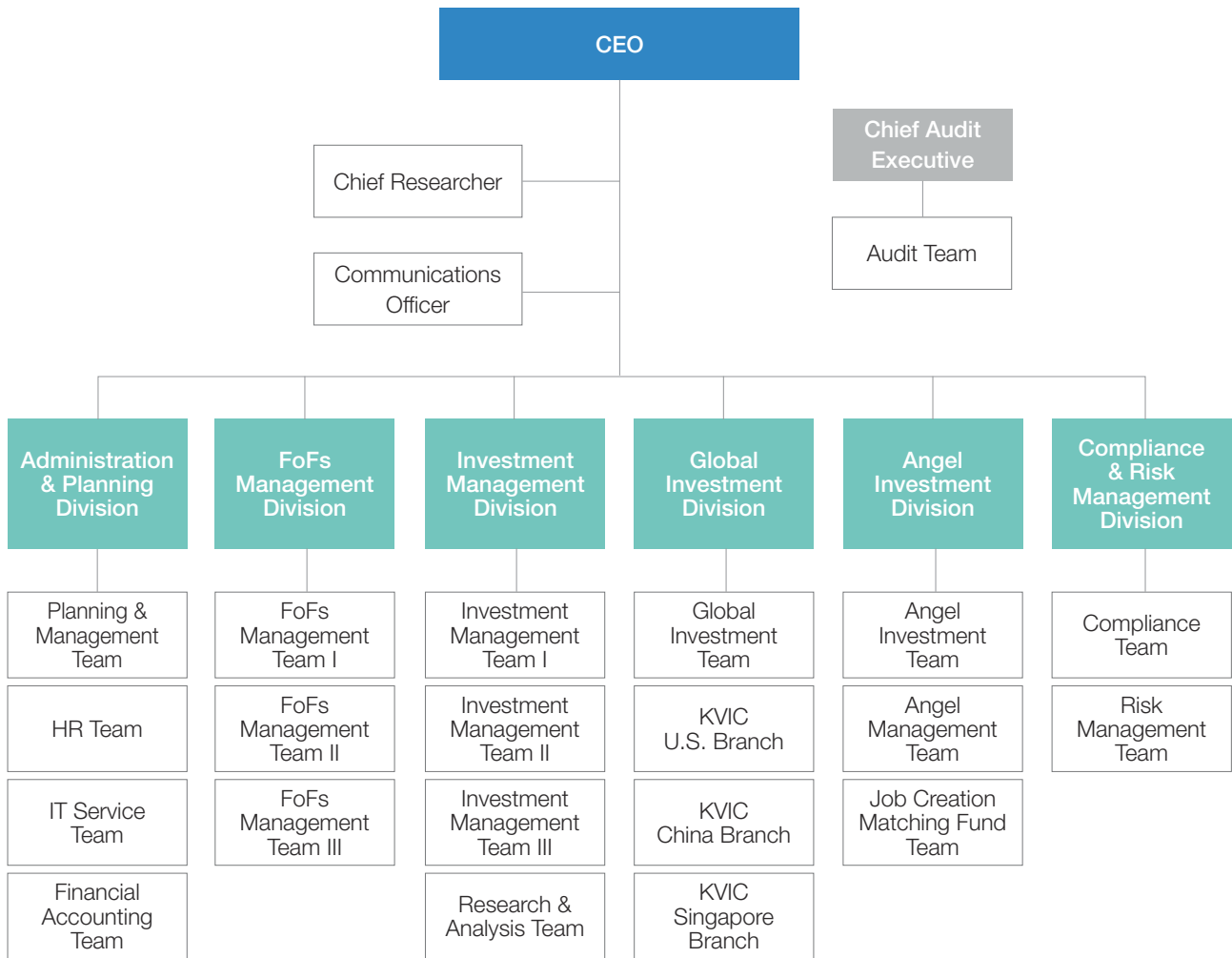
### A Glimpse into KVIC History & Milestones

2019	September	The Ministry of Land, Infrastructure and Transport participated as a limited partner (LP) in KFoF.
	January	The Ministry of Oceans and Fisheries participated as a limited partner (LP) in KFoF.
2018	June	Cumulative capital commitments to Korea Fund of Funds (KFoF) reached KRW 4 trillion.
	August	Cumulative commitments to KFoF totaled KRW 3 trillion.
2017	May	The Ministry of Education participated as a limited partner (LP) in KFoF.
	April	The Ministry of Environment became an LP in KFoF.
2016	October	KVIC launched Venture Investment Comprehensive System (VICS).
	June	Cumulative commitments to Foreign VC Investment Fund reached KRW 1 trillion.
2015	August	KVIC opened its Korea Venture Investment Center in Singapore (KVIC Singapore Branch).
	May	Cumulative commitments to KFoF totaled KRW 2 trillion.
2014	January	Korea Sports Promotion Foundation (KSPO) became an LP in KFoF.
	June	KVIC opened Korea Venture Investment Center in China (KVIC China Branch).
2013	August	The Ministry of Health and Welfare became an LP in KFoF.
	August	KVIC launched Korea Venture Investment Center in the United States (KVIC U.S. Branch).
2012	June	M&A Matching Fund for SMEs and Startups was formed with capital commitments of KRW 30.5 billion.
2011	December	Angel Investment Matching Fund I was set up with capital commitments of KRW 10 billion.
	May	The Ministry of Employment and Labor participated as an LP in KFoF.
2010	August	The Korean Film Council joined as an LP in KFoF.
	June	The Korea Communications Commission became an LP in KFoF.
2009	September	Cumulative commitments to KFoF stood at KRW 1 trillion.
2006	June	The Ministry of Culture, Sports and Tourism participated as an LP in KFoF.
	May	The Korean Intellectual Property Office (KIPO) joined as an LP in KFoF.
2005	June	KFoF, a government VC program, was launched, and KVIC was formed for the purpose of managing KFoF.
	June	KVIC was designated as a GP of KFoF.
2004	December	The legal basis of KFoF formation and operation was laid down by amendments to the Act on Special Measures for the Promotion of Venture Businesses.
	December	The government announced measures to vitalize startups.
	July	The government unveiled its comprehensive initiative to strengthen the competitiveness of SMEs.

# Organizational Structure

KVIC has six divisions, seventeen teams and three offshore branches.

Figure 1 KVIC Organizational Chart



# Korea Fund of Funds

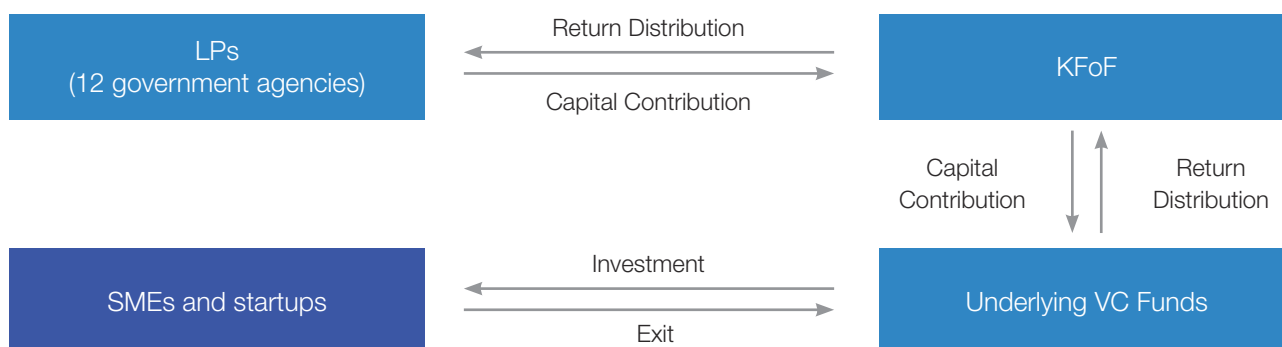
Korea Fund of Funds (KFoF) is a government-backed fund of funds that invests in venture capital (VC) funds managed by private VC firms. Investors or limited partners (LPs) in KFoF are mainly government agencies that have committed capital for venture investments catering to their policy needs. The underlying VC funds invest in SMEs and venture companies, playing an important part in creating a venture ecosystem.

## Fund Overview

<b>Date of Formation</b>	July 15, 2005
<b>Fund Size</b>	KRW 4,446.7 billion (as of June 30, 2019)
<b>Size of Underlying Funds</b>	KRW 22,523.2 billion (cumulative, as of June 30, 2019)
<b>Fund Term</b>	30 years (2005-2035)
<b>LPs (12 government agencies)</b>	Korea SMEs and Startups Agency; Ministry of Culture, Sports and Tourism; Korean Intellectual Property Office; Korean Film Council; Ministry of Science and ICT (formerly called Ministry of Science, ICT and Future Planning); Ministry of Employment and Labor; Ministry of Health and Welfare; Korea Sports Promotion Foundation; Ministry of Environment; Ministry of Education; Ministry of Land, Infrastructure and Transport*; Ministry of Oceans and Fisheries*
<b>GP</b>	KVIC

\* The Ministry of Land, Infrastructure and Transport, and the Ministry of Oceans and Fisheries are the new LPs that have got into KFoF in 2019.

## Fund Structure



# Other Funds of Funds

## Foreign VC Investment Fund

Foreign VC Investment Fund (FVCIF) was first set up to invest in offshore VC funds managed by non-Korean VCs under the Measures to Develop a Virtuous Cycle in the Venture-Startup Funding Ecosystem, unveiled by the government on May 15, 2013. Its mandate is to help local SMEs and startups attract global investors and expand overseas.

	FVCIF I	FVCIF II
<b>Date of Formation</b>	October 4, 2013	July 15, 2016
<b>Fund Size</b>	KRW 135.4 billion (as of June 30, 2019)	KRW 291.9 billion (as of June 30, 2019)
<b>Size of Underlying Funds</b>	USD 2,045 million (cumulative, as of June 30, 2019)	
<b>Fund Term</b>	21 years (2005-2035)	19 years (2016-2035)
<b>LPs</b>	KFoF/KVIC	KFoF/KVIC
<b>GP</b>	KVIC	

## Angel Fund of Funds

Established in 2015, the Fund invests solely in angel funds that concentrate on startup or early-stage small businesses.

	Fund Profile
<b>Date of Formation</b>	November 18, 2015
<b>Fund Size</b>	KRW 53.7 billion (as of June 30, 2019)
<b>Size of Underlying Funds</b>	KRW 79.57 billion (cumulative, as of June 30, 2019)
<b>Fund Term</b>	20 Years (2015-2035)
<b>LPs</b>	KFoF/KVIC
<b>GP</b>	KVIC

## KEBHana-KVIC Unicorns Fund of Funds

The Fund has officially launched its operations in 2019, primarily financed by KEB Hana Bank, with the aim of creating a venture ecosystem and nurturing unicorns. It makes indirect investments in SMEs and startups through its underlying funds.

	<b>Fund Profile</b>
<b>Date of Formation</b>	August 21, 2018
<b>Fund Size</b>	KRW 110 billion (as of June 30, 2019)
<b>Size of Underlying Funds</b>	KRW 190 billion (expected)
<b>Fund Term</b>	10 years (2018-2028)
<b>LPs</b>	KEB Hana Bank/KFoF/KVIC
<b>GP</b>	KVIC

## KEPCO Fund of Funds

The Fund is intended to foster the growth of the power and energy sectors, and to identify and nurture not only SMEs and startup companies related to ICT applications in the power and energy sectors but also those in Gwangju and South Jeolla Province (Jeonnam region) in which the Energy Valley is located. The primary LP or investor in the Fund is Korea Electric Power Corporation (KEPCO).

	<b>Fund Profile</b>
<b>Date of Formation</b>	August 19, 2015
<b>Fund Size</b>	KRW 52.5 billion (as of June 30, 2019)
<b>Size of Underlying Funds</b>	KRW 88 billion (cumulative, as of June 30, 2019)
<b>Fund Term</b>	10 years (2015-2025)
<b>LPs</b>	KEPCO/KFoF/KVIC
<b>GP</b>	KVIC

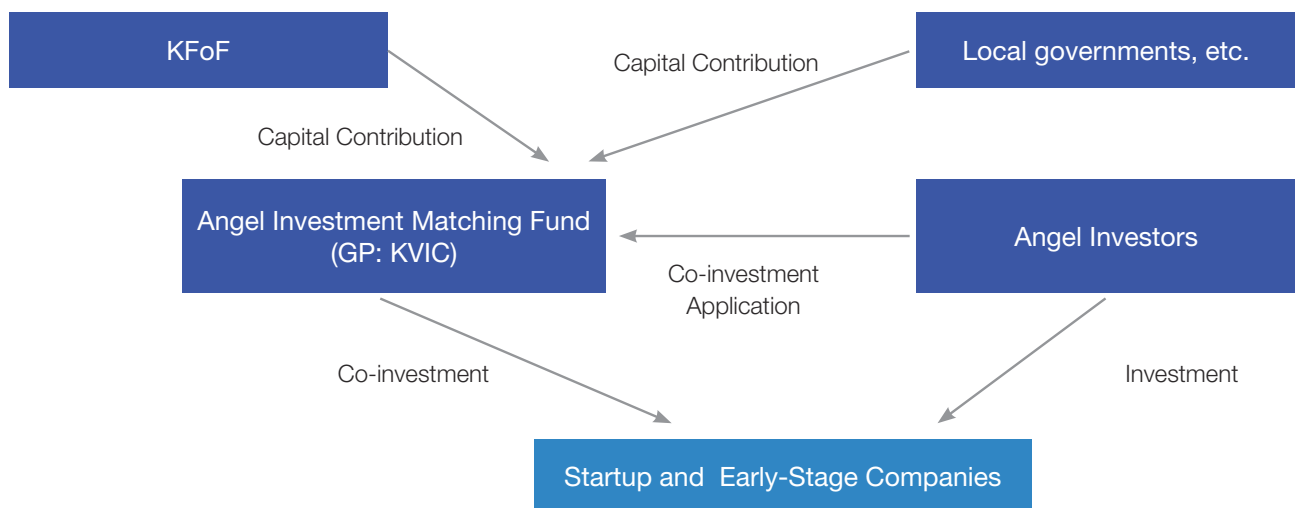
## Other Funds

Other funds managed by KVIC include the Fund of Funds for Industrial Technology Commercialization (KRW 25 billion in assets under management or AUM), and KoFC-KVIC Job Creation Fund I and II (KRW 120 billion and KRW 107 billion in AUM, respectively). All the job creation funds are currently liquidating their investments.

# Co-Investment Funds

## Angel Investment Matching Fund

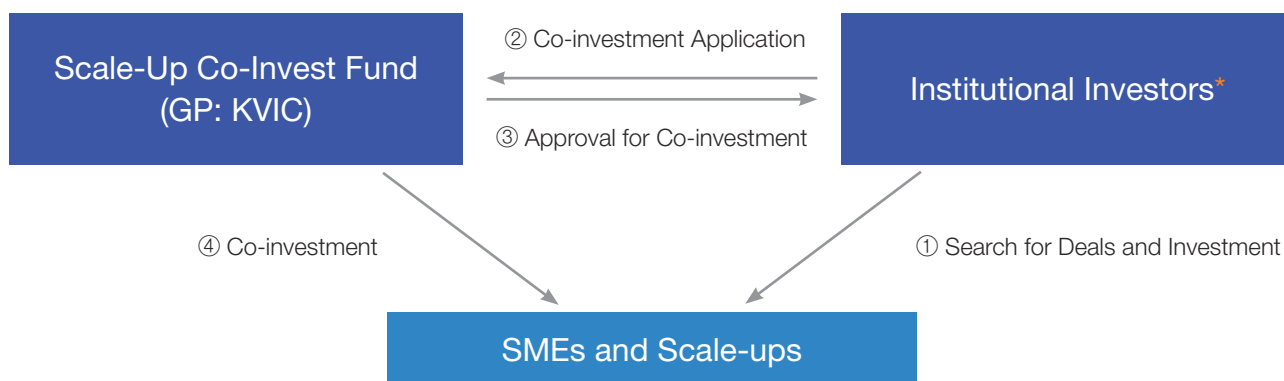
An angel investment matching fund in Korea refers to a public-private co-investment fund that is specially designed to nurture angel investors and angel clubs, thereby laying the foundation for startup creation and helping startup or early-stage companies fill their equity gaps. As of June 30, 2019, there were 16 angel investment matching funds with KRW 192 billion in aggregate AUM.



## Scale-Up Co-Investment Fund

In August 2018, the Fund was formed for the first time in Korea to co-invest alongside institutional investors in SMEs and scale-up companies that are designated as a good job creator.

	Fund Profile
Date of Formation	August 16, 2018
Fund Size	KRW 50.6 billion (as of June 30, 2019)
Fund Term	8 years (2018-2025)
LPs	KFoF/KVIC
GP	KVIC



\* Institutional investors that are qualified to manage small and medium enterprise establishment investment partnerships, Korea Venture Funds (KVFs), new technology venture investment partnerships, and private equity funds (PEFs).

1H2019



# Korean VC Industry at a Glance



# Venture Capital Funds in Korea<sup>1)</sup>

## Fundraising

Capital committed to venture capital (VC) funds<sup>2)</sup> in Korea has continued to grow over the past five years, recording its all-time high of KRW 4,686.8 billion in 2018. The first half of 2019 saw 67 new funds established with aggregate committed capital of KRW 1,317.7 billion. Compared to the first half of last year, fund count rose, but total capital committed declined slightly.

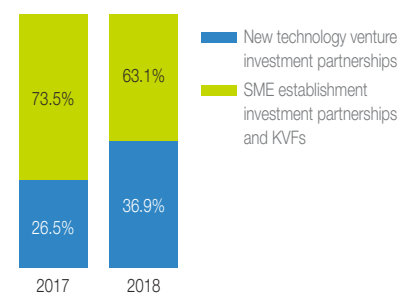
1) This report does not include PE investment data, and thus there may be some discrepancies between the overall VC market's performance and VC fund performance presented below.

2) Major investment vehicles in the South Korean VC market can be divided largely into small and medium enterprise (SME) establishment investment partnerships, Korea Venture Funds (KVF), and new technology venture investment partnerships. The Ministry of SMEs and Startups (MSS) is the competent authority for the first two types of VC funds, while the Financial Services Commission (FSC) is the competent authority for the third type of VC funds. Each of the competent authorities collates and analyzes VC data, and produces VC statistics annually. Among the three types of investment vehicles, SME establishment investment partnerships and KVF together accounted for 73.5% of the total committed capital in 2017, and 63.1% in 2018, showing a slight YoY decline. Still, however, those VC funds are playing a dominant role in the VC market. This report, therefore, defines SME establishment investment partnerships and KVF as VC funds. It has been prepared based on VC data from the Korea Venture Capital Association (KVCA).

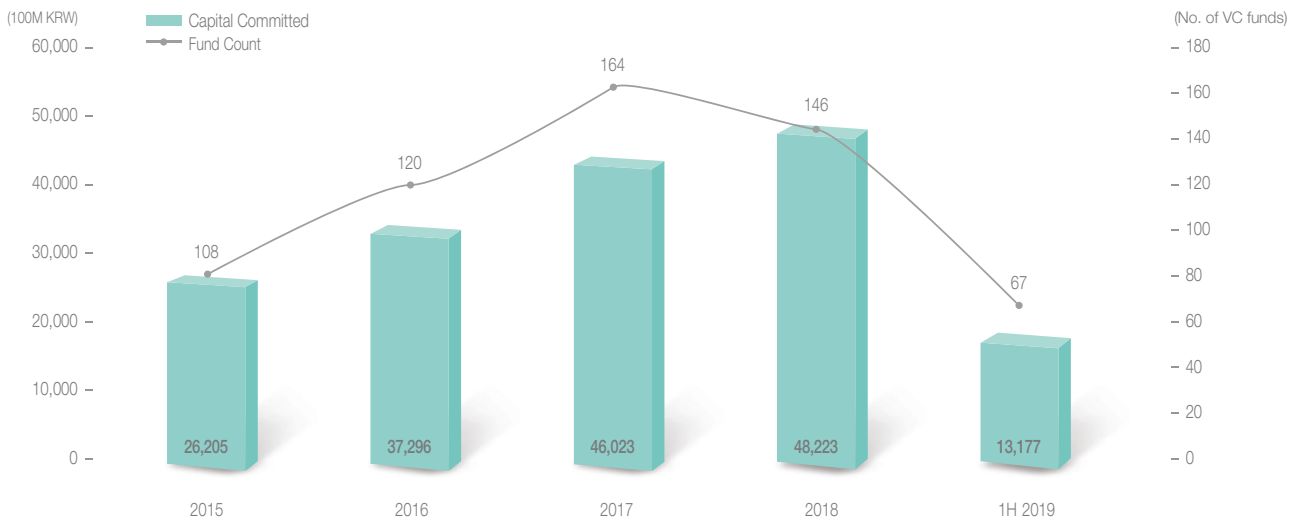
Table 1 Major Investment Vehicles in the Korean VC Market

Vehicle	SME Establishment Investment Partnership	KVF	New Technology Venture Investment Partnership
Applicable Law	Support for Small and Medium Enterprises Establishment Act	Act on Special Measures for Venture Businesses	Specialized Credit Finance Business Act
GP	SME establishment investment company, new technology venture investment company, limited company, limited liability company, etc.	SME establishment investment company, new technology venture investment company, limited company, limited liability company, etc.	New technology venture investment company
Competent Authority	Ministry of SMEs and Startups (MSS)		Financial Services Commission (FSC)

Figure 1 SME Establishment Investment Partnerships and KVF vs New Technology Venture Investment Partnerships (% of Investment Vehicles in the VC Market)

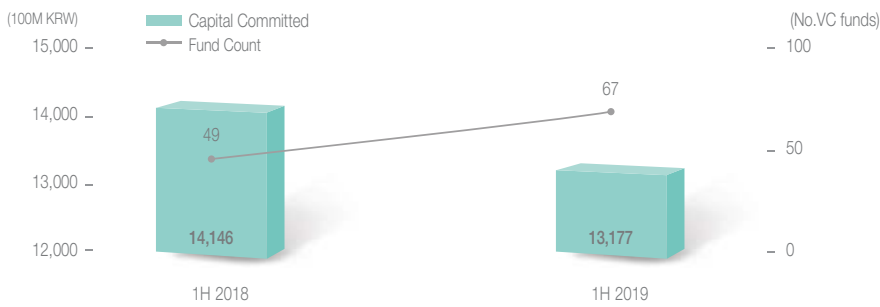


**Figure 2** 5-year Trends in VC Fund Creation



Source: Korea Venture Capital Association (KVCA)

**Figure 3** VC Fund Creation: 1H2018 vs 1H2019



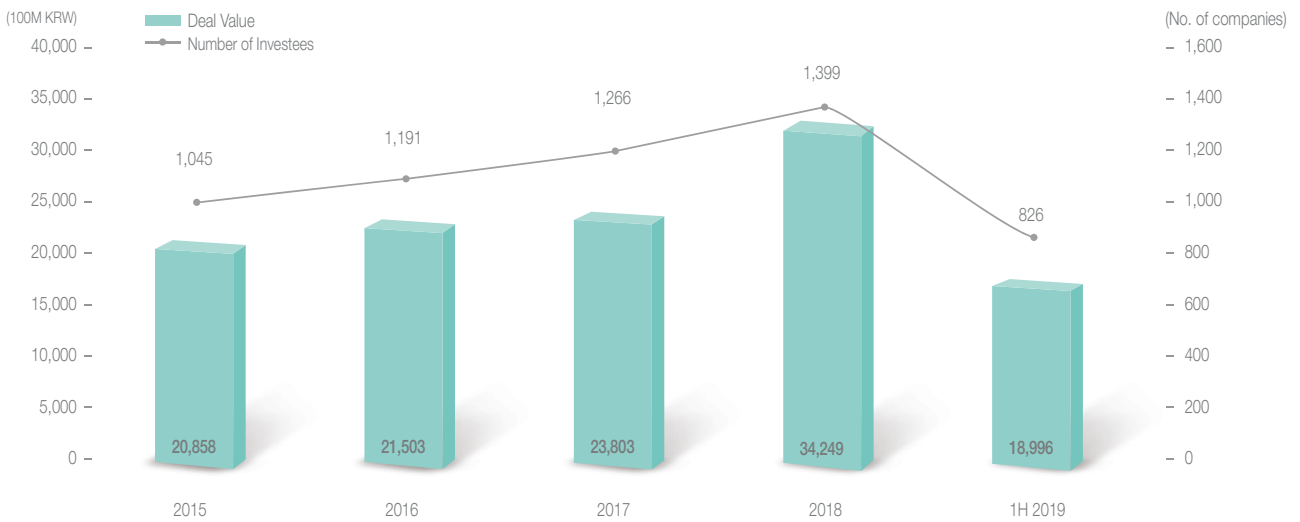
Source: KVCA

# Investments

## Investments by VC Funds

Korean VC funds collectively invested KRW 1,899.6 billion across 826 companies in the first half of 2019, showing increases in the amount invested and the number of investees compared to the same period last year. The average investment per company was KRW 2.3 billion, up slightly from 2.26 billion in the first half of the previous year.

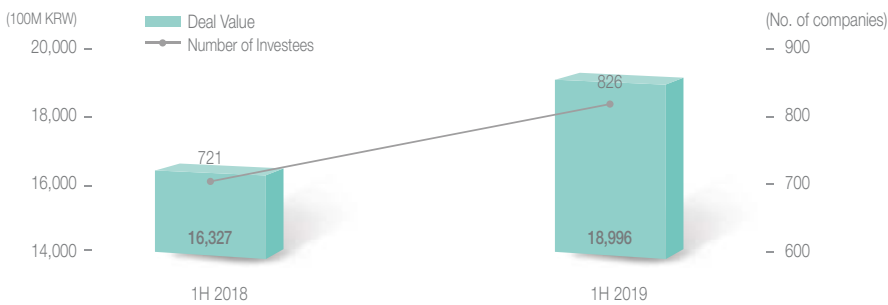
**Figure 4** 5-year Trends in Investments by VC Funds



\* As of June 30, 2019

Source: KVCA

**Figure 5** Investments by VC Funds: 1H2018 vs 1H2019

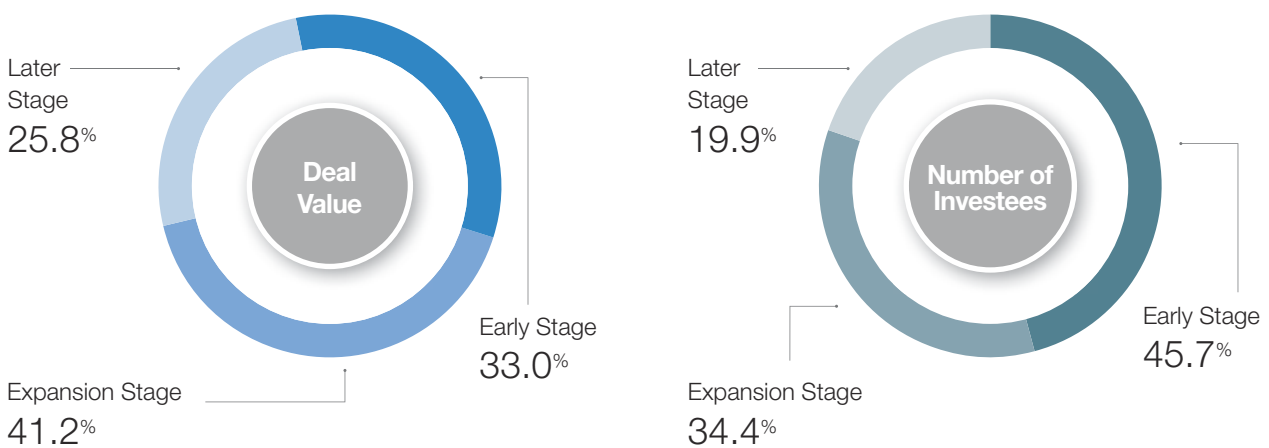


Source: KVCA

## Deals by Stage and by Industry (January to June 2019)

When looking at VC deal activity by stage<sup>3)</sup> during the first six months of the year, Korean VC funds deployed KRW 782.6 billion in expansion-stage companies (41.2% of the total VC funding), KRW 627.2 billion in early-stage companies (33.0%), and KRW 489.8 billion in later-stage companies (25.8%). Regarding the number of investees by stage, early-stage, expansion-stage and later-stage companies accounted for 45.7%, 34.4%, and 19.9% of the total investee companies, respectively.

**Figure 6** 1H2019 Deal Activity by Stage-VC Funds



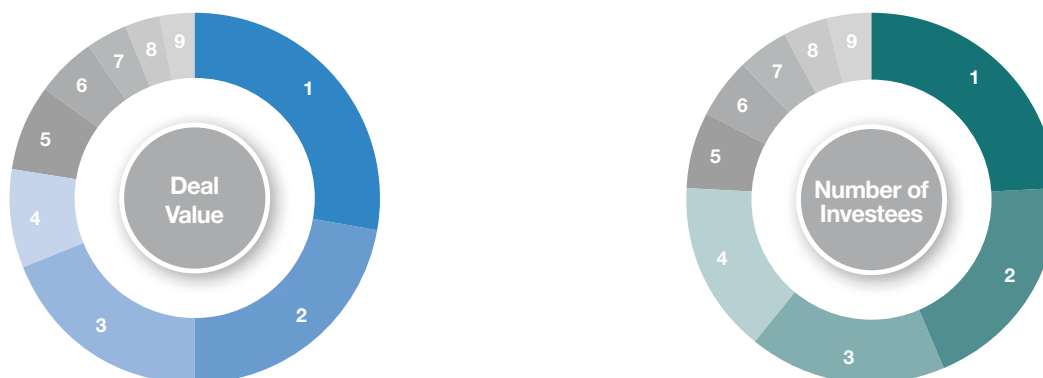
Source: KVCA

Biotechnology/healthcare was the most active industry<sup>4)</sup> for VC investment in the first half of 2019, attracting KRW 523.3 billion (27.5% of the total deal value), followed by ICT services with KRW 412.9 billion (21.7%), and distribution/services with KRW 357.6 billion (18.8%). For the number of investee companies broken down by industry, ICT services, distribution/services, and biotechnology/healthcare represented 24.4%, 19.5%, and 17.1% of all investee companies, respectively, in the same period.

<sup>3)</sup> Stages of a startup are determined based on the duration from the date on which a company is founded to the time capital is invested in the company. This indicates information about what stage an investee company has raised capital from a VC fund (early stage: less than 3 years/expansion stage: 3-7 years/late stage: more than 7 years).

<sup>4)</sup> Industry classification is based on the Korean Standard Industrial Classification published by Statistics Korea.

Figure 7 1H2019 Deal Activity by Industry-VC Funds



No	Sector	% of Total
1	Biotech/Healthcare	27.5
2	ICT Services	21.7
3	Distribution/Services	18.8
4	Film and TV/Performing Arts/Recording	9.9
5	Other	7.6
6	Electrics/Machinery/Equipment	5.2
7	Game	3.2
8	Chemicals/Materials	3.1
9	ICT Manufacturing	2.8

No	Sector	% of Total
1	ICT Services	24.4
2	Distribution/Services	19.5
3	Biotech/Healthcare	17.1
4	Film and TV/Performing Arts/Recording	15.0
5	Other	6.8
6	Electrics/Machinery/Equipment	5.1
7	ICT Manufacturing	4.5
8	Game	3.9
9	Chemicals/Materials	3.8

Source: KVCA

Industry*	Sub-Industry*
ICT Manufacturing	Semiconductor/other electronic components; computer/peripheral equipment; broadcasting and communications equipment; audio and video equipment
ICT Services	Communications; software publishing; information services
Electrics/Machinery/Equipment	Electrical equipment; general purpose machinery; transport equipment/parts; precision instruments
Chemicals/Materials	Chemical materials/products; rubber/plastics; metals; non-metallic minerals
Biotech/Healthcare	Medical devices; medical materials/pharmaceuticals; healthcare facilities/services
Film and TV/Performing Arts/Recording	Publishing/broadcasting; audiovisual content; performing arts/exhibition/music
Game	Game software; sports/leisure
Distribution/Services	Wholesale and retail trade; transportation; accommodation/food services; education; professional services
Other	Food and beverages; textiles/clothing/leather; wood/paper/printing/furniture; energy/resources; construction; finance; real estate/renting and leasing; other

\* KVCA and KVIC sort portfolio companies into 9 industries and 36 sub-industries, and collate data accordingly.

We kindly ask for your understanding that this issue of KVIC MarketWatch does not contain the analysis of exits by VC funds in the first half of 2019 because the related data from KVCA are not available. KVCA publicly releases annual statistics and data on VC exits at the end of each year.

For all figures in the article, the following conversion can be used for reference: USD 1=KRW 1,150.

1H2019 Korea Fund of Funds:

# Trends in Fundraising, Investments and Exits

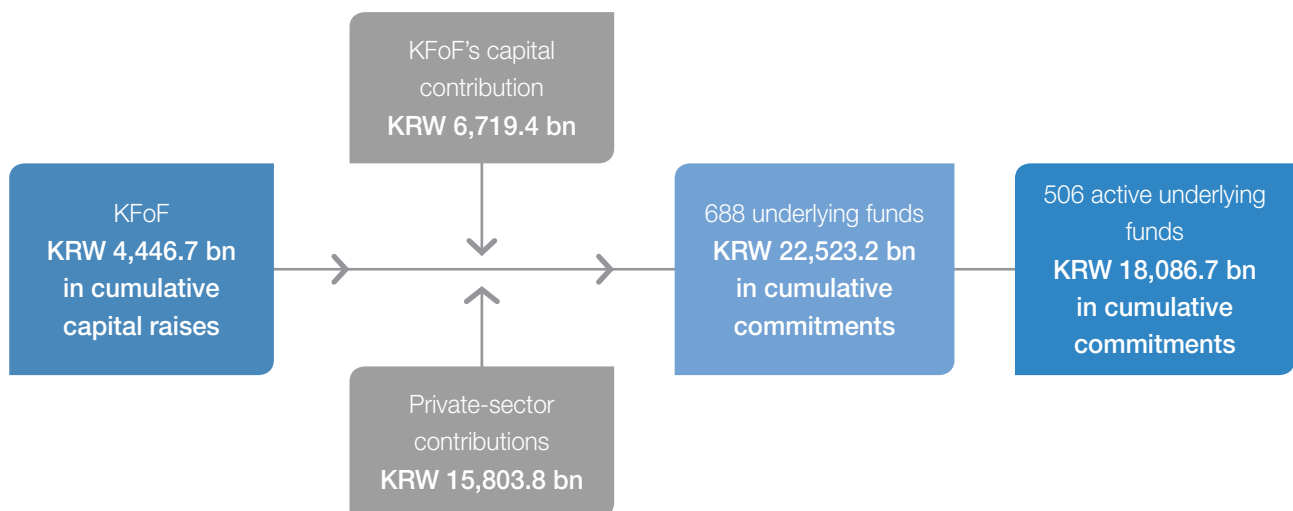


# Overview of Korea Fund of Funds

Korea Fund of Funds (KFoF) has secured KRW 4,446.7 billion in cumulative capital commitments as of June 30, 2019. KFoF has so far set up a total of 688 venture capital (VC) funds with total committed capital of KRW 22,523.2 billion on a cumulative basis, including KRW 15,803.8 billion

committed by private-sector investors. 506 of its underlying VC funds are currently active with KRW 18,086.7 billion in assets under management (AUM). Since its inception, KFoF has invested KRW 16,452.1 billion in 5,620 companies through the 688 underlying funds.

Figure 1 KFoF at a Glance

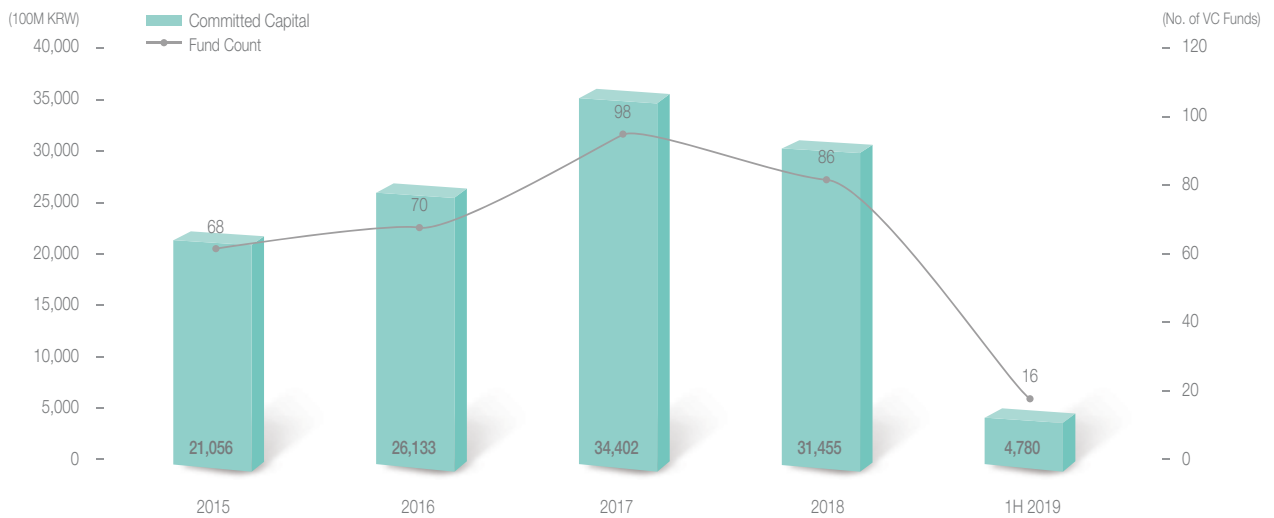


# Fundraising

In general, the number of new VC funds created by KFoF and the total amount of capital committed to the funds have been on the rise over the last five years, hitting record highs in 2017 with 98 funds and KRW 3,440.2 billion in aggregate com-

mited capital. During the first half of 2019, on the other hand, KFoF formed 16 new VC funds and committed KRW 478 billion to the funds, 30.4% and 48.3% lower than the same period last year, respectively.

**Figure 2** 5-year Trends in Fund Creation by KFoF



Source: KVIC

**Figure 3** Fund Creation by KFoF: 1H2018 vs 1H2019



Source: KVIC

# Investments

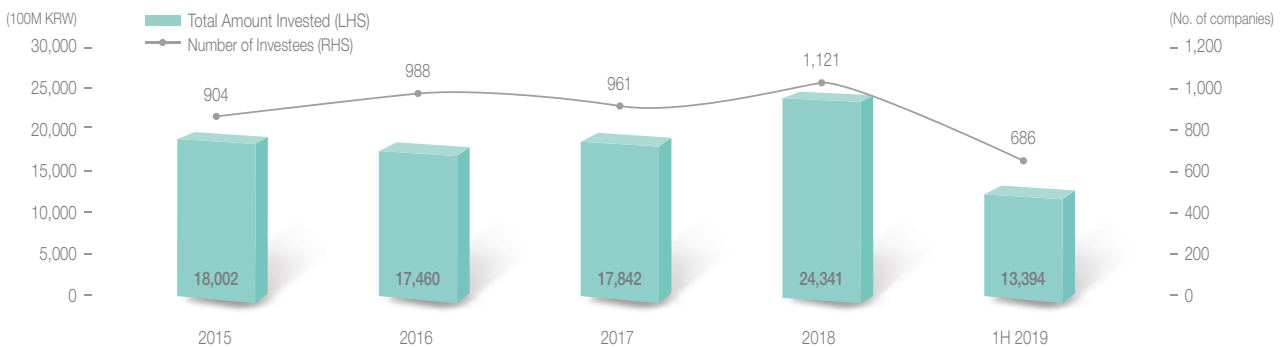
## Investments by KFoF Underlying Funds

In the first half of 2019, 266 KFoF underlying funds invested a total of KRW 1,339.4 billion in 686 companies. The amount invested and the number of investees (portfolio companies) grew by 10.5% and 20.1%, compared to the same period last year, respectively.

## Top-Ranked Investees and Investment Sectors

Looking at overall investments made by the KFoF underlying funds for the first six months of 2019, the average investee company raised KRW 1.95 billion from 1.8 funds, and the average deal size for top 10 companies was KRW 15.9 billion. By investment sector, 22.3% (KRW 298.7 billion) of the total capital invested by the KFoF underlying funds went to medical materials/pharmaceuticals, 15.1% (KRW 202.3 billion) to software, 9.4% (KRW 126.2 billion) to wholesale and retail trade, 8.4% (KRW 112.1 billion) to information services, and 8.4% (KRW 112.1 billion) to professional services.

**Figure 4** 5-year Trends in Investments by KFoF Underlying Funds

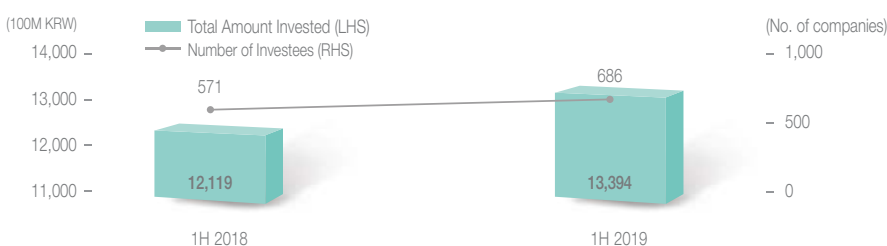


\* As of June 30, 2019

\*\* The number of investee companies above excludes overlapping companies.

Source: KVIC

**Figure 5** Investments by KFoF Underlying Funds: 1H2018 vs 1H2019



Source: KVIC

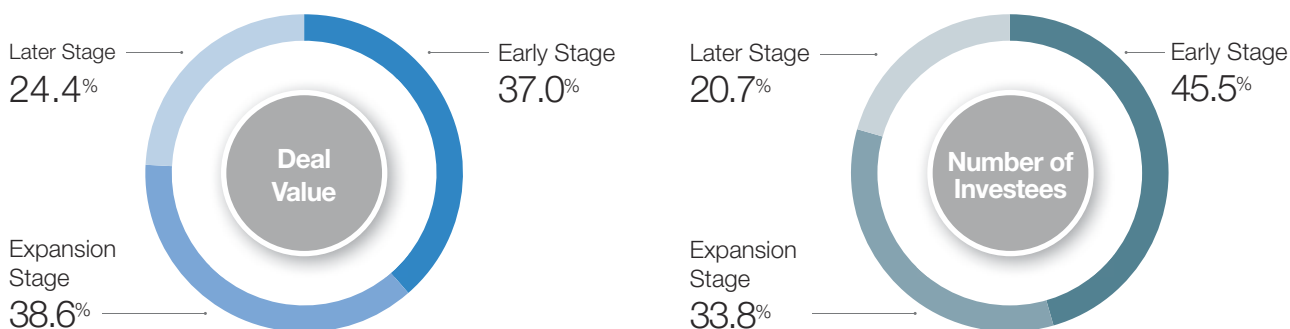
## Deals by Stage (January to June 2019)

When delving into deal value by stage in the first half of 2019, the KFoF underlying funds deployed KRW 494.9 billion in early-stage companies (less than 3 years old), accounting for 37.0% of the total VC deals, KRW 517.2 billion (38.6%) in expansion-stage companies (3-7 years old), and KRW 327.3 billion (24.4%) in later-stage companies (more than 7 years old). Meantime, a detailed look at the number of investees by stage in the same period found that early-stage, expansion-stage and later-stage companies made up 45.5%, 33.8%, and 20.7% of the total investees, respectively.

## Deals by Industry (January to June 2019)

By industry, biotechnology/healthcare received KRW 353.4 billion in VC funding from the KFoF underlying funds, representing the largest share (26.4%) of the total investments in the first half of 2019. ICT services came in second with KRW 316.7 billion (23.6%), followed by distribution/services with KRW 250 billion (18.7%). In terms of the number of investees, ICT services was the most popular industry, accounting for 23.6% of all investee companies, followed by biotechnology/healthcare (19.3%), and distribution/services (18.8%).

**Figure 6** 1H2019 Deal Activity by Stage-KFoF Underlying Funds



**Figure 7** 1H2019 Deal Activity by Industry-KFoF Underlying Funds



No	Sector	% of Total
1	Biotech/Healthcare	26.4
2	ICT Services	23.6
3	Distribution/Services	18.7
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5	Other	7.9
6	Electrics/Machinery/Equipment	6.0
7	Chemicals/Materials	3.1
8	Game	2.8
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4	Film and TV/Performing Arts/Recording	14.9
5	Other	7.0
6	Electrics/Machinery/Equipment	5.5
7	Chemicals/Materials	4.0
8	Game	3.7
9	ICT Manufacturing	3.3

Source: KVIC

# Exits

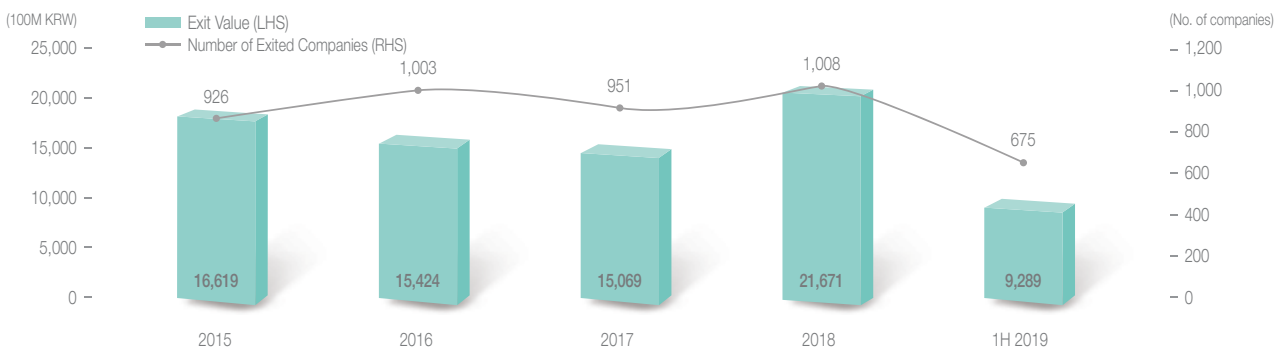
## Exits by KFoF Underlying Funds

During the first half of 2019, 292 KFoF underlying funds exited 675 companies valued at KRW 928.9 billion (KRW 463.7 billion in initial investments and KRW 465.1 billion in returns), generating a gross return multiple of 2.0x. The exit value and the number of companies exited in the first half of 2019 dipped by 8.5% and 5.9%, as compared to the same period in 2018, respectively.

## Exit Value and Exits by Industry

The value of the largest exit in the first half of the year was KRW 60.2 billion, and the highest exit return multiple was recorded at 31.2x. When it comes to exits by industry, medical materials/pharmaceuticals made up 28.8% (KRW 267.7 billion) of the total, software 10.0% (KRW 92.7 billion), professional services 7.7% (KRW 71.4 billion), general purpose machinery 7.0% (KRW 65.4 billion), and audiovisual content (including projects) 7.0% (KRW 65.1 billion).

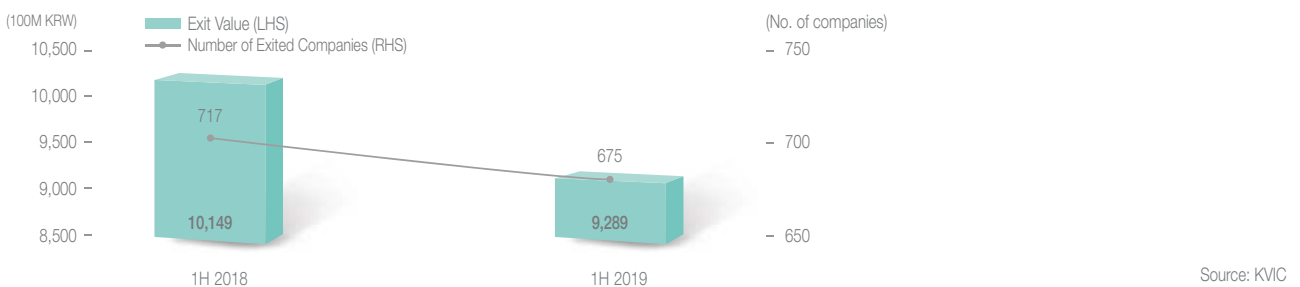
**Figure 8** 5-year Trends in Exits by KFoF Underlying Funds



\* As of June 30, 2019

Source: KVIC

**Figure 9** Exits by KFoF Underlying Funds: 1H2018 vs 1H2019



Source: KVIC

For all figures in the article, the following conversion can be used for reference: USD 1=KRW 1,150.

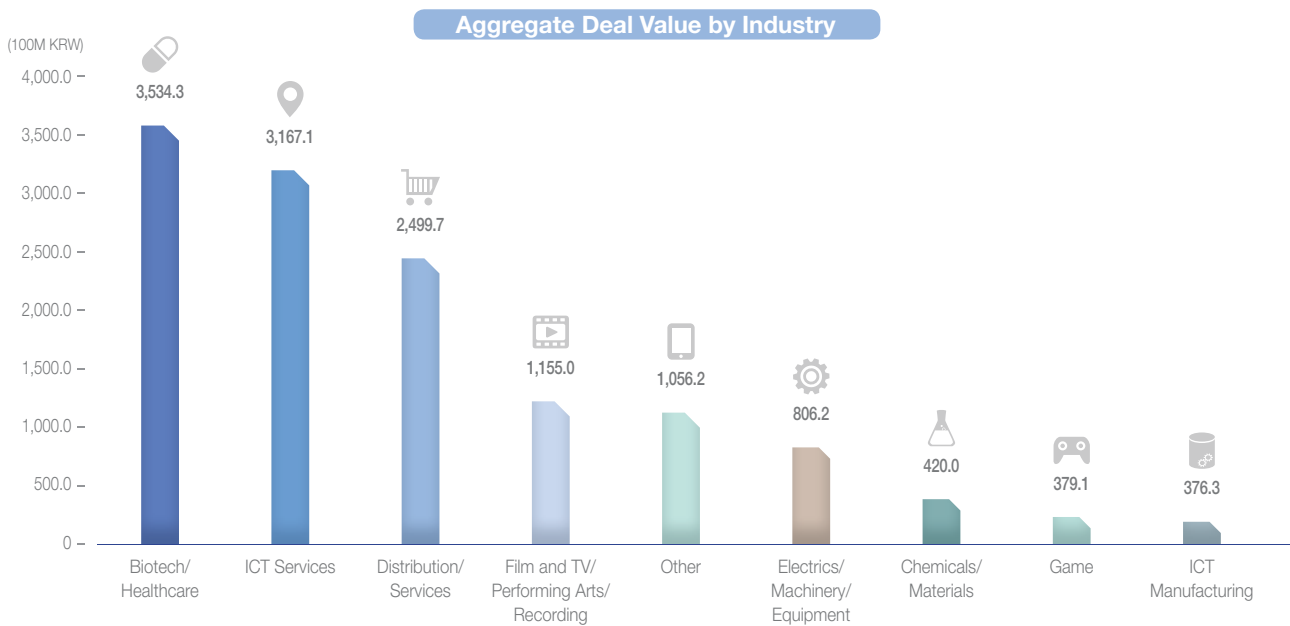
# 1H2019 KFoF Investments by Industry

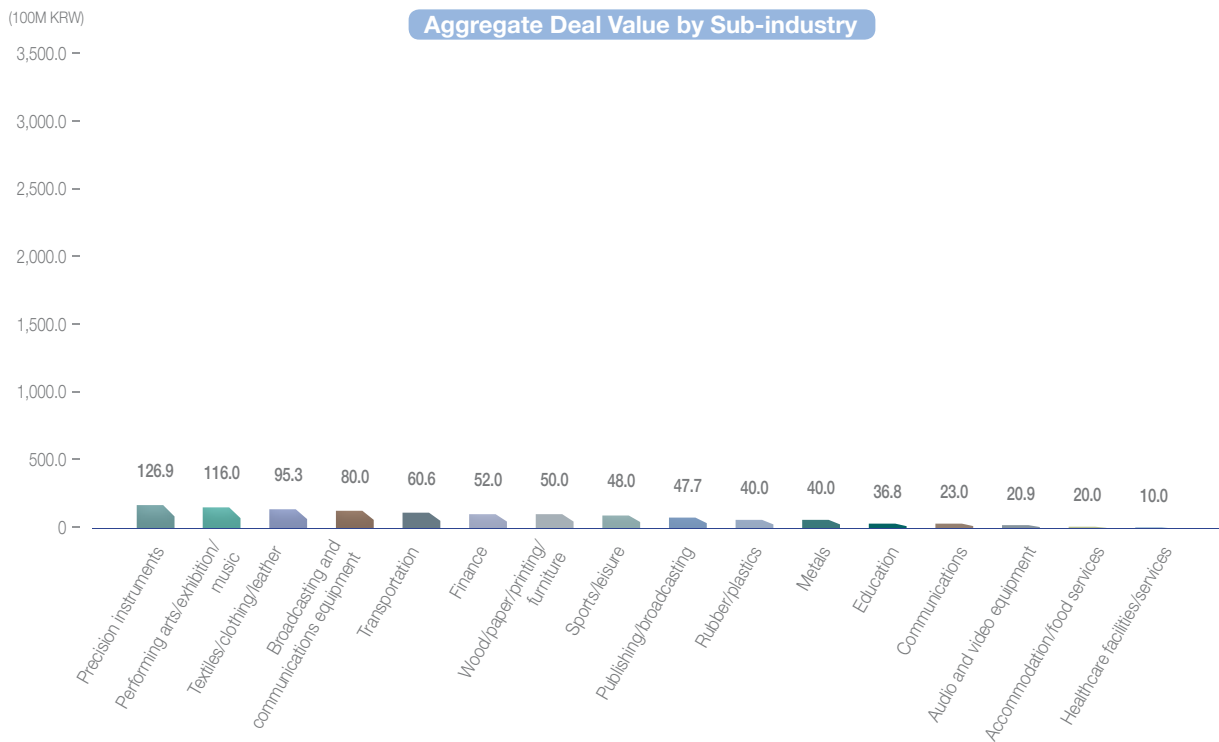
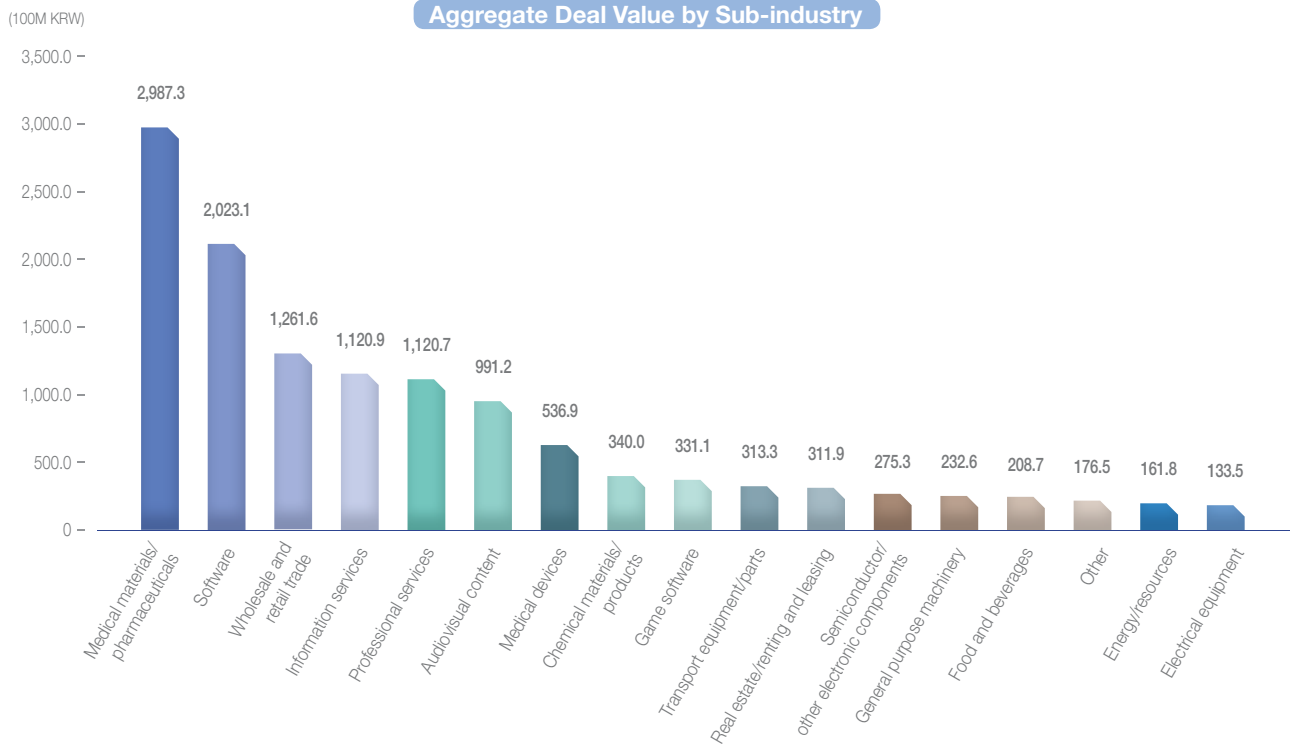


# 1H2019 KFoF Investments by Industry

In the first half of 2019, Korea Fund of Funds (KFoF) invested a total of KRW 1,339.4 billion (up 9.4% HoH) in 686 companies and projects (up 4.3% HoH) through its underlying funds. The investments during the first half already surpassed half of last year's record total (KRW 2,434.1 billion) since its launch. If this trend goes on, 2019 is expected to be another record-setting year for VC investments by KFoF. The average amount invested per company in the first half of 2019 was KRW 1.95 billion, up 5% from KRW 1.86 billion in the second half of 2018.

**Figure 1** 1H2019 KFoF Investment Activity by Industry and by Sub-Industry





Note: KVCA and KVIC sort portfolio companies into 9 industries and 36 sub-industries, and collate data accordingly.

Source: KVIC

The hottest industries for VC investment in terms of both value and growth rate were biotechnology/healthcare (KRW 353.4 billion, 25.8% HoH growth), ICT services (KRW 316.7 billion, 13.2% HoH growth), and distribution/services (KRW 250.0 billion, 33.7% HoH growth). VC investment in these three industries remained strong in the first half of 2019 on par with trends seen in the past five years.

The number of companies with KRW 10 billion or more in aggregate funding from the KFoF underlying funds during the first six months of the year was 12, and will reach levels similar to those in previous years (22 in 2017 and 29 in 2018) if the trend continues. Five out of the 12 companies are involved in ICT services, three in biotechnology/healthcare, two in other, and one each in distribution/services and electrics/machinery/equipment. The top recipient of VC investment was a biotech/healthcare company that is developing drugs to treat neurodegenerative diseases.

Table 1 shows that medical materials/pharmaceuticals, which is a sub-industry of biotechnology/healthcare, reported the largest hike in funding amount (up KRW 74.8 billion or 33.4% HoH) when measured in absolute terms. Compared to the second half of 2018 with an average of KRW 2.57 billion deployed across 87 companies working in medical materials/pharmaceuticals, the first half of 2019 saw increases in both the number of portfolio companies and the average amount invested in the same sub-industry with KRW 2.598 billion invested in 115 companies. The average amount invested per company for the medical materials/pharmaceuticals in the first half of 2019 remained at a similar level to that in the second half of 2018 because of similar HoH percentage increases in the investment amount (up 33.4%) and the number of portfolio companies (up 32.2%). The second largest increase in funding amount came from wholesale and retail trade within distribution/services (up KRW 31.5 billion or 33.2% HoH), followed by professional services within distribution/services (up KRW 30.4 billion or 37.2% HoH).

Wood/paper/printing/furniture within other industries boasted the biggest rise in the rate of investment growth in the first half of 2019 with KRW 5 billion invested in a digital printing company, compared to the second half of 2018 with KRW 200 million invested in one company. KFoF's investment in wood/paper/printing/furniture through its underlying funds surged by 2,404.6% HoH.

ICT services and software were the most popular sectors during the first half of 2019 in terms of the number of portfolio companies, as 172 ICT services companies and, more specifically, 120 software companies within ICT services received VC funding from the KFoF underlying funds. The average amount invested was the highest in real estate/renting and leasing within other industries. Thanks to large-scale investments in such companies as a shared office space operator, a car rental company, and a platform provider for real estate information, the sub-industry that those companies belong to enjoyed an uptick in the average amount invested.

**Table 1** 1H2019 KFoF Investment Activity

(100M KRW)

	1H2019	2H2018	HoH	Number of portfolio companies	Average amount invested
Total	13,393.8	12,240.7	9.4%	686	19.5
Biotech/Healthcare	3,534.3	2,809.8	25.8%	141	25.1
Medical devices	536.9	565.3	-5.0%	27	19.9
Healthcare facilities/services	10.0	5.0	100.0%	1	10.0
Medical materials/pharmaceuticals	2,987.3	2,239.5	33.4%	115	26.0
ICT Services	3,167.1	2,799.0	13.2%	172	18.4
Software	2,023.1	1,913.5	5.7%	120	16.9
Information services	1,120.9	853.1	31.4%	65	17.2
Communications	23.0	32.4	-29.0%	2	11.5
Distribution/Services	2,499.7	1,870.2	33.7%	137	18.2
Education	36.8	51.4	-28.5%	7	5.3
Wholesale and retail trade	1,261.6	946.8	33.2%	65	19.4
Accommodation/food services	20.0	45.1	-55.6%	2	10.0
Transportation	60.6	10.0	506.0%	4	15.1
Professional services	1,120.7	816.9	37.2%	64	17.5
Film and TV/Performing Arts/Recording	1,155.0	1,340.0	-13.8%	109	10.6
Performing arts/exhibition/music	116.0	195.9	-40.8%	14	8.3
Audiovisual content	991.2	1,060.9	-6.6%	88	11.3
Publishing/broadcasting	47.7	83.2	-42.6%	7	6.8
Other	1,056.2	815.1	29.6%	51	20.7
Construction	-	20.0	-100.0%	-	-
Finance	52.0	93.3	-44.3%	5	10.4
Other	176.5	306.8	-42.5%	12	14.7
Wood/paper/printing/furniture	50.0	2.0	2404.6%	1	50.0
Real estate/renting and leasing	311.9	177.0	76.2%	6	52.0
Textiles/clothing/leather	95.3	95.0	0.3%	8	11.9
Energy/resources	161.8	20.0	709.0%	4	40.4
Food and beverages	208.7	101.0	106.6%	15	13.9
Electrics/Machinery/Equipment	806.2	1,125.5	-28.4%	40	20.2
Transport equipment/parts	313.3	139.8	124.0%	9	34.8
General purpose machinery	232.6	382.9	-39.2%	14	16.6
Electrical equipment	133.5	321.1	-58.4%	11	12.1
Precision instruments	126.9	281.7	-55.0%	7	18.1
Chemicals/Materials	420.0	465.8	-9.8%	29	14.5
Rubber/plastics	40.0	25.0	60.0%	4	10.0
Metals	40.0	80.0	-50.0%	2	20.0
Non-metallic minerals	-	15.0	-100.0%	-	-
Chemical materials/products	340.0	345.8	-1.7%	24	14.2
Game	379.1	534.9	-29.1%	27	14.0
Game software	331.1	500.9	-33.9%	25	13.2
Sports/leisure	48.0	34.0	41.2%	2	24.0
ICT Manufacturing	376.3	480.3	-21.7%	24	15.7
Semiconductor/other electronic components	275.3	281.1	-2.0%	19	14.5
Audio and video equipment	20.9	20.0	4.6%	2	10.5
Computer/peripheral equipment	-	11.0	-100.0%	-	-
Broadcasting and communications equipment	80.0	168.2	-52.4%	3	26.7

Source: KVIC

Table 2 lists the hashtags describing the features of a product or service developed, produced or provided by the portfolio companies receiving KRW 5 billion or more in VC funding in the first half of 2019. These hashtags aim to help readers better understand the characteristics of portfolio companies in the KFoF underlying funds.

**Table 2** Hashtags for Portfolio Companies with Over KRW 5 Billion in VC Funding in 1H2019

<b>Biotech/Healthcare</b>	#Parkinson's Disease Medications #Cancer Immunotherapies #Osteoarthritis Medications #Biosimilars #Autoimmune Drugs #Drugs for Cervical Pre-Cancer (cervical intraepithelial neoplasia or CIN) #Mitochondrial Targeting Agents #New Central Nervous System (CNS) Disorders Medications #Chimeric Antigen Receptor T-cell Therapy #Personal Genome Service #New Drugs to Promote Optic Nerve Regeneration #AI-based Diagnostic Medical Imaging Equipment #Home Beauty Care #Medical Sterilizing Device #Diagnosis and Treatment of Dementia Caused by Alzheimer's #Medical 3D Printing #Genotyping Kit #Contract Research Organization (CRO) for Non-Clinical Trials
<b>ICT Services</b>	#e-book Subscription Platform #Mobile Real Estate Information #Forex Solution #Travel Guide App #Machine Vision Solution #Marketplace for Professional Services #Legal Services Platform #Marketing Automation Solution #Cloud MSP & SaaS Solutions #Mobile Web Fiction Platform #Open Platform for Virtual Currencies #SNS-based Recruiting Platform
<b>Distribution/ Services</b>	#e-commerce #Car Sharing Service #Shared Office #Platform for Extracurricular Activities and Hobby Classes #Shared Kitchen #Travel Activities Platform #Maid Service (Home Cleaning) #e-commerce (Vietnam) #Fashion B2B Platform #Celeb Market Commerce #Wholesale and Resale Platform for Pharmaceutical Products #Platform for Cars Powered by Renewable Energy #Food Media Content
<b>Electrics/Machinery/ Equipment</b>	#Aircraft Components #Renewable Energy Generator #Machine Tool Parts #Smart Auto Parts #Small Satellite Launchers
<b>Game</b>	#Sports Virtual Reality Theme Park #Online Game
<b>Film and TV/ Performing Arts/ Recording</b>	#Creation of Mobile Audiovisual Content
<b>ICT Manufacturing</b>	#SSD Controller
<b>Chemicals/ Materials</b>	#Organic Photoconductor (OPC) Drum Materials
<b>Other</b>	#Investment in Intellectual Property Rights

Source: KVIC

# KVIC Next Unicorns:

(1) Inven

(2) LetinAR



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KVIC Next Unicorn:

This project is designed to help promising Korean companies with high growth potential attract scale-up funding from global investors and grow into unicorns by enabling them to leverage KVIC's global networks.

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# KVIC Next Unicorn

## (1) Inven

### Games Industry Leader, Inven

#### Highlights

- Number one global games media platform in the field of gaming content services (with a market share of 80%)
- Also engaging in hosting gaming conferences, broadcasting live gaming events, and running an online shopping mall for gaming gear and merchandise, apart from generating and providing game-related content.

#### Company Overview

Founded in 2004, Inven Co., Ltd. is a provider of the most visited gaming media platform in South Korea. The company provides users with a wide range of gaming content, such as game news, features, and interviews, through web and mobile channels. Further, it provides a place where users can create game content of their own, and exchange their thoughts and opinions on games. By taking advantage of the resulting cumulative user database, Inven is able to deliver ads targeting different users, which helps advertisers tailor their marketing activities to meet their needs.

Moreover, Inven has been reaching out to gamers across the globe beyond North America and Europe through Inven Global, which was established in September 2016. The company is also preparing to enter the mobile esports market for user access to gaming communities. On top of that, it has expanded the scope of its business to include organization of game conferences and official competitions for Blizzard, Riot Games and other game developers, and operation of an online shopping mall for gamers. The recent business expansion heralds immense potential for Inven's growth.

**Table 1** Company Brief

<b>Founder</b>	CEO Hyungjun Seo
<b>Date of Foundation</b>	November 11, 2004
<b>Location</b>	Seongnamdaero 331, Bundang-gu, Seongnam, Gyeonggi Province, Korea
<b>Number of Employees</b>	152
<b>Main Services</b>	Game content creation and delivery; development of related software and systems
<b>Contact</b>	Website: <a href="http://www.inven.co.kr">www.inven.co.kr</a> Facebook: <a href="http://www.facebook.com/invennews">www.facebook.com/invennews</a> Twitter: <a href="https://twitter.com/inventeam">https://twitter.com/inventeam</a>

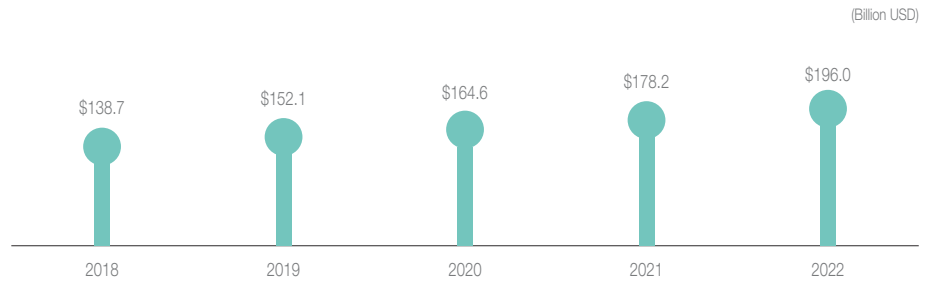
## Market Opportunities

21st-century gamers in the world have two choices: either play games or watch games. In other words, gaming content consumption is divided into direct consumption (users play games) and indirect consumption (users watch others play games through streams or esports broadcasts).

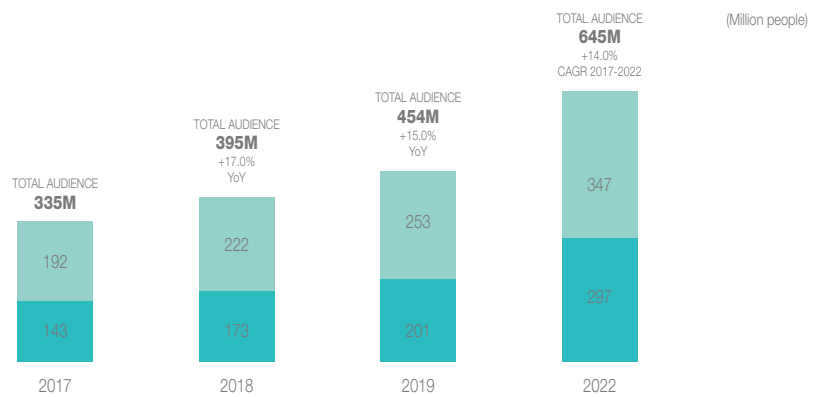
The indirect consumption paradigm (i.e., gameplay watching) has continued to grow together with the traditional games industry driven by direct consumption (gameplay), changing the way games are adopted. Not only that, the new paradigm has spurred the growth of the games industry by generating new game-related content. The spread of indirect game consumption is expected to accelerate the birth, expansion and growth of new games media platforms and gaming communities that use and offer the content of games.

As users have spent more time watching other people play games and sharing gaming content, esports have witnessed a dramatic rise. According to market research firm Newzoo in its 2019 Global Games Market Report, the global games market is projected to generate revenues of USD 152.1 billion in 2019, up 9.6% from USD 138.7 billion in 2018. The esports market will hit USD 1.1 billion in 2019, up 26.7% from USD 865 million in 2018, outpacing the overall games market. The esports market is expected to reach USD 1.8 billion by 2022. There were approximately 395 million esports viewers worldwide in 2018, and this audience number is projected to rise to 645 million by 2022, surpassing that of traditional sports such as football, basketball, and baseball.

**Figure 1** 2018-2022 Growth Forecast of Global Games Market



**Figure 2** Global Esports Audience Forecast



Source: Newzoo, Global Games Market Report 2019

Game enthusiasts who want to dig deeper into esports and games tend to actively search out and consume game-related content. They consume not only video content around competitive games involving well-known esports athletes or other gamers, gaming strategy and commentary, but also game-related video content. In the meantime, life cycles of popular games are short, although there are exceptions, such as StarCraft and League of Legends. As new games in different genres are ceaselessly released, the competition is intensifying, which poses a great threat to some game producers. However, this situation may be favorable for games media platforms to generate various and ample content. Once a game gains popularity and the related market is created, game media platforms can benefit from the rise of the game and the market growth.

Boasting a vibrant gamer community based on the highest number of subscribers in Korea, Inven is the games media platform with high quality gaming content and database, running its own esports broadcasting station as well as the online shopping mall for game gear and merchandise. Underpinned by its capabilities built up so far, the company is poised to enter the North American market. With two wings, i.e., the growth of the games and esports industries and the expansion of game consumption channels, Inven is expected to become one of top global games media platform providers in the future.

## Main Services

### 1) Inven – Number one games media platform

- ① Web magazine (webzine) content
  - The webzine aims to deliver premium game content, serving as the gaming media channel that represents the gaming industry and gamers.
  - Providing specialized and extensive content including card news, columns, interviews and feature reports, forecasting games industry trends, and sharing insights.
- ② Managing and running the game community
  - Providing a variety of information on games and acting as a communication channel between users.
  - Having the number one game community in the country through well-managed and stable operation.
- ③ Esports
  - Producing and distributing official broadcasting programs for game developers and publishers with its experienced and talented staff specializing in game broadcasts and video production as well as its own production studio.
  - Providing a comprehensive esports platform that is capable of conducting game tournaments, and broadcasting esports events online and offline.

**Figure 3** Inven Ryzen Esports Arena where esports and other various broadcasting programs are produced and transmitted



④ Advertising & marketing

- Offering the enabling environment for advertisers to run diverse marketing campaigns (e.g., video ads, background or skin ads and other display ads, pre-event booking, contests, participation events, etc.) customized to their needs.

⑤ Conferences

- Hosting the Inven Game Conference (IGC) in Korea and the Inven Global E-Sports Conference (IGEC) in North America annually that bring together industry experts and veterans to discuss pressing topics around games and esports.

Figure 4 Inven Game Conference (IGC) and Inven Global Esports Conference (IGEC)



## 2) Inven Global – The bridge between Korean and global game markets

- ① North American esports webzine
  - This webzine delivers the latest esports news and articles written by local reporters in North America, and includes esports news from Korea through exchanges with Inven.
- ② Game ads & marketing
  - Providing game ads targeted to users in English-speaking countries, and specializing in local influencer marketing.

## 3) Market Inven – Shopping is more fun than gaming.

- ① Selling computers, computer peripherals, and licensed merchandise
  - Market Inven is the one and only shopping mall in Korea that caters primarily for game enthusiasts and sells computers, game statues and figures, clothing, and other merchandise.
  - Creating and selling officially licensed mobile accessories, key-chains and other goods under license agreements with game developers.

**Figure 5** Blizzard's Overwatch licensed goods available for sale in Market Inven



## Business Model

The company's revenue model consists of revenue streams in various areas including broadcasting, webzines, and game community operation.

### Inven's revenue model

- Existing businesses: Advertising, game community, content, promotion, and broadcasting
- New businesses: Inven Global, Market Inven, IGEC, and affiliated businesses

Inven has the industry's top content and media platform in terms of game content generation and consumption, not to mention games. The company is expanding its market to countries beyond its home country to attract game users from all over the world, and is poised to launch various businesses for revenue generation. Given its size and systems to constantly create quality content, Inven is expected to become a new type of leader in the games market.

## Strategies Going Forward

Inven recently made inroads into the B2C market as it launched Market Inven, an online shopping mall for gamers, and rolled out licensed cell phone accessories under a license agreement with Activision Blizzard to produce officially licensed goods for Overwatch, a global megahit first-person shooter game. What is more, Inven plans to boost its merchandise business by finalizing intellectual property agreements involving domestic and foreign game producers currently under negotiations, and it participated as an exhibitor with a big B2C booth in Korea's biggest gaming exhibition G-Star 2019 slated for late 2019.

The company is also increasing its influence on the gaming markets in North America and other English-speaking countries as it successfully launched its esports media platform Inven Global and established the IGEC as a must-attend esports event in the rapidly growing North American esports market. Accordingly, Inven Global, which is Inven's North American Branch, plans to strive for growth in the size and quality of the IGEC in order to make it the world's best esports event.

Along with that, Inven Global is stepping up its efforts to enter the steadily growing mobile esports market. It will actively create and provide mobile game-related content in collaboration with mobile game developers and mobile device manufacturers, thereby functioning as a bridge between game users and mobile esports companies, and leading the way in the

game community market. These strengths will allow the company to venture into new businesses.

In addition, Inven expects continued growth in its targeted marketing and promotion business that helps Korean game developers seeking to launch their games in the North American market select target users and groups, and conduct effective promotional campaigns.

## Leadership



CEO Hyungjun Seo

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The games industry is now a major segment of the entertainment industry worth KRW 14 trillion in Korea. Looking back when Inven was in its nascent stage, however, playing games was considered a pastime for children, and there was therefore no such thing as gaming industry ecosystem. For the past 15 years, Inven has acted as stepping stones between the games industry, game communities and gamers while games have evolved to become a popular pastime for Koreans of all ages regardless of gender.

The company's motto "Creating the world gamers are dreaming of" has been the cornerstone on which Inven has built the top games media platform by market share in Korea. Bearing a gamer's pure enthusiasm, Inven, just like it has been, won't stop trying to provide better services and create enjoyable experiences for users.

# KVIC Next Unicorn

## (2) LetinAR

Let us into Amazing Reality, LetinAR

### Highlights

- Developer of world-class optical solutions for augmented reality (AR) glasses, which employ its unique Pin Mirror (PinMR™) technology
- Setting a sales goal to top five million units by 2023 for high-end AR smart glasses made with its optical technology (equivalent to a market share of nearly 15%).

### Company Overview

Established in 2016, LetinAR Co., Ltd. is a startup company that develops optical solutions for augmented reality (AR) or mixed reality (MR) smart glasses. With its proprietary innovative PinMR™ technology, the company is set to innovate AR smart glasses, promising the arrival of a new AR optical module that achieves remarkably superior performance over existing modules. LetinAR's PinMR™ lens module has a much simpler structure than other optical modules, meaning that it can be manufactured on a large scale at a low cost. This will make it possible for the company to play an important part in the proliferation of next-generation AR glasses. Although LetinAR embarked on its startup journey less than three years ago, it showcased its smart glasses prototype in the International Consumer Electronics Show (CES) and the Mobile World Congress (MWC) in 2018, getting bombarded with offers and requests for technology or business collaboration from world-renowned companies. Starting in 2020, the company will work in full swing for business collaboration and development with the supply of PinMR™ lens modules for AR glasses to smart glasses manufacturers.

**Table 1** Company Brief

<b>Founder</b>	Jaehyeok Kim (CEO), Jeonghun Ha (CTO)
<b>Date of Foundation</b>	October 4, 2016
<b>Location</b>	2nd Floor, Baekyoung Seongsu Center, Seongsuil-ro 56, Seongdong-gu, Seoul, Korea
<b>Number of Employees</b>	18
<b>Main Services</b>	Design, development and production of optical solutions for AR smart glasses; development and production of special-purpose AR smart glasses
<b>Contact</b>	Website: <a href="http://www.letinar.com">http://www.letinar.com</a> Facebook: <a href="https://www.facebook.com/letinar/">https://www.facebook.com/letinar/</a> YouTube: <a href="https://youtube.com/c/letinar">https://youtube.com/c/letinar</a> E-mail: <a href="mailto:info@letinar.com">info@letinar.com</a>

## Market Opportunities

The global market for smart devices grew exponentially after the initial release of iPhone in 2007. But the market has become saturated, reaching a growth plateau as the adoption of smart devices has increased. We see another tipping point approaching for the market evolution in the midst of growing demand for a new type of smart device along with technological advances. Market experts point to AR smart glasses as a new market that will drive evolutionary changes.

According to IT market research firm Digi-Capital, the global AR smart glasses market will reach USD 37 billion by 2023, with AR smart glass devices taking the lion’s share of USD 25 billion (Digi-Capital, 2019). The shipments of AR smart glasses worldwide are projected to surpass 36 million units in 2023. AR technology whose first applications were offered on smart phones is gradually moving its focus to wearable smart glasses. To support the adoption of AR in wearable smart glasses, the hardware market, which encompasses spatial mapping, low-power processes manufacturing, battery and Ultra Wide Band (UWB) technologies, is expected to grow as well. Optical technology, among other things, will garner increasing attention because breakthroughs in optical technology are essential to reduce a device’s form factor, size and weight. Smartphone-tethered AR smart glasses are likely to dominate the nascent smart glasses market because of technical limitations. Then, standalone AR smart glasses will take mainstream.

For optical solutions currently used in AR smart glasses, a handful of companies based in the United States, United Kingdom or Israel are the first movers in the market. There are three currently available optical systems smart glasses manufacturers use:<sup>1)</sup> half mirror reflection (Epson and Google Glass);<sup>2)</sup> diffractive optical elements (DOEs) or holographic optical elements (HoloLens, Vuzix Blade and Magic Leap);<sup>3)</sup> optical waveguides (Lumus). For

<sup>1)</sup> Half mirror reflection refers to an approach for an optical system using a half mirror which reflects half of the incoming light that strikes its surface and lets the other half pass through.

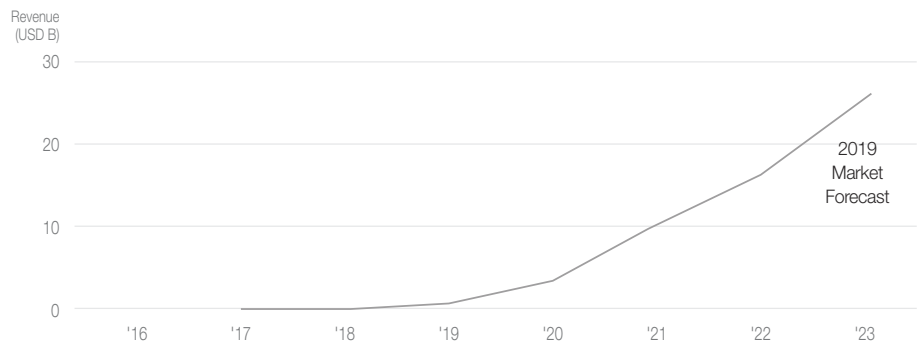
<sup>2)</sup> Diffractive optical elements/holographic optical elements operate by means of diffraction and interference of light.

<sup>3)</sup> Optical waveguides work using the total internal reflection of light caused by differences in the refractive index.

different reasons, smart glasses that utilize one of the three optical systems are bulky and heavy, have a narrow field of view (FOV) or chromatic aberration, or are expensive and difficult to mass produce due to their complicated manufacturing process.

On the other hand, LetinAR's PinMR™ lens is highly praised as the innovative technology that can address the aforementioned limitations of its competitors' products, thus attracting attention and excitement from a number of global smart glasses developers and manufacturers. We expect LetinAR to become a leader in the global AR smart glasses market if it builds an enduring competitive advantage based on its technological prowess and gets ahead in the fledgling market.

**Figure 1** Smart Glasses Market Forecast



Source: Citi-Research and Digi-Capital, Smart Glasses Market Forecast

## \* Current State of Overseas AR Technology Companies

### 1 Microsoft

Microsoft has released HoloLens 2 in early 2019 after it launched its first AR smart glasses called HoloLens in 2015. HoloLens is a standalone AR device that uses its own optical system based on DOEs. Microsoft reported disappointing sales of the original HoloLens which was oversized, heavy and expensive, only supporting a 35-degree FOV, low resolution and limited color expression. HoloLens 2 brings significant improvements when compared to the original HoloLens in terms of user convenience and software. However, HoloLens 2 is receiving some criticism for its still unsatisfactory resolution and color expression, limited FOV of 51 degrees, and bulky size. In addition, the device carries a hefty USD 3,500 price tag.

### 2 Magic Leap

Magic Leap received more than USD 2.6 billion in funding from giant companies including Google and Alibaba, and released its AR smart glasses called Magic Leap One in the second half of 2018. Many people expressed concerns about the design of the device even before its debut. There were negative reviews on the device in terms of product usability and optical performance. Magic Leap One is often directly compared with Microsoft's HoloLens. Although it is cheaper than HoloLens 2, it costs more than USD 2,000, which is still too expensive for the general public to purchase and use. Magic Leap One has a 52-degree FOV, which is narrow considering usability. The device fails to overcome the limitations of a DOEs-based optical system in terms of resolution and color expression. While the company sells the device in the U.S. market through its exclusive distributor AT&T, it has also entered the markets in Korea and Japan through partnerships with SK Telecom and NTT DoCoMo, respectively.

**Table 1** Magic Leap's Funding History

Year of Funding Rounds	Investors	Funding Amount
2014-2016	Google and Alibaba	USD 1,385.5 million
2017-2018	Temasek, Axel Springer, Saudi Arabia's Public Investment Fund, etc.	USD 963 million
2019	NTT DoCoMo	USD 280 million
<b>Total</b>		<b>USD 2.63 billion</b>

### 3 Other AR optics makers

Other AR optics makers worth noting are Lumus, WaveOptics, and DigiLens. Lumus is an Israeli company that has developed technology enabling the production of very thin AR lens. Low optical efficiency and production complexity are the major challenges facing the company. WaveOptics is a UK-based developer and manufacturer of diffractive waveguides whose manufacturing process is simple. DigiLens is a U.S. company that has holographic waveguide display technology. Leveraging the funding they have received, all of these companies have been conducting optical technology research for the mass production of AR optics at a low cost, but they have yet to overcome the limitations of diffractive optics.

**Table 2** Funding History for Other AR Optics Makers

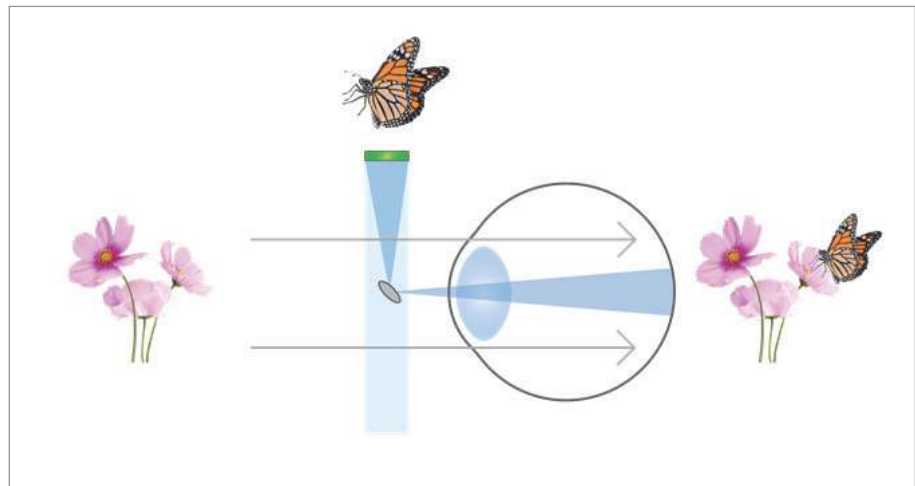
Company	Investors	Funding Amount
Lumus (ISR)	Alibaba, Quanta, Shanda, etc.	USD 63 million
WaveOptics (UK)	Octopus Ventures and other investors	USD 42.3 million
DigiLens (USA)	UDC Ventures and Samsung Ventures	USD 102 million

## Core Technology

### 1) What is Pin Mirror (PinMR™) technology?

If you look at an object through a small hole that looks like a needle hole, the image of the object is projected more sharply on your retina because the depth of field increases. It is called the pinhole effect. At the heart of LetinAR's optical solution exploiting this pinhole effect are pinhole-sized mirrors embedded inside lens. This pin mirror (PinMR™) technology allows for the production of AR smart glasses almost identical in appearance to ordinary glasses. Looking at how PinMR™ works, a real-world object placed at distance behind the lens is passed through the lens to the eye of a user. At the same time, a virtual image from the micro-display is reflected by pin mirrors and is seen by the viewer. The pin mirrors are not detectable by the eye because they are smaller than a pupil. This works in the same way as people can see out through glasses with a small piece of dust on the lens without interference. The virtual image and the image of the real-world object are merged together and perceived as augmented images by the viewer. LetinAR owns basic patents for display technology that uses pinhead-size mirrors to reflect images from the display to the human retina. The company also has more than 20 patents related to this technology issued by Korea, the US and China.

Figure 2 How PinMR™ Works



Source: LetinAR

## 2) Advantages of PinMR™ technology

LetinAR's PinMR™ lens offers various optical advantages. Its simple structure enables manufacturing of optics in smaller, lighter packages for AR displays. The PinMR™ lens easily produces a FOV of greater than 80 degrees by placing more pin mirrors horizontally or vertically. And it provides at least 100 times higher optical efficiency than diffractive waveguide optics, making possible the application of thin-film transistor (TFT) and organic light-emitting diode (OLED) with low light intensity, widely used in flat panel displays. On top of that, the PinMR™ lens is power efficient, lengthening the runtime of a device. In addition, the reflecting surface of precision pin mirrors produces high quality images without any chromatic aberration. Also, LetinAR's PinMR™ lens can be made of plastic, enabling the mass production of AR optics. As these advantages of the optical technology have been recognized, LetinAR has been selected as one of AR tech companies by Digi-Capital in 2019. The company is gaining global recognition, as evidenced in the introduction of PinMR™ approach as innovative optical technology for AR devices by many global research institutes.

**Figure 3** Performance Comparison: PinMR™ vs Competitors' Products

HMD-Type							
Product	Optics	FoV	Resolution	Image Quality	Imaging Engine	Form Factor	Product
<b>LetinAR</b>	<b>PinMR</b>	<b>85°</b>	<b>3840×2560 or more</b>	<b>Natural color</b>	<b>OLED/LCOS</b>	<b>Middle</b>	<b>Plastic</b>
Microsoft HL2	DOE	52°	1920×1440i	Color Aberrated	LBS	Big	Glass + Plastic
Nreal	Half Mirror	52°	1920×1080	Low Transparency	OLED	Middle	Glass + Plastic
Magic Leap 1	DOE	50°	1280×960	Color Aberrated	LCOS	Big	Glass + Plastic
DigiLens	HOE	40°	1280×720	Color Aberrated	DLP	Middle	Plastic
LUMUS OE	Cascaded Macro Mirror	40°	1920×1080	Blurry	LCOS	Middle	Glass
WaveOptics	DOE	40°	1280×720	Color Aberrated	LCOS	Big	Glass + Plastic

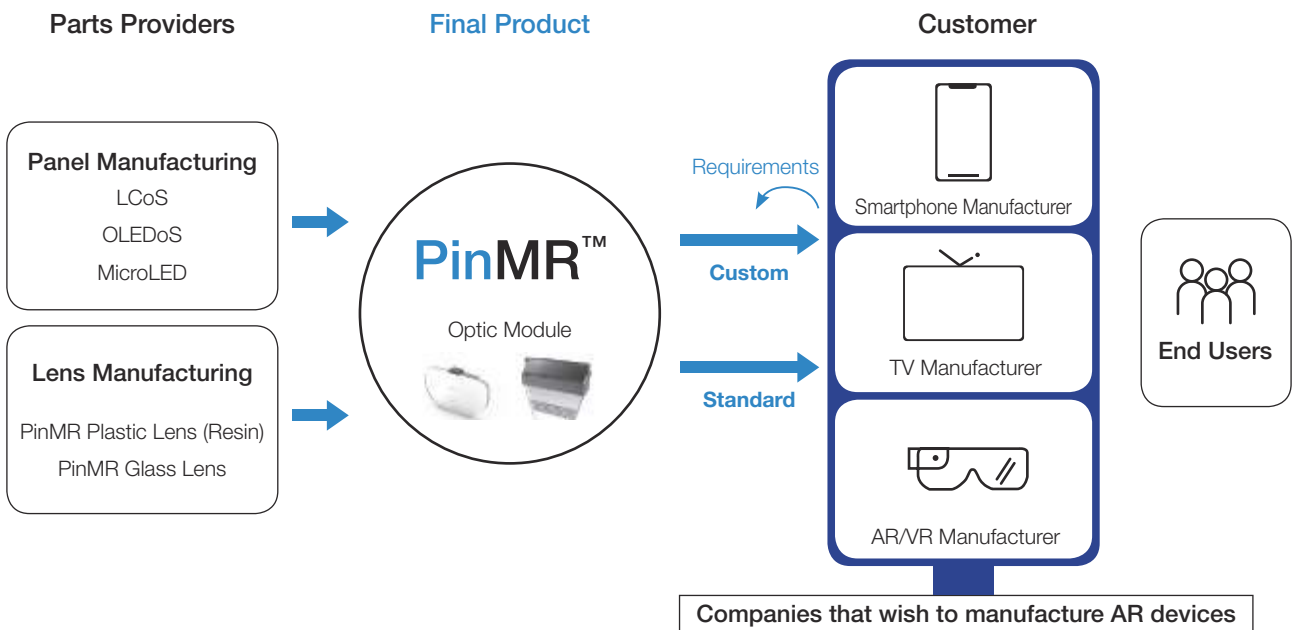
HMD-Type							
Product	Optics	FoV	Resolution	Image Quality	Imaging Engine	Form Factor	Product
<b>LetinAR</b>	<b>PinMR</b>	<b>43°</b>	<b>600×400</b>	<b>Natural color</b>	<b>OLED</b>	<b>Small</b>	<b>Plastic</b>
Epson Moverio	Half Mirror	23°	1280×720	Natural color	OLED	Middle	Plastic
Vuzix Blade	DOE	20°	854×480	Color Aberrated	DLP	Small	Glass + Plastic
Google Glass	Half Mirror	20°	640×360	Natural color	LCOS	Small	Plastic
North Focal	HOE	15°	200×200	Color Aberrated	LBS	Small	Plastic

Source: LetinAR

## Business Model/ Funding

LetinAR plans to supply a PinMR™ module, which combines its proprietary PinMR™ lens with a microdisplay from external partners, to AR smart glasses manufacturers and other customers. Moreover, it is capable of developing various types of modules in small quantities, either custom or standard, to meet the different needs of customers apart from key players in the AR market.

Figure 4 LetinAR's Business Model



LetinAR is in the spotlight as market participants' excitement level and expectations are high for the company's PinMR™-based optical solution which is more advanced than other optical solutions already on the market. Until 2018, the company received a total of KRW 6.8 billion in funding from local investors.

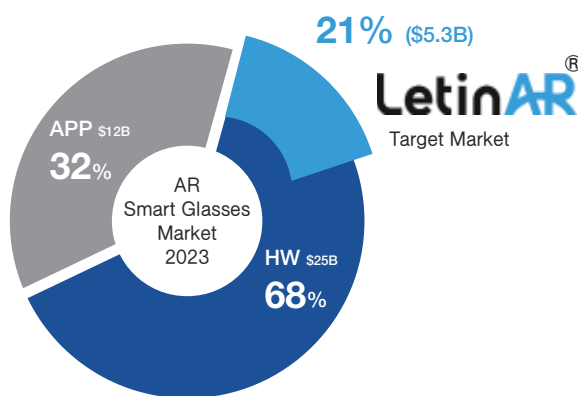
**Table 3** LetinAR's Funding History

Stage	Year of Funding Round(s)	Funding Amount	Investors (VC)
Series A	2018	KRW 6 billion	Kakao Ventures, Naver Corporation, Platinum Technology Investment, KB Investment, Korea Asset Investment Securities and DSC Investment
Angel/Seed	2017	KRW 0.8 billion	Naver Corporation and Platinum Technology Investment

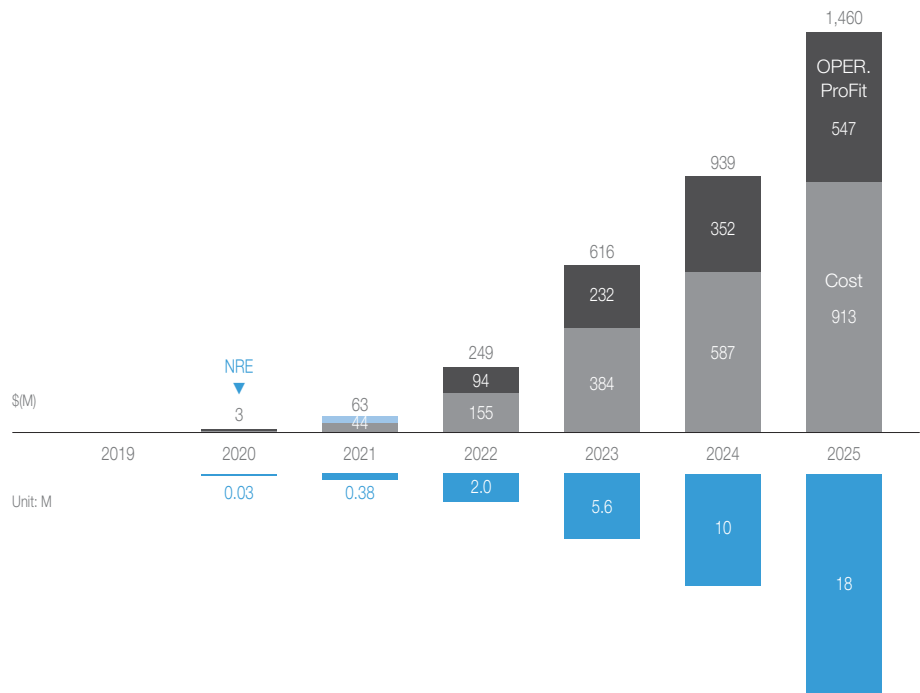
## Strategies Going Forward

Starting with the sale of PinMR™ lens sample or evaluation kits in 2020, LetinAR will develop a prototype in collaboration with partners. The company expects that it will start generating revenue in 2021 when it commences mass production of PinMR™ lenses for smart glasses manufacturers. Furthermore, it is striving hard for technology and business development under its plans to cover roughly 20% of downstream demand from the global AR smart glasses market by 2023, setting market share and annual revenue targets at 15% and at least USD 600 million, respectively. LetinAR targets approximately USD 1.5 billion in revenue in 2025.

**Figure 5** Size of LetinAR's Target Market (2023)



**Figure 6** LetinAR's Targets for Revenue & Supply Volume



Source: LetinAR

**Table 4** Technology Roadmap

<b>Innovation in product technology</b>	2019	Develop plastic lens; develop evaluation kits for use by customers.
	2020	Enhance the vertical FOV, illumination uniformity and durability of PinMR™ lens.
	2021	Build technology to improve the aesthetic appearance of PinMR.
	2022	Develop curved and multifocal AR lens.
<b>Enhancement in manufacturing technology</b>	2019	Acquire technology to mass produce samples.
	2020	Build mass production system.
	2021	Reduce production costs by increasing production yield and cutting production time.
	2022	Obtain manufacturing technology to support multi-axis form.

Source: LetinAR

## Leadership



CEO Jaehyeok Kim

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Earned a bachelor's degree in industrial engineering from Hanyang University;  
Conducted R&D on object recognition at Samsung Electronics;  
Developed VR applications for healthcare and rehabilitation at Hanyang University's Human Computer Interaction (HCI) lab.



CTO Jeonghun Ha

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Obtained a bachelor's degree in materials science and engineering from Hongik University;  
Developed NeoVision's AR contact lenses;  
Developed PinMR™ technology.

### **Awards & Achievements - LetinAR**

Received the Minister of Trade, Industry and Energy's award at the Technology Commercialization Contest;  
Won the Minister of Trade, Industry and Energy's award at the SMART Venture Contest.

Jaehyeok Kim (CEO) and Jeonghun Ha (CTO) are co-founders of LetinAR who have been friends for 11 years since they met each other at their high school. After continuously exchanging business ideas with each other, they decided to embark on a startup journey in 2015, sparked by the idea of combining ultra-small lens Jeonghun Ha was then developing and AR technology Jaehyeok Kim dealt with at the university lab. As part of efforts to secure seed funding, they participated in many contests and competitions. Faced with distrust and bias about the feasibility and innovativeness of new technology, they never gave up and continued their startup journey, which in turn led them towards winning awards in several contests, and successfully developing a prototype for the first time. With support from good partners they have met on their journey, they established LetinAR. Currently, they are in talks with global companies for the commercialization of PinMR™ technology.

The logo consists of the letters 'K', 'V', 'I', and 'C' in a bold, white, sans-serif font. The letters are centered and spaced evenly. Above the letters, there are two white brackets: one above 'K' and 'V', and another above 'I' and 'C'.

**KVIC**

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