

Invest Korea

December 2022



Invest KOREA Week 2022

2022 외국인 투자주간

INVEST KOREA WE

Future of K-content, Created and Enjoyed by All

Gumi National Industry Complex with a Fifty-Year History Prepares for the Next Fifty Years

Toward the 21st Century Era of Photonics, Photonisol Inc.



Ministry of Trade,
Industry and Energy

kotra

Korea Trade Investment
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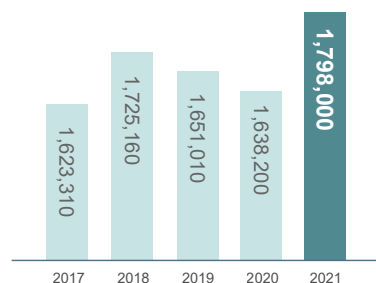
Economic Trends

Here's a look at Korea's major economic indicators that provide an overview of the country's recent economic developments.

Korea's Major Economic Indicators from 2017 to 2021

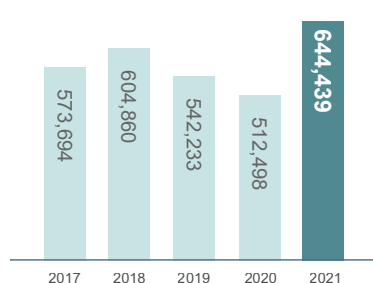
GDP

(Unit: USD million)



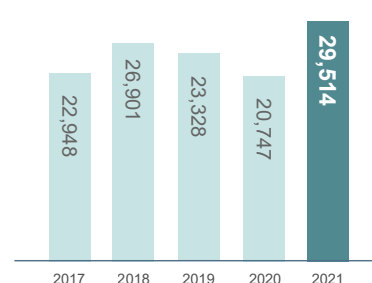
Exports

(Unit: USD million)



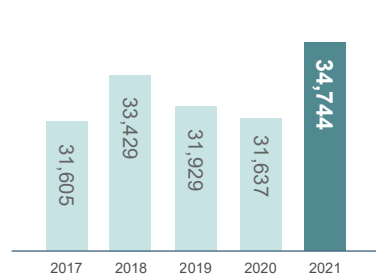
FDI

(Unit: USD million)



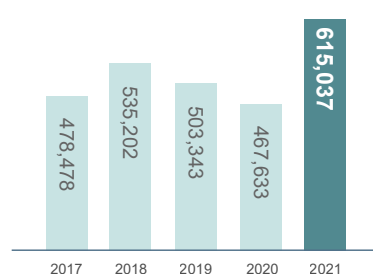
Per capita GDP

(Unit: USD million)



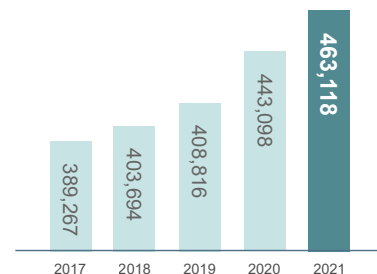
Imports

(Unit: USD million)



Foreign exchange reserves

(Unit: USD million)



Source: International Monetary Fund (IMF), Bank of Korea (BOK), Korea International Trade Association (KITA), Ministry of Trade, Industry and Energy (MOTIE)

November Economic Trends

In October, the economy continued to add jobs, and the consumer prices also grew at a faster pace. 677,000 jobs were added year-on-year in October, and the unemployment rate fell by 0.4 percentage points from a year ago to 2.4 percent. The consumer prices grew by 5.7 percent year-on-year in October at a faster pace than the previous month due to an increase in public charge, and the core inflation rose by 4.8 percent.

In October, stock prices increased, the won strengthened, and Korean treasury yields returned to a decline after an increase at the beginning of the month due to market expectations about major economies' adjusting the pace of tightening. Housing prices decline is faster in September, and prices of Jeonse (lump-sum deposits with no monthly payments) also saw a faster decline.

Domestic demand has continued to improve gradually due to a recovery in employment and in-person service industries. However, with global inflationary pressure continuously rising, there are continued financial market volatility and economic downside risks due to major economies' interest rate increases, the Russia-Ukraine war and China's lockdown measures. Amid continued high inflation and deteriorating economic sentiment due to external factors, there are concerns of economic slowdown such as export slowdowns.

Source: Ministry of Economy and Finance (moef.go.kr)

ASML's expansion in S. Korea reflects its 'preparation for growth': CEO

The CEO of the Dutch chip equipment maker ASML Holding NV said on Nov. 15 that building a new chip cluster in S. Korea reflects the company's preparation for sustained growth in what he said is an industry that will only continue to expand.

Building a Korean supply base "is a significant opportunity" for the company to grow further, ASML President and CEO Peter Wennink said during a press briefing in Seoul.

Wennink visited the country to attend a groundbreaking ceremony on Nov. 16, for a new USD 181 million chip cluster in Hwaseong, some 40 kilometers south of Seoul.

When completed by the end of 2024, the 16,000-square-meter cluster will include a local repair center, training center, R&D center for parts, and education and experience center. It also operates a global distribution center in Incheon, 27 km west of Seoul.

S. Korea seeks to change dividend-linked rules to attract more foreign investment to stock market

S. Korea will push to change regulations in a way that would allow investors to know how much they would receive in dividends before buying stocks in a bid to attract more foreign investment in the local equity market, a senior official of the country's top financial regulator said on Nov. 28.

Under the current rules, listed companies de-

termine who will receive dividends in late December first before setting the amount in March and then pay out dividends to investors in April the following year.

Market experts say such a rule change would attract more foreign investors seeking stable income through dividend payments.

Tesla's Musk names Korea among top candidate sites for Gigafactory

Tesla Inc. Chief Executive Elon Musk said on Nov. 23 that S. Korea is among its top candidates to build in Asia another Gigafactory, the US electric car maker's vehicle, battery and component factory.

Musk, also the chief executive of SpaceX, the rocket and spacecraft manufacturer he founded, made the remark during a video call with Korean President Yoon Suk-yeol, Korea's presidential office said in a statement.

Yoon, aware of Tesla's plan to build a Gigafactory in Asia, asked Musk to build it in Korea and the US billionaire responded that he is considering the country as one of the top candidate locations and would make the final decision after reviewing investment conditions in other Asian countries, including labor quality, technology level and production infrastructure, according to the statement.

Saudi gifts Korea with \$30 bn deals, invites more in energy, infrastructure

Saudi Arabia's Crown Prince Mohammed bin Salman gifted S. Korea with 26 business deals worth USD 30 billion and invited Korean enterprises to the ambitious Saudi 2030 initiative to turn the oil-rich kingdom into sustainable energy and economic structure during his business-packed one-day stay in Seoul.

During the Crown Prince's visit, Korea and

Saudi Arabia signed 26 memoranda of understanding (MoU) in celebration to the 60th anniversary of diplomatic ties.

The two governments opened a Korea-Saudi Investment Forum in central Seoul where investment agreements worth USD 30 billion were signed.

Trade & Commerce

S. Korea to push for tailor-made strategies to boost exports

S. Korea's industry ministry said on Nov. 23 it will seek to enhance cooperation with partner nations in infrastructure, defense and other strategic fields with tailor-made approaches and to diversify its export structure in an effort to prop up sluggish exports.

Under the plan, the government vowed to enhance support for exporters making inroads into Middle East nations to actively participate in their major energy, infrastructure, nuclear power

generation and other manufacturing sector promotion projects.

"In order to increase exports, we cannot tell private enterprises to do it on their own. ... For this, we need the government's enthusiastic and preemptive assistance," Yoon said, adding that he will personally preside over future export strategy meetings and check each strategy and issue regarding exports.

Industry

S. Korea aims to take up 40 percent of global secondary battery market by 2030

S. Korean battery firms will invest a combined more than KRW 50 trillion (USD 35.2 billion) at home by 2030 to secure advanced technologies in the secondary battery field, a move that could to make the country the world's No. 1 player with a market share of over 40 percent, the industry ministry said on Nov. 1.

For the goal, the government launched a "battery alliance" with major firms to boost cooperation on securing key minerals in prepa-

rations for supply disruptions amid heightened global uncertainties, according to the Ministry of Trade, Industry and Energy.

During the first six months of this year, S. Korea accounted for 25.8 percent of the global secondary battery market after China with 56.4 percent of the market share. Japan came third with a 9.6 percent market share, according to government data.

Government & Policy

Seoul to relax regulations to allow wireless EV charging, IoT on smartphones

The S. Korean government will ease regulatory hurdles to allow wireless charging for electric vehicles and Internet of Things (IoT) access devices, which are expected to attract more than KRW 3.25 trillion (USD 2.37 billion) investment from the private sector for national digital transformation.

The ministry said the government will announce frequency spectrums (85kHz) for contactless EV charging within this year after com-

pleting applicable legal procedures in Dec. It will also lower the bar for the use of ultra-wide-band (UWB) technology for portable devices to make it more convenient to use Internet of Things (IoT) services on smartphones. The government will also improve in-facility equipment inspection for semiconductor manufactures by allowing wireless inspection from outside the building when those facilities are equipped with an electromagnetic wave shielding system.

S. Korea to cut coal's share of energy usage to under 20% by 2030

The draft of the Korean government's 10th Basic Plan for Electricity Supply and Demand contains a clause on reducing coal generation's share of nationwide energy usage to below 20% by 2030,

The Ministry of Trade, Industry and Energy said the idea is to have nuclear power account for 32.4% of energy use by 2030, liquefied nat-

ural gas (LNG) take up 22.9%, renewable energies 21.6% and coal 19.7%. In addition, carbon-free resources like hydrogen and ammonia will comprise 2.1% and all other forms 1.3%.

The revisions are seen as a response to growing energy demand through LNG and renewable power, whose facilities are relatively easy to expand.

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Ministry of Trade, Industry & Energy
Korea Trade-Investment Promotion Agency
Korea Chamber of Commerce & Industry
Korea Chamber of Commerce & Industry



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WEEK 2022



INVEST KOREA WEEK 2022



Event Overview

Invest KOREA Week 2022

IKW 2022 is currently available to watch on KOTRA and Arirang TV's YouTube channels



Invest KOREA Week 2022

Invest KOREA Week 2022 (IKW 2022), is Korea's largest foreign investment forum, which is held annually as a platform to gather investors, policymakers and business leaders from all over the world to promote Korea's business environment. IKW 2022 was hosted by the Ministry of Trade, Industry and Energy (MOTIE) and organized by the Korea Trade-Investment Promotion Agency (KOTRA) and Arirang TV. This year, the event was held as an in-person event for the first time in two years on November 2-4, under the theme of "Invest in Open and Innovative Korea."



First launched in 2006, Invest KOREA Week (IKW), formerly known as “Foreign Investment Week,” was held for the 18th time this year, proudly standing as Korea’s largest international investment promotion event. IKW brings together key players across industries from all around the globe, and

serves as a platform for attendees to share insights on doing business in Korea and provides opportunities for future collaboration. The annual event connects global investors with Korean policymakers and entrepreneurs. This year, IKW was held both online and in person at Grand InterContinental Seoul PARNAS from November 2 to 4 under the theme, “Invest in Open and Innovative Korea.”

Last year, Korea witnessed foreign direct investment reached a record high and the country maintained a solid economic foundation despite various external difficulties such as the ongoing pandemic, supply chain disruptions, and geopolitical risks. At the event, such topics were addressed and discussed by representatives in key sectors of government and economy.

IKW 2022 kicked off with the opening ceremony, featuring speeches from YU Jeoung Yeol, President and CEO of KOTRA; Moon Dong-min, Deputy Minister for Trade and Investment at the Ministry of Trade, Industry and Energy; and Andre Nothomb, Head of APAC at Solvay.



During the Global Investment Forum held under the topic of “Transition of Global Investment Environment and Korea,” Richard Baldwin, Professor of the Graduate Institute of International and Development Studies, Geneva, delivered his keynote speech on the recovery of the GVC through FDI expansion.

Shawn Chang, Commissioner of Invest KOREA, gave a presentation entitled, “Sustainable Growth with Innovative Korea,” highlighting the reasons why the country is an excellent investment destination.

In addition, Stephen Pierce, Global Manufacturing 4.0 Leader at IBM discussed the global semiconductor industry and future collaboration; Son Geon-seog, VP of Global R&D at Umicore covered the topic of rechargeable

battery materials and investment in Korea; Ahn Jae-hoon, VP at SK bioscience discussed bio investment in Korea and the company’s activities; Shin Hoon-kyu, Vice Director at the National Institute for Nanomaterials Technology, POSTECH, spoke on power semiconductors in Korea and the opportunities and challenges to come.

Finally, Bernd Stenger, Head of Heraeus Epurio, detailed the company’s successes in doing business in Korea.

Other events at IKW included a networking luncheon, specialized industry forums, foreign press conference, investor pitching event, offline and online business meetings, and more.



Invest KOREA Week 2022 Overview

Date	Program
11.2 [Wed.]	<ul style="list-style-type: none"> > Opening Ceremony & Global Investment Forum <ul style="list-style-type: none"> - Recovery of the global supply chain * Introduction of Korea's Investment environment in BBC industry >BBC & Regional Specialized Industry Forum <ul style="list-style-type: none"> - In-depth Forum for Battery[B], Bio[B] and Semiconductor[C] industry and presentations from experts >Foreign Press Conference
11.3 [Thu.]	<ul style="list-style-type: none"> >Investor Pitch Event <ul style="list-style-type: none"> - Investment pitch event (IT, Social Impact and Biotech Korean Startups) > Global Battery Tech Day <ul style="list-style-type: none"> - Matchmaking between global anchor companies and Korean partners > Offline Business Meeting
11.4 [Fri.]	<ul style="list-style-type: none"> > Get to Know Korea <ul style="list-style-type: none"> - Cultural experience for investors and reporters visiting Korea
11.7 [Mon.] ~ 11.9 [Wed.]	<ul style="list-style-type: none"> > Online Business Meetings





456억,

어른들의 동심이 파괴된다

Future of K-content, Created and Enjoyed by All

넷플릭스 시리즈

9월 17일 공개 | **NETFLIX**

©Courtesy of Netflix

The World Captivated by K-Content

The seed of 'Hallyu' that sprouted in East Asia at the end of the 20th century has been reaping splendid fruits spanning all the way from Gangnam Style in 2012 to Squid Game, and to BTS. Released in September 2021, Squid Game set a record, securing the No.1 position for the longest time in Netflix's history. Moreover, the costumes and 'Dalgona,' which appeared in the drama, have been enjoyed by not only Koreans but people all over the world. Accordingly, the drama won six awards, including Best Director and Best Actor, at the 74th Primetime Emmy Awards.

Meanwhile, back in April 2022, every corner of Las Vegas was dyed purple to celebrate the third performance of "BTS Permission to Dance on Stage" in the city, after the concerts in Los Angeles and Seoul. The name of Las Vegas' social media account was changed to "Borahae-gas," a combination of Borahae, which means "I love

BTS," and Las Vegas, while global fans of BTS gathered in the city. Furthermore, the septet won awards at the American Music Awards (AMAs) for the fifth straight year to date, including the "Artist of the Year" in 2021. Most notably, BTS, together with US President Biden, spoke up for the eradication of Anti-Asian hate crimes at the White House in May 2022.

Besides Squid Game and BTS, other numerous Korean movies, dramas, and music also grabbed the attention of the global market. K-content, also known as Hallyu, refers to cultural content planned or produced in Korea and has become part of the mainstream in the world's cultural market. Hallyu has grown into a global cultural phenomenon created and enjoyed by people worldwide. On top of that, the K-content once again demonstrated its power as domestically produced dramas, such as "Extraordinary Attorney Woo" and "Hometown Cha-Cha-Cha," were introduced to the world via global platforms, resulting in its gaining popularity.



Active Use of Global Online Platform

While there are different analyses of Hallyu's success, the most compelling is that Korea has adapted well to and capitalized on the changing shape of the global online platforms landscape. Just as Korean Economy developed on the back of exports, the K-content could go beyond the limited confines of a narrow domestic market owing to Youtube, Netflix, and other global platforms. Rather than regarding the entry of global platforms with immense capital and influence as a threat, Korea took the opportunity to present accumulated excellent domestic content to the world. At the same time, the mainstream K-content has brought amusement and joy to so many around the world. As of 2022, the market size of Korea's content ranks 7th globally, amounting to about USD 67.9 billion (estimate). Maintaining its positive reputation, Hallyu has continued to show global achievements over the past two decades.



Content Market Size and Forecast by Country

(Unit: USD 100 million, %)

Ranking	Country	2020	2021	2022	2023	2024	2025	Annual Price Variation
1	US	8,446	8,925	9,519	9,885	10,230	10,543	4.54
2	China	3,449	3,699	3,939	4,153	4,339	4,505	5.49
3	Japan	1,943	2,034	2,109	2,156	2,201	2,243	2.91
4	Germany	999	1,058	1,128	1,169	1,206	1,237	4.36
5	UK	971	1,058	1,136	1,194	1,250	1,305	6.10
6	France	680	728	782	816	849	878	5.25
7	Korea	598	641	679	709	735	759	4.87
8	Canada	544	574	610	636	660	681	4.62
9	Italy	382	417	454	472	488	500	5.54
10	India	352	401	448	494	540	586	10.75

*Source: Overseas Content Market Analysis, KOCCA (Dec. 2021)

Public-Private Efforts to Promote K-content

For global platforms, Korea is a key base for producing high-quality content. It is known that Netflix has invested over KRW 1 trillion in the Korean market since 2016. The company's investment in the Korean market has generated ripple effects worth KRW 5.6 trillion and created 16,000 jobs in various industries, with an economic impact of about KRW 2.7 trillion in other industries, including fashion and food. The strategies of overseas platforms such as Disney Plus are not much different from those of domestic video streaming services such as TVing and Wavve. Now, people can consume content anytime, anywhere, on streaming services. As such platform companies have become big players in the domain of investment in producing films and videos, we are witnessing significant changes in the K-content industrial ecosystem.

In the meantime, after the launch of the new administration in May 2022, 120 policy agendas were presented. One of them was "to make the K-content appeal to the world." Plus, in order to form a foundation for the K-content, the Ministry of Culture, Sports and Tourism, the Korea Communication Commission, and the Ministry of Science and ICT decided to pursue the establishment of the control tower for the media and content industry.

The administration also suggested other relevant agendas that allow financial support policies "to foster enterprises holding global content IP," "to create a fair environment centering on creators," and "to bolster cultural sovereignty through copyright protection." In particular, the government promised to nurture the main genres of K-pop, games, drama, films, and webtoons and provide supports so that Korea can be a content powerhouse both in name and reality. For the time being, Korea's cultural content industry appears to walk a bright path ahead since both the private sector and the government are willing to make steady efforts underpinned by the global popularity and production capability of the K-content.

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** The opinions expressed in this article are the author's own and do not reflect the views of KOTRA.*



New Legislations

Here's a brief look at Korea's newly proposed & enforced legislations.

Newly Enforced Legislations

Legislation	Category	Date of Enforcement
Rules on Occupational Safety and Health Standards	Ordinance of the Ministry of Employment and Labor no. 367, partially amended	October 18, 2022
Electric Utility Act	Act no. 19003, partially amended	October 18, 2022
Support for Small and Medium Enterprise Establishment Act	Act no. 19020, partially amended	October 18, 2022
Enforcement Rules of the Tourism Promotion Act	Ordinance of the Ministry of Culture, Sports and Tourism no. 492, partially amended	October 17, 2022

To see more newly enforced legislations in Korea, visit the Invest KOREA website (<https://www.investkorea.org/ik-en/bbs/i-2715/list.do>).



Newly Proposed Legislations

Legislation	Ministry in Charge	Opinion Submission Due Date
Pre-Announcement of Partial Amendment to the Enforcement Rule of the Food Sanitation Act	Ministry of Food and Drug Safety	December 8, 2022
Pre-Announcement of Partial Amendment to the Enforcement Rule of the Venture Investment Promotion Act	Ministry of SMEs and Startups	December 5, 2022

Please submit your opinion on the newly proposed legislations and get more information on newly proposed legislations on the Foreign Investment Ombudsman website (<https://ombudsman.kotra.or.kr/ob-en/bbs/i-2651/list.do>).



Industry Trends

All Industries

The Index of all industry production in September decreased, mostly in the mining and manufacturing industries due to disruptions in steel supply. However, consumption and equipment investment gained sharply from the previous month, and the overall economy continues to be on the recovery track with the coincident composite index growing for five consecutive months.

Monthly Industrial Activity Trends

Subject	All industries	Mining & manufacturing	Service	Retail sales	Equipment investment	Construction completed
Monthly Change (%)	Δ0.6	Δ1.8	Δ0.3	Δ1.8	Δ2.4	0.0

All industrial production fell for three straight months in September, but continued to rise year-on-year. Mining industry production decreased due to a fall in steel production and the sluggish semiconductor sector caused by the havoc wreaked by Typhoon Hinnamnor. In the case of service industry production, ICT, food, and accommodation industries grew, but wholesale and retail, after rising sharply in the previous month boosted by Chuseok. In retail sales, strong car sales led the sales of durable goods. However, the sales of semi-durable and non-durable goods decreased, bogged down by a decrease in the consumption of clothing worn in the changing season due to warmer-than-average weather and the effect of the earlier-than-average Chuseok of the previous month. Despite rising prices and interest rates, service industry consumption and commodities consumption also rebounded and supported the continued trend of recovery. Equipment investment fell as machinery investment decreased due to a surge in the introduction of equipment for semiconductor and display manufacturing in the previous month. Construction investment remained steady as investment in construction projects grew, witnessed by the increase in the area of newly-launched construction projects, but investment in civil engineering projects decreased.

Amid continued global inflation, uncertainties in economic trends have increased due to the growing downside risk of the global economy, including the interest rate hikes in major countries, China's lockdown measures, and the prolonged Russia-Ukraine War. On the production side, there are positive signals such as the easing of supply chain disruptions and the recovery in service production, but weakening export recovery and accumulating semiconductor inventories could be a burden in the future, alongside disruptions in steel production due to the damages caused by typhoons. In the case of consumption and investment, the continued recovery of consumption, supported by accumulated household savings and the increased arrival of foreigners, are positive signs that exist alongside risks from high inflation and rising household and corporate loan rates.

Trends by Industry

Automobile

Easing of supply chain disruptions increased supply, boosting both domestic demand and exports increase

In August, imports grew by 37.1 percent year-on-year, driven by increased imports of finished cars especially from the United States and Germany. Exports in September rose by 25.8 percent from the same period of the previous year, with exports of finished cars to the US rising sharply to 54.6 percent and exports of auto parts reaching 16.6 percent. In September, domestic demand increased by 22.6 percent year-on-year, driven by the increases in both the sales of domestic car sales and the registration of imported cars.



General machinery

Production gained sharply while imports fell slightly

In August, production rose by 7.6 percent year-on-year and by 4.1 percent month-on-month, backed by the recovery of both domestic demand and exports. In particular, domestic shipments increased slightly by 1.7 percent after falling for five straight months, and both equipment investment and machine orders rose sharply to 13.1 percent and 22.7 percent and drove production growth. Imports in August amounted to \$2.896 billion, up 13.7 percent from a year earlier. Exports in September fell by 1.5 percent year-on-year due to sluggish demand affected by the slowdown of the global economy.



Shipbuilding

As production indicators recover rapidly, exports increased while imports plunged



Cumulative global ship orders in August decreased by 20 percent year-on-year, but Korean shipbuilders continued to win orders. Orders were focused on LNG carriers, up 117 percent year-on-year, but orders of most vessel and hull types plunged. Including Qatar's order of LNG carriers, Korea won orders worth 11.9 million CGTs in August, up by 1 percent year-on-year. In August, imports fell by 57.3 percent from the same period of the previous year due to decreases across all areas of cargo ships, ship engines, and ship parts. In contrast, exports in September increased by 15.5 percent year-on-year as several tankers, ordered after the COVID-19, were delivered.

Steel

Steel industries at home and abroad continue to shrink due to concerns over an economic slowdown



In August, steel production recorded a sharp year-on-year fall of 7.5 percent due to sluggish demand and a shift in the optimal production trend triggered by excessive inventories. Imports in August dropped by 21.1 percent from the same period of the previous year as sluggish domestic demand diminished the demands for import and delayed purchases. Exports in September decreased by 21.1 percent year-on-year due to diminished steel demand in major countries such as the US, China, and the EU and reduced export capacity caused by typhoons wreaking havoc at home and abroad.

Oil refining

Record-high petroleum product exports for the month of September

In August, production grew by 6.0 percent year-on-year supported by increased national and international demands for transport fuels and especially aviation fuel. Domestic demand rose by 5.8 percent driven by a recovery in demand for transportation petroleum products, and exports increased by 42.6 percent boosted by increased exports of transportation petroleum products such as aviation fuel, diesel and gasoline. Exports in September continued the long-term upward trend by recording USD 5.46 billion.

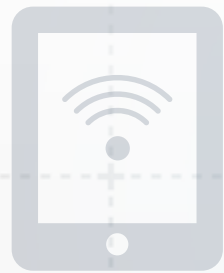
Semiconductor

Year-on-year decrease of exports

In August, the production and shipments of semiconductors both fell by 1.7 percent and by 20.4 percent, respectively, compared to the same period of the previous year. Compared to the previous month, production decreased by 14.2 percent, and inventory increased by 67.3 percent, continuing a significant increase in inventory. Semiconductor exports shifted to a year-on-year decline, while imports remained on the rise. Exports in September fell by 5.7 percent year-on-year to USD 11.49 billion to decrease for two straight months after ending the long-term upward trend.

Wireless communication devices

Exports continued to decline due to sluggish global demand



In August, production decreased by 7.1 percent from the same period of the previous year, but capacity utilization rate rose by 9.7 percent. The domestic mobile phone market grew by 2.9 percent year-on-year and by 0.1 percent month-on-month in August. Imports in August gained 18.7 percent year-on-year, mostly driven by the imports of mobile phones. Exports fell across major markets in September, as exports to the US, China and the ASEAN region nosedived by 5.7 percent, 6.1 percent, and 41.4 percent, respectively.

Display

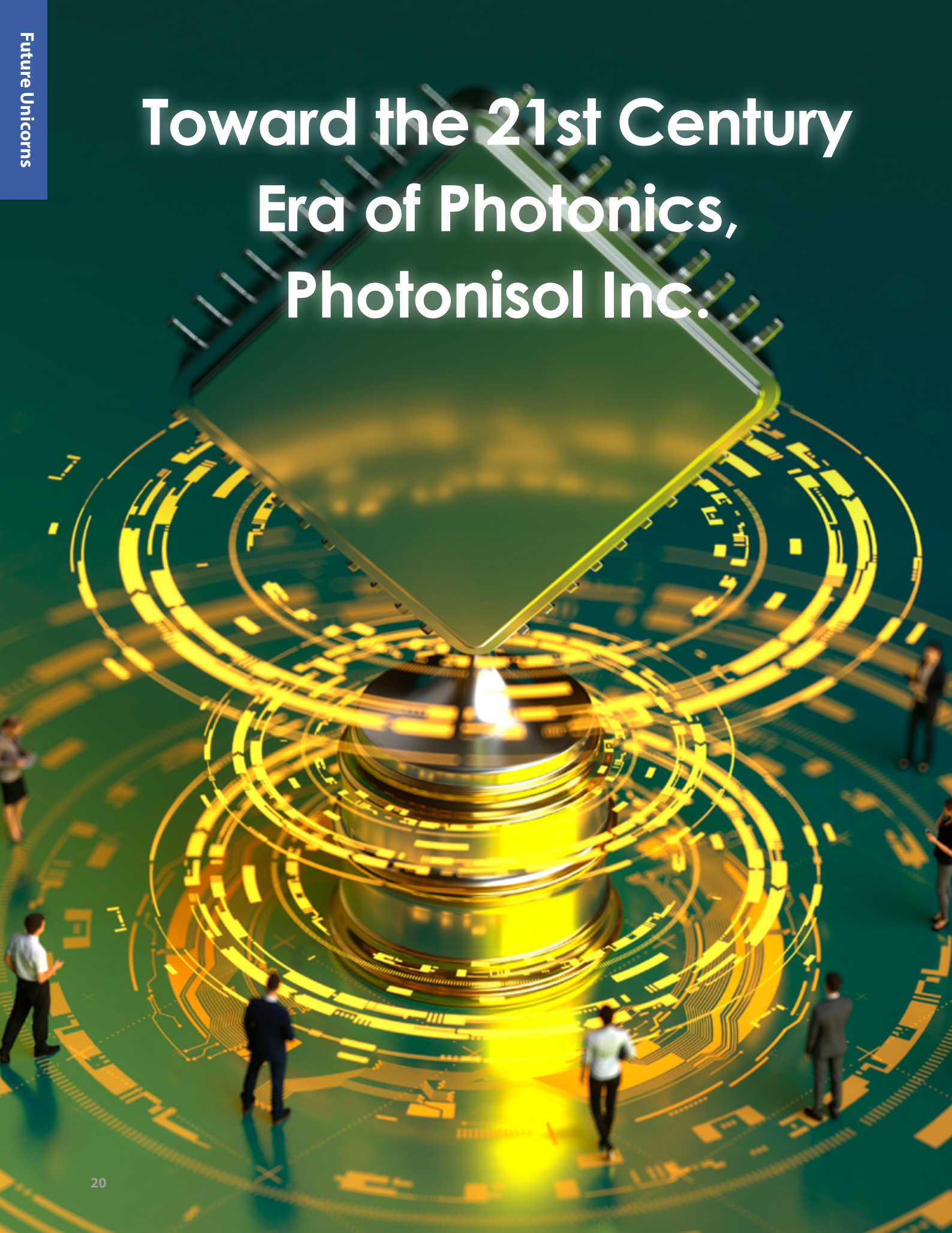
Exports continued to decrease due to sluggish demand and base effects

In August, production continued to decline by falling 24.6 percent year-on-year as the economic slowdown dampened demand. In September, exports plunged by 19.9 percent due to reduced demand for smartphones, and continued to decline for four consecutive months. Moreover, falling LCD prices and sluggish demand caused exports to decrease by 32.4 percent while OLED exports fell by 15.6 percent.



**Please note that the latest data available in Statistics Korea are for the previous month in the case of exports and the month prior to the previous one for production.*

Toward the 21st Century Era of Photonics, Photonisol Inc.



About the Company

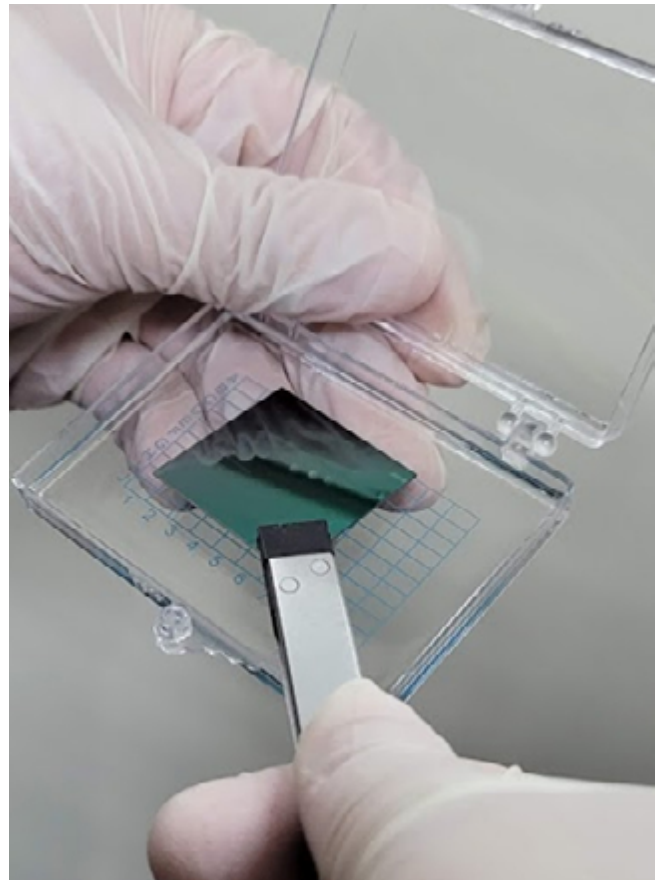
Photonisol Inc. develops next-generation semiconductor devices and aims to commercialize for the first time in the world optical isolator (optical diode) chips, which are crucial for opening the new era of photonic integrated circuits of the 21st century. Based on patented technology for optical isolator chips that can be mass-produced by the conventional silicon semiconductor process, Photonisol plans to release products in the global market within a year by raising device performance to the level that can be used in real world.

Based on the optical isolator chips, Photonisol envisions to grow into a high-tech company leading the field of photon integrated circuits of the 21st century.

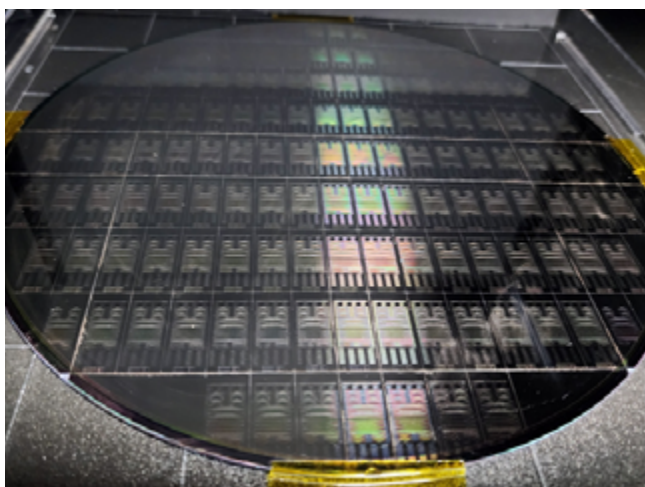
Background

Emerging photonics technology beyond the current electronics limitation

The technology for micro-processing semiconductors is about to reach the limit where further micro-processes are difficult because they have approached the size of atoms. Quantum computers dealing with quantum states of atoms need cryogenic devices to block the effects of the external environment, and we are still far from developing portable devices such as laptops and smartphones. Recently, photonics-based optical wiring technology has been highlighted as the technology to be used in next generation machine learning and artificial



intelligence computers, because it enables information exchange with light by overcoming the limitations of electromagnetic interference by electronic devices so that multi-core CPUs and memory banks can exchange information at high speeds.



Absence of an optical isolator chip which is one of key photonics devices

Because the optical isolator (optical diode) chip, one of the most important elements of silicon photonics circuit technology, has not yet been put into practical use, the related technology market is not developing quickly.

For the first time in the world, Photonisol's researchers are working towards the commercialization of optical isolators that can be mass-produced in existing semiconductor lines with crystallization technology through thin film formation and heat treatment using liquid magnetic optical materials. Photonisol envisions to

lead the photon integrated circuit technology of the 21st century based on its optical isolator chips.

About the Product

Integrated optical isolator (optical diode) chip technology

Photonisol has patented technology on the core structure of the optical isolator chip and how to use liquid magneto-optical materials. Based on this technology, Photonisol has core technologies for silicon optical waveguide device design technology, liquid magnetic optical crystallization and analysis technology, thick film process and packaging, and characteristics analysis.

Optical isolator chip integrated optical manual interposer platform technology

Photonisol is also in the process of developing a prototype of an optical passive device platform for optical interposers that connects optical isolator chips with wavelength multiplexing devices and integrated electronic chips.

Competitive Edge and Business Strategy

- Photonisol holds domestic and international registered patents for optical isolator chips and is currently applying for additional patents.
- Implementing a government project in the BIG3 Innovation Field (system semiconductors) (Government subsidy of KRW 450 million)

- Start-up Growth Technology Development Project [Strategic type (BIG3)] (Ministry of SMEs and Startups) (Government subsidy of KRW 300 million)
- Production and prototype development support project for innovative companies (National Nanofab Center) (KRW 200 million)
- Signed a MoU with Quintess Co., Ltd., a material company, to ensure stable supply of magnetic optical materials and development of new materials.
- Plans to distribute optical isolator chips and optical passive device platform prototypes for integrated optical interposers to global customers starting in the second half of 2023 to negotiate technology demand and promote technology sales, licensing, and M&A.

Future Plans

Photonisol strives to commercialize optical isolator chips for the first time in the world and emerge as the global leader of next-generation photon integrated circuits, thereby leading the photonics era of the 21st century, which will succeed the electronics era of the 20th century.



By Kyong Hon Kim

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** The opinions expressed in this article are the author's own and do not reflect the views of KOTRA.*

Invest KOREA Market Place

Invest Korea Market Place (IKMP) is an online business matching platform available on Invest KOREA's website with information on approximately 300 Korean companies seeking to partner with foreign investors. This month, Invest Korea introduces some outstanding companies in Korea's tech industry.

COMPANY A



Text subtitles translation



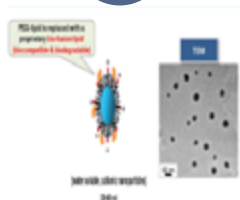
Translation of Voice into Text/live subtitles/meeting interpretations

Investment Requirement		Company Profile	
Amount	USD 8 million	Patents and Certificates	N/A
Investment Structure	Equity Investment	Financial Performance	N/A

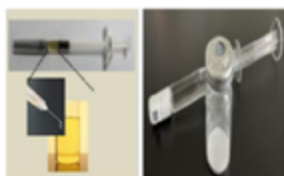
Investment Highlights

- **Media market:** Due to rapid growth in OTT and FAST markets, it has shown an annual growth of 19% or more. Content continues to increase, but the supply of translation is limited compared to the high demand for translation due to inelastic supply of manpower.
- **AI-based machine translation solution:** The company is a tech startup based on artificial intelligence technology that provides machine translation engines to global local translation companies (LSPs) that provide translation services to the OTT market. AI machine translation can accelerate the speed of translation and content delivery faster than human translation. It plans to expand its business to games, webtoons, sports, broadcasting, and FAST markets by diversifying customers and markets to. It is also planning to grow into a global company by receiving investment from global VCs such as the U.S. from the early stage.

COMPANY B



Principles of LNP technology



1-month lasting diabetes and obesity treatment

Investment Requirement		Company Profile	
Amount	USD 1.5 million	Patents and Certificates	9 patent applications and 2 patent registrations for high-density lipoprotein imitative solid lipid nanoparticles for drug delivery and their application, etc.
Investment Structure	Equity Investment	Financial Performance	N/A

Investment Highlights

- **Prospects of injection-type drug delivery market:** A drug delivery system delivers drugs with various methods such as targeting, absorption promotion, and long-lasting, and in particular, the injection-type drug delivery system is growing fastest in the market. The injection-type drug delivery market is expected to grow 7.2% annually from about USD 1.4 trillion in 2021 to USD 1.5 trillion in 2027.
- **LNP & long-lasting type drug delivery platform:** Current lipid nano particle (LNP) technology is difficult to commercialize due to various patent protection, and has many problems such as PEG-related toxicity. The company has developed an LNP-based drug delivery platform that can be applied to various drugs such as peptides, RNA, and lung cancer treatments through bio-fusion LNP, and is currently developing a new Kras target RNA lung cancer drug.

For more information please e-mail ikmp@kotra.or.kr, or visit the Invest KOREA Market Place page on www.investkorea.org.



Gumi National Industry Complex with a Fifty-Year History Prepares for the Next Fifty Years

Gumi National Industrial Complex is the nation's largest ICT industry hub and is a national industrial complex that has led the history of Korea's textile, electrical, and electronics industries. The Complex is divided into a total of five complexes, and the foreign investment area is located in Complex 4. Currently, about 2,481 companies are operating in the Complex, and the electricity and electronics sector accounts for the highest proportion of total production and exports, with a total of KRW 2.01 trillion in production and a total of USD 1.27 billion in exports as of June 2021.

- **Title:** Gumi National Industrial Complex
- **Location:** Around Gongdan-dong, Simi-dong, Haepyeong-myeon, Sandong-myeon and Chilgok-gun, Gumi, Gyeongsangbuk-do
- **Area:**

(Unit: m²)

Total area	Industrial facilities	Supporting facilities	Public facilities	Green zone	Multi-purpose facilities
27,946,344.3	19,664,165	1,439,745	4,819,978.3	1,921,358	101,098

Finding future growth engines by attracting new industry businesses

The Gumi National Industrial Complex, which led Korea's textile and electronics industries in the 1970s, has been taking the lead in upgrading Korea's industrial structure by concentrating on semiconductors and computers in the 1980s and focusing on IT and mobile industries from the 2000s. Following Complex 4 which focused on new industries such as LEDs and secondary batteries, Complex 5 was established in 2000 where semiconductor-related companies such as SK Siltron and LG Innotek are scheduled to relocate. Moreover, the Complex is expected to continue growing as it had successfully attracted leading players such as LG BCM (EV batteries) and KOLON (advanced materials, secondary batteries).

Supporting the growth of businesses through a major renovation

Currently, the Gumi National Industrial Complex is at the center of change with the confirmed relocation of Daegu and Gyeongbuk New Airport, the establishment of an industrial complex specializing in Metabus, and the establishment of an innovative ecosystem for semiconductor convergence parts. With Gumi as the hub, an ICT materials and parts cluster linking the Gimcheon 1, Wae-gwan, and Seongju Industrial Complexes will be developed to evolve from the existing cluster covering electronics, machinery, and automobile parts to one specializing in 5G RF modules, e-mobility, and special environmental clothing. The transformation will not only revive the electronic industry but also nurture the car industry of the future and enable the Complex to emerge as a global export base.

Source: (Text and photo) Korea Industrial Complex Corporation





EPC Contract Price Adjustments Amidst Inflation

1. Disputes on Adjustment of EPC Contract Price

Due to the disruptions in the global supply chain caused by COVID-19 and the Ukraine war, raw material prices have skyrocketed resulting in a significant increase in such disputes. As compared with the same quarter last year, the number of disputes filed with the Korea Fair Trade Mediation Agency increased by 250% in the first quarter of 2022.

Contractors take the biggest hit since owners refuse to adjust their contract price and subcontractors raise theirs. The firm price contracts (e.g., those without provisions for price adjustments) require contractors to solely bear price fluctuations. Contractors are becoming hesitant to accept more construction contracts, and some consider abandoning the ongoing construction work.

In particular, disputes have erupted over whether such contracts “unreasonably limit the contractual interests” (public contracts) or “are significantly unfair in that a change to the contract price occasioned by changes in design or economic conditions after the execution of the contract is not conceded on a reasonable ground or the burden is shifted onto the other party” (primarily private contracts).

After the Ministry of Land, Infrastructure and Transport stated that a provision that expressly prohibits contract price adjustment according to price fluctuations “may be invalidated except for good reasons to deny it” (April 5, 2022, “Construction Policy Department – Reply to the Inquiry No. 1644”), many contractors take a more aggressive stance against owners over the firm price contracts.

2. Review of Judicial Precedents

The Supreme Court ruled that an adjustment of a contract price according to price fluctuations is not compulsory under the State Contracts Act, and any provision excluding such adjustment may be held invalid in very exceptional cases (e.g., Supreme Court en banc Decision, no. 2012da74076 dated December 21, 2017).

The question is whether the current “soaring raw material prices” can be considered an exceptional case enough to deny the effect of firm price contracts. The rates of price increases in 2021 and 2022 are unprecedented across all economic sectors. From 2017 to 2020, the construction cost index rose by an average of 2 to 4% per year from 2017 to 2020, but it increased by 13.48% in 2021 compared to the previous year and by 2.8% in the first quarter of 2022.

While it is not easy to predict how the court sees the current situation, some public contracts that exclude price changes were held invalid in light of public contract characteristics like public interest.

For private construction projects, a lower court ruled that a special agreement requiring the contractor to bear certain indirect construction costs resulting from the extension of the construction period unreasonably limits the contractor’s contractual interests.

3. Resolving Disputes by Application of the Principle of Change of Circumstances

The principle of change of circumstances allocates the risk of significant change of circumstances, which is not allocated by the relevant contract, ex-post between the

parties. The Supreme Court has applied the principle in very limited cases.

Simultaneously, the Supreme Court ruled, in its decision no. 2020da254846 dated December 10, 2020, that “where the circumstance that served as the basis for the execution of the contract has significantly changed, the parties could not predict such change at the time of the execution of the contract, and the maintenance of the contract causes a significant imbalance in the interests of the parties or the purpose for which the contract was executed cannot be achieved as a result thereof, the parties may cancel or terminate the contract on the ground of change of circumstances as an exception to the *pacta sunt servanda*.” The decision recognized the termination of a contract based on the principle of change of circumstances.

We accordingly expect that changes in contractual term would most likely emerge under the principle of change of circumstances for private/public construction projects which are currently facing raw material price spike.



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Bangjja Bronzeware

Bangjja bronzeware is a traditional form of Korean tableware. It is beautiful to look at, and very durable. The secret of its strength lies in using a unique ratio of copper and tin, which defies modern engineering standards. Thanks to the minerals it naturally produces when water is stored in it, Bangjja has beneficial health effects, enhancing the taste of food and counteracting infections such as the lethal O-157 colon bacillus.

Bangjja bronzeware is another item rich in wisdom and tradition commonly found on the Korean dining table. Each country and region has different foods, and serves them in different dishware. Within East Asia, China traditionally favored porcelain, Japan preferred wooden tableware, and Koreans preferred metal. The hand-forged *Bangjja* bronzeware of Korea has been in use for thousands of years, and is part of its culinary tradition.

In the Shosoin, a Japanese royal treasure house, there are 436 *Bangjja* bowls from 8th century Korea. The ancient Japanese were clearly impressed by their compactness and consistency of design. Up to ten bowls can be stacked together at a time, meaning that their utility is proportionally greater relative to the space required to store them.⁴⁰

Bangjja is a unique bronzeware found nowhere but in Korea. It is made from an alloy of 78% copper and 22% tin, a ratio that no other nation is known to have used for tableware items.

A ratio of 22% tin is in fact contrary to the conventions of modern science. Tin is a malleable metal which increases the brittleness of an alloy. Its content level is hence limited to 19% in the manufacture of modern materials. *Bangjja*, however, does not break even though it consists of 22% tin. High resistance to corrosion and deterioration meant that it was widely used in Buddhist and Confucian ceremonies, and even for musical instruments such as gongs and bells.

The secret of *Bangjja*'s durability lies in the method used to create it. The tin and copper are mixed together at a high temperature of 1200°C, and the molten mixture is then poured out and hammered into a thin sheet. Once it cools, it is again heated and then hammered. When the molten alloy solidifies, it is initially more than 1 cm thick, and it is converted into a thin sheet by heating and hammering. If it were simply to be hammered and beaten continuously, the sheet would break. However, because the *Bangjja* is produced by heating and hammering alternately, the α formations (soft structure) are transformed



Before and after processing

40. Sang-woon Jeon, A History of Science in Korea, 202-203.

into β formations (hard structure) through the distribution of tin, as can be seen below from a structural image taken with an SEM (Scanning Electron Microscope). As the process is repeated, more of the β arrangements appear, and as the tin and copper particles become further integrated, potential faultiness disappears, so the material becomes more resistant to shattering.⁴¹



Bangjja Tableware

Another characteristic of *Bangjja* is its beautiful appearance. The whitish gold luster of *Bangjja* gives the illusion that it is actually made of gold. It blends in naturally with the diverse colors of a Korean meal, and brings a feeling of grace and homeliness to the table. If the level of tin is reduced to below 19%, in line with modern guidelines, this color cannot be achieved, and so it remains unique to Korean *Bangjja* produced in accordance with the traditional methods.

Metallic dishware has not been used only in Korea. Ancient Romans also used metal dishes, generally containing lead. The toxic properties of lead seem to have been poorly understood by the Romans, who made extensive use of the metal, as it was plentiful, had a low-boiling point, and was easy to process. Besides dishware, lead was also used in kitchen utensils, jars, liquor bottles,

and even water pipes. Some historians therefore have identified lead poisoning as the cause of Rome's eventual downfall.

In the modern era, the invention of stainless steel by Harry Brearley in the early 20th century not only overcame the principal weakness of iron – rust – but in addition produced an alloy which was light and relatively inexpensive. However, stainless steel contains nickel and chromium, which are heavy metals like lead. These metals are not discharged easily once accumulated in the body, even in negligible quantities, and may have negative effects after an extended period.

In contrast, *Bangjja* has been shown to have a beneficial effect on the human body. Anecdotal accounts of its benefits, passed down by Korean housewives, tell us that when dropwort is soaked in a *Bangjja* container, poisonous insects stick to the sides of the dish, making the vegetables easier to clean. One traditional method used to improve the taste of Kimchi and other fermented vegetables is to cover the vegetables with straw that has been used to clean the bronzeware. When shaving a monk's head, a knife made from *Bangjja* was also used. This was because even if the knife made a cut by mistake, the wound would not become infected. How can these traditional beliefs be explained?

In November 2003, at the Kyungwon University Department of Foods and Bioengineering, a series of experiments was conducted to investigate the scientific basis of these claims regarding *Bangjja*'s properties⁴². Water was poured into 3 containers, made of porcelain, stainless steel, and *Bangjja*, and after 24 hours the properties of the water were tested for changes. The water in the porcelain and stainless steel showed no changes in mineral content, but inside the *Bangjja* small quantities of minerals such as sodium, copper, and zinc were detected. Minerals such as these are an essential part of the human diet, and must be obtained externally, as they are not produced by the body.

In another experiment, flowers were placed inside bowls of porcelain, stainless steel, and *Bangjja*, which were all filled with water. The flowers in the porcelain and stainless steel withered after a week, but the flower

⁴¹ Tong-chan Chong, *Korean Science: Crafts* (Seoul: Minsokwon, 1999), 152-154.

⁴² The findings were broadcast in a documentary on 22 Nov. 2003 by the Korean Broadcasting System (KBS). This can be seen at www.kscpp.net.



Left: *Bangjja* bronzeware Middle: Porcelain Right: Stainless steel

inside the *Bangjja* remained fresh. This is because the mineral elements passed on by the *Bangjja* supplied inorganic nutrients to the plant, assisting its biotic activity.

Ultimately, the improved taste of kimchi and jangajji may also be attributed to these mineral elements produced by the bronzeware, which enhance the taste and nutritional value of the fermented foods.

Another experiment demonstrated the ability of *Bangjja* to eradicate the lethal O-157 colon bacillus, which claimed many lives during an outbreak in Japan in 1996. A quantity of O-157 was mixed with distilled water and placed inside containers made of stainless steel, porcelain and *Bangjja*. When the water in the *Bangjja* was tested after 24 hours, not a trace of the original pathogen was discovered, while the bacteria in the other containers remained unaffected. Professor Park from Kyungwon University points out that *Bangjja* dishware has a sterilizing, rather than antibiotic, effect in this case. Accord-

ing to his explanation, pathogens with a high level of toxicity contain many anions (negatively charged ions), and since the copper in the *Bangjja* produces cations (positively charged ions), the pathogens are therefore eliminated, and the water stored in the *Bangjja* comes out cleaner and safer.

The disadvantage of *Bangjja* bronzeware is that it is heavier compared to other forms of tableware and cannot be mass-produced, and it is therefore quite expensive. During the last century, demand for traditional tableware decreased significantly, and it became quite rare in ordinary Korean houses. In the early 21st century, however, the health benefits of *Bangjja* are once again gaining attention. Both beautiful and durable, producing beneficial minerals and neutralizing harmful substances, *Bangjja* is not merely a variety of dishware, but a tangible legacy of enlightened wisdom.

Source: Excerpt from "Fifty Wonders of Korea" Vol. 2 Science and Technology, Korean Spirit & Culture Promotion Project,
Photographed by Kim Jiho, Korea Tourism Organization

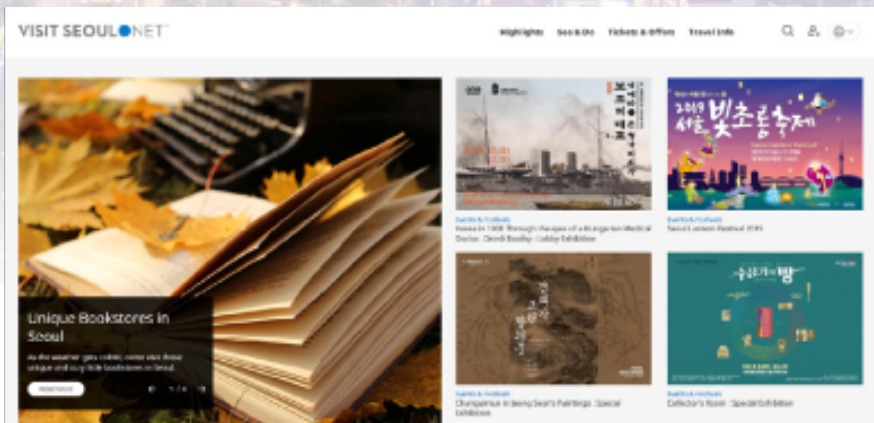


Korea 101: Tourism

The Seoul Capital Area: Seoul Special Metropolitan City, Gyeonggi-do, Incheon Metropolitan City, Gangwon-do

(1) The Seoul Special Metropolitan City

As the capital of Korea, Seoul serves as the center of the country's politics, economy, culture and history. Though accounting for only 0.6 percent of Korea's total land area, Seoul is home to almost 10 million people (as of June 30, 2019), representing a high population density. Over the past few decades, Seoul has developed fast into the economic and cultural hub of Asia



english.visitseoul.net

Travel Info

Maps & Guidebooks

2019 Seoul Official Tourist Guide

(2) Gyeonggi-do

Gyeonggi-do is a province located in the western part of central Korea with the Seoul Special Metropolitan City and the Incheon Metropolitan City in what would be its center. Gyeonggi-do is the most populous province in Korea with over 13 million people (As of March 2019). As most subway lines in Seoul extend their services to Gyeonggi-do, access to Seoul is very convenient from the province.



en.ggtour.or.kr

Required information

Guidebooks

Travel Planner's Guide

(3) Incheon Metropolitan City

Traditionally a key port city, Incheon now serves as a transportation hub connecting the entire country to the whole world through Incheon International Airport. As the plan for GTX (Great Train eXpress) has recently been approved by the government, the travel time between Incheon and Seoul will be shortened soon, raising the prospect of further development of the metropolitan city.



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Tour Guide

▼

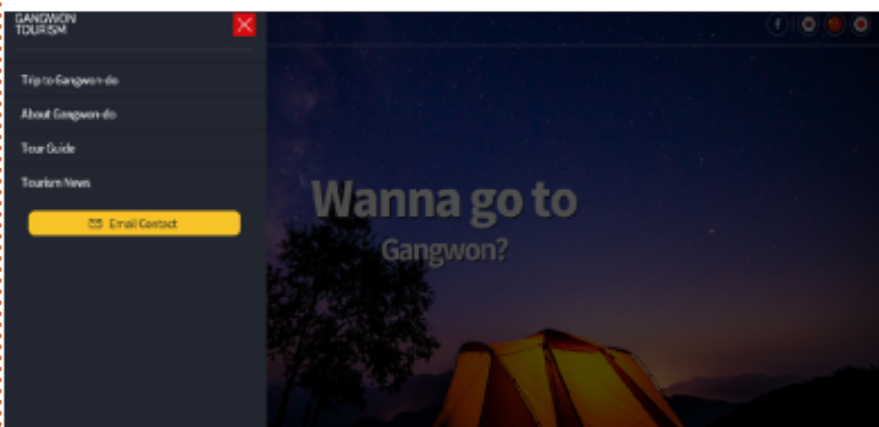
Tourist Map

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Incheon Tourist Guidebook

(4) Gangwon-do

Gangwon-do is mostly mountainous. It also has extremely long shores, and a large number of tourists visit the province to enjoy nature and relax.



gangwon.to/en

▼

Menu

▼

Tourism News

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e-Brochure

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Download Gangwon tourist guide (map)

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Can a foreign-invested company redeem whole or part of its long-term loan within five years before maturity?

Every month, Invest Korea provides answers to some frequently asked questions submitted by foreign-invested companies in Korea and potential investors.

Q.

Can a foreign-invested company redeem whole or part of its long-term loan within five years before maturity?

A.

Yes, early redemption is possible.

- In accordance with Article 2(1)4(b) of the Foreign Investment Promotion Act, a loan with maturity of not less than five years is based on the loan maturity prescribed in the first loan contract. Therefore, early redemption of loans (within five years) is permitted for loans that satisfy the qualifications for foreign investment prescribed by Article 2(2) of the Enforcement Rule of the same Act and introduced after notifying foreign investment in the form of long term loans.
- However, for early redemption of loans, a notification of change of information of foreign investment in the form of long term loans shall be completed (the revised loan contract shall be attached) pursuant to Article 5(3) of the Act and Article 22(3) of the Enforcement Rule of the Act, and overseas remittance procedure shall be completed according to Article 4-2 (procedures for payment, etc.) of the Foreign Exchange Transactions Regulations.

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Invest KOREA's Services

Foreign Investment Ombudsman

The Office of Foreign Investment Ombudsman is an organization established in 1999 to provide close aftercare support and grievance resolution services for foreign-invested companies, and is dedicated to resolving any difficulties that foreign-invested companies face while doing business in Korea.

One-Stop Service for Foreign Investors

The Inbound Investment Consulting Department not only assists foreign investors and foreign-invested companies in the investment review and implementation stage, but also offers customized services to help foreign investors and their families get comfortably settled in Korea.

Invest KOREA Market Place (IKMP)

IKMP is a project aimed at discovering promising Korean SMEs seeking to attract foreign investment and matching them with foreign investors who have compatible needs. Projects looking for investment are posted on our website at www.investkorea.org.

Job Fair for Foreign-Invested Companies

IK organizes regular job fairs to help foreign-invested companies discover qualified local talent, and job seekers find employment through job consultations, on-site interviews, and more.



Invest KOREA Plaza (IKP)

Invest KOREA Plaza (IKP) is Korea's first facility dedicated to the incubation and investment of foreign investors. Each year, more than 40 foreign-invested companies rent out offices in the plaza and utilize IK's one-stop service.

IKP also provides serviced offices, business lounges, video conference rooms and a shower and sleeping lounge to maximize convenience for foreign investors.

IKP Offices for Lease

Foreign-invested companies

Companies planning to notify investment: Those who expect to report foreign direct investment of which the arrived amount is over USD 100,000 within 1 year of move-in.

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