MOTIE
MINISTRY OF
TRADE, INDUSTRY & ENERGY

Korean
Industrial Initiatives
for the Creative Economy

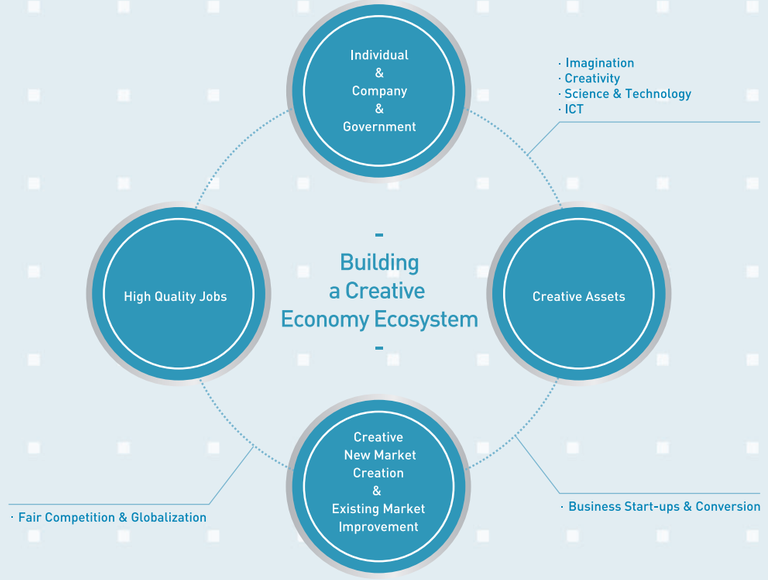
MOTIE
MINISTRY OF
TRADE, INDUSTRY & ENERGY

Korean Creative Economy

Economy which creates new added value, jobs and growth
by converging industries with industries, and industries with culture
on the basis of people's creativity, science & ICT

Due to low growth rates, jobless growth, and emerging countries gaining ground, an interest in a 'Creative Economy' has become prominent

Moreover, the global economic paradigm is shifting from a 'Knowledge Economy' to a 'Creative Economy', which creates added value through innovative technologies and creative ideas



New growth engines for industry in the Korean creative economy are not solely limited to creative industries such as IT, culture, etc.
The manufacturing sector is also a key component of Korea's creative economy future.

Examples of Creative Economy

Steam Engine

The idea of changing pressurized steam into kinetic energy became a key component of the Industrial revolution

Mass Production System

Ford revolutionized the automobile industry by realizing a mass production system which utilizes a conveyor system and standardization

Smartphone

Adding computer, camera and audio functionalities into a communication device resulted in the creation of new markets and expansion of related sectors including contents, software, telecommunication, etc.

Korean Industrial Initiatives for the Creative Economy

Objective

Establishment of an ecosystem / system of new industries for the revitalization of the manufacturing industry and creation of a new market

Project Selecting Process

15 Industrial Initiatives were selected by establishing an execution system consisting of approximately 500 nongovernment experts from industry, academic and research sectors

Execution Strategy

Prioritized development of sectors with a large impact on industries in general

Develop core technology which has influence on other industry sectors due to its large application range of R&D output, and induce expansion of core technology by communal participation of related parties

Creation of high level jobs by adding converging technology in the manufacturing industry

Redesign industry structures adequate to realize a creative economy by converging creativity, technology, ICT, and SW based on manufacturing businesses

Realize high added value generation and create jobs through concentrated cultivation of industries using intelligence such as embedded SW, etc.

Secure future growth by suggesting long-term direction of private investment

Reduce risk and induce investment by suggesting a long term (5-10 years) industry vision; promote infra establishment and regulation improvement for long term growth engine creation and maintenance

Enhancement of technological capabilities of SMEs and establishment of regional / global cooperation system

Induce mutual growth and development among participants of industry ecosystems such as conglomerates, SMEs, research centers, etc.

Impact regional development and secure global markets by establishing regional / global cooperation systems

1.
Wearable Smart Device

Under the concept of "carrying to wearing", develop smart devices and related materials/parts maximizing mobility and convenience

Applied in various types of smart devices such as devices attached to bodies, transplant devices, etc.

Development of core parts and platforms related to input/output, data processing and low-power circuits

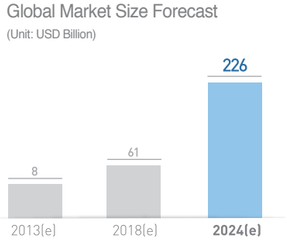
Utilized in various sectors such as infotainment[1], health care, fashion, etc.

Lead global markets by promoting the growth of expert companies in the field of ICT, electronics, material, etc.

Preoccupancy of patent and international standards by procuring original technologies

Goggles, watches and other accessory type markets (from '14), and clothing markets (from '15) are expected to reach a considerable size in the future

Google, Apple, Microsoft, and other global companies recognize wearable devices as the next dominant device following smartphones



1) Information + Entertainment

2.
Autonomous Vehicle

Obtain future technology for autonomous driving which will allow for safe driving by recognition of highways,roads, parking spaces, and other surrounding environments with minimized driver control

Develop human friendly vehicles which provide autonomous safe driving by developing core technologies which include sensory, recognition, control, etc.

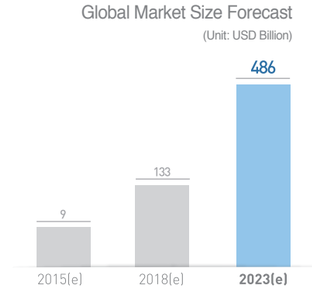
Planning to provide 1) efficient communication systems between devices used, 2) conditional autonomous driving functions in certain road conditions, and 3) complete autonomous driving in dedicated areas

Occurrence of a ripple effect e.g. reduction of traffic congestion, accidents, and other social costs, and the promotion of leading global companies through preoccupancy of core technologies

Reduction of highway death rate up to 25% and KRW 470 Bn in social costs by 2025 in Korea

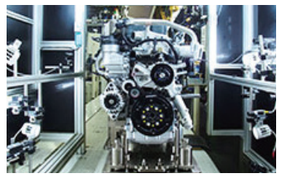
Preoccupancy of core technologies by sector convergence among the automobile, IT, SW, semiconductor, etc.

GM, Toyota, Honda, Nissan, BMW and other automobile companies are developing technologies with the goal to commercialize by 2020



3.

Manufacturing System for Advanced Material



Develop production and operation systems to mass-produce high value products by processing ultra-light / high stiffness materials used in airplanes, automobiles, etc.

Develop technologies to manage ICT utilized production systems and optimize processes

Develop system packages such as processing technology, equipment, software, etc.

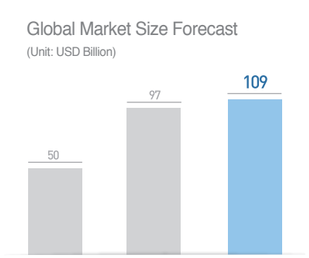
Develop related facilities regarding ultralight CFRP (Carbon Fiber Reinforced Plastics) for automobiles, aircrafts, etc.

The manufacturing system is applicable when producing various industrial goods such as aircrafts, automobiles, machinery parts, vessels, commercial goods, consumer goods, etc.

Increase in demand for advanced material especially in the automobile and airplane industry

Increase in demand regarding environment regulation, durability improvement, etc.

Technology related to advanced material processing is currently under intense competition



4.

High Speed / Vertical Takeoff and Landing Unmanned Aerial Vehicle

Development of future aircrafts and embedded SW technology which will allow for autonomous and high speed flights with VTOL technology

By developing military and public purpose aircrafts used for disaster prevention, remote exploration, etc. execution of dangerous missions and increase in accessibility to locations without runways

Development of unmanned aerial vehicle systems including core technologies for tilt-rotors, integrated and embedded module typed SW, etc.

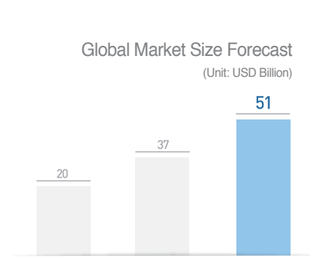
Ripple effects, such as new industry creation and opportunity provision for existing industry, are expected

Applied to future personal aircrafts, next generation combat planes, high technology passenger planes, etc.

Provide various opportunities in the aircraft and IT industry

Private and public demand increase in environments without runways (mountainous areas, etc.)

Increase in private/military usage especially in deserted areas such as the Middle East



5.
Safety & Health Robot

Development and manufacture of robot products/ services which provide life-saving and health care services in places where human capabilities are insufficient

Constant provision of functionalities and services related to nursing, diagnosis, rehabilitation, walking assistance, etc.

Secure safety of the people, minimize economic loss, support life, and provide welfare service

Development of original technology and integrated systems for robots to support big accidents, disasters, life saving activities, etc.

Impacts to new business developments, safety & health care improvements, etc. are expected

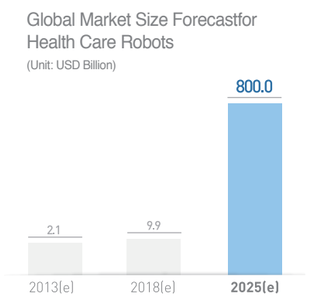
Reduction of direct/indirect damage from disasters in half by 2030

Reduction of KRW 1.2 Tn worth of medical expenses expected by 2023 in Korea

Market expansion expected due to increase in needs regarding welfare and safety

Market growth is expected to be led by health care robots and related technologies

Global market preoccupancy is possible through early development due to lack of commercialized technology



6.
Offshore Plant in Extreme Environment

Develop offshore plants and equipment technology to mine and process eco-friendly resources by maintaining long-term credibility and safety in extreme conditions

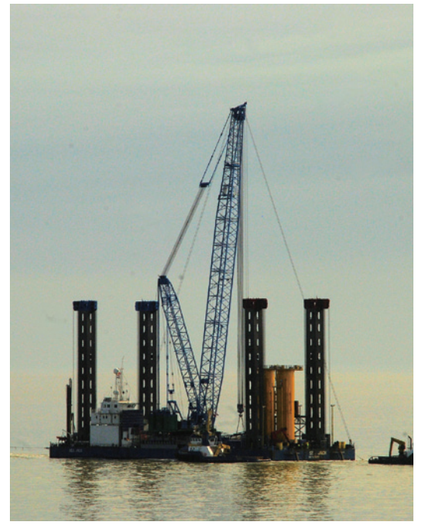
Development of related technologies will relieve concerns regarding energy deletion by excavation of new energy sources

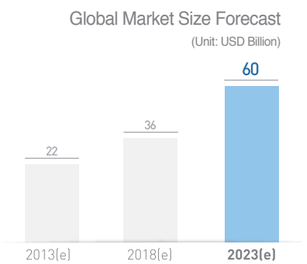
As a representative convergence business interconnected with plant, oil, gas, and other sectors, various ripple effects are expected in the shipbuilding, energy material, and other related industries

Proactive resource development in extreme areas due to high oil price

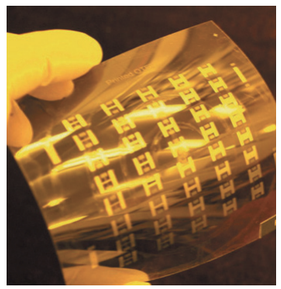
Various nations are promoting policies regarding resource development in extreme locations

13% of non-extracted oil and 30% of non-extracted gas is in extreme environments





7.
Carbon Materials



Development of various next-generation material technologies such as carbon fiber, graphene, etc.

Used in various transportations (eco-plastic transportation equipment, etc.), next generation display (graphene material), etc.

Expansion of 'ecofriendly / smart lives' is expected through faster transportation, IT related material innovation, etc.

Development of advanced materials and industry infrastructure

Developed 160 core material technologies, fostered 250 leading global firms, and created 300,000 jobs in Korea

Global market size expanding due to rising popularity of weight lightening, functionality, and eco-friendly as the main themes of transportation

Graphene material/parts technology is at a premature stage, thus high growth potential is expected in case of commercialization

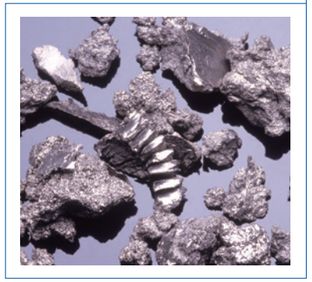
In the case of market size USD 979 Bn is expected by 2023 in the chemical material industry and USD 416 Bn by 2025 in the graphene material industry

8.
Non-Ferrous Metals for the Advanced Industry

Development of non-ferrous material such as titanium, magnesium, etc. for the advanced industry

Ti material utilized in plant, leisure, medical, aircraft, military, and other industries; Mg materials used in plant, aircraft, shipbuilding, transportation, etc.

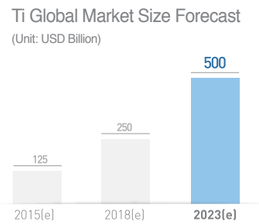
Development of processing technology in low-priced and low-purity Ti, ultra light and high strength Mg, etc.

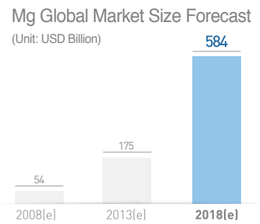


Positive effects such as preoccupancy of the global market through development of original technology, enhancement of national competitiveness through nurturing SMEs and mid-sized firms, etc.

A high increase in demand is expected with the successful development of related technology

Basic characteristics of the Ti and Mg market is that supply generates demand, therefore with successful development of new technologies, an explosive increase in demand is expected





9.
Personalized Health Care System

Provision of personalized health care solutions through bio-data such as genetic information, medical records, etc.

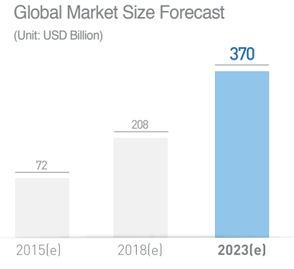
Realize healthier environment for seniors and provide personalized diagnosis/treatment services based on genetic information

Various personalized solution technology developed through genetic information, medical records, big data analysis, and clinical tests

A new medical concept and new market openings are possible for SMEs and mid-sized firms by converging IT, BT, NT, and other technologies

Personalized health care market is expected to have high growth due to a paradigm shift in the medical industry; from treatment to prevention

23andMe, Navigenics, deCODE, and various other companies are providing medical services which foresee risks while undergoing a certain treatment, reactions to drugs, etc.



10.
Nano Based Bio-Artificial Device

Development and manufacture of biological tissue or convergence structure related devices based on nano material/micro-processing and neogenesis technology

Development of human tissue kits for drug validity tests, drug screening systems, bio-printing material, artificial organs, etc.

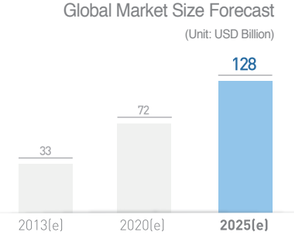
Contributes to life expansion and incurable disease treatment by providing personalized artificial organs quickly and safely

Vitalization of related industries are possible by creating mutual ecosystem growth in the bio-medical industry

10% increase in new medicine productivity through development of related technology (USD 154 Bn is reduced globally)

Due to graying society, bio-medical market is increasing, and the technological demand for drug validity evaluation is also expected to increase

The US and EU succeeded in partially commercializing bio-printing & bio-organs, and started its research on drug screening using biological tissues



11.
Virtual Training Platform

Promote development of immersive virtual training systems allowing reality-like education/training by utilizing the experience and knowledge of experts

Pass down expert knowledge through digitalization

Realization of high degree virtual training environments and digitalization of the experience and knowledge of experts through converging technology development of HW (simulator) and SW (contents)

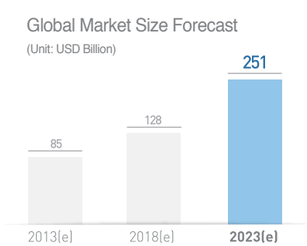
New business creation and industry competitiveness improvement is possible by utilizing experience and techniques of experts from various industry backgrounds

Training of high quality experts is possible through an efficient training system related to the strategic planning of key industries such as the manufacturing industry

Decrease in training period and increase in productivity expected

The virtual training market is expected to grow by expanding its coverage

1. Manufacturing
2. Sports: Golf, ski, etc.
3. Safety training of automobile vehicles
4. Medical: Virtual operation, customized rehabilitation
5. Military training, etc.



12.
High Efficiency Subminiature Generating System

Development of a system and establishment of a real facility which generates electricity by using transcritical[1] CO_2 instead of high temperature and pressure steam created with oil and coal

An approximate 30% increase in power generating efficiency compared to existing power plants, and reduction in size of power generating facilities are possible

Applicable in new and alternative power plants such as cogeneration, thermal, nuclear, etc.

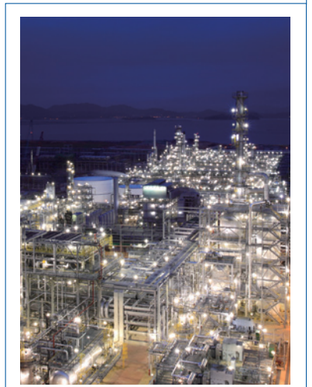
An increase in efficiency enhancements is required to cope with high oil prices and global warming. High market growth is expected through the establishment of new and alternative power plants

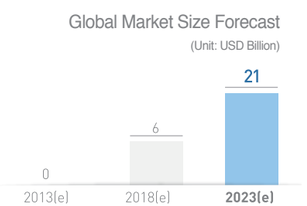
Positive effects such as energy saving, decrease in CO_2 emissions, etc. are expected

Moreover, the system will contribute to the dispersion of power distribution systems and the alleviation of distribution problems

Entry into new high value-added markets through self-development of technologies regarding the design/ manufacture of supercritical power generations

1) Condition where characteristics of both liquid and gas is shown under certain temperature and pressure



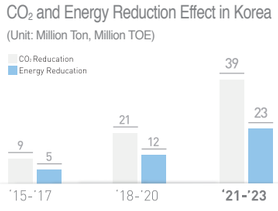


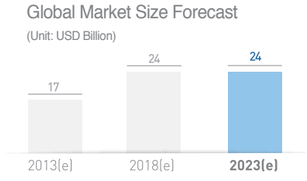
13.
Direct Current Power Distribution System

Promote development of DC power distribution systems adequate for

1. Intercontinental and underwater power transmission:
Although early investment costs are higher for direct current transmission, the amount of power transmitted with direct current is 200% higher in terms of long distance power transmission

2.New and renewable energy:
Direct current energy source is applicable in newly built grids or partial grid replacement scenarios





Economic power usage and a reduction in CO_2 and energy through the increase in power distribution efficiency expected

A virtuous industry ecosystem cycle is achievable through technological cooperation between SMEs and conglomerates

Synergy created through convergence in industries such as semiconductor, electronics, power facilities, machineries, construction, etc.

Market growth expected due to an increase in new and renewable energy and the development of converting technology

14.
Northeast Asia Oil Hub

Construction of a large size commercial oil storage facility with oil refining, preserving, distributing, and financing functionalities

Preparation and promotion of supporting regulations related to installation of crude oil transportation, storage facility, exchange market, etc.

Currently planning to build additional tank terminals (266 Mn barrels) and storage facilities (200 Mn barrels)

Various industries such as refining, preserving, financing, etc. are affected by the creation of new jobs and value

Economic effects reaching up to KRW 35 Tn and employment of 310,000 people expected

Value added through the operation of an oil hub in Singapore is approximately 11.5% of their GDP, and 7.3% of Netherland's GDP for Europe's ARA ports

Global oil consumption is moving toward Northeast Asia and in terms of location, Korea is optimized to establish a Northeast oil hub

Until recently, Singapore was the only oil hub in Asia, however, the current trend is the separation of the Northeast Asian market due to an increase in oil consumption in China, Russia, and other Northeast Asian countries

Korea is the most optimized to connect Korea-China-Japan-Russia

15.
ICT Based Energy Demand Management System

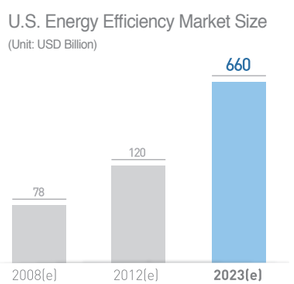
Foster an energy demand management system using ICT and create a new energy market through the sale of leftover energy from efficient energy usage

Reduce energy consumption and power peak to prevent blackouts through establishment of an ESS (Energy Storage System) and EMS (Energy Management System)

Preoccupy the global market through creation of new jobs and business models in the demand management market

Establishment of a stable and continuous energy system is possible through the reduction of energy consumption especially during periods of peak energy consumption

Power demand management which minimizes inconvenience is possible



High growth prospects due to expansion of investment policy shifting the energy paradigm from supply management to demand management

14% annual growth is expected in the energy efficiency industry (U.S. Global Insight)

Development of a market up to KRW 3.5 Tn in size, creation of 15,000 jobs, and a power reduction of 0.7-1.0 Mn kW is expected