

# Doosan Robotics

Innovation in every motion,  
revolutionizing the way we work

**DOOSAN**





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Chapter 01

## Who we are

- 01. Main business areas
- 02. Structural change in labor market
- 03. Cobot optimized for targeting potential market
- 04. Most rapidly growing robotics company















# Main business areas

Expansion into solution packaged products and SW platform backed by best-in-class quality of Cobot

## DR's business areas

Main Business Area Cobot	Key Strategic Focus Solution	Future Growth Driver Software
 <p><b>Series E</b></p> <p>Higher accessibility to the F&amp;B market with lower price</p>	 <p><b>Coffee Module</b></p> <p>Unmanned café solution</p>	 <p><b>Dart-Suite</b></p>
 <p><b>Series A</b></p> <p>A low payload<sup>(1)</sup> model of 5~9kg without torque sensor</p>	 <p><b>Palletizing Solution</b></p>	<p><b>Dart IDE</b></p> <p>Tool kit for developing robot apps</p>
 <p><b>Series M</b></p> <p>A premium model capable of precise work based on torque sensors</p>	<p>To be released</p>	<p><b>Dart Platform</b></p> <p>Primary platform where apps are downloaded and run</p>
 <p><b>Series H</b></p> <p>A high payload model of 20~25kg</p>	<div>  <p><b>Frying solution</b></p> </div> <div>  <p><b>Ice-cream robot</b></p> </div> <div>  <p><b>Welding solution</b></p> </div>	<p>To be released</p> <p><b>Dart Store</b></p> <p>A store offering a variety of robot apps</p>

(1) Payload: The maximum weight that robot can lift and carry



# Structural change in labor market

Working-age population is expected to decline rapidly mainly in developed countries while the avoidance of labor intensifies due to changed paradigm

## Intensifying labor shortage

### Falling labor force population



Drop in working-age population due to the aging and shrinking birth rate

### Reduction in labor elasticity



Post COVID-19, needs for stable labor force has increased

### High labor cost



Mounting burden of labor cost as average income level grows

## Desire for high quality of life



Dangerous

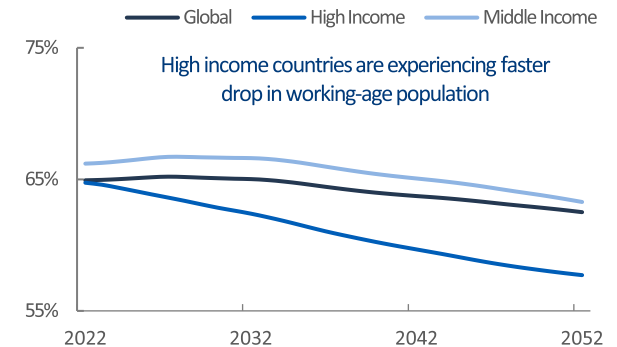
Difficult

Dirty

Repetitive

Increasing aversion to 3D / repetitive labor

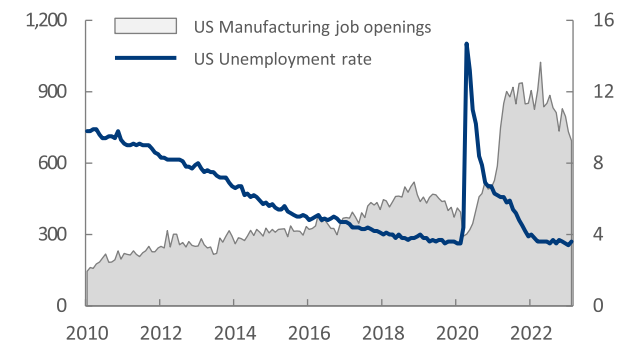
## Global working-age population forecast<sup>(1)</sup> (age between 15 ~ 64)



Source: World Population Prospects 2022 (UN),  
(1) Breakdown by income level, based on World Bank classification

## U.S. Manufacturing job openings and unemployment rate trend

(10k (LHS), % (RHS))




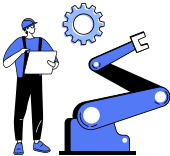


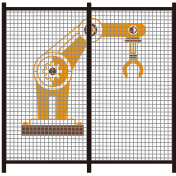
Source: U.S. Bureau of labor statistics



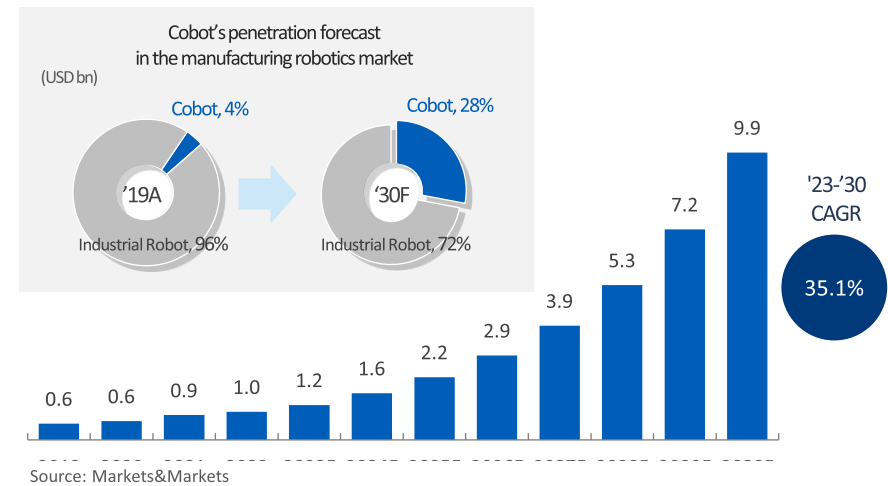
# Cobot optimized for targeting potential market

Robust growth of cobot market is expected with a replacement of human labor and Cobot is expected to vastly penetrate to wider markets including professional and personal service market

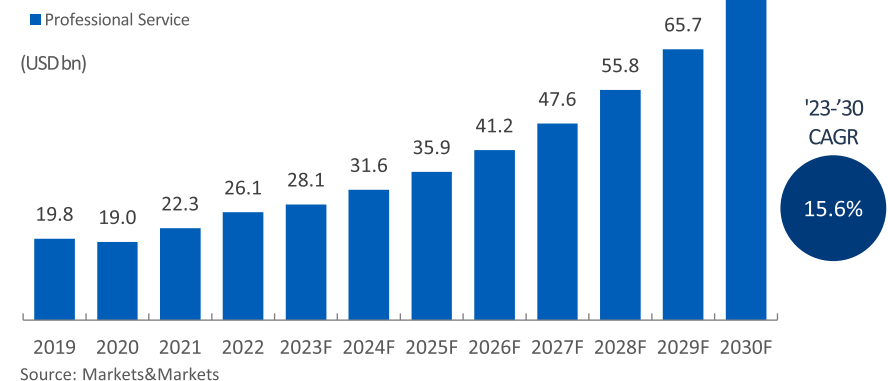
## Why Cobot?

	Feature	Industrial	Professional Service	Personal Service
<b>Cobots</b> 	Safety	 Interaction with human / Low initial cost	<b>High Expandability</b>  Combination with mobility and vision / Diverse applications	
	Light weight			
	Easy control			
<b>Industrial Robots</b> 	High Danger	 Low expandability due to inability to interact with human		
	Fence needed			
	Heavy weight			

## Cobot market outlook



## Service robot market outlook<sup>(1)</sup>



(1) Professional service robots are robots used for commercial purposes, and do not include personnel robots (i.e. robot vacuum cleaners, drones, etc.) used by individuals for non-commercial purposes.

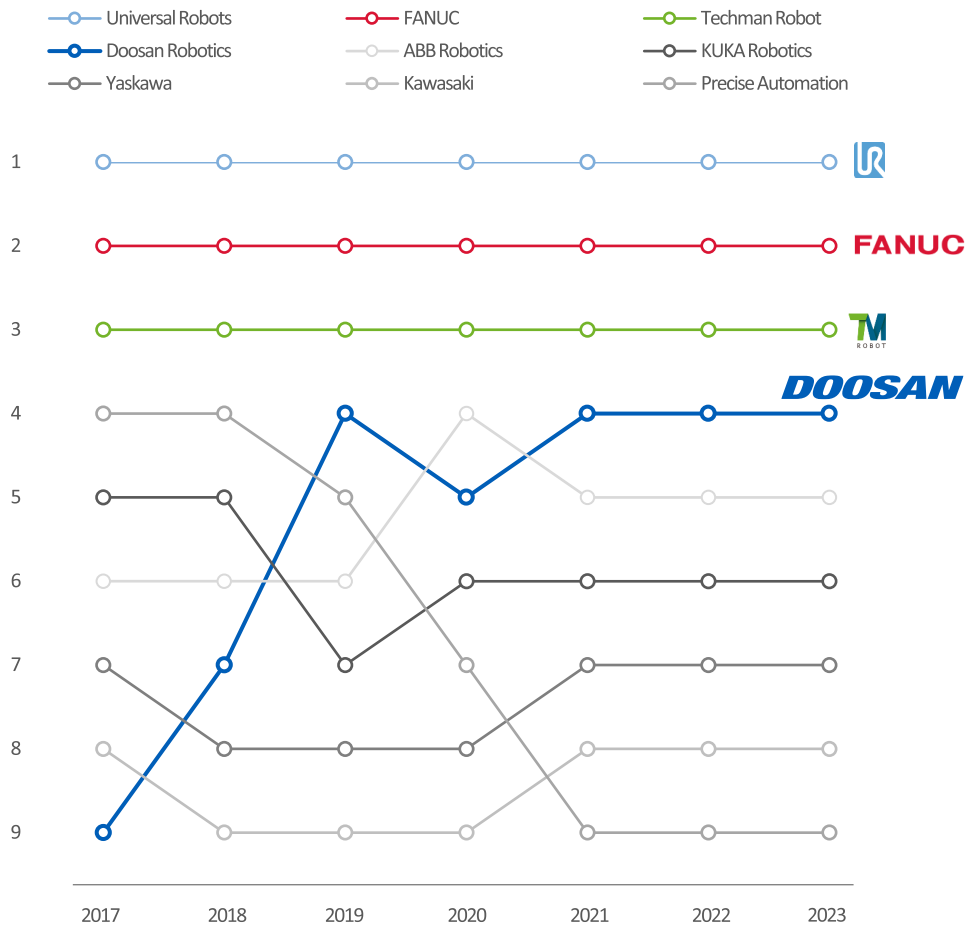


# Most rapidly growing global leading robotics company

**DOOSAN**

Fastest growth among the global leading robotics peers since its product launch in 2018

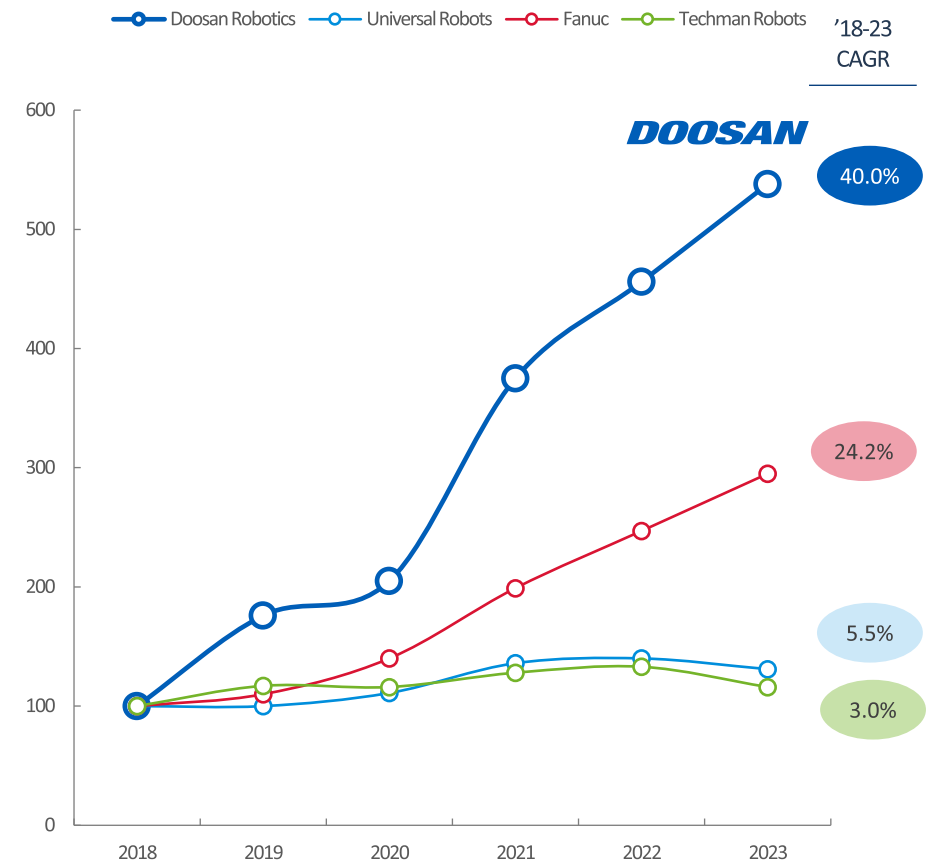
## Cobot market share ranking (excl. China market)



Source: Company data, Markets & Markets

## Major cobot makers' revenue growth trends

(2018 Revenue = 100)



Source: Company data, Markets & Markets

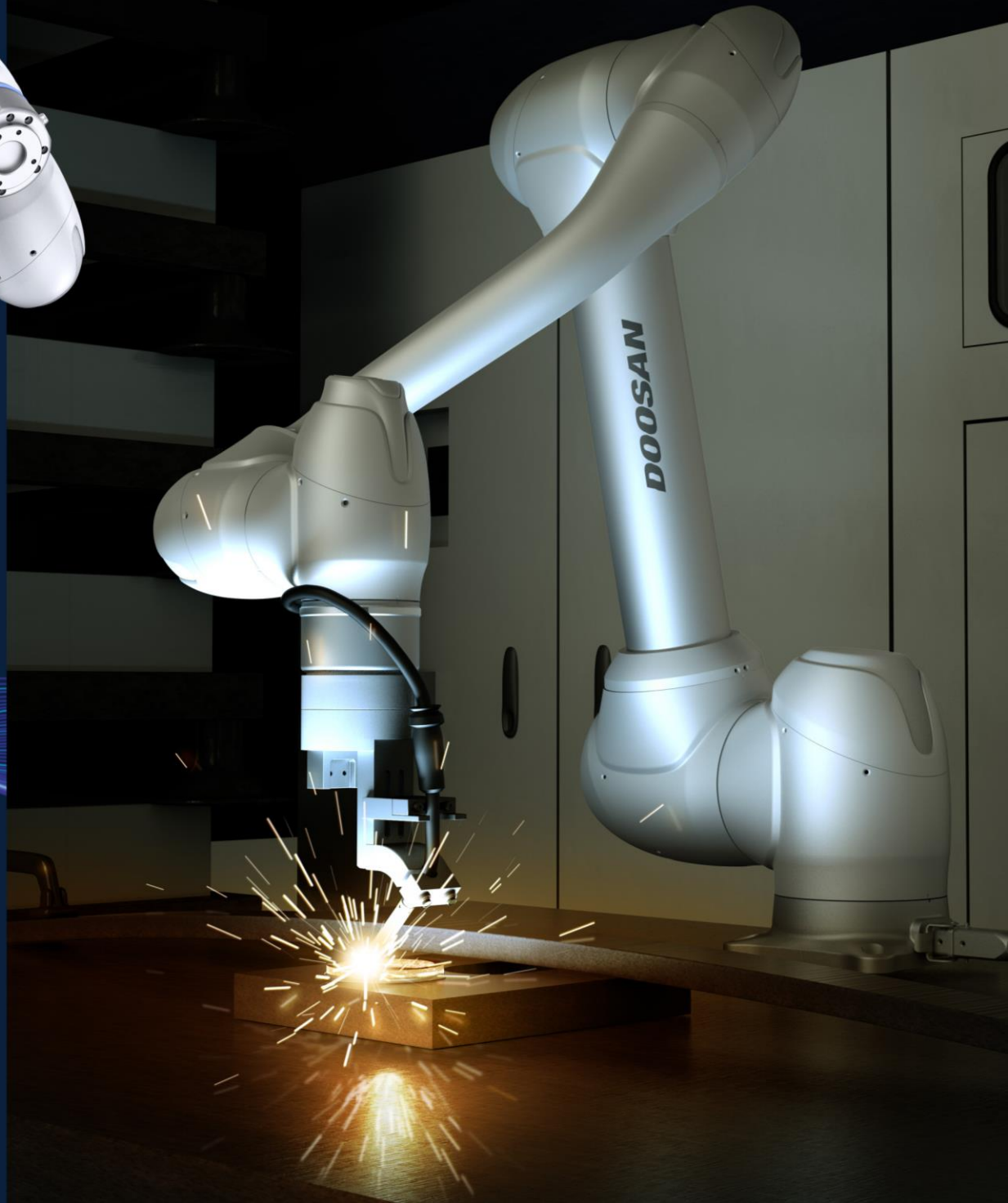




Chapter 02

## What Makes us Special?

- 01. Leading Technology
- 02. Global Presence
- 03. New Application





## DR is the leader of safety qualification

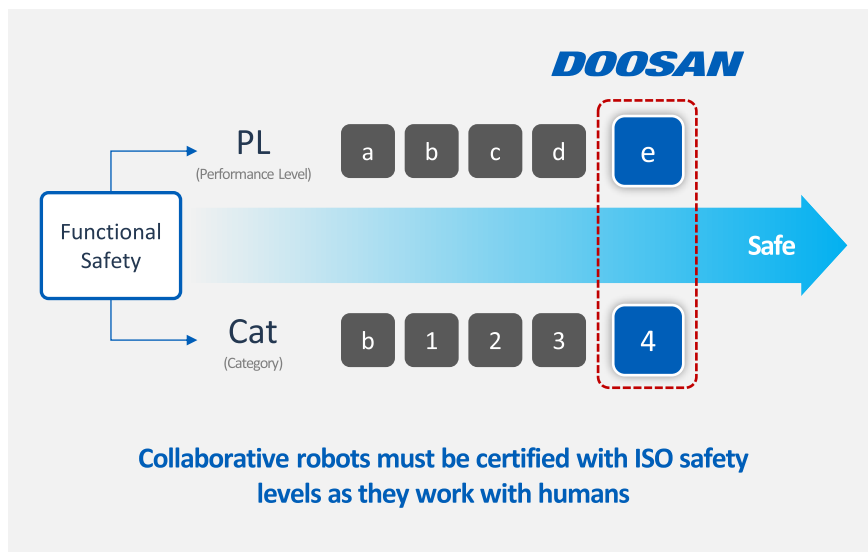
**DOOSAN**

DR is certified with the highest safety rating among leading global cobot manufacturers

### Best-class safety certificates

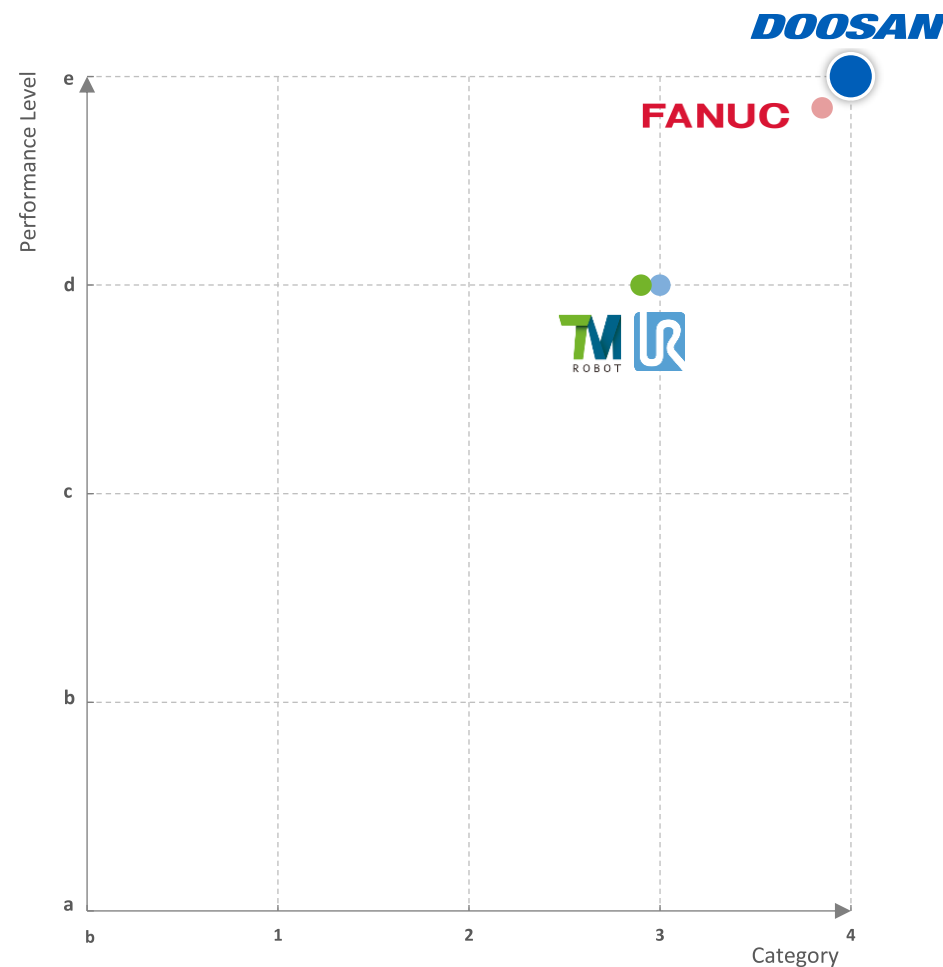
PL e, Cat 4 Certification

### ISO certification overview



Source: Company data

### Major cobot makers' certification status<sup>(1)</sup>



Source: Company data  
(1) Based on highest safety rating



# DR is specialized in offering products with a high degree of precision





Best-in-class precision capability with top-notch software and control technology backed by 6 torque sensors<sup>(1)</sup>

## Adoption of torque sensors



## Differences in operation

	 Torque sensors	 Current control
Mechanism	Directly measure the torque generated from robotics motion	Indirectly measure torque with the current value input to a motor
Operating Feature	Measure the direction of an object to enable robots to perform diverse motions	Cannot measure the direction of an object, instead perform only predetermined motions
Pros	<ul style="list-style-type: none"> <li>Capable of doing unstructured motions such as fitting an object into a specified form</li> <li>Precise force control for delicate and safe motion</li> </ul>	Affordable Price

## Torque sensor's control methods



Force Control

Generates motion until the set force and reaction force are in equilibrium



Compliance Control

Reaches equilibrium at a target point, generating reaction force when displacement occurs at the equilibrium point



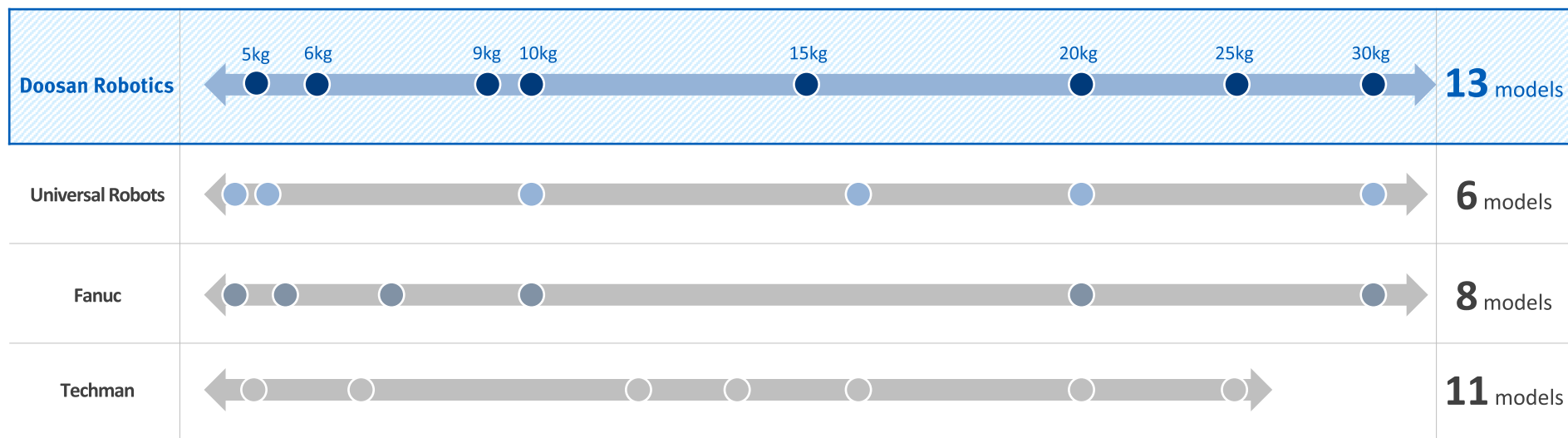


## Diverse product portfolio

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DR has the largest product portfolio with various payloads and work ranges

### Product portfolio of major cobot makers<sup>(1)</sup>



Source: Markets&Markets

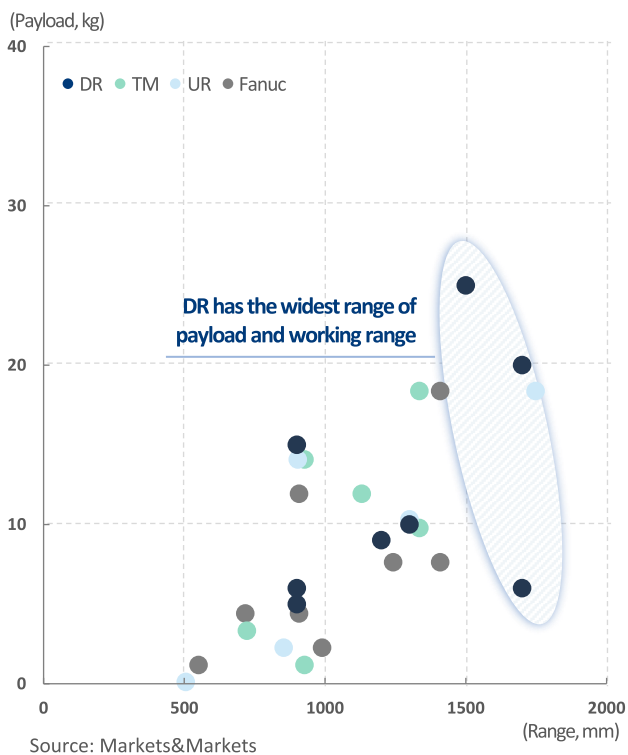
(1) Based on Markets&Markets research data excluding models that weights more than 100kg



# Pioneering high payload markets

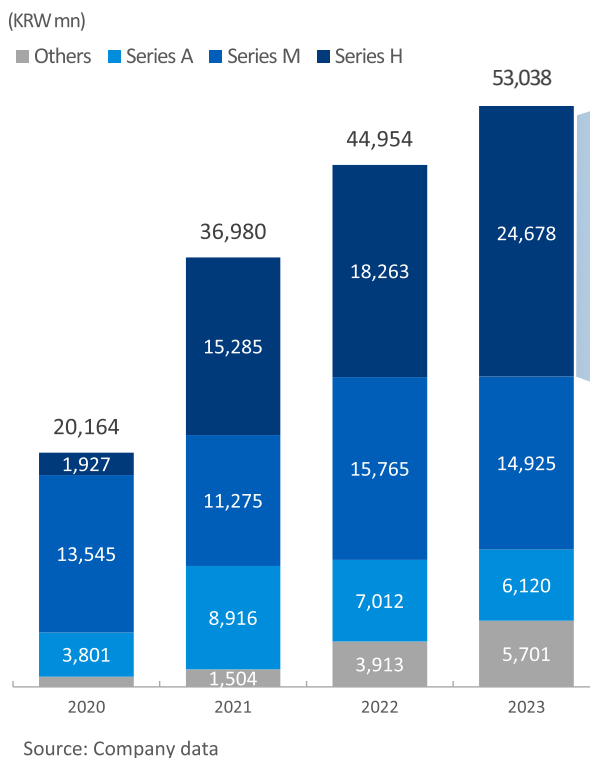
Pioneering the new markets with high payload and wide work range

## Payload and work range landscape of major cobot makers<sup>(1)</sup>



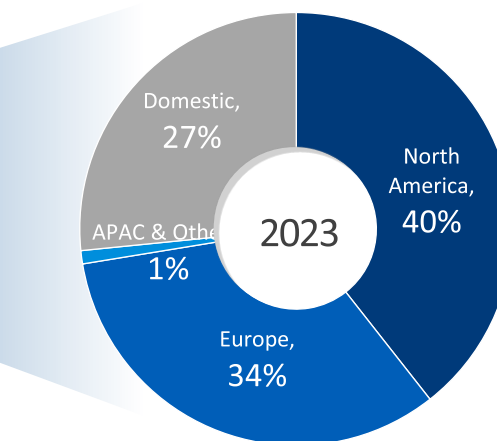
A wide range of product lineups and coverages enables diverse market applications and customizations

## DR's revenue breakdown by series



Strong dominance in 20kg+ Payload Cobot market with a market share of 72.0% in 2022<sup>(2)</sup>

## Series H revenue breakdown by region



(1) Based on Markets&Markets research data excluding models that weights more than 100kg

(2) Markets&Markets

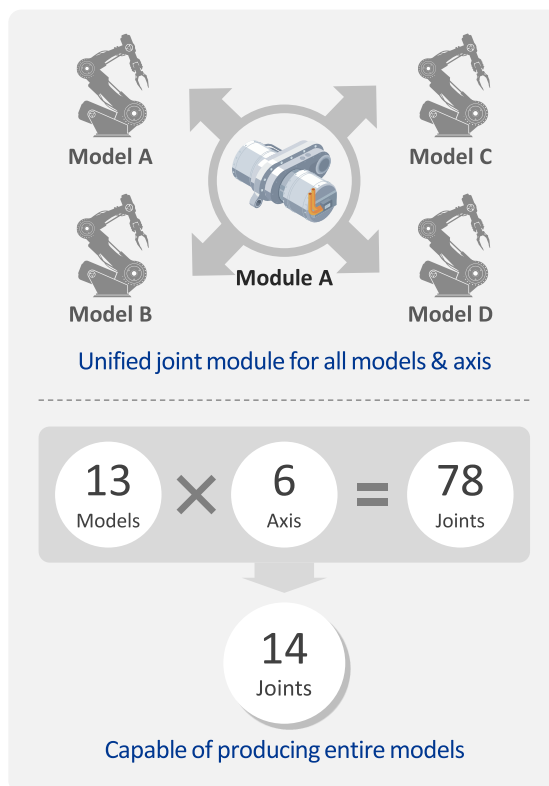


## Establishment of a mass production system

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Unified Joint module manufacturing offers enhanced cost structure and an opportunity to expand capacity without large-scale CAPEX

### Modularized production system

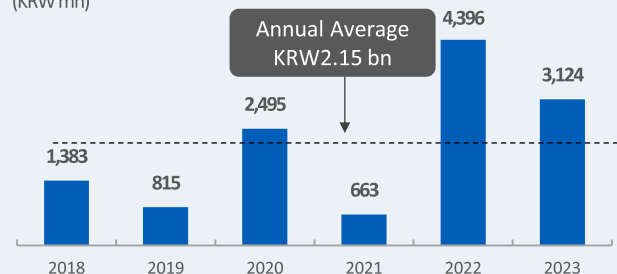


#### Simplified manufacturing process

Ready for mass production without large-scale CAPEX through production of unified joint module

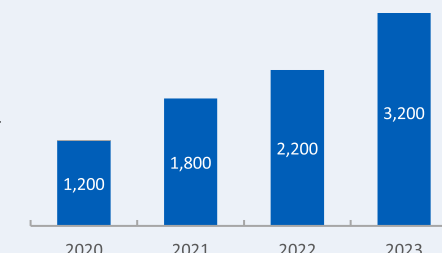
#### CAPEX trend (excl. intangible asset)

(KRW mn)



#### Annual capacity

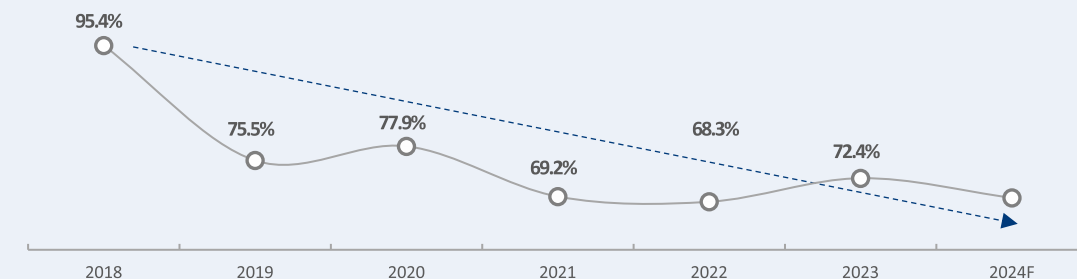
(Unit)



#### Enhanced raw material composition

Secured economies of scale and unit-cost reduction via streamlining raw materials and unified joint module design

#### CoGs % to sales

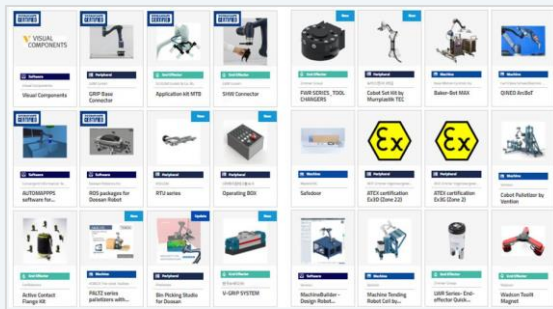




# Outstanding user convenience

DR offers easy-to-use working environment to all customers (SI & end-users) with user-friendly SW platform and UI/UX

## 1. Easy Connecting



### Doosan Mate

Provides SW environment for easy connection between various tools(EOAT<sup>(1)</sup>) such as Gripper

## 2. Easy Teaching



### Cockpit Function

Able to directly pre-set simple motions without any complex programming

## 3. Easy Programming



### Task Editor, Dart-Studio, etc.

Easy programming that does not require professional knowledge through functions such as Drag & Drop of pre-programmed application

Source: Company data

(1) End of Arm Tooling: An accessory that attaches to the end of a robot that allows the robot to perform a specific action, such as grabbing an object or tightening a screw

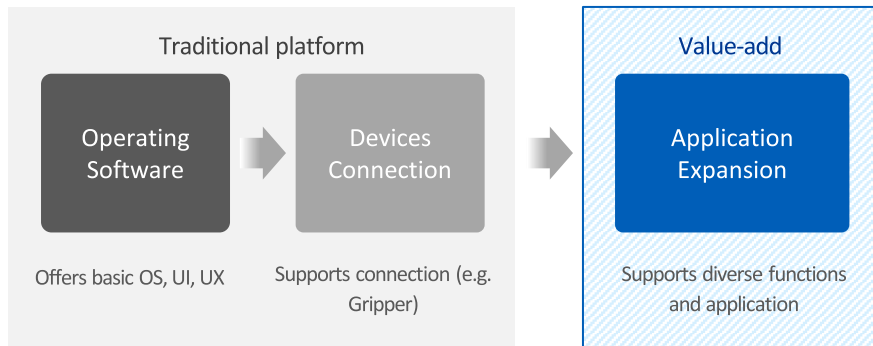




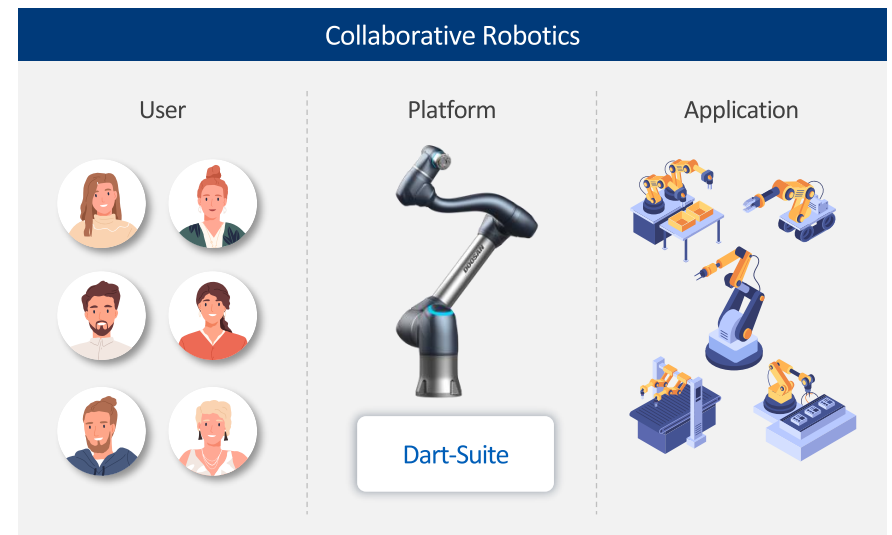
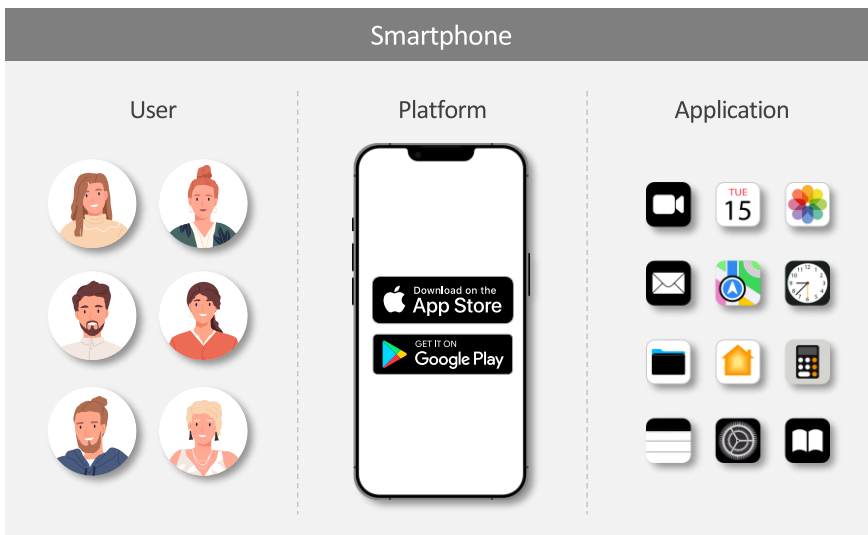
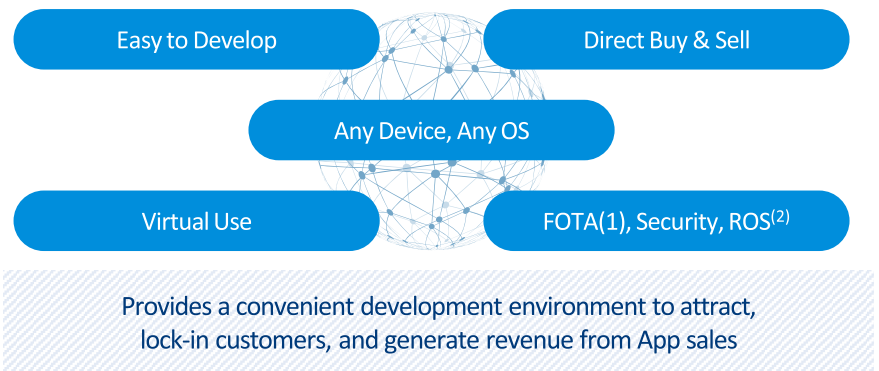
## Establishment of a software platform

Dart-Suite is an integrated platform for all developers, creators, and users, providing a similar working environment to those of smartphone

### What is Dart-Suite?



### Dart-Suite Pros



(1) FOTA(Firmware Over-The-Air): Updating Software remotely (First to developed and implemented in the robot industry)  
(2) ROS: Robot Operating System

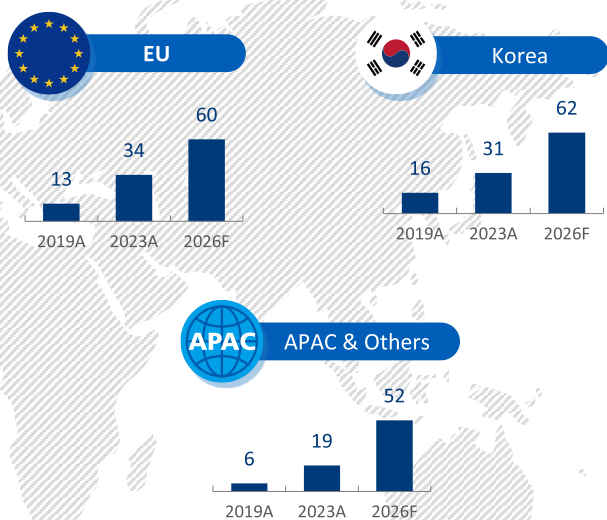


## True global player with comprehensive sales network in advanced markets

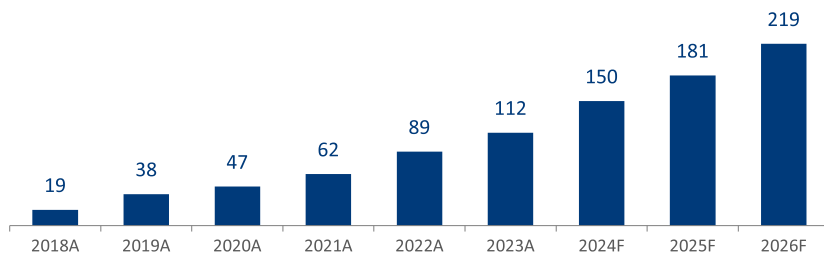
**DOOSAN**

DR possesses strong global presence with 100+ global sales channels, generating more than 60% of its revenue from overseas (North America, Europe, etc.)

### DR global sales network



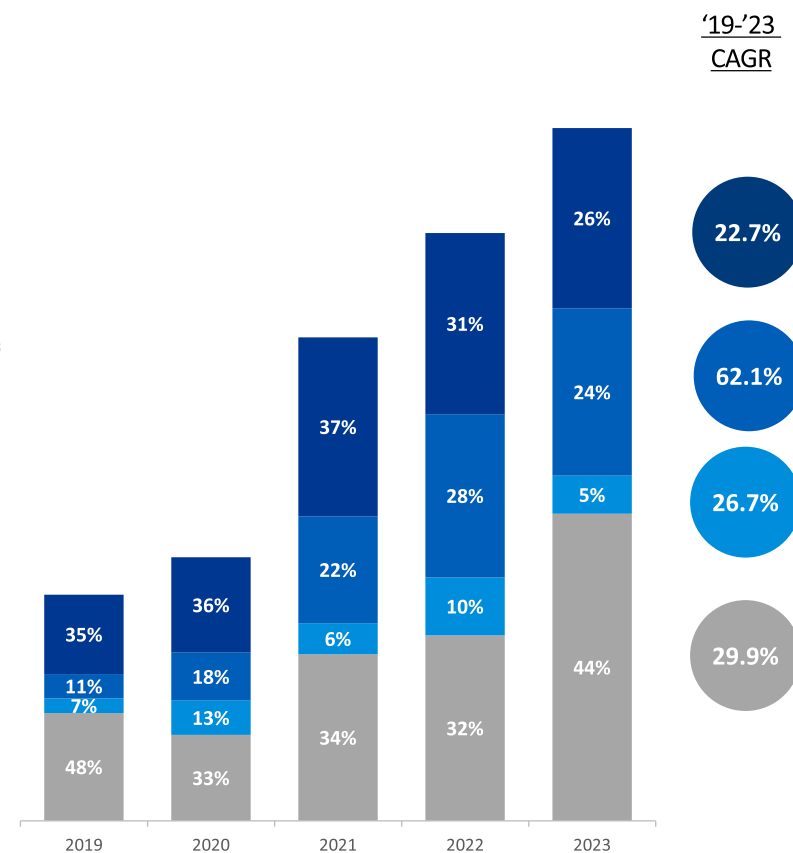
### DR sales channel trend



Source: Company data

### DR sales geography breakdown

■ Europe ■ North America ■ APAC & Others ■ Korea





## Proven track record

**DOOSAN**

DR is a trusted partner for a well-diversified group of blue-chip customers across major industries

### DR's Global Customers

Automotive	          
Electronics	      
Industrials	           
Consumer Goods	              



## Expansion through global partnerships

**DOOSAN**

Signed MOU with global leaders from various industries to jointly develop and exclusively supply robot solutions

### Global IT Company A

AI-Based  
Robot Control  
Solution



### Rockwell Automation

Exclusive supply of  
collaborative robots  
in smart factories



### SAMSUNG C&T

Joint development of  
collaborative construction  
robot solution



### Global Battery Manufacturer B

Joint development of  
automatic EV charging  
solution



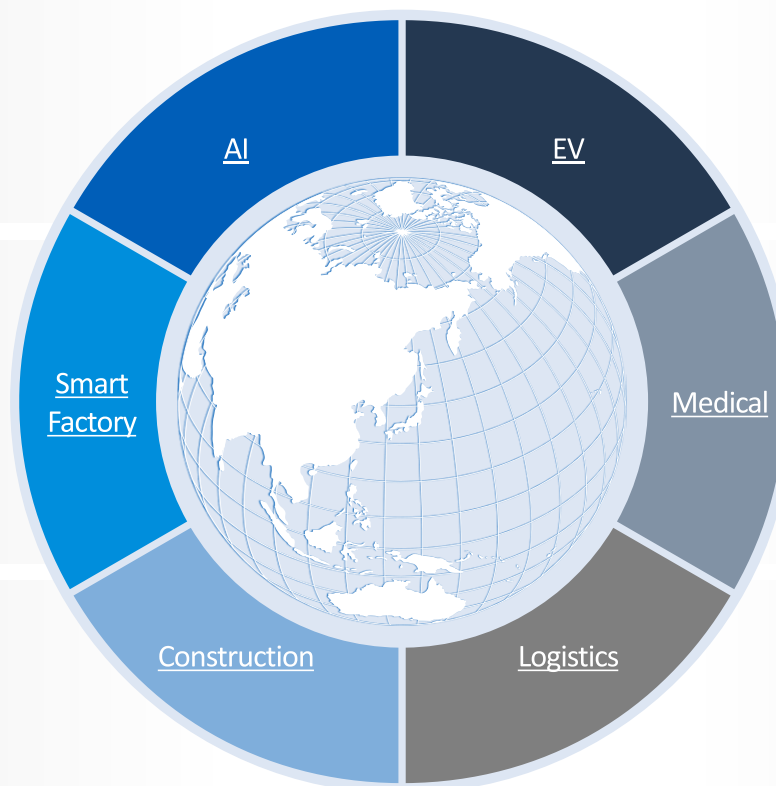
**세브란스병원**  
SEVERANCE HOSPITAL

Joint development of  
medical solutions



**Cobot Lift**

Joint-development of lift-  
applied luggage solution













## Diversified application backed by accumulated know-hows

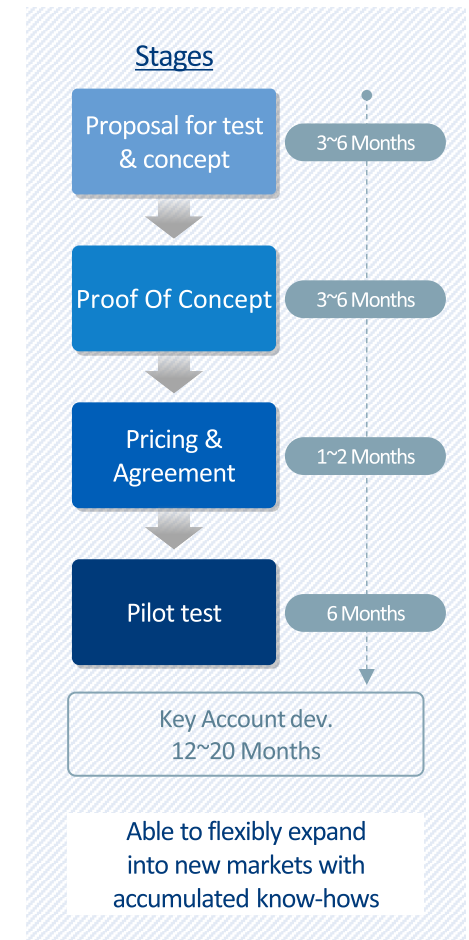
**DOOSAN**

Able to flexibly expand into new markets and applications with accumulated know-hows with each Key Account, which takes 12 to 20 months of development/testing

### Key Account's use cases

Industrials	Automotive	Consumer Staples	Food Service
<p>Schiphol Airport, Netherlands</p> <p><b>Baggage Handling</b></p>  <ul style="list-style-type: none"> <li>Picks up a baggage from the transport conveyor with a cobot and automatically loads it into a cart</li> </ul> <p>Safety equipment manufacturer A</p> <p><b>Assembly</b></p>  <ul style="list-style-type: none"> <li>Collaboration with human workers to screw parts and settle them on the conveyor</li> </ul>	<p>Global Top Automobile OEM</p> <p><b>Assembly</b></p>  <ul style="list-style-type: none"> <li>Rear wheel shock absorber assembly</li> </ul> <p>Automobile part maker B</p> <p><b>Gluing</b></p>  <ul style="list-style-type: none"> <li>Mat gluing for automotive moldings</li> </ul>	<p>Coffee Manufacturer C</p> <p><b>Palletizing</b></p>  <ul style="list-style-type: none"> <li>Product palletizing</li> <li>Sets speed limit tailoring to the human worker</li> </ul> <p>Beverage Manufacturer D</p> <p><b>Palletizing</b></p>  <ul style="list-style-type: none"> <li>Product pack palletizing</li> </ul>	<p>Chicken Franchise G</p> <p><b>Fryer</b></p>  <ul style="list-style-type: none"> <li>Automated chicken fry</li> </ul> <p>Restaurant franchise F</p> <p><b>Noodle Cook</b></p>  <ul style="list-style-type: none"> <li>Automated noodle making</li> </ul>

### Key Account Development







Chapter 03

## Our Way Forward

- 01. Revenue growth drivers
- 02. Doosan Robotics' growth roadmap
- 03. Financial statements



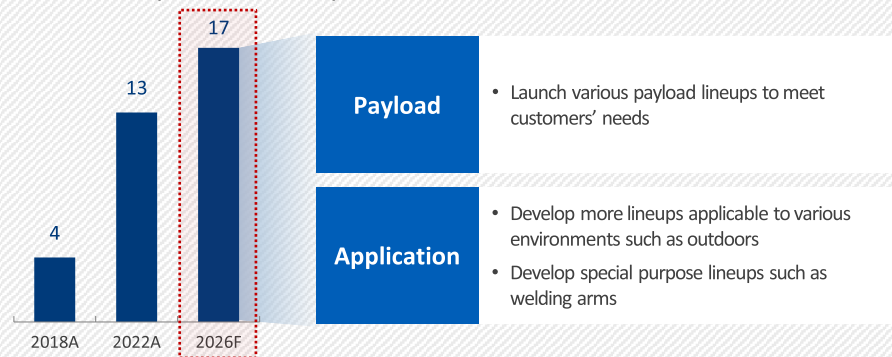


# Revenue growth driver

Capable of robust revenue growth through the expansion of product lineups, sales channel, sales of solution

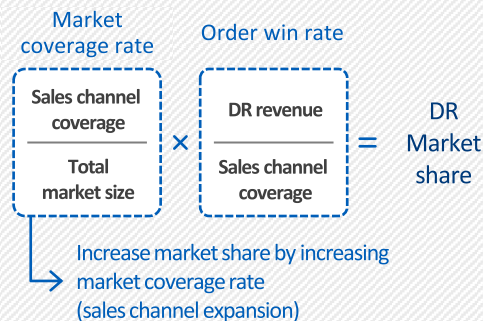
## Driver 1: Product lineups expansion

Number of product lineups

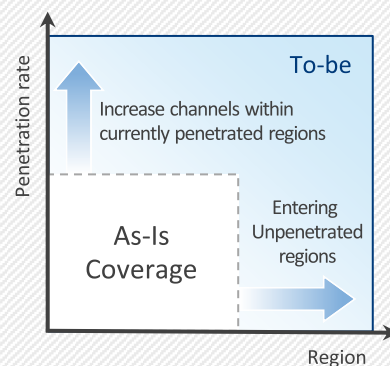


## Driver 2: Sales channel expansion

Strategies to win market share



Channel expansion strategy



## Driver 3: Solution sales expansion

Short-term sales strategy

### 1. Palletizing



- Develop and sell automated palletizing solutions that enable logistics automation
- Establish partnership with domestic top-tier B2B logistics company to expand coverage to partners customers

### 2. Fryer



- Automated chicken frying solution with integrated robot arm
- Establish partnership with domestic top-tier chicken franchisor to increase penetration into franchise stores
- Planned partnership with a global restaurant franchisor

### 3. Coffee



- Automated coffee brewing and barista collaboration solutions
- MOU with top-tier Korean coffee franchisor for installation in new stores and store renewals

## Future plans

EV charging solution, Medical(surgical robot) solution, AMR<sup>(1)</sup> solution, etc.



## Based on stable growth of B2B market, DR can enter B2C market preemptively

**DOOSAN**

Preoccupy B2B robotics market in a short period → Pioneering advanced robotics market, leveraging AI and MoMa → Expand to B2C robotics

### Step 1

Preoccupying market shares in the B2B robotics market



Become No.1 in Cobot

### Step 2

Pioneering AI-based Advanced B2B market



Become a global leader of professional services robots

### Step 3

Expansion into the B2C market with integrated robotics solutions



End to housekeeping

Offer integrated robot solutions



## Financial statements

## Consolidated Income Statement

Unit: KRWmn

	FY2020	FY2021	FY2022	FY2023
	K-IFRS, Audited	K-IFRS, Audited	K-IFRS, Audited	K-IFRS, Reviewed
Revenue	20,164	36,980	44,954	53,038
Cost of Goods Sold	15,714	25,598	30,710	38,378
Gross Profit	4,450	11,382	14,244	14,660
SG&A Expense	18,305	18,467	27,472	33,828
Operating Loss	(13,855)	(7,085)	(13,228)	(19,168)
Financial Income	144	247	819	4,389
Financial Expense	635	582	1,027	1,907
Other Non-op. Income	87	40	981	1,907
Other Non-op. Expense	194	38	93	309
EBIT	(14,453)	(7,417)	(12,548)	(15,874)
Tax expense	-	-	-	-
Net Loss	(14,453)	(7,417)	(12,548)	(15,874)

## Consolidated Balance Sheet

Unit: KRWmn

	FY2020	FY2021	FY2022	FY2023
	K-IFRS, Audited	K-IFRS, Audited	K-IFRS, Audited	K-IFRS, Reviewed
Current Asset	12,005	19,662	38,837	426,105
Cash & Cash Equivalent	2,621	4,390	7,430	305,424
Accounts Receivables	3,385	8,558	10,644	22,236
Inventory	5,323	5,615	13,391	14,154
Other Current Asset	676	1,099	7,372	84,291
Non-current Asset	10,327	9,783	23,782	30,317
PP&E	8,095	7,754	15,973	21,657
Other Non-current Asset	2,232	2,029	7,809	8,660
Total Asset	22,332	29,445	62,619	456,422
Current Liabilities	11,207	11,809	14,738	13,353
Accounts Payable	3,217	5,036	3,875	5,894
Short-term debts	3,000	-	-	-
Other Current Liabilities	4,990	6,773	10,863	7,459
Non-current Liabilities	1,986	2,135	5,116	4,261
Lease Liabilities	1,708	1,544	3,418	3,773
Other Non-current Liabilities	278	591	1,698	488
Total Liabilities	13,193	13,944	19,854	17,614
Common Equity	20,700	22,100	24,310	32,410
Total Equity	9,139	15,502	42,765	438,808

Source: Company data



[www.doosanrobotics.com](http://www.doosanrobotics.com)  
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