

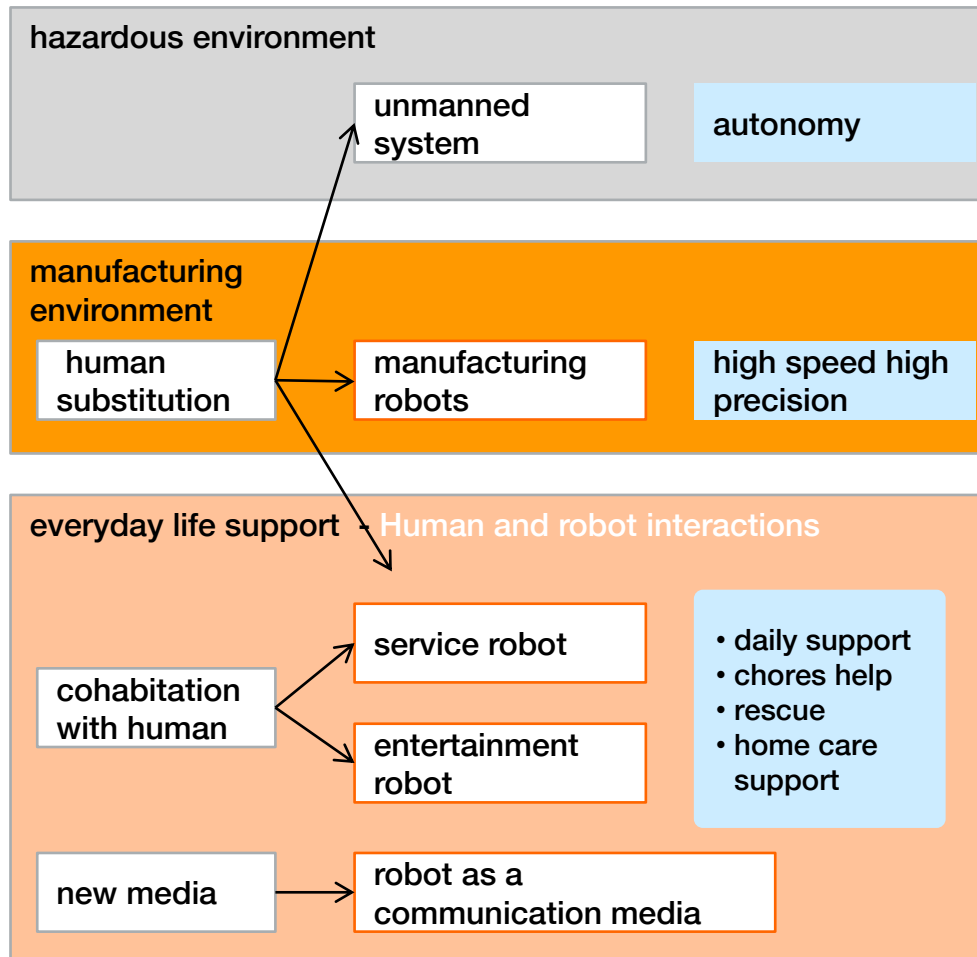
Japan | robot market overview

Market Intelligence, Orange Labs Tokyo
April 2016



overview | definition and purpose of robots

The Ministry of Economy, Trade and Industry defines robots as an intelligent mechanical system that incorporates three technological elements: sensing, intelligence and control, and drive.



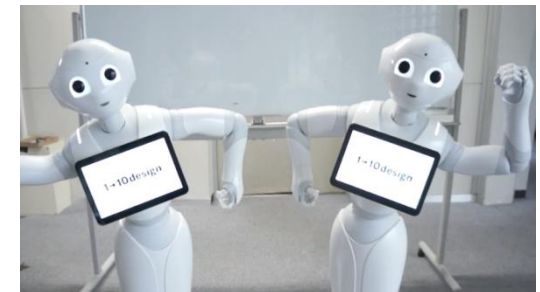
robot used for Fukushima nuclear plant cleaning operations



Robot filling pipes for pharmaceutical experiments



SONY's pet robot "Aibo"



Softbank's humanoid robot "pepper"

overview | Japanese government strategy

The Japanese government have issued its robot strategy , the “New Robot Strategy”, in Jan 2015 to help the development of the robot market in Japan by 2020.

3 main goals to achieve by 2020

❖ total Investment of €769 mil in government and private robot related projects to reinforce creativity, robot innovation and standardize technology with an eye on global expansion.

❖ Raise the robot market to €18.4bil. (€6.6bil in 2012)

❖ Set up a new robot field test area in Fukushima.

4 key sectors

Manufacturing/service sectors

- Creation of the service robots 100 best practices
- Improvement of robots Artificial intelligence, sensors, control
- Introduction of robots for set-up tasks and back office operation of service business



day care/medical

- Eliminate staff injury risks when moving patients
- Implementation support to more than 100 medical robots projects.



infrastructure/ disaster prevention

- intelligent construction (Computer aided construction): reach penetration rate of 30%
- Introduction of robots to check and renovate 20% of aging infrastructure.



agriculture



- Implement auto-driving tractors by 2020
- Introduction of more than 20 different labor-saving robots

overview | social context

With a rapidly aging society and a diminishing workforce, the Japanese society is increasingly focusing its interest on the service robot sector in which they see an opportunity to cop with these 2 issues.

outline



Population:
126 million (2016)



- ❖ The Japanese population is aging with 31.9 mil of the population above 65 years old, accounting for 25.1% of the total population (Oct 2015)
- ❖ Working population is also on the decline at 79 mil.
- ❖ Social security accounts for 30% against national income

factors for emergence of robots

1. technological advancement:
sensors, Artificial Intelligence, data processing

2. new needs arising from society
structural changes:
medical, workforce decreasing etc

3. the advancement of telecommunication
technology

increasing
interest for
robots in the
service
sector



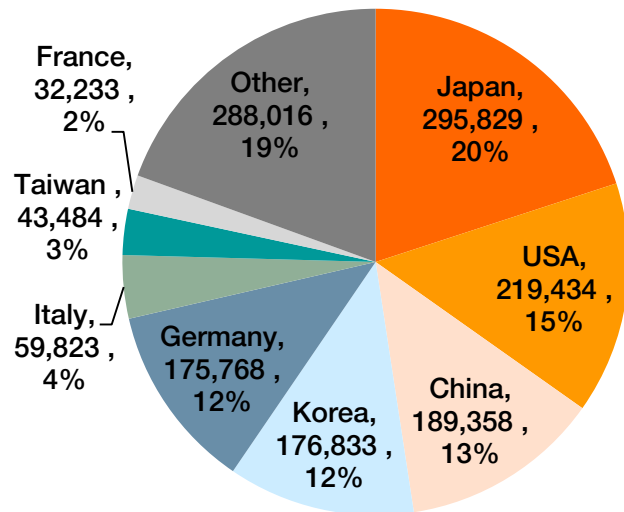
The robot industry is seen as a key growth sector for Japanese economy.

the market | the robot market in Japan

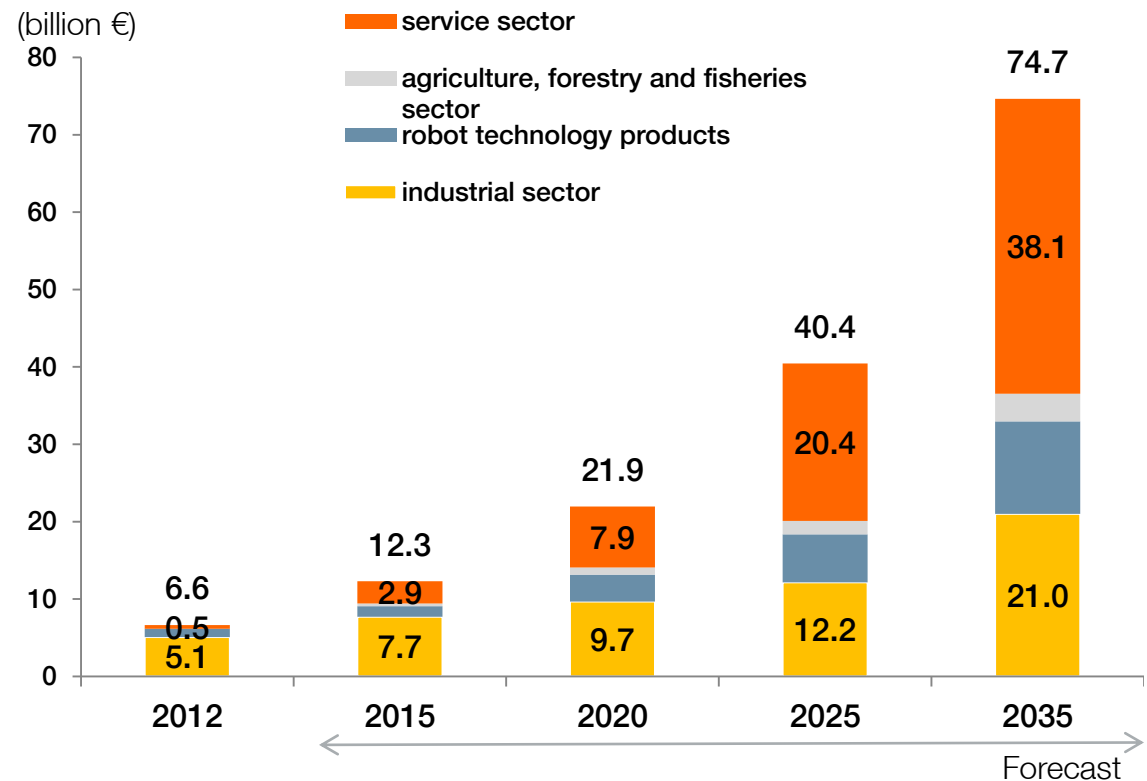
Japan is globally leading in terms of operational industrial robots stock in the country and most of its robot market revenue are from industrial sector, however the service sector is expected to become the largest in 2025.

operational industrial robots per country*

estimation in units, as of end of 2014



the robot market in Japan

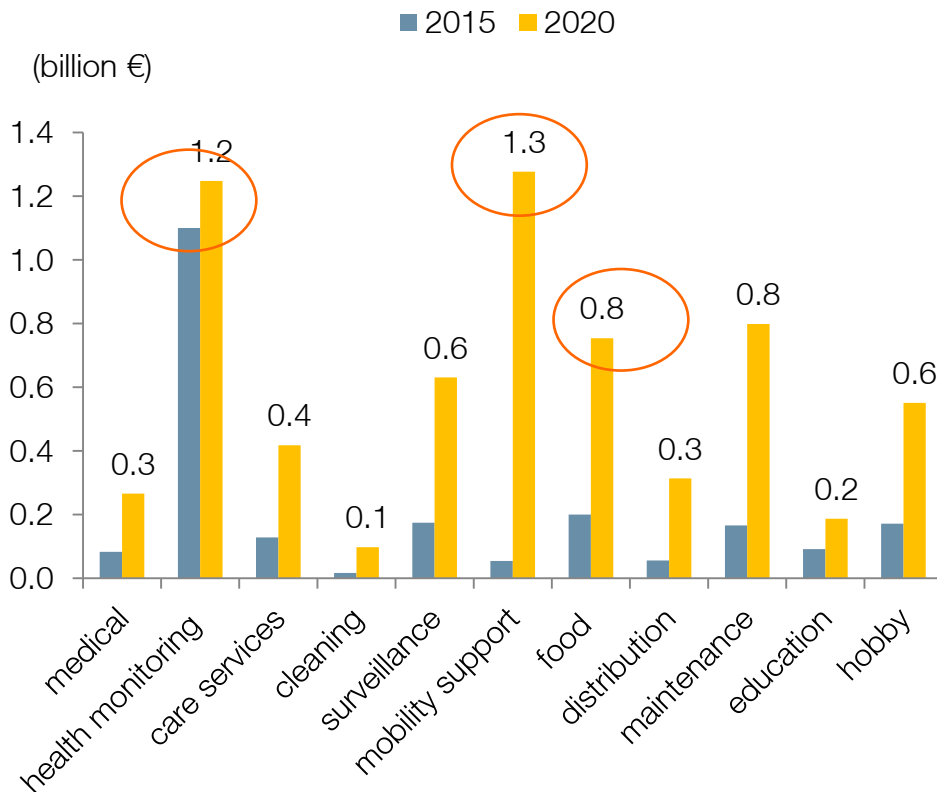


➡ The service robot market is expected to overtake the manufacturing sector by 2025.

the market | the service robot sector in Japan

The service sector comprises robots and systems designed for service in offices, homes & public facilities. It is even forecast to overtake in market size the industrial robot sector by 2025.

service robot market breakdown (main categories)



- ❖ the most important categories are expected to be health monitoring, mobility support and food industry related.

key services

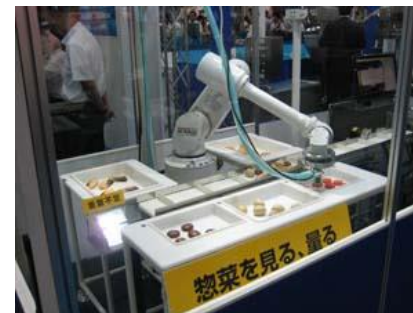


robot that can carry up to 80kgs, RTC



mobility robot by Toshiba

CORISM



Food handling robot, Fanuc



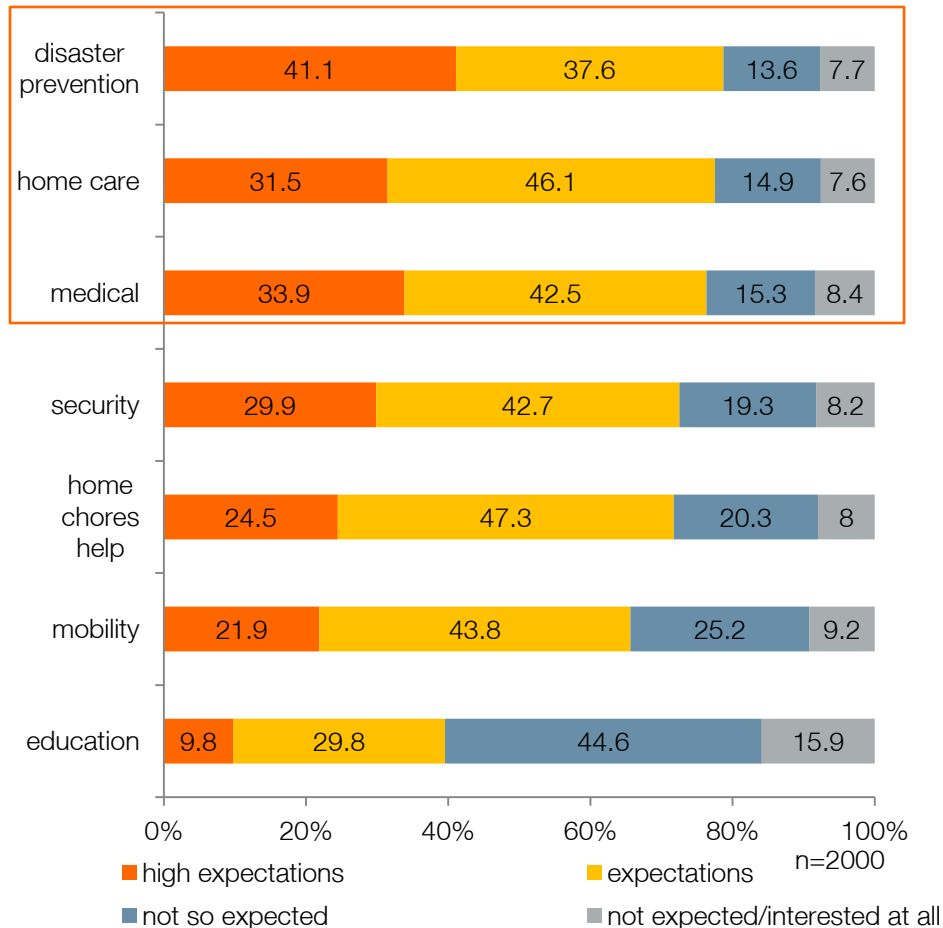
cooking robot, Yaskawa Electric

1€=130JPY
source: NEDO

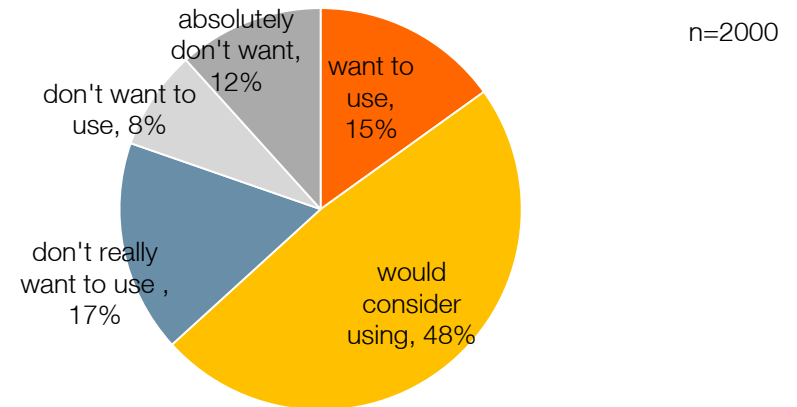
user survey | market trends and consumers' expectations

Potential users are rather enthusiastic about the potential use of service robots in their daily life especially for disaster prevention, home care and medical sectors, however child education is not well received with people concerned about moral issues and safety.

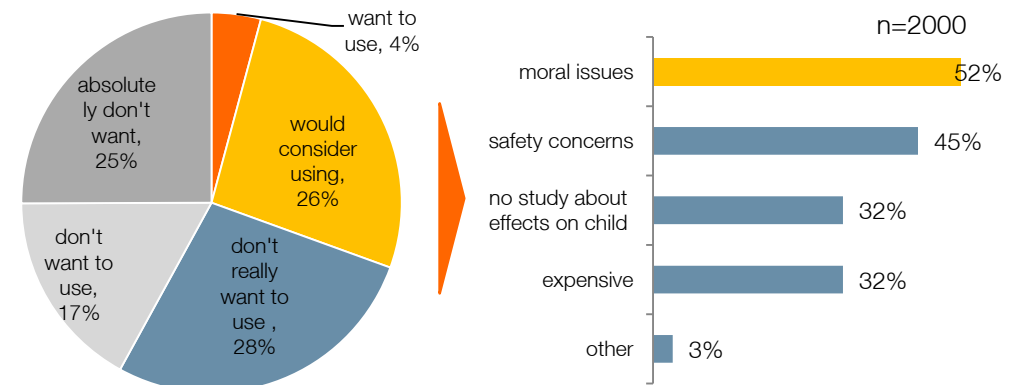
service sectors where robots are awaited the most



home care robot



education robot



robots | Telcos' strategy

The three key Japanese operators have been working on partner robots by partnering with players from the robot industry.

NTT Group



robot Sota, helping user to measure blood pressure

- ❖ NTT and robot developer Vstone have teamed to launch a **service robot targeting the elderly**.
- ❖ The desktop robot Sota, can talk and communicate with smart devices in the house, to provide seniors with **e-health services and to control appliances**.

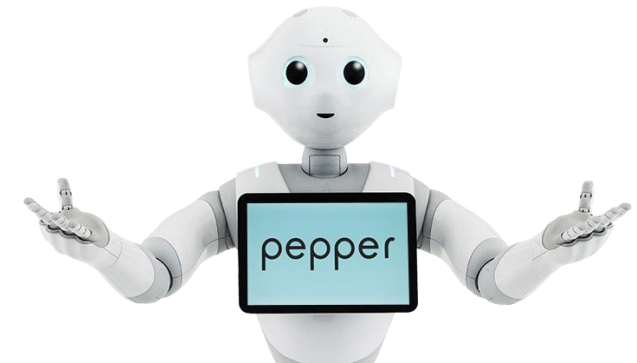
KDDI



Jibo

- ❖ KDDI has invested through its **corporate venture fund** KDDI Open Innovation Fund, in the US Jibo, **the start-up and developer of the partner robot** Jibo.
- ❖ Jibo's functions: face recognition, email notifications, camera, cloud apps, possibilities to connect accessories to allow motion etc,

Softbank



- ❖ Softbank has established **robot business subsidiary** Softbank Robotics in Jul 2014 in which Foxconn and Alibaba are investors (Jun 2015).
- ❖ The main robot they are featuring is the humanoid robot Pepper.

robots | service sector

Humanoid robots are starting to be seen in various environment in Japan such as department stores, mobile phone stores, banks or car retailers, etc.

Hitachi



Emiew3

- ❖ Hitachi unveiled Emiew3, a humanoid robot meant to be used for customer service, with plan to be launch to the market in 2018.
- ❖ use cases: customer service in airports, hospitals, train stations, other.

Toshiba



Android Chihira Aico @ Mitsukoshi department store

- ❖ Toshiba showcased its android robot Chihira Aico at Mitsukoshi department store (Ginza, Tokyo), in Apr 2015, where it was guiding customers.
- ❖ Unlike other humanoid robot, it cannot reply to questions (although the function may be added), the focus was for the robot to act as human-like as possible.

Softbank Robotics



Pepper @ 1 week trial Softbank shop operated by robots only

- ❖ Pepper is a personal humanoid robot for entertainment purpose that can recognize human emotions via voice tones and facial expressions, and it can increase its capabilities via the cloud.
- ❖ Pepper is used by businesses for greeting customers: Mizuho bank, Toyota, Softbank shop. It was used to sell Softbank mobile products during a week as a trial at a shop operated by robots only.

robots | communication robots (service sector)

Communication robots are increasingly being released and are mostly expected to be used for daily care, communication and education.

FUJISOFT



- ❖ PALRO is a **connected communication humanoid robot** with an open architecture that allows installation of any communication application stored in a cloud server. (mar 2010)

SHARP/ ROBO GARAGE



- ❖ Robohon is an **hybrid communication robot that integrates a smartphone**.
- ❖ functions: voice call, e-mail, camera, touch screen, project content, have a conversation, move, and recognize people.(launch Jun 2016)

DOCOMO/TAKARA TOMY



- ❖ oHanas is a communication robot co-developed by DOCOMO (voice recognition technology) and TAKARA TOMY (Oct 2015)
- ❖ The robot access to the **cloud via pairing with a smartphone**.

DOCOMO/others



- ❖ DOCOMO, IWAYA, VITEC, MOOREdoll have unveiled in Mar 2016 their co-developed **communication robot, targeting the elderly**.
- ❖ The robot can record and send/receive voice messages and have a conversation

robots | home care and medical sector

Japanese makers' interest has been increasingly spreading to the home care and medical sector seen as a new source of revenue.

YASKAWA Electric



humanoid robot with two arms preparing medicines

- ❖ YASKAWA, one of the biggest industrial robots maker in Japan, has entered the medical robotic market with robots able to prepare medicines.
- ❖ here, the robot developed in collaboration with Kyushu University, is used to prepare chemotherapy treatments.

CYBERDYNE



robot suit "HAL" (Hybrid Assistive Limb)

- ❖ CYBERDYNE, a robot venture from the university of Tsukuba, specializes in the development of robotic equipment for the medical sector.
- ❖ HAL is a robot suit that increases the wearer strength. It is used for care giver to carry patients but also for patients for rehabilitation.

NSK



guide robot LIGHBOT

- ❖ NSK is a mechanical parts maker: rolling element bearings, linear motion and automotive parts for various applications including medical robotic
- ❖ LIGHBOT is a guide robot helping visually impaired people to avoid obstacles via its navigation function. It is expected to be mostly used in hospitals, and commercialized in 2016.

robots | industrial sector

Japan has leading manufacturer in the global industrial robot sector. Its main makers have increasingly been releasing collaborative type robots, that can work along with humans.

Fanuc



Fanuc's collaborative robot "green Fanuc"

- ❖ Fanuc is the world's leading manufacturer of factory automation with 2.4 million CNC (computer numerical control) systems and 250,000 robots installed worldwide.

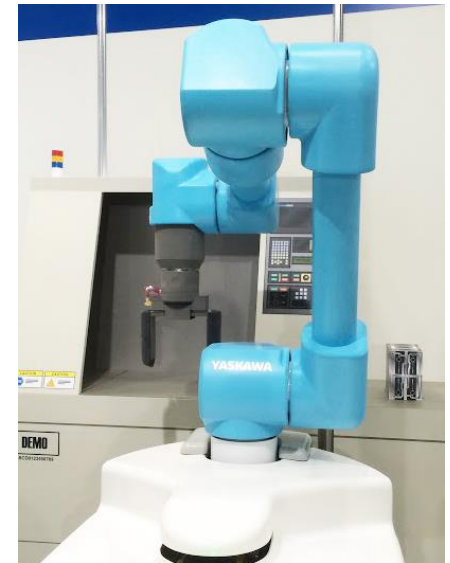
Kawasaki Heavy Industries



duAro

- ❖ The dual-armed industrial robot duAro needs 60cm² and can fit easily in a work space occupied by human.
- ❖ use cases: assembling machine parts, inserting documents into files, arranging food in lunch boxes.

Yaskawa Electric



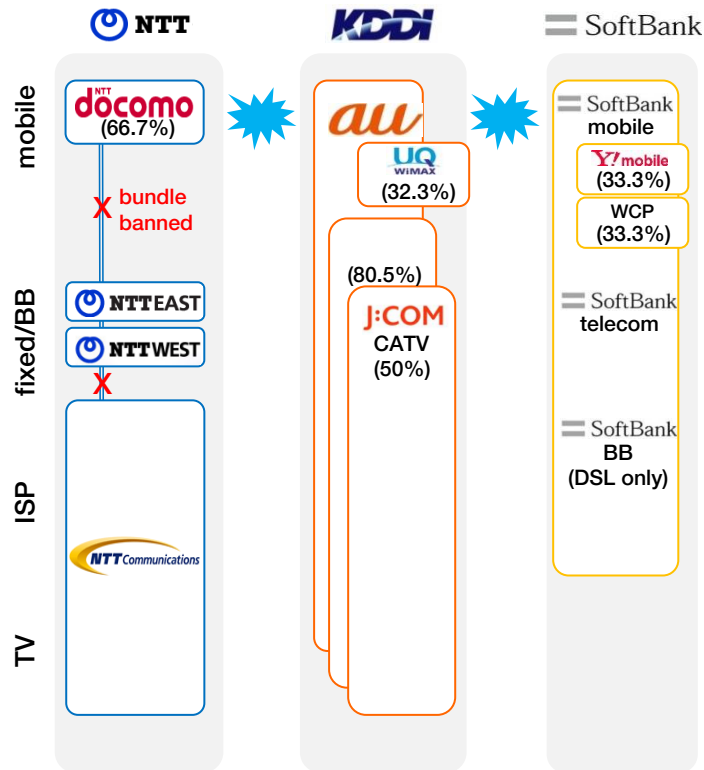
MOTOMAN-HC10

- ❖ Yaskawa Electric unveiled in Nov 2015 its first collaborative robot "MOTOMAN-HC10",

annex | telecom operators in Japan

Three key operators are competing in the mobile and broadband market, the incumbent operator NTT is leading in both with a 44% and 55% market share respectively.

key competitors



market presence

