

Annexes

Annexe 1 : Evolution du marché domestique des robots communicants



Annexe 2 : Plan d'action intersectoriel de la *Japan's New Robot Strategy*

Action Plans (Cross-Sectoral-Items)

<p>◆ Reaction for International Standardization</p> <p>→ Essential item to expand Japan's robotics technology to the world</p> <ul style="list-style-type: none"> • Ensure compatibility (connection, interface, OS etc.) • Guarantee quality and safety (Security, obtain certification) • Establish necessary testing method (collision test, stability test etc.) 	<p>◆ Establish Demonstration Experiment Field for Robots</p> <p>→ Effective for accelerating research and development and introduction of robots.</p> <ul style="list-style-type: none"> • Secure stable management from a certain amount of equipment needs. • Clarify concrete and systematic effects to support commercialization. • <i>Survivable as hub for innovation into the future.</i> • <i>Establish "Fukushima Hama street Robot Demonstration District" (tentative name).</i>
<p>◆ A Robot Olympics</p> <p>→ Taking this opportunity for introducing and diffusing robots</p> <ul style="list-style-type: none"> • Encouraging and accelerating research and development, offering experiment field during 5 years. • <i>Set up an executive committee and consolidate the system within this year. Decide concrete opening style etc. by 2016.</i> • <i>Hold a preparatory contest in 2018.</i> 	<p>◆ Human Resource Development</p> <p>→ A software development engineer, Sler is a key to expand robots.</p> <ul style="list-style-type: none"> • Usage of retired person with manufacturing technology, enlarge the human resource by OJT (on-the-job-training). • Utilize public job training. • Interdisciplinary curriculum of graduate college .
<p>◆ Great Robot Prize</p> <p>→ Effect of industrial development by evaluating excellent cases.</p> <ul style="list-style-type: none"> • Press-agent of advanced cases and applied cases sharing best Practices. • Establish new awards and expand the award winners. 	
<p>◆ Promote Regulatory Reform</p> <p>→ Easing the regulations and upgrading the rules for utilizing robots to promote regulatory reforms.</p> <ul style="list-style-type: none"> • Improvement of a new Radio use system to support usage of robots (Radio Act). • Making rules for unmanned aerial type robots (Civil Aeronautics Act etc). 	





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Source : Y. Kakimoto, « Development Strategy for Robotics and the Present conditions in Japan », JOGMEC Techno Forum 2015, NEDO





Annexe 3 : Projets de R&D liés à la robotique soutenus par le gouvernement japonais



Publicly-supported R&D robot projects	
METI	<ul style="list-style-type: none"> ○ Project to Promote the Development and Introduction of Robotic Devices for Nursing Care (FY2013-FY2017) ○ Demonstration project for the introduction of robots (FY2015-) ○ Project of technological development regarding practical application and utilization of robot (FY 2015-FY 2019) ○ Core technology development for next-generation robots (FY 2015-FY 2019) ○ Development of Medical Devices and Systems for Advanced medical services (FY 2014-FY2018) ○ Project to develop systems for handing social issues such as infrastructure maintenance, management, and renewal (FY2014-FY2018).
NEDO	<ul style="list-style-type: none"> ○ Promotion of Market Implementation by Applying Robotics ○ Future Robot Technology Development
CSTI (Cabinet Office)	<ul style="list-style-type: none"> ○ ImPACT Program (FY2014-FY2018) <ul style="list-style-type: none"> ▪ Tough Robotics Challenge http://www.jst.go.jp/impact/en/program/07.html ▪ Innovative Cybernic System for a ZERO intensive Nursing-care Society http://www.jst.go.jp/impact/en/program/05.html ▪ Bionic Humanoids Propelling New Industrial Revolution
Ministry of Education, Culture, Sports, Science and Technology: JST	<ul style="list-style-type: none"> ○ Program for Creating Startups from Advanced Research and Technology (START Program) http://www.jst.go.jp/start/en/index.html ○ Intelligent Information Processing Systems Creating Co-Experience Knowledge and Wisdom with Human-Machine Harmonious Collaboration http://www.jst.go.jp/kisoken/crest/en/research_area/ongoing/areah26-2.html ○ Ishiguro Symbiotic Human-Robot Interaction Project http://www.jst.go.jp/erato/ishiguro/en/ ○ Riken BSI-Toyota Collaboration Center http://btcc.brain.riken.jp/RIKEN_BSI-TOYOTA_Collaboration_Center/BTCC_English_Home.html

Annexe 4 : Liste non-exhaustive des entreprises japonaises impliquées dans la robotique

Société	Activités	Exemple de robot
Fanuc	<p>Fanuc est l'un des leaders mondiaux dans la production de robots industriels. La société possède trois secteurs d'activités : l'automatisation des usines, les robots et les machines robotiques. La majorité de leurs revenus proviennent du secteur automobile. En 2017, Fanuc a atteint le record de 500 000 robots produits.</p>	 <p>FANUC Robot CR-7iA</p>
Yaskawa	<p>Yaskawa est un acteur majeur de la robotique industrielle avec plus de 350 000 robots utilisés dans le monde. Depuis 2007, l'entreprise s'est lancée dans la production de robots de service (Smart Pal V).</p>	 <p>Smart Pal V Mecha-Gumby</p>
Kawasaki Heavy Industries	<p>Avec plus de 160 000 robots dans le monde, Kawasaki Heavy Industries est un fournisseur majeur de robots industriels et de systèmes d'automatisation robotique.</p>	 <p>MX350L Robot</p>
Cyberdyne	<p>Créée en 2004, Cyberdyne Inc. est une société spécialisée en robotique connue pour son modèle d'exo-squelette HAL.</p> <p>Le champ d'application d'HAL est large (domaine médical, aide au mouvement dans le domaine du bien-être, assistance pour les travaux lourds dans les usines et assistance pour les activités de sauvetage sur les sites sinistrés).</p>	 <p>HAL 5</p>

<p>Fuji Corporation</p>	<p>Fuji Corporation a créé un système d'assistance à la mobilité appelé Hug.</p>	 <p>The Hug robot is a white, compact, four-wheeled device with a black seat and handlebars, designed for mobility assistance.</p>
<p>Fujitsu</p>	<p>Fujitsu a développé plusieurs robots :</p> <ul style="list-style-type: none"> - le première modèle HOAP, un robot humanoïde miniature en 2001 - le robot ENON en 2005 - le Fujitsu Teddy Bear en 2010 	 <p>The ENON robot is a white, humanoid robot with a spherical head and a screen on its chest, standing on a circular base.</p>
<p>Hitachi</p>	<p>Hitachi est l'une des premières entreprises japonaises à se lancer dans la recherche en robotique au Japon dans les années 1960. Elle a présenté son premier robot en 1970.</p> <p>Aujourd'hui, Hitachi développe des robots de service humanoïdes communicants : EMIEW1, EMIEW2 et EMIEW3.</p>	 <p>The EMIEW2 robot is a red and white humanoid robot with a friendly, bear-like appearance, standing on a small base.</p>
<p>Komatsu Ltd.</p>	<p>Komatsu, l'une des plus grandes entreprises dans le secteur de la construction, se tourne vers les robots en développant des véhicules de chantiers autonomes grâce à un système appelé Autonomous Haulage System (AHS).</p>	 <p>The Autonomous Haulage Vehicle is a large yellow mining truck with a high-capacity dump body, displayed in an exhibition hall.</p>

<p>Mitsubishi Electric Corporation</p>	<p>Mitsubishi Electric Corporation a créé une série de robots industriels d'assemblage appelés MELFA.</p>	 <p>MELFA</p>
<p>Toshiba Machine Co.,Ltd.</p>	<p>Toshiba possède une large gamme de robots industriels : des robots d'assemblage et d'inspection SCARA, des robots articulés verticaux, des robots cartésiens etc.</p>	 <p>THE400</p>
<p>Yamaha Motor Co.</p>	<p>Yamaha a une division spécialisée dans les robots industriels depuis 1981. Ses robots sont utilisés pour l'assemblage d'appareils électriques grand public, le transport de pièces automobiles ou la production d'écrans à cristaux liquides...</p> <p>En 2015, Yamaha présentait un robot humanoïde automatisé « Motobot ».</p> <p>En mars 2018, Yamaha Motor a investi dans la société Néozélandaise <i>Robotics Plus</i>, spécialisée en robotique agricole.</p>	 <p>MOTOBOT</p>
<p>Denso Wave</p>	<p>DENSO a commencé à produire des robots en 1967. L'objectif initial était d'augmenter la productivité des usines de fabrication de composants automobiles.</p> <p>En 2005, le nombre de robots utilisés a atteint 15 000 unités.</p> <p>En 2017, DENSO présente un nouveau robot collaboratif COBOTTA.</p>	 <p>COBOTTA</p>

<p>Sony</p>	<p>Sony se lance dans la robotique dès 1999 avec son robot Aibo Dog, un robot de loisir dont la vente est stoppée en 2006 (150 000 robots vendus sur 7 ans).</p> <p>En novembre 2017, Sony annonce la reprise de la production de son robot, avec une nouvelle version améliorée.</p>	 <p>AIBO (2018)</p>
<p>Softbank Group</p>	<p>Softbank possède une filiale de conception et de fabrication de robots humanoïdes interactifs, Softbank Robotics, issue du rachat de la start-up française Aldebaran qui a développé les robots Nao, Romeo et Pepper.</p> <p>Le premier robot NAO est conçu en 2009, avec plus de 9000 robots vendus dans le monde.</p> <p>En 2009, Softbank lance le projet ROMEO, en collaboration avec des institutions et laboratoires de recherche, dans le but d’approfondir la recherche sur l’assistance aux personnes en perte d’autonomie.</p> <p>Softbank a ensuite développé les robots Pepper, déployés dans les boutiques Softbank en 2014 et rendus disponibles aux particuliers en 2015.</p>	 <p>Pepper</p>

Annexe 5 : Liste des universités et instituts japonaises possédant des laboratoires de recherche en robotique

<u>Chiba Institute of Technology</u>	<u>Chiba University</u>	<u>Chukyo University</u>	<u>Chuo University</u>
<u>Doshisha University</u>	<u>Gifu University</u>	<u>Gunma University</u>	<u>Hiroshima City University</u>
<u>Hiroshima University</u>	<u>Hokkaido University</u>	<u>Hosei University</u>	<u>Ibaraki University</u>
<u>Iwate University</u>	<u>Japan Advanced Institute of Science and Technology</u>	<u>Kagawa University</u>	<u>Kagoshima University</u>
<u>Kanazawa Institute of Technology</u>	<u>Kansai University</u>	<u>Kansei Gakuin University</u>	<u>Kanto Gakuin University</u>
<u>Keio University</u>	<u>Kinki University</u>	<u>Kobe University</u>	<u>Kochi University of Technology</u>
<u>Kogakuin University</u>	<u>Kumamoto University</u>	<u>Kyoto Institute of Technology</u>	<u>Kyoto University</u>
<u>Kyushu Institute of Technology</u>	<u>Kyushu University</u>	<u>Mie University</u>	<u>Nagaoka University of Technology</u>
<u>Nagoya Institute of Technology</u>	<u>Nagoya University</u>	<u>Nara Institute of Science and Technology</u>	<u>National Defense Academy of Japan</u>
<u>Nihon University</u>	<u>Nippon Institute of Technology</u>	<u>Okayama Prefectural University</u>	<u>Okayama University</u>
<u>Osaka Electro-Communication University</u>	<u>Osaka Institute of Technology</u>	<u>Osaka University</u>	<u>Ritsumeikan University</u>
<u>Ryukoku University</u>	<u>Saga University</u>	<u>Saitama University</u>	<u>Shibaura Institute of Technology</u>
<u>Shizuoka University</u>	<u>The Graduate University for Advanced Studies</u>	<u>The University of Electro-Communications</u>	<u>The University of Tokyo</u>
<u>Tohoku Bunka Gakuen University</u>	<u>Tohoku Gakuin University</u>	<u>Tohoku University</u>	<u>Tokai University</u>
<u>Tokyo City University</u>	<u>Tokyo Denki University</u>	<u>Tokyo Institute of Technology</u>	<u>Tokyo Metropolitan University</u>
<u>Tokyo Polytechnic University</u>	<u>Tokyo University of Agriculture and Technology</u>	<u>Tokyo University of Science</u>	<u>Toyohashi University of Technology</u>
<u>University of Fukui</u>	<u>University of Miyazaki</u>	<u>University of Tsukuba</u>	<u>University of Yamanashi</u>
<u>Wakayama University</u>	<u>Waseda University</u>	<u>Yamagata University</u>	<u>Yokohama National University</u>

Annexe 6: Liste des réformes réglementaires envisagées par le gouvernement dans le cadre de sa stratégie robotique

Action Plan - Cross-cutting issue (4) Implementation of Robot Related Regulation Reform-

<ul style="list-style-type: none"> ◇ Promote regulatory reforms that are well-balanced in both of deregulation and rule establishment aimed at robot utilization. ◇ <u>Sort out issues occasionally through "Robot Revolution Initiative".</u> Coordinate with government Regulatory Reform Council and implement comprehensive reform which look down on the related systems. <u>Construct a robot barrier-free society.</u>
<ul style="list-style-type: none"> ◆ Establishment of new radio wave utilization system that supports robot utilization (Radio Act) (Treating of radio used for remote controlling and unmanned robot such as the rule of sharing the frequency with existing radio wave systems and the simple procedure for radio station licenses) → <u>Implement necessary action serially after considering the requirement condition and technical review by 2016FY.</u>
<ul style="list-style-type: none"> ◆ Smooth pre-market review process for brand-new medical devices (The Act on Securing Quality, Efficacy and Safety of Pharmaceuticals, Medical Devices, Regenerative and Cellular Therapy Products, Gene Therapy Products, and Cosmetics) (Handling of new medical device which utilize robotic technique such as surgical robot which is expected to alleviate the burdens of patients) → Conduct smooth pre-market review for brand-new medical devices, <u>increase the ratio where medical devices are approved in the standard review period (10 months for priority items) up to 80 percentage</u> in 2018FY.
<ul style="list-style-type: none"> ◆ Reviewing the various legal systems related nursing care (Flexibility of the procedure that require to add the new nursing-care insurance devices which are currently carried out once in three years (Reception of the request and consideration that can respond to the technical innovation)) → From 2015, <u>MHLW receives the requests regarding the coverage of the nursing-care insurance system occasionally</u> and add <u>the new target items occasionally.</u>
<ul style="list-style-type: none"> ◆ Road Traffic Act and Road Transport Vehicle Act (electric personal assistive mobility devices use at public road) → in addition to the utilizing the relaxation of the standards for road transport vehicles, <u>based on the evaluation results of "Evaluation and Research Committee for Structural Reform Special Districts", which is planned to be conducted during FY2014, the way to deal with these assistive mobility devices will be considered, including whether to make the use of "Special System for Corporate Field Tests", which was created in 2014.</u>
<ul style="list-style-type: none"> ◆ Laws and Regulations related to uninhabited airborne robot(Aviation Law and the like) (Concrete rule about uninhabited airborne type robots (UAV) which is expected to be used at the disaster sites and the like) → As for the Large-size uninhabited aerial vehicles, <u>domestic rules will be established by participating the consideration of the revision of the international standards at International Civil Aviation Organization (ICAO) and based on such revision which is expected to take place in 2019 or later.</u> As for the small-size uninhabited aerial vehicles, while identifying their operational situation, further examination will be proceeded to the laws and regulations.
<ul style="list-style-type: none"> ◆ Laws and regulations related to public infrastructure maintenance and repair (Valid method for utilizing robot effectively (a rule related to the utilizing robot in checking where visual inspection is required) → <u>Through the based on the on-site verification results, trial, and evaluation,</u> examination will be proceeded about the method for utilizing robot. Based on the results, method will be applied to the fields where robots are to be utilized

Source: "Summary of Japan's Robot Strategy – Its vision, strategy and action plan", METI, 23/01/2015