



# MEASURING THE SUSTAINABILITY OF ABENOMICS

*Are Improved Returns for Japanese Companies Smoke and Mirrors?*

Minako Takaba, Yukie Shibano, Kenji Watanabe, and Diane Oh Hart

September 2016

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## EXECUTIVE SUMMARY

Following decades of recession and slow growth, Japan’s Prime Minister Shinzo Abe introduced a revitalization plan in 2012 –dubbed Abenomics – to address the key barriers of economic growth. In particular, the third “arrow” of Abenomics, the growth strategy, focused on a series of government-driven initiatives impacting corporations and capital markets. Among them was the establishment of Japan’s Stewardship Code and Corporate Governance Code. Implementation of these codes, also called Two Wheels, focused greater attention among Japanese companies and investors on corporate earnings capabilities. Constituents of the MSCI Japan Index as of August 16, 2016 showed return on equity (ROE) growth of 13% compound annual growth rate (CAGR) between FY2012 and FY2015.<sup>1</sup> However, questions remain as to whether the positive trends in earnings growth can continue and whether Japanese companies have fundamentally changed their practices to accelerate future growth.

MSCI ESG Research analyzed constituents of the MSCI Japan Index as of August 16, 2016 for trends in corporate governance, human capital and innovation. We found that while companies significantly improved their performance over key parameters,<sup>2</sup> in aggregate, Japanese companies still had a large gap to make up in order to match global peers in governance oversight and in human capital capacity. An intense competitive landscape has also raised the bar for Japan to keep up with the pace of innovation among global firms.

### KEY FINDINGS

- The number of constituents of the MSCI Japan Index with zero outside directors fell from 54 in 2014 after the Corporate Governance Code was introduced to three as of August 16, 2016. However, only 8% of the constituents had a majority independent board.
- Policy makers have pushed for greater female inclusion in the workforce, including setting a target of 30% women in leadership positions by 2020. Our analysis, however, indicated significant structural barriers to meeting this target. In sectors such as Energy and Materials, roughly 2% of managers were women. Our analysis indicated that many companies in these sectors are headquartered in regions facing severe childcare shortages, making it difficult to retain and develop the already small pool of female staff (13% of staff for Energy and 11% for Materials).<sup>3</sup>

<sup>1</sup> MSCI ESG Research calculated the CAGR based on Return on Equity by net income after tax divided by total equity which was sourced from Thomson Reuters on August 16, 2016.

<sup>2</sup> For example, among constituents of MSCI Japan Index (as of August 16, 2016), the number of companies with more than two outside directors has increased to 299 from 187 in 2014; Japan’s women’s employment rate has grown from 60.7% to 64.6% between 2012 and 2015.

<sup>3</sup> MSCI ESG Research collected data from company disclosures and Japan’s Ministry of Health, Labor and Welfare database of companies promoting women, as of July 2016. The regions facing severe childcare shortage are based on a childcare report published in April 2015 by the Ministry of Health, Labor and Welfare of Japan.

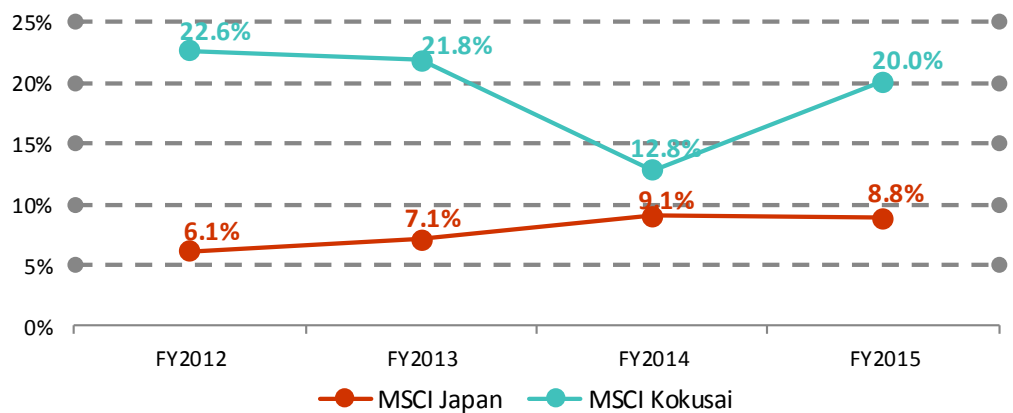
- Japanese companies enjoyed far greater exposure than global peers to opportunities arising from clean technologies. However, the trend in the number of patent filings per GDP was negative; and at 3.9% CAGR (2012-2015), growth in the R&D-to-sales ratio lagged the U.S. (16.9%), China (6.6%) and South Korea (4.5%) over the same timeframe.

## 1 TRACKING JAPAN’S ECONOMIC REVITALIZATION PLAN

In 2012, Prime Minister of Japan Shinzo Abe introduced new political measures for the country’s economic revitalization. Commonly referred to as Abenomics, the plan is based on three arrows: monetary policy, fiscal policy and economic growth strategy. Now moving into the third stage of Abenomics,<sup>4</sup> the economic growth strategy arrow of the recovery plan aims to encourage greater alignment of corporate governance practices with global standards, more efficient utilization of human capital to mitigate demographic crises, and more innovation to strengthen the country’s technological expertise in the fast-paced global market.

Based on MSCI ESG Research analysis, ROE<sup>5</sup> among constituents of the MSCI Japan Index as of August 16, 2016 averaged 13% CAGR for four years (FY2012-2015).<sup>6</sup> While the ROE gap between these Japanese companies and constituents of the MSCI Kokuasai Index as of August 16, 2016 has narrowed in that time frame, the Japanese companies persistently underperformed on average and by 9% versus 20% for the most recent fiscal year. It is unclear how much the narrowing performance gap reflects changes to Japanese company fundamentals and strategy, or whether it is a reflection of a short-term shift in emphasis towards more sustainable business models.

**Exhibit 1: ROE Comparisons: Constituents of MSCI Japan Index vs. constituents of MSCI Kokuasai Index (FY2012-2015)**



Source MSCI ESG Research, Thomson Reuters

<sup>4</sup> Prime Minister of Japan and Shinzo Abe’s Cabinet, Japan Revitalization Strategy, Revised in 2014 and 2016.

<sup>5</sup> MSCI ESG Research calculated the CAGR based on ROE by net income after tax divided by total equity which was sourced from Thomson Reuters on August 16, 2016.

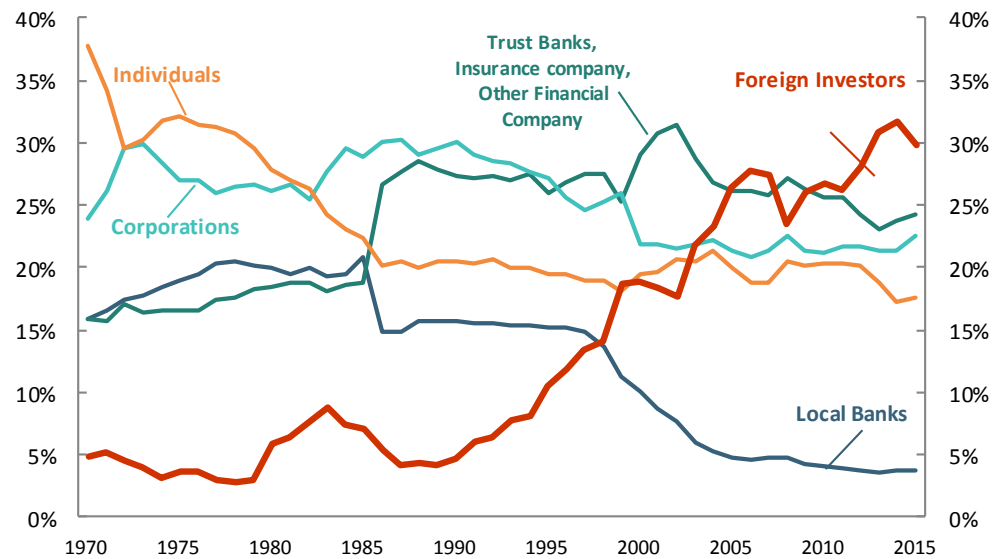
<sup>6</sup> ROE average of MSCI Japan Index and MSCI Kokuasai Index(FY2014-2015) are calculated retroactively based on constituents of MSCI Japan Index and MSCI Kokuasai Index as of August 16, 2016.

## 2 JAPAN’S CORPORATE GOVERNANCE REFORMS

### 2.1 FOCUS ON FOREIGN INVESTORS DRIVES DEMAND FOR GOVERNANCE REFORM

According to information from the Japan Exchange Group,<sup>7</sup> until the early 1990s, domestic corporations, banks and insurance companies were the main shareholders of Japanese companies, which culturally allowed for the widespread practice of cross shareholding and limited emphasis on board independence and expertise. However, over the last two decades foreign direct investment has been on the rise; foreign investors are now the largest shareholder group in Japan,<sup>8</sup> forcing Japanese companies to focus on adopting governance practices aligned with global standards. In fact, the Japan Exchange Group estimated foreign investors represented the largest single block of shareholders in the country (about 30% in 2015) if counted as a group.

Exhibit 2: Transformation of Japan’s shareholder structure



Source: Japan Exchange Group as of June 20, 2016

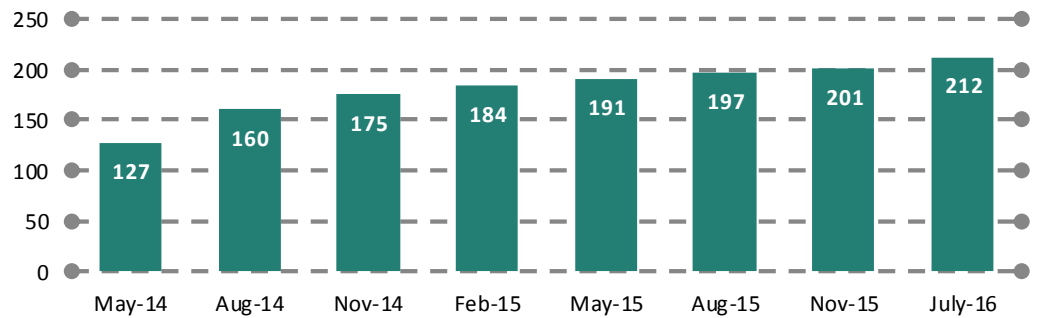
<sup>7</sup> Japan Exchange Group, 2015 Shareownership Survey (June 20, 2016)

<sup>8</sup> Japan Exchange Group, 2015 Shareownership Survey (June 20, 2016)

**2.2 TWO WHEELS: STEWARDSHIP AND THE GOVERNANCE CODE**

In February 2014, Japan’s Financial Services Agency introduced a stewardship code to improve stewardship and promote sustainable growth of Japanese companies with the support of institutional investors. By November 2015, more than 200 institutional investors had signed up to the Stewardship Code (Exhibit 3).<sup>9</sup>

**Exhibit 3: Number of institutional investors that have signed Japan’s Stewardship Code**



Source: Financial Services Agency of Japan

Following the launch of the Stewardship Code, Japan’s Corporate Governance Code was introduced in March 2015. The Governance Code applies a “comply or explain” approach and outlines 73 principles to guide corporations in establishing corporate governance structures that are more closely aligned with global norms on issues such as shareholder rights, board independence and expertise, and reporting transparency. Together with the Stewardship Code, these ‘Two Wheels’<sup>10</sup> were designed to increase investor confidence in corporate management, governance and growth strategy implementation.

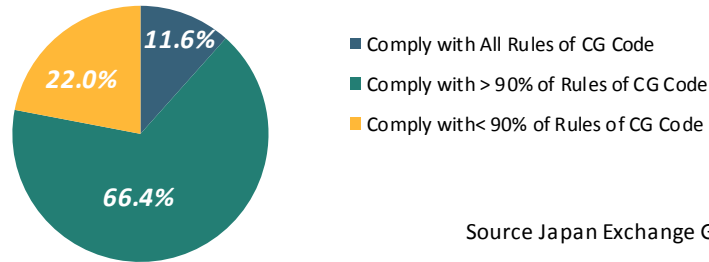
Japan Exchange Group’s reported data shows that by the end of December 2015, nearly 2,500 Japanese companies have submitted corporate governance reports in accordance with the Corporate Governance Code; 78% of these companies have reported their compliance to 90% or more of the Code’s principles (Exhibit 4).<sup>11</sup>

<sup>9</sup> Financial Services Agency of Japan, List of institutional investors signing up to “Principles for Responsible Institutional Investors” (July 28, 2016).

<sup>10</sup> Financial Services Agency of Japan, Corporate Governance Code follow-up council material submitted by Financial Services Agency of Japan (September 24, 2015). The Council of Experts Concerning the Follow-up of Japan’s Stewardship Code and Japan’s Corporate Governance Code expresses the Japan’s Corporate Governance Code and the Stewardship Code as “two wheels of a cart.”

<sup>11</sup> Japan Exchange Group (2016). Percentage of Japanese companies listed on the First and Second Sections of the Tokyo Stock Exchange which comply with Japan’s Corporate Governance Code of 73 “comply or explain” principles.

**Exhibit 4: Percentage of Japanese companies complying with Corporate Governance Code**



Source Japan Exchange Group

### 2.3 BOARD INDEPENDENCE INCREASED...

The key principles of Japan’s Corporate Governance Code relate to board and committee structures and call for an increase in the number of independent directors to at least two per board, aiming to carry out effective oversight of directors and the management from an independent and objective standpoint.<sup>12</sup>

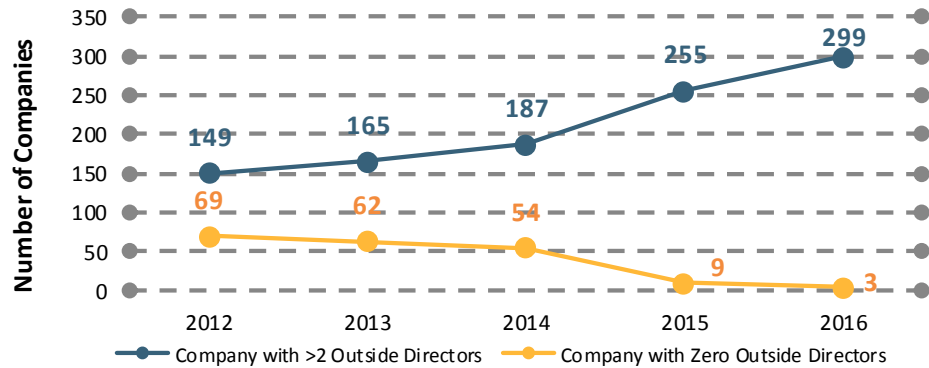
Based on MSCI ESG Research’s analysis on board independence, **among 317 constituents of the MSCI Japan Index as of August 16, 2016, about 94% of companies had appointed two or more external directors,<sup>13</sup> up from 60% in 2014.** However, given the average board of a company within the MSCI Japan Index comprised nearly eleven members, the requirement to appoint at least two outside directors does not bring Japanese boards significantly closer to gaining an independent majority.

<sup>12</sup> Financial Services Agency of Japan, Japan’s Corporate Governance Code (March 5, 2015) description in Section 4 in Responsibilities of the Board.

<sup>13</sup> Criteria of independence based on MSCI ESG Research’s definition. The number of Japanese constituents in MSCI World Index was 317 as of August 16, 2016. We did not include companies that had more than 2 outside directors before or during the 2012-2015 time frame, and not listed on the TSE until 2016 (also added to the index in 2016) as only listed companies are subjected to the code.



**Exhibit 5: Changes in board composition between 2012-2016 among constituents of MSCI Japan Index as of August 16, 2016**



Source: MSCI ESG Research

## 2.4 ...BUT STILL FELL SHORT OF GLOBAL PRACTICES

Despite the strong record of Corporate Governance Code compliance, MSCI ESG Research found that corporate governance practices of Japanese companies fell short of standards applied in other developed countries across several key metrics as of August 16, 2016.<sup>14</sup>

In particular, we found that a lack of independent board majority, gender diversity, independent chair and independent directors on key committees remained a common practice for a large majority of Japanese companies (Exhibit 6). In addition, cross shareholding<sup>15</sup> and poison pills, which are key metrics to assess companies' ownership and control practices, are still much more prevalent among Japanese firms than across companies in other developed countries.<sup>16</sup> Key findings of comparison on corporate governance practice<sup>17</sup> between constituents of the MSCI Japan Index and the MSCI Kokusai Index as of August 16, 2016 are outlined below:

- Based on MSCI ESG Research, only 8% of constituents of the MSCI Japan Index had board majority independence compared to 88% of the constituents of the MSCI Kokusai Index. The average percentage of independent directors for MSCI Japan

<sup>14</sup> These metrics are included in the construction of the MSCI Governance-Quality Index, which aims to reflect a strategy that seeks to capture both the financial and corporate governance aspects of Quality investing. The standards of corporate governance used in the index are selected based on relevance, objective, differentiation, universe, and coverage (see p.4 of MSCI GOVERNANCE-QUALITY INDEXES METHODOLOGY June 2015 ([https://www.msci.com/eqb/methodology/meth\\_docs/MSCI\\_Governance-Quality\\_Jun15.pdf](https://www.msci.com/eqb/methodology/meth_docs/MSCI_Governance-Quality_Jun15.pdf)). In Exhibit 6, Qualified Audit Opinion Key Metric is excluded from our analysis because only seven constituents of the MSCI Japan Index and the MSCI Kokusai Index received qualified audit opinions as of August 16, 2016.

<sup>15</sup> MSCI ESG Research categorizes the shareholding practice of two companies holding more than 0.5% of each other as cross shareholding.

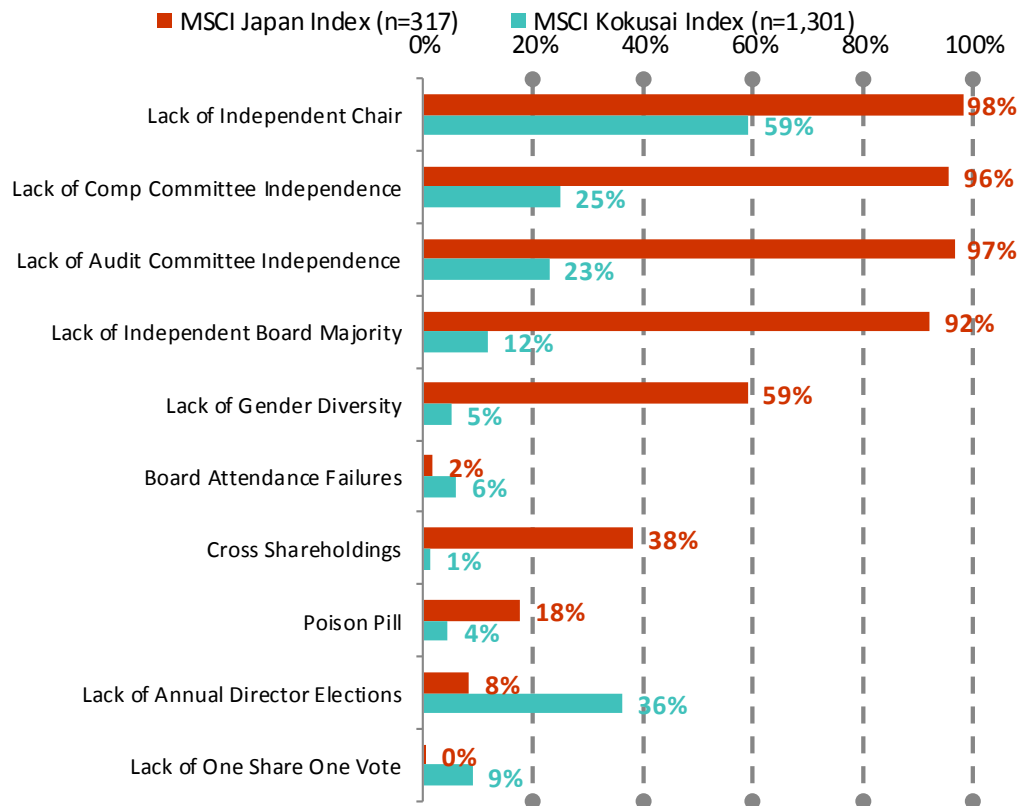
<sup>16</sup> In Exhibit 7, the peer countries are selected by the countries' market cap in the MSCI Kokusai Index as of August 16, 2016 (United States, United Kingdom, Canada, France, Switzerland, Germany, Australia, Hong Kong, and the Netherlands).

<sup>17</sup> All findings are based on MSCI ESG Research, GovernanceMetrics Research, as of August 16, 2016.

Index constituents was 25%, compared to 67% among the constituents of the MSCI Kokusai Index (Exhibit 7) as of August 16, 2016.

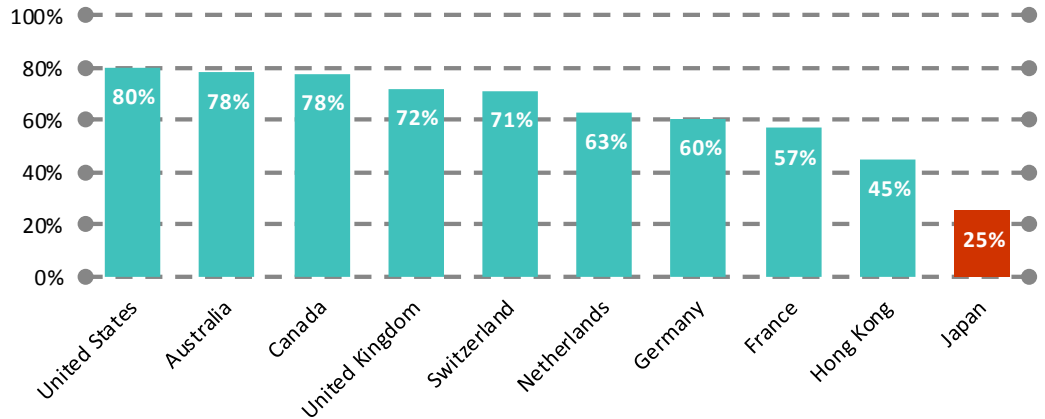
- Only 4% of the constituents of MSCI Japan Index compensation committees had full independence, while 75% of constituents of the MSCI Kokusai Index had solely independent compensation committees.
- Only 2% of constituents of the MSCI Japan Index had independent board chairs compared to 41% of constituents of the MSCI Kokusai Index.
- 38% of constituents of the MSCI Japan Index practiced cross shareholdings compared to 1% of constituents of the MSCI Kokusai Index.
- 18% of constituents of the MSCI Japan Index had implemented a poison pill, a practice seen only among 4% of constituents of the MSCI Kokusai Index.

**Exhibit 6: Key characteristics of corporate governance practices among constituents (MSCI Japan Index vs MSCI Kokusai Index) as of August 16, 2016**



Source: MSCI ESG Research

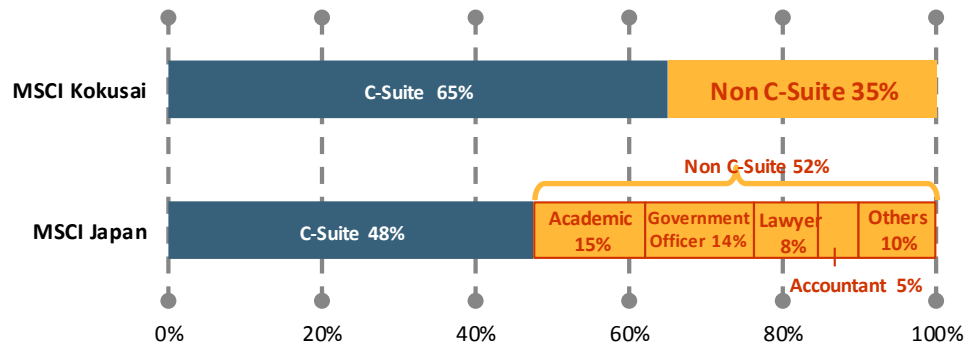
**Exhibit 7: Average board independence level of constituents (MSCI Japan Index vs. major developed countries of MSCI Kokusai Index as of August 16, 2016)**



Source: MSCI ESG Research, company disclosure

We also found differences in director backgrounds: **only 48% of the outside directors of constituents of the MSCI Japan Index have C-suite level experience (Exhibit 8), compared to 65% of outside directors of constituents of the MSCI Kokusai Index.**<sup>18</sup> Among the 52% of directors of MSCI Japan Index constituents without C-suite level experience, 42% had an academic background (including university professors, 15%), 14% were government officers, and 8% and 5% were lawyers and accountants, respectively.

**Exhibit 8: Outside directors' background profiles (MSCI Japan vs. MSCI Kokusai Index constituents)**



Source: MSCI ESG Research, company disclosure

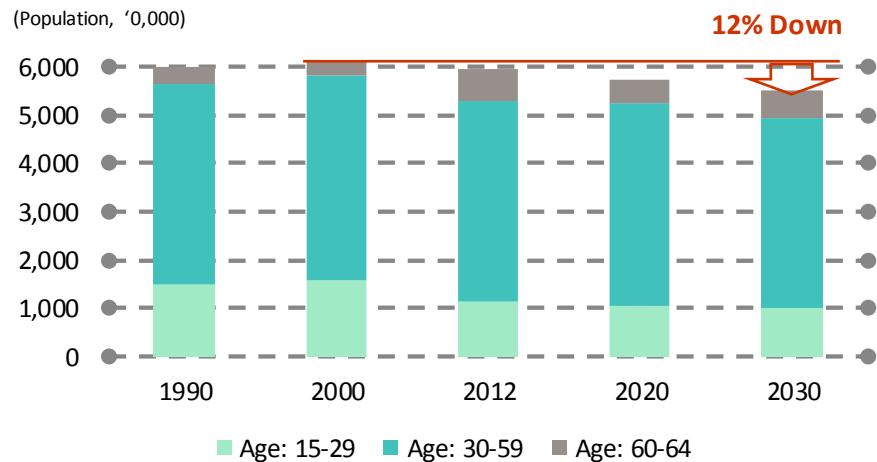
<sup>18</sup>Profiles of outside directors of constituents of the MSCI Japan Index are based on data as of August 2015, and profiles of outside directors of Japanese constituents of the MSCI Kokusai Index are based on end of June 2016 data with updates of appointed outside directors during the 2016 shareholder meeting season which took place mainly between January 1<sup>st</sup> 2016 and July 31<sup>st</sup> 2016.

### 3 JAPAN’S HUMAN CAPITAL FOCUS

Policy makers have developed initiatives to encourage greater female inclusion in the workforce, including setting **a target of 30% women in leadership positions by 2020**.<sup>19</sup> In October 2015, Prime Minister Abe advocated the ‘Plan for Dynamic engagement of All Citizens’ aimed at tackling Japan’s declining birth rate and ageing population to encourage economic growth. In particular, the plan aims to promote empowerment of women by strengthening parenting support, so more women can play an active role in Japanese society.<sup>20</sup>

Structurally, Japan’s human capital issues have been well documented. The working population (age 15-64) in Japan has been decreasing and is estimated to drop by approximately 12% in 2030 compared to 2000, with a skewed age ratio as a core problem for future employee supply. Women historically have been an underutilized source of labor in Japan, a gap which is emphasized by Abe’s reforms.<sup>21</sup>

**Exhibit 9: Japan’s working population (age 15-64)**



Source: Health, Labour and Welfare white paper 2015, Ministry of Health, Labour and Welfare’s global economic importance, and policy & business barriers

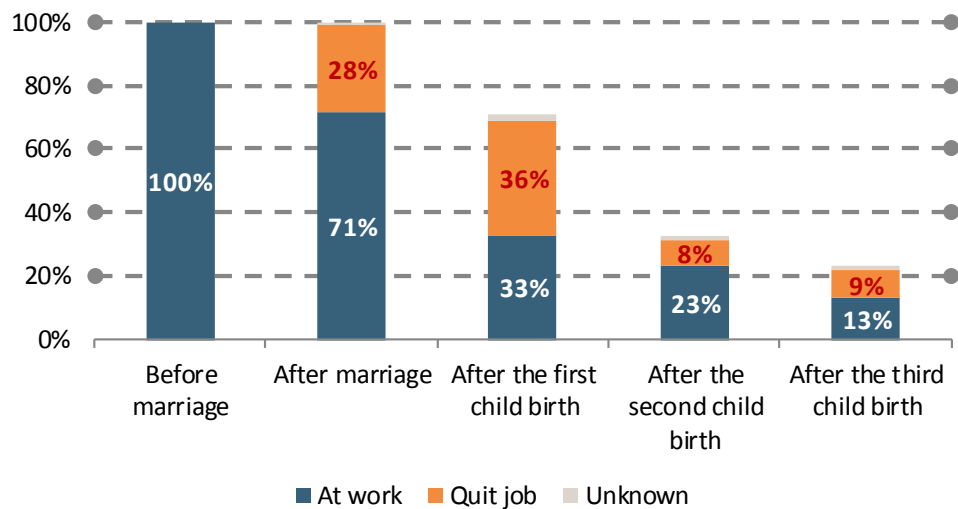
<sup>19</sup> Gender Equality Bureau Cabinet Office, Brochure depicting the activities of women empowerment target (March 2011)

<sup>20</sup> Cabinet Public Relations Office, Cabinet Secretariat, Information release on the Japan’s Plan for Dynamic engagement of All Citizens (October 16<sup>th</sup> 2015, last updated on August 2<sup>nd</sup> 2016)

<sup>21</sup> Notification of the law to promote women in workplace (November 20<sup>th</sup>, 2015). The notification describes in the background of the low enforcement that about 3 million women are out of work due to childcare or nursing care burdens, although they want to work, and women have not fully utilized their ability in workplace.

Shrinking the human capital gender gap, though, is likely to be a significant challenge. According to a white paper published by the Gender Equality Bureau Cabinet Office (2013), only 33% of women who had jobs before marriage continued working after having their first child, based on data collected between 2002 and 2012. The percentage of women who continued working dropped further during that timeframe as the number of children rose: 23% returned to work after the second child and only 13% sought employment after having the third child.<sup>22</sup>

**Exhibit 10: Drop in female employment after marriage and childbirth**



Source: Gender equality white paper, Gender Equality Bureau Cabinet Office (2013)

We examined these structural barriers for female utilization in the workforce, specifically reviewing how Japanese companies were either exposed to or have proactively removed limitations to career paths, childcare, and leadership opportunities.

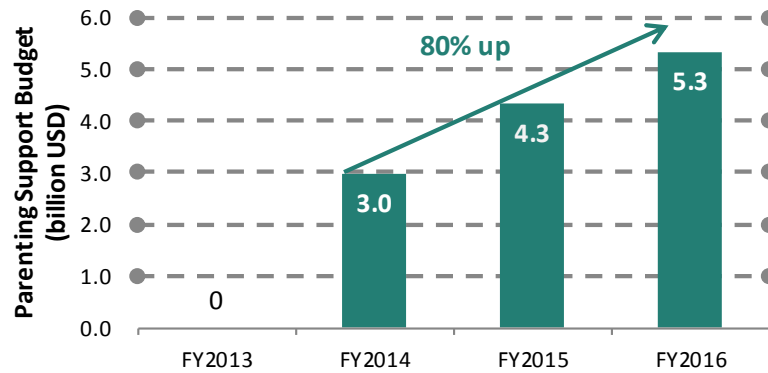
### 3.1 IMPROVING PROMOTION AND CHILDCARE OPTIONS ARE A FOCUS...

The central government and local administrations have taken up parenting support as a major agenda item. This is evidenced by an 80% increase in budgets for parenting support such as subsidies for childcare operation fees between FY2014 and FY2016 (Exhibit 11).<sup>23</sup>

<sup>22</sup> According to the white paper published by the Gender Equality Bureau Cabinet Office (2013), the statistics are based on the survey conducted by the Ministry of Health, Labor and Welfare in 2011. The survey covers women who had a job before marriage and got married between 2002 and 2011, and women who had a job before having children and had children between 2002 and 2011.

<sup>23</sup> Cabinet Public Relations Office, Cabinet Secretariat, Prime Minister Abe’s press conference material (July 12<sup>th</sup>, 2016).

Exhibit 11: Japanese government budgets for parenting support (billion USD)

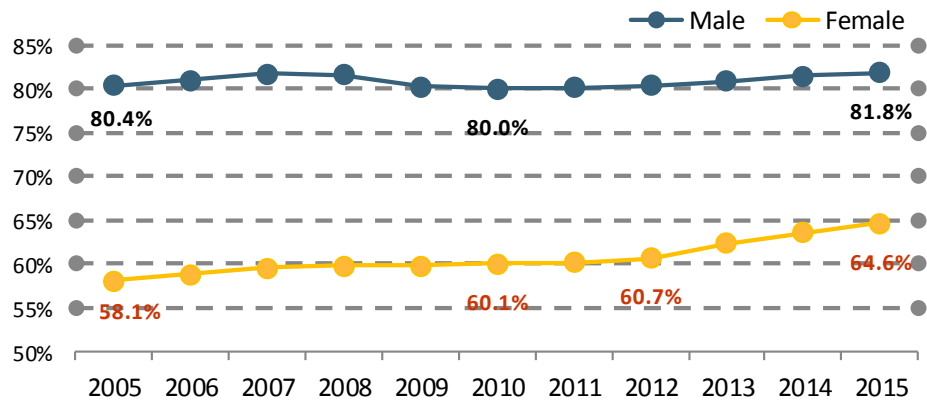


Source: Cabinet Public Relations Office, Cabinet Secretariat

Also, the Japanese government aims to strengthen female leadership in corporations as well as in congress and government with **a goal to increase the percentage of women in leadership roles to 30% by 2020.**<sup>24</sup> With such government-driven initiatives, women’s rate of employment has grown from 60.7% to 64.6% between 2012 and 2015. However, it is still lower than men’s employment rate, which averaged 81%.<sup>25</sup>

In April 2016, the Ministry of Health, Labour and Welfare (MHLW) established a law to help promote women in the workplace by requiring companies with more than 300 employees to develop a women’s empowerment plan.<sup>26</sup>

Exhibit 12: Employment rate trend, male vs female employees



Source: Labour Force Survey (2015), Statistics Bureau, Ministry of Internal Affairs and Communications

<sup>24</sup> Gender Equality Bureau Cabinet Office, Brochure depicting the activities of women empowerment target (March 2011)

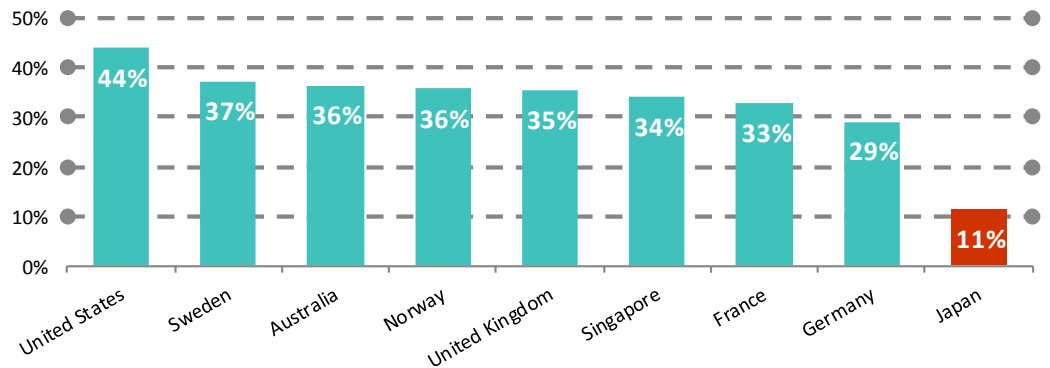
<sup>25</sup> Labour Force Survey (2015), Statistics Bureau, Ministry of Internal Affairs and Communications

<sup>26</sup> The law requires companies to disclose at least one of four data categories; women at hiring (%), difference in tenure between male and female employees, women in middle and senior management (%), and average overtime work hours per employee.

**3.2 ...BUT THE GLASS CEILING AND CHILDCARE ACCESS REMAIN BARRIERS**

Despite the recent government emphasis, according to The Japan Institute for Labour Policy and Training, as of 2014 the percentage of women in managerial positions in Japan was the lowest of several major developed market countries (Exhibit 13).

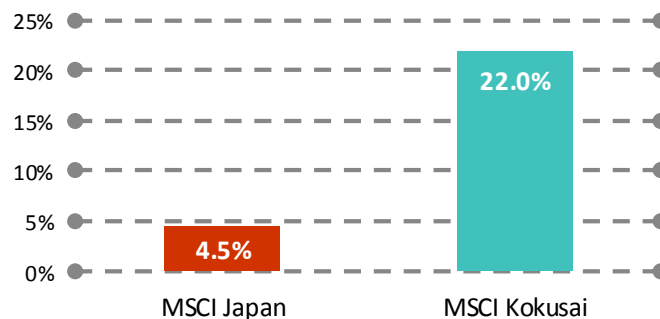
**Exhibit 13: Percentage of female managers in 2014 (Japan vs. major developed market countries)**



Source: Databook of International Labour Statistics 2016, The Japan Institute for Labour Policy and Training

The management gap may have additional effects, as female directorship positions also continued to show a wide and persistent gap against global peers. MSCI ESG Research found that of all directors serving on boards of constituents of the MSCI Japan Index, **only 4.5% were female** as of August 16, 2016 compared to 22% for constituents of the MSCI Kokusai Index. While certain countries' gender quotas may propagate larger female participation on the board, where gender diversity is not mandated the gaps were often large.

**Exhibit 14: Females as a percentage of total number of directors, constituents of MSCI Japan Index vs. constituents of MSCI Kokusai Index as of August 16, 2016**

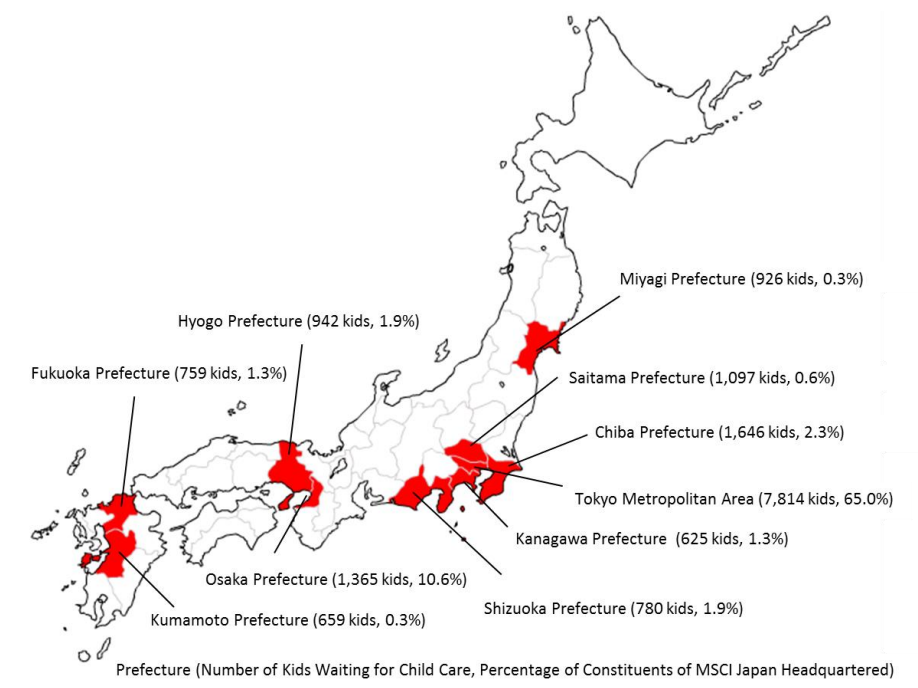


Source: MSCI ESG Research

Part of the gap may be the persistent cultural and structural barriers to access to childcare that would allow for deeper labor participation. Despite increased budgeting for childcare services, in many densely populated areas childcare continues to be largely unavailable.

Using headquarters address data from Shikiho as of March 31<sup>st</sup>, 2016 and childcare facilities situation data from the MHLW as of April 1<sup>st</sup>, 2015, we found that **about 86% of constituents of the MSCI Japan Index as of August 16, 2016 have headquarters in regions with severe shortages of childcare service.** We defined prefectures with more than 500 children waiting for childcare as regions that face severe shortages of these services (See Exhibit 15). For companies operating in such regions, this shortage may translate into the risk of losing trained and experienced female members of the workforce after childbirth. This risk affected all levels of management, including managerial and board positions, both areas prioritized by Prime Minister Abe’s reforms for increased female representation.

**Exhibit 15: Prefectures with severe shortages of childcare (in red)**



Source: Report on childcare situation (April 1<sup>st</sup>, 2015), Ministry of Health, Labor and Welfare, Shikiho 2016 Spring (March 31<sup>st</sup>, 2016), Toyo Keizai, Inc.

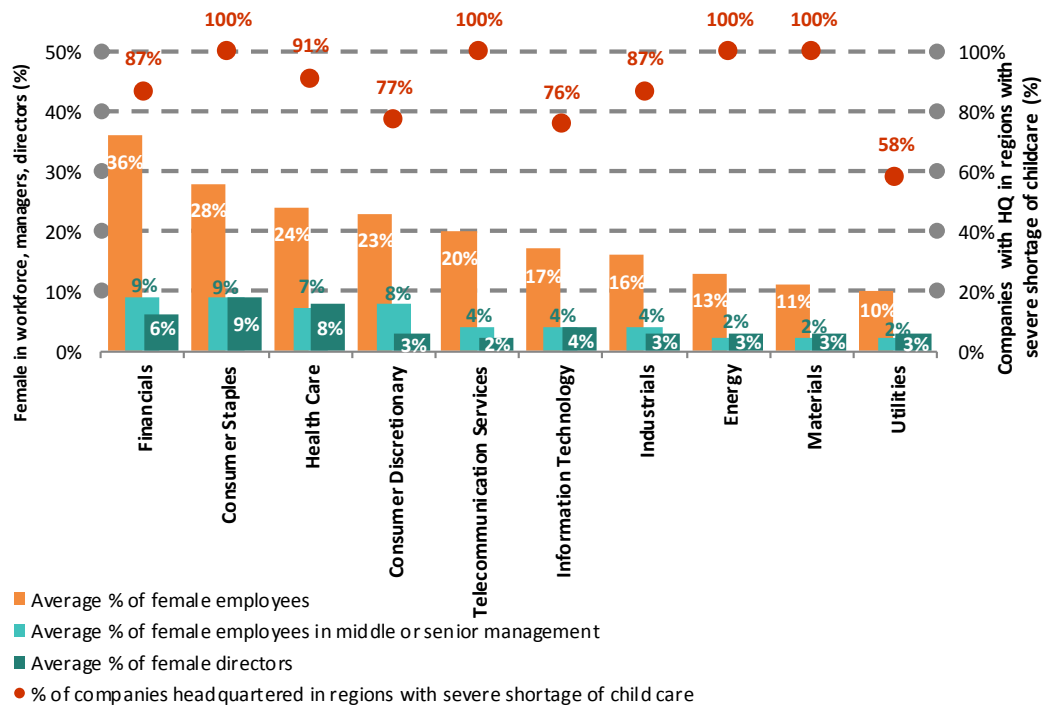
We overlaid female director data from MSCI ESG Research and female management data from MHLW’s database of companies promoting women and company disclosure as of July 2016 with data from Shikiho and the MHLW (see Exhibit 15). We found specific sectors may have acute difficulties utilizing female labor. We also found companies in the **Energy, Materials, and Utilities sectors had relatively few female managers compared to other sectors** among constituents of the MSCI Japan Index as of August 16, 2016. Also, 100% of companies in Consumer Staples, Telecommunication Services, Energy, and Materials sectors



were headquartered in regions with severe shortages of childcare services, **and face relatively high future risk of losing experienced female workforce after childbirth.**

Lastly, the **Financials sector had more women in the workforce, but had the largest gap of female inclusion in manager and director positions; in addition, 87% were headquartered in regions with severe childcare shortages as of April 1<sup>st</sup>, 2015.** This may also indicate a higher risk of losing female workers.

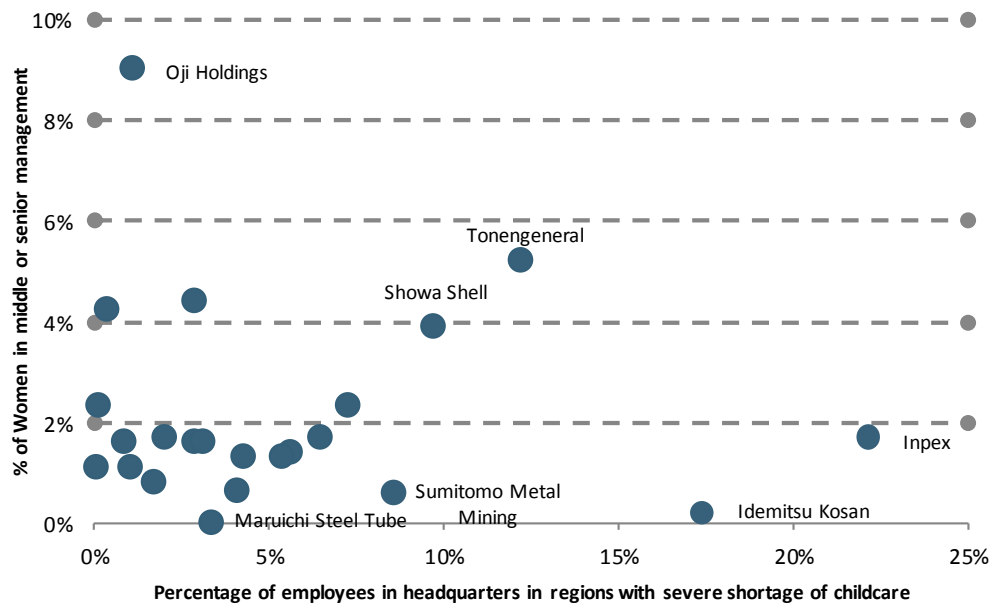
**Exhibit 16: Percentage of female among total employees, managerial roles, and director positions by sector vis-à-vis location of corporate headquarters in regions with severe childcare service shortages (constituents of MSCI Japan Index as of August 16, 2016)**



Source: MSCI ESG Research, Database of companies promoting women, Ministry of Health, Labor and Welfare, Company disclosure as of July 2016, Report on childcare situation (April 1<sup>st</sup>, 2015), Ministry of Health, Labor and Welfare, Shikiho 2016 Spring (March 31<sup>st</sup>, 2016), Toyo Keizai, Inc.

Focusing on industries with the lowest female workforce participation - Energy, Materials, and Utilities Sectors – we identified **Inpex**, **Idemitsu Kosan**, and **Sumitomo Metal Mining** as potential outliers. A shortage of childcare services in prefectures where these companies are based therefore could continue to constrain human capital supply.

**Exhibit 17: Distribution of Japanese companies in Energy, Materials, and Utilities Sectors by percentage of employees based in headquarter offices in regions with severe shortage of childcare service and percentage of women in managerial positions**



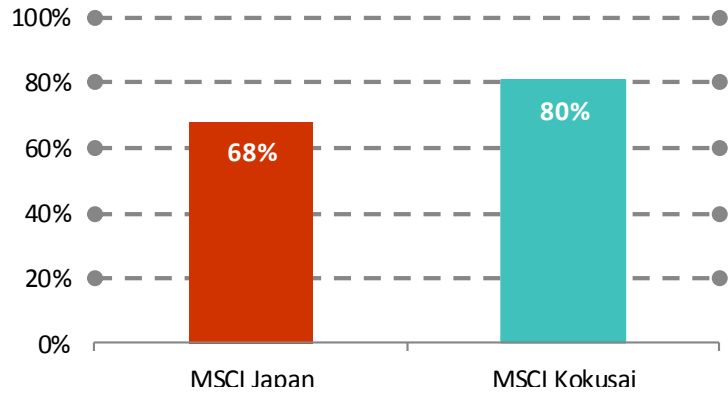
Source: MSCI ESG Research, Database of companies promoting women (Ministry of Health, Labor and Welfare), Company disclosure as of July 2016

Under the economic revitalization plan and the goal to increase female participation in corporate activities, Japanese companies are required to strengthen their programs to support employees’ work-life balance<sup>27</sup> and establish a corporate culture where diversity is included.<sup>28</sup> However, the percentage of constituents of the MSCI Japan Index that we observed to have diversity, inclusion or anti-discrimination policies remained below that of global peers (68% of constituents of MSCI Japan vs 80% of MSCI Kokusai Index as of August 16, 2016).

<sup>27</sup> Article 4 of the law to promote women in workplace that took effect on April 1<sup>st</sup>, 2016

<sup>28</sup> Section 2-1-6 of the guideline of action plan for promoting women in workplace based on the law to promote women in workplace (November 20<sup>th</sup>, 2015)

**Exhibit 18: Percentage of companies with anti-discrimination, diversity, and inclusion policies (constituents of MSCI Japan n=317, constituents of MSCI Kokusai Index n=1,301 as of August 16, 2016)**

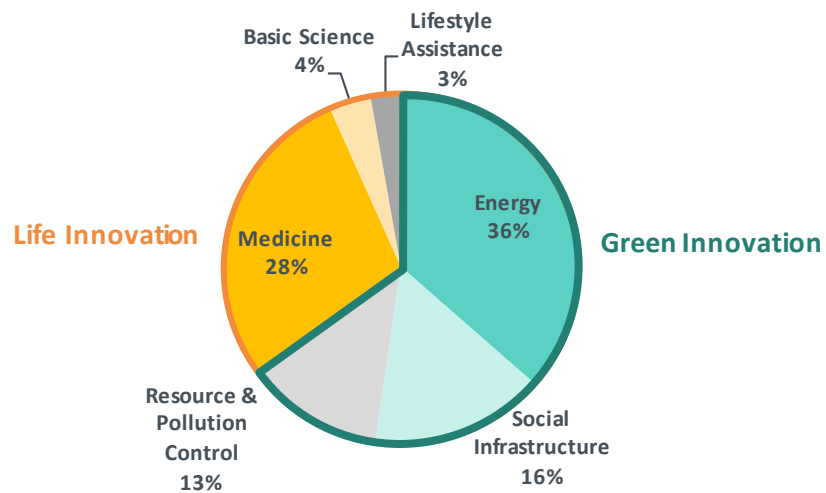


Source: MSCI ESG research

## 4 FUTURE GROWTH THROUGH INNOVATION

The growth strategy arrow of Abenomics aims to stimulate innovation as a way to encourage long-term progress and development. In 2016, 36% of the government innovation support budget (USD 500 million equivalent) under the Cross Ministerial Strategic Innovation Program (SIP)<sup>29</sup> was allocated to the development of energy technology (e.g., hydrogen energy), 28% toward medical applications (e.g., anti-carcinogenic drugs), and 16% toward social infrastructure (e.g., smart grid).<sup>30</sup>

Exhibit 19: Abenomics focus areas for innovation



Source: Strategic Innovation Program, MSCI ESG Research

### 4.1 JAPAN SHOWED LEADERSHIP IN GREEN INNOVATION, PARTICULARLY ENERGY EFFICIENCY...

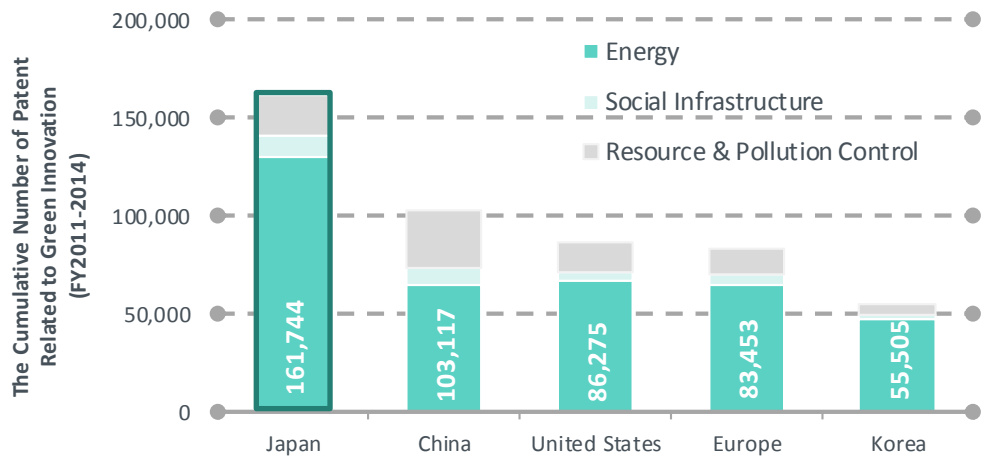
We assessed the number of patent applications as a proxy for technology development. Porter and Stern for the Harvard Business Review assert that international patents constitute the best available measure of innovation that is consistent across time and location.<sup>31</sup>

<sup>29</sup> The Cross-Ministerial Strategic Innovation Promotion Program (SIP) is a national project for science, technology and innovation, spearheaded by the Council for Science, Technology and Innovation as it exercises its headquarters function to accomplish its role in leading science, technology and innovation beyond the framework of government ministries and traditional disciplines.

<sup>30</sup> Cabinet Office, Strategic Innovation Program, Science and Technology Related Budgets for FY2016

<sup>31</sup> Michael E. Porter and Scott Stern, Harvard Business Review, National Innovative Capacity (2012)

**Exhibit 20: Patents filed in green innovation areas**



Source: Japan Patent Office, MSCI ESG Research

Based on patent filing data from Japan Patent Office (JPO) research on the World Patent Index,<sup>32</sup> Japan’s cumulative green innovation patent filings as defined by the JPO outnumbered other industrialized countries during Fiscal Years 2011-2014.<sup>33</sup> Over the same period, Japan’s patent filings on green innovation grew by 5% CAGR. We note that about 80% of Japanese green innovation patents during this time involved energy technology, including power generation (e.g., solar, wind), energy efficiency (e.g., hybrid electric vehicle, smart grid) and energy storage (e.g., lithium ion battery, hydrogen),<sup>34</sup> ensuring **Japan’s leading position in energy efficiency areas.**

Of the 127 constituents of the MSCI Japan Index that operate in sectors with strong potential for clean technology development and market positioning in FY2014/2015,<sup>35</sup> about 50% were involved in solar power, 35% in battery and hybrid vehicles, 25% in smart grid, wind and LED lighting, and 20% in fuel cell and hydrogen energy, all of which ranked above peer constituents on the MSCI Kokusai Index (Exhibit 21). Approximately 10% of constituents

<sup>32</sup> Japan Patent Office researched the number of patents filed by country covering Japan, China, United States, Europe and Korea during 2006 and 2015. The number of patents filed by country is defined as the patents that are publicly disclosed and recorded on Derwent World Patent Index as of March 2015.

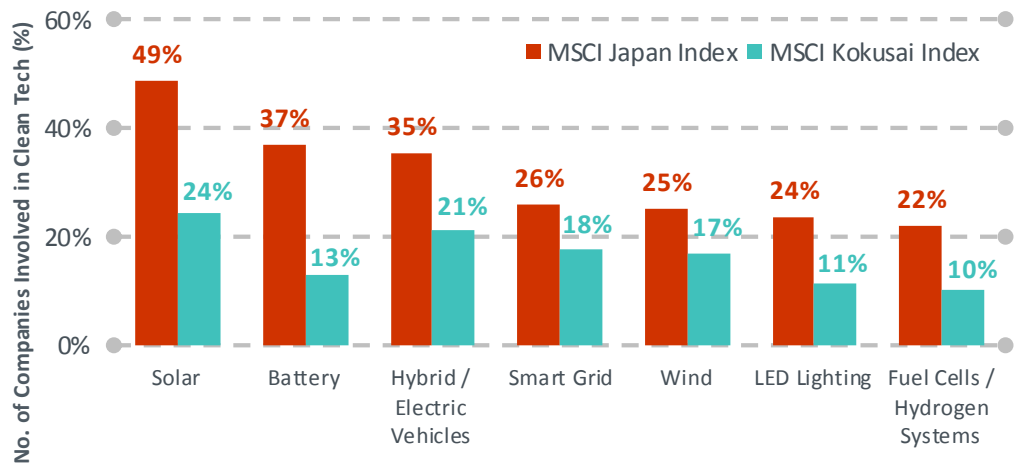
<sup>33</sup> Japan Patent Office, The Status of Patent Applications in Green Innovation and Life Innovation Areas (February, 2015)

<sup>34</sup> Japan Patent Office, The Overview of Patent Applications in Green Innovation and Life Innovation Areas (February, 2015)

<sup>35</sup> We defined “Strong potential” as Japanese companies assessed with Opportunities in Clean Tech in the MSCI ESG Ratings model. 127 Japanese constituents in MSCI World Index as of August 2016 met this criteria.

in the MSCI Japan Index were involved in the areas of Energy Efficiency and Green Building at the level of core business focus (defined as deriving over 20% of revenue from technologies such as batteries, hybrid vehicles, and LED lighting), again well above the constituents in the MSCI Kokusai Index (2%). For instance, **GS Yuasa** purely focused on the lithium ion battery, **Toyota** has a core business strategy on hybrid electric vehicles, and **Ushio** derived 35% of revenues from LED lighting. Overall, the involvement in and development of these key clean tech businesses were significantly higher for Japanese companies than for their counterparts in the MSCI Kokusai Index.

**Exhibit 21: Involvement of Japanese constituents in MSCI World Index in renewable energy, energy efficiency and green building materials**



Source: MSCI ESG Research, Company disclosure

#### 4.2 ...BUT SOCIAL INNOVATION LAGGED, AND R&D FOCUS SLOWED.

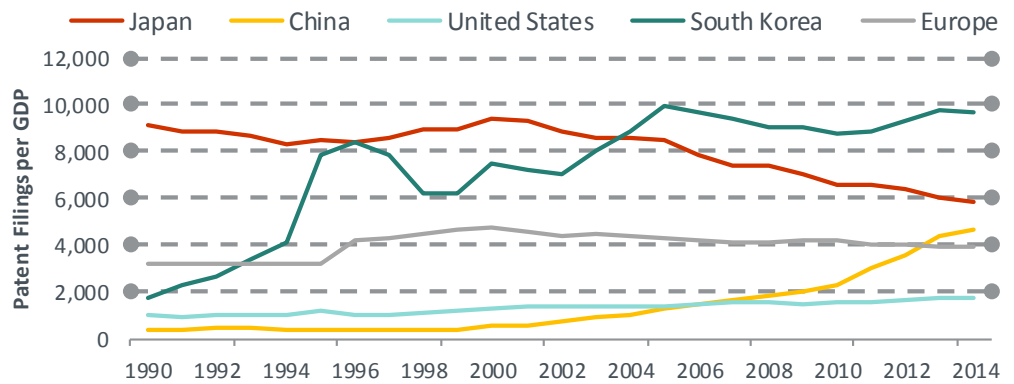
The World Intellectual Property Organization (WIPO) statistics on patent applications under the Patent Cooperation Treaty per 100 billion USD GDP showed that the size of the economy and level of development were reflected in differences in patent activity.<sup>36</sup> Based on these statistics, Japan had maintained the number of resident patent applications relative to GDP at the ten year average of 8,793 per USD 100 billion GDP with 0.6% CAGR during the 1990s. From 2000 to 2014, Japan showed a -3.31% CAGR decreasing trend, while the other

<sup>36</sup> World Intellectual Property Organization, IP Data Center, Total count by applicant's origin (equivalent count), resident applications per 100 billion USD GDP (2011 PPP) Note: 2011 Purchasing Power Parities (PPPs) were used as currency converter to compare the size of economies.

countries in the statistics including China, the U.S., South Korea and Europe maintained or increased their growth rate. It remains to be seen whether the green innovation strategy under Abenomics’s growth strategy will lead to a sustainable change in Japanese firms’ fundamental capacity for innovation.

**Exhibit 22: Growth of patent filings per GDP by country**

*Change in the number of PCT international applications per 100 billion USD GDP by applicant’s country of origin (1990-2014)*



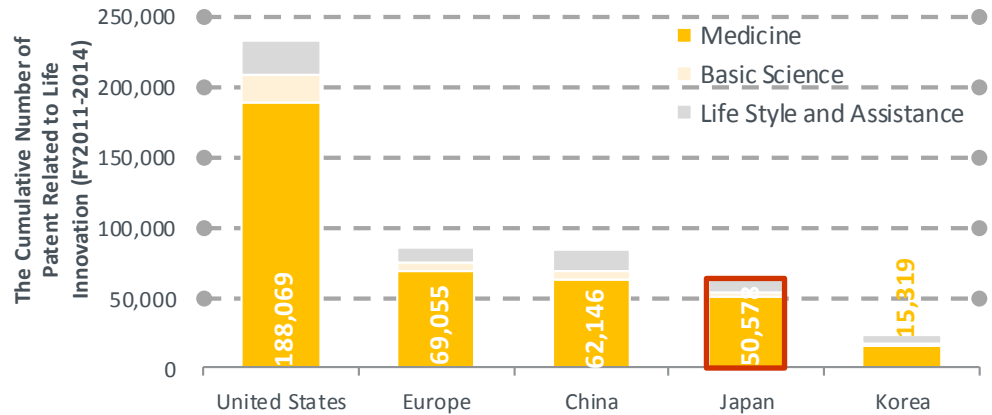
Source: World Intellectual Property Organization, MSCI ESG Research

**While Japanese companies led in the area of green innovation, patent applications in the life and social areas lagged U.S., European and Chinese firms,** according to JPO Research.<sup>37</sup> The life innovation patents, which include medical applications (e.g., pharmacy, diagnostic apparatus), basic science (e.g., human genome, epigenetics) and life style assistance (e.g., hearing aids, wheel chairs).<sup>38</sup> During FY2011-2014, Japan’s patent filings on life innovation grew by 0.1% CAGR. This could prove to be a significant shortcoming given the proportion of Japan’s ageing population that might benefit from social innovation.

<sup>37</sup> Japan Patent Office, The Status of Patent Applications in Green Innovation and Life Innovation Areas (February, 2015)

<sup>38</sup> Japan Patent Office, The Overview of Patent Applications in Green Innovation and Life Innovation Areas (February, 2015)

Exhibit 23: Patents filed in life innovation areas



Source: Japan Patent Office, MSCI ESG Research

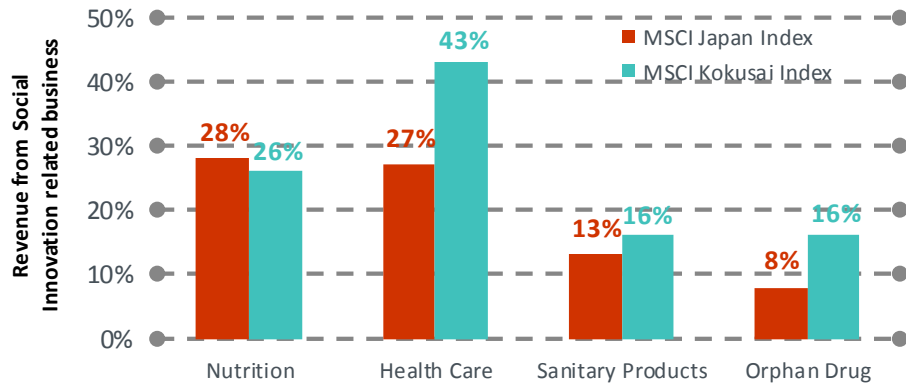
Using MSCI ESG Sustainable Impact Metrics,<sup>39</sup> we identified the percentage of revenues derived from socially impactful business activities, such as nutritious products, health care equipment, sanitation products and orphan drugs.<sup>40</sup> We found that the constituents of the MSCI Japan Index had a higher percentage of revenue from nutritious Foods, but had lower revenues from the health care, sanitary products and orphan drugs compared to MSCI Kokusai Index constituents. Combined with the fewer patent filings in these areas, **Japanese firms may have less strategic emphasis and capacity to capitalize on the opportunities derived from social and welfare needs** relative to other countries in the MSCI World Index.

<sup>39</sup> MSCI ESG Sustainable Impact Metrics are designed to identify companies with products or services that address at least one of the major social and environmental challenges as defined by the UN Sustainable Development Goals. Designed as a positive screen, these metrics look to highlight companies that are deriving revenue from products and services that may have a positive impact on society and the environment.

<sup>40</sup> Nutrition Food includes products and services classified under the basic products category, as defined by Choices International. According to Choices International, basic products refer to those products that contribute to the daily intakes of essential nutrients while non basic are not needed to fulfill our daily requirements; Health Care represents major diseases treatment that includes drugs and healthcare equipment used to treat the world’s major diseases; Major diseases include those diseases with the highest daily adjusted life year as well as orphan diseases and tropical neglected diseases; Sanitary products include products and services used for basic sanitation including oral care (toothbrush, toothpaste), detergents, water purifiers, et al. Orphan drugs refer to treatments for orphan diseases which affect about 1 in 1,500 people, as defined by the U.S. Food & Drug Agency.



**Exhibit 24: Revenue from social innovation related business in total revenue (MSCI Japan vs. MSCI Kokusai)**

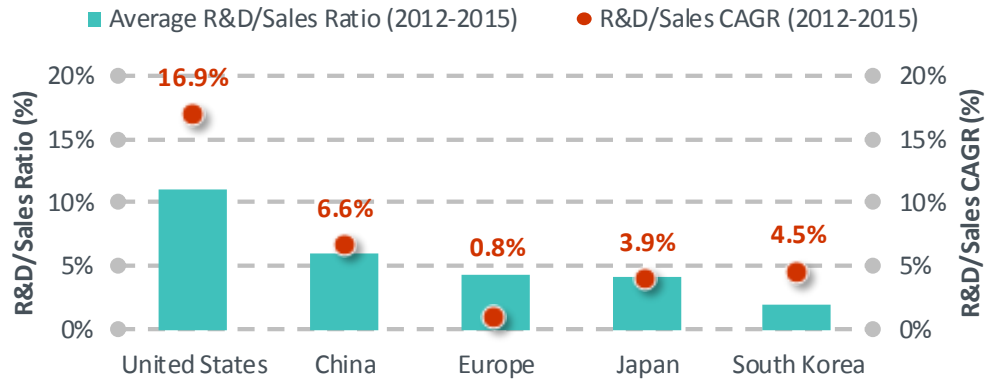


Source: MSCI ESG Research, Company disclosure

Based on our comparative analysis of R&D/Sales between Japan and peer countries,<sup>41</sup> despite a large number of patents filed on an aggregate level for the green innovation technologies, constituents of the MSCI Japan Index had maintained an average 4.1% R&D/Sales ratio during FY2012 through FY2015, below the U.S. (11.1%) and Chinese (6.0%) constituents, and demonstrated a 3.9% CAGR growth of R&D investment per sales in the same time period, trailing their U.S. (16.9% CAGR) and Chinese (6.6% CAGR) peers. This trend may indicate that the **innovation quotient remained unchanged and, if anything, lagged the capitalization and revenue generation** needed to sustain the growth demands of investors.

<sup>41</sup> Japan represents the average R&D/Sales of constituents in MSCI Japan Index, United States and Europe represent the average R&D/Sales of constituents in MSCI Kokusai Index, China and South Korea represent the average R&D/Sales of constituents in MSCI ACWI Index.

Exhibit 25: R&D/Sales Comparison (Japan vs. Peer Countries)



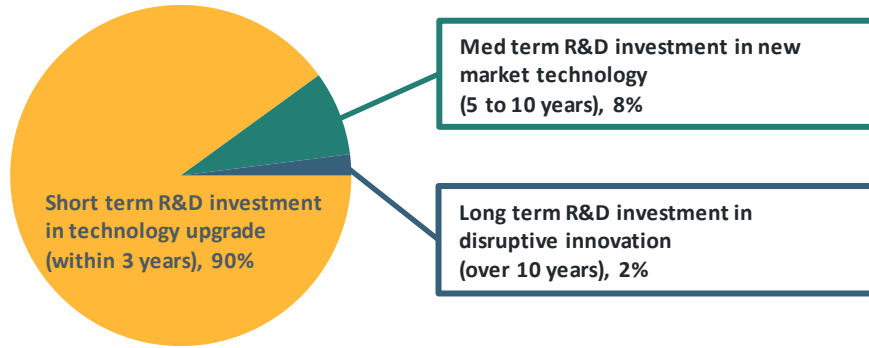
Source: MSCI ESG Research, Thomson Reuters

The flat trend in R&D investments per sales in Japan could be partly attributed to the nature of R&D investment. Based on the National Energy Development Organization survey of Japanese corporations, around 90% of R&D expenses were dedicated to short term investments to upgrade the existing technology models (e.g., cyclical updates in smart phones), and around 8% were invested in medium-term range technology (e.g., auto-driving cars).<sup>42</sup> Only about 1-2% of R&D expenses were spent on long term R&D investment in disruptive innovation, which is expected to take more than 10 years to create and capitalize on the market opportunities (e.g., quantum dot solar cells).<sup>43</sup>

<sup>42</sup> Ministry of Economics, Trade and Industry, Survey on Med to Long Term R&D Investment for Innovation among Japanese Companies (2011)

<sup>43</sup> Ibid

**Exhibit 26: The nature of R&D Investment**



*The nature of R&D investment is defined based on survey conducted by Ministry of Economics, Trade and Industry in 2010 with 50 companies.*

*Source: Ministry of Economics, Trade and Industry, MSCI ESG Research.*

While Japanese companies have significantly improved their performance on key parameters associated with corporate governance, gender equality and innovation, they still have some way to go to match global peers. An intense competitive landscape has also raised the bar for Japan to keep up with the pace of innovation among global firms.

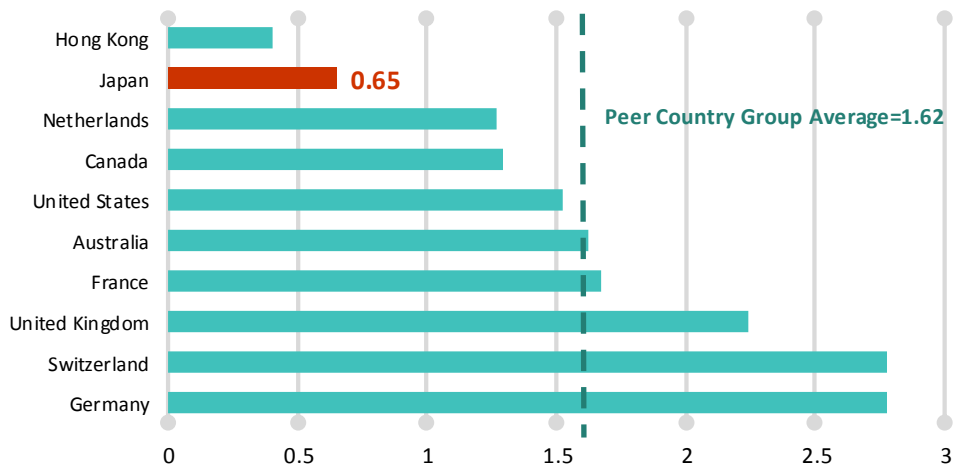
## APPENDICES

The Appendices below provide an additional overview of Japan’s ESG Government Rating, and the performance of Japanese companies on managing ESG-related risks and opportunities (MSCI ESG Rating), involvement in controversial business lines (MSCI ESG Business Involvement Screening) and events (MSCI ESG Controversies). In addition, we include the assessment of Accounting and Governance Risk for Japanese constituents in the MSCI World Index.

### APPENDIX A: MSCI ESG CONTROVERSIES

Based on the MSCI ESG Controversies assessment, which analyzes involvement in controversial events for constituents in the MSCI Japan Investable Market Index (IMI) (n=1,216 as of July 29, 2016), Japanese companies on average have seen fewer ESG controversies per company than global peers over the 18 months between January 2014 and July 2016.

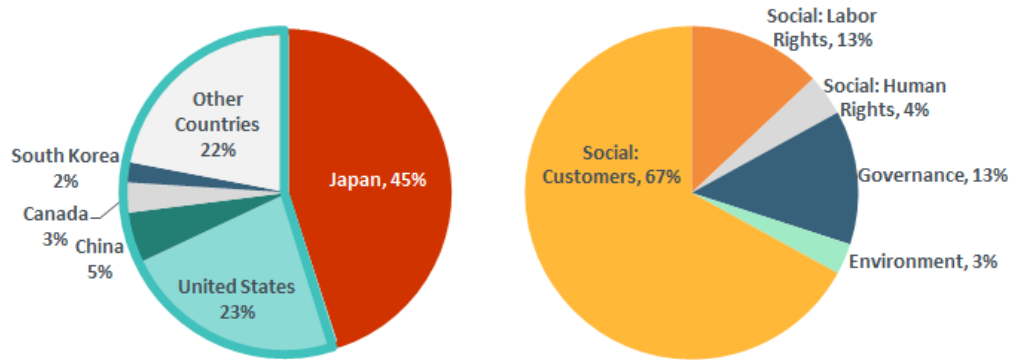
**Exhibit 27: Controversies per company by country (January 2014 – July 2016)**



Source: MSCI ESG Research as of July 29, 2016

Between January 2014 and July 2016, Japanese companies included in the MSCI ACWI IMI Index were involved in 784 controversies; 45% of these controversies took place in the home country, and the rest occurred in close to 40 countries and regions outside of Japan, in particular in the U.S. (Exhibit 28).

**Exhibit 28: Distribution of controversies involving Japanese companies by location of occurrence and by theme (n=784)**



Source: MSCI ESG Research

Customer-related controversies, under the Social pillar, accounted for 67% of all recorded controversial events involving Japanese companies. We view customer-related controversies as among the most significant as they may affect brand positioning and therefore revenue and market share, and can also lead to additional costs related to product recalls, settlements and remediation actions.

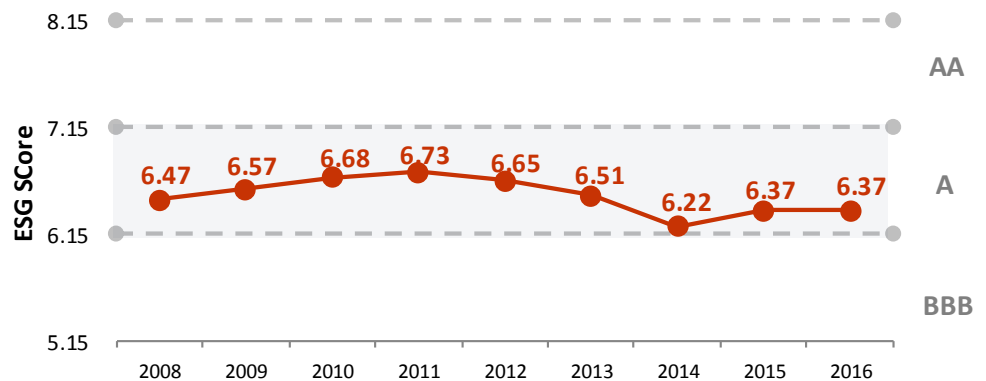
**Most prominent consumer-related controversies involving Japanese companies in MSCI Japan IMI Index constituents (as of July 2016)**

Company	Year	Impact	Cost
Olympus Corporation	2012	11 fatalities and over 350 patients having suffered bacterial infections	Pending lawsuits by impacted patients and their families and regulators' scrutiny
Takata Corporation	2004	14 fatalities and over 100 injuries; millions of defective airbags recalled worldwide; the number of recalls estimated to affect 120 million cars	Pending lawsuits and USD 250 million of regulators' penalty
Hitachi, Ltd	2013-14	Price-fixing over starter motors, fuel injection systems and ignition coils	USD 250 million in penalties and fines

## APPENDIX B: MSCI ESG GOVERNMENT RATING

MSCI ESG Government Rating evaluates sovereign entities' environmental, social and governance risks. Japan has maintained **A** rating since 2008 due to strong political governance, human and knowledge capital development, as well as robust educational and health care infrastructure. However, Japan continues to face a high degree of energy security risk and places excessive reliance on fossil fuels. In addition, Japan displays weak financial governance performance. At 223% of its GDP, Japan has high public debt, one of the highest globally, and its ageing level is also higher than its global peers, with a young and old age support ratio of 0.5.

Exhibit 29: Japan's Government Rating and ESG Score, 2008 - 2016



Source: MSCI ESG Research as of January 2016

Exhibit 30: Comparison of Japan to Global Markets, Developed Markets and East Asia based on key MSCI ESG Government Rating parameters

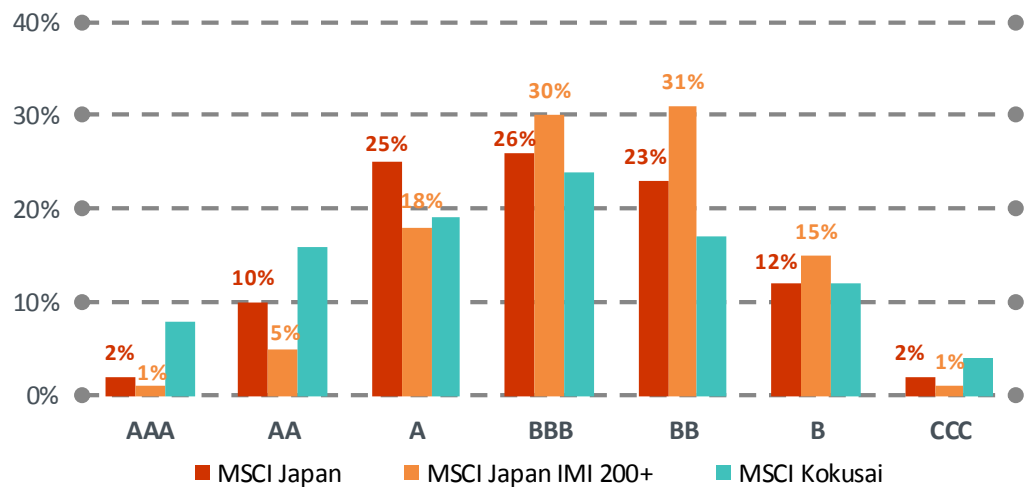
ESG Parameters	Japan	Global	DM	EA
Energy consumption per capita (kgoe/capita/year)	3,539	3,350	4,240	2,360
Proven fossil and nuclear fuel reserves (TJ/person)	0.1	19.2	10.2	5.7
Renewable energy (% of total energy consumption)	3%	5%	8%	4%
Income inequality (GINI, higher => more inequality)	32.1	36.8	33.7	37.5
Young and old age support ratio	0.5	0.23	0.34	0.16
Public debt (% of GDP)	223%	58%	81%	50%

Source: MSCI ESG Research as of January 2016

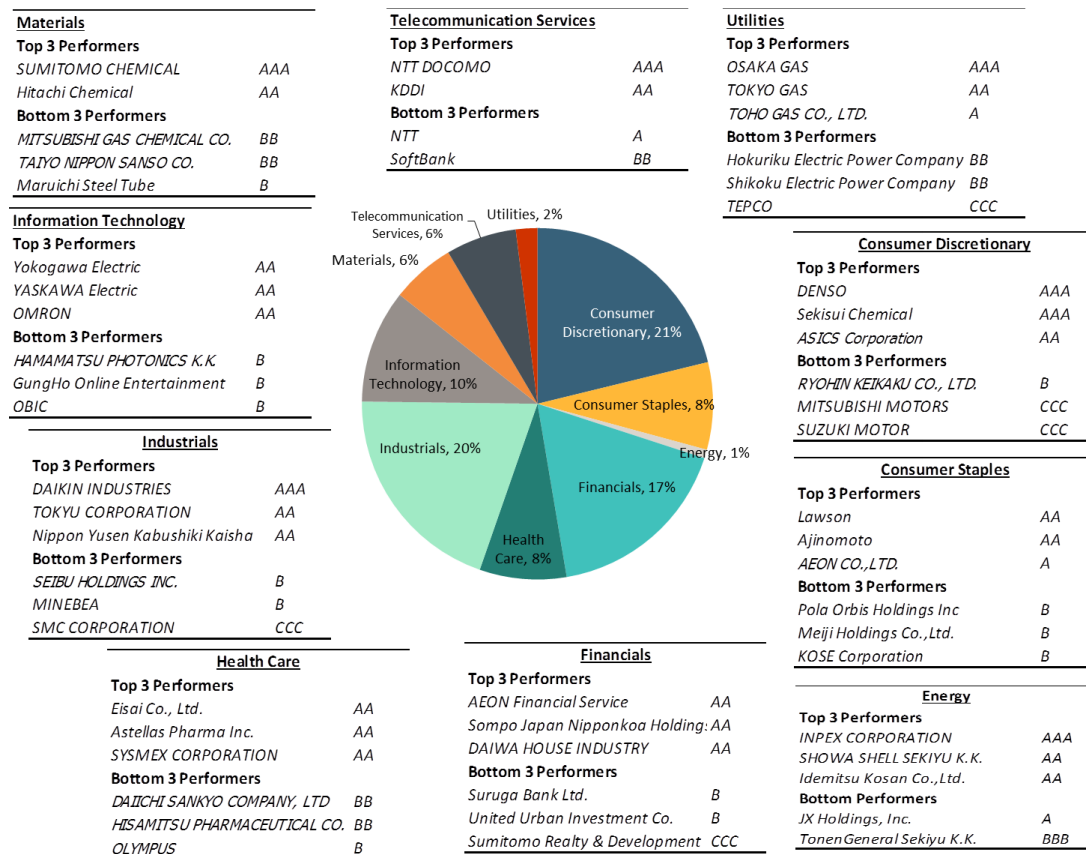
**APPENDIX C: MSCI ESG RATINGS – JAPANESE EQUITY MARKET**

MSCI ESG Ratings provide industry-relative ratings of companies based on their exposure and ability to mitigate key ESG-related risks, as well as to tap into prospective areas of growth with positive environmental and social implications. As of July 2016, 546 Japanese companies had an MSCI ESG Rating (317 Japanese constituents of the MSCI World Index and 229 MSCI Japan IMI constituents). The constituents of the MSCI Japan Index accounted for a larger portion of companies in the middle rating range (from A to BB) compared to the MSCI Kokusai Index, with consequently fewer companies rated at the extremes (AAA and CCC). A large majority (61%) of constituents in the MSCI Japan IMI 200+ Index were rated as BBB and BB, indicating that at large they met regulatory requirements and mitigated the most pressing risks, with some areas potentially requiring more attention. The top three and bottom three performers by sector and companies which had positive ESG Rating momentum are shown in Exhibit 32 and Exhibit 33 respectively.

**Exhibit 31: ESG Rating Distributions**



Source: MSCI ESG Research

**Exhibit 32: Top three and bottom three performers by sectors (MSCI Japan, n=317) and sector breakdown based on market capitalization as of July 2016**


Source: MSCI ESG Research



**Exhibit 33: Companies with the strongest positive ESG Rating momentum**

Company	2015 Rating	2014 Rating	2013 Rating	2 Year Momentum
SUMITOMO CHEMICAL COMPANY, LIMITED	AAA	AA	A	↑↑
FAST RETAILING CO., LTD.	A	BBB	BB	↑↑
SECOM CO., LTD.	A	BBB	BB	↑↑
Shionogi & Co., Ltd.	A	BBB	BB	↑↑
Tokio Marine Holdings, Inc.	A	BBB	BB	↑↑
Calbee Inc	BBB	BB	B	↑↑
Mitsubishi Electric Corporation	BBB	BB	B	↑↑
OTSUKA CORPORATION	BBB	BB	B	↑↑
SECOM CO., LTD.	BBB	BB	Not rated	↑↑
TOBU RAILWAY CO., LTD.	BBB	BB	B	↑↑

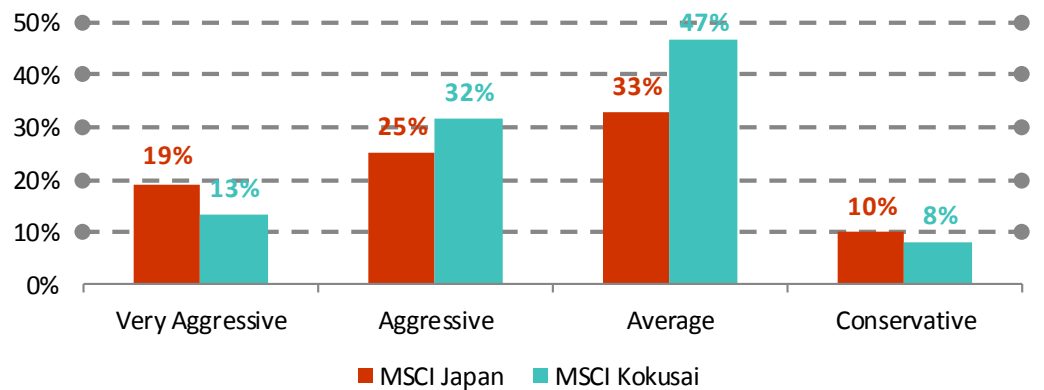
Source: MSCI ESG Research

**APPENDIX D: ACCOUNTING AND GOVERNANCE RISK**

MSCI Accounting and Governance Risk (AGR) is a statistical scoring system focused on identifying potential accounting irregularities<sup>44</sup>. Among AGR coverage, 276 constituents of the MSCI Japan Index as of August 16 2016, 19% of Japanese companies adopted ‘very aggressive’ accounting practices and 25% adopted ‘aggressive’ accounting practices, relative to regional industry peers. “Very aggressive” accounting practices are more prevalent among Japanese companies compared to companies in the MSCI Kokusai Index.

**Exhibit 34: AGR distributions on aggressiveness**

(MSCI Japan Index n=276, MSCI Kokusai Index=1,228)



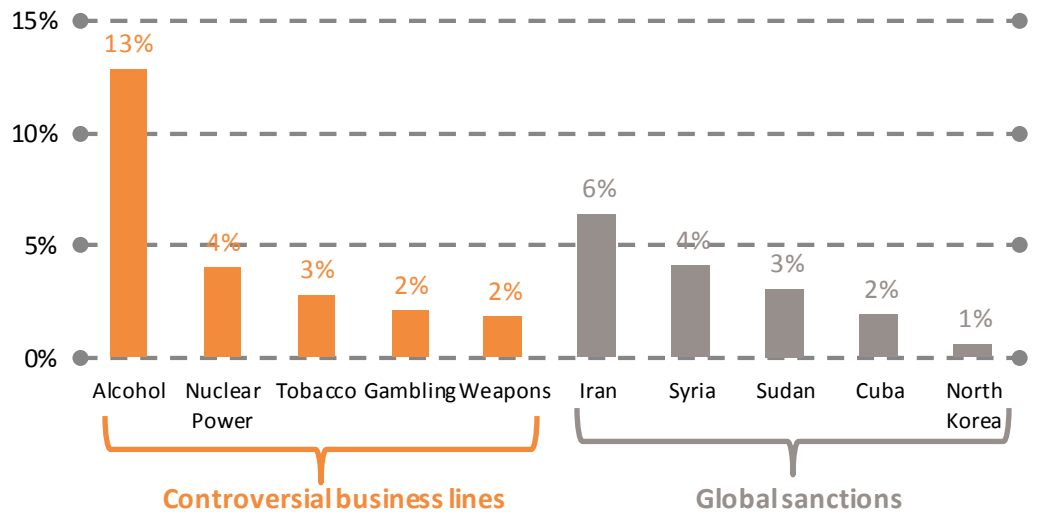
Source: MSCI ESG Research

<sup>44</sup> Accounting and Governance Risk Rankings are assigned based on pre-defined, percentile cutoffs described as follow. Conservative - The highest scoring 15% of corporations receive this ranking; Average - the next 50% of corporations receive this ranking; Aggressive - the following 25% of corporations receive this ranking; Very Aggressive - the lowest scoring 10% of corporations receive this ranking.

**APPENDIX E: BUSINESS INVOLVEMENT SCREENING**

MSCI Business Involvement Screening Research (BISR) analyzes companies’ involvement in controversial business lines and operations in countries that are restricted by global sanctions. Our analysis found that the most common areas of involvement for Japanese companies were alcohol production, distribution retail (13% of Japan IMI Index constituents) and nuclear power related businesses (4%). With regard to operations and business transactions with regions restricted by Global Sanctions, 6% of Japanese companies have involvement with Iran, 4% with Syria, and 3% with Sudan.

**Exhibit 35: Top five exposures to unethical business involvement: MSCI Japan IMI as of July 29<sup>th</sup> 2016 (n=1,216)**



Source: MSCI ESG Research

## CONTACT US

esgclientservice@msci.com

### AMERICAS

+ 1 212 804 5299

### EUROPE, MIDDLE EAST & AFRICA

+ 44 20 7618 2510

### ASIA PACIFIC

+ 612 9033 9339

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