



## Taiyo Holdings / 4626

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## INDEX

**How to read a Shared Research report:** This report begins with the trends and outlook section, which discusses the company's most recent earnings. First-time readers should start at the business section later in the report.

|   |           |
|---|-----------|
| <b>Executive summary</b>                              | <b>3</b>  |
| <b>Key financial data</b>                             | <b>5</b>  |
| <b>Recent updates</b>                                 | <b>9</b>  |
| Highlights  | 9         |
| <b>Trends and outlook</b>                             | <b>12</b> |
| Quarterly trends and results                          | 12        |
| Medium-term outlook                                   | 18        |
| <b>Business</b>                                       | <b>24</b> |
| Business description                                  | 24        |
| <b>Market and value chain</b>                         | <b>42</b> |
| Strengths and weaknesses                              | 48        |
| <b>Historical performance and financial statement</b> | <b>49</b> |
| Income statement                                      | 49        |
| Balance sheet   | 50        |
| Statement of cash flows                               | 52        |
| Historical performance                                | 53        |
| <b>Other information</b>                              | <b>63</b> |
| News and topics                                       | 63        |
| History   | 65        |
| Major shareholders                                    | 66        |
| Dividend policy                                       | 66        |
| Top management  | 67        |
| Employees   | 67        |
| Corporate philosophy and CSR initiatives              | 68        |
| Glossary  | 69        |
| Profile   | 70        |

## Executive summary

### Business overview

- Taiyo Holdings' forerunner, Taiyo Ink Mfg., was established in 1953 as a printing ink manufacturer and marketer. In 1970 Taiyo made its first etching resist shipments and entered the resist ink field (resist ink: insulating film that covers printed wiring boards [PWBs] to protect circuit patterns). Taiyo was early to become an official supplier for many large manufacturing clients, leveraging its execution speed (thanks to its independence), R&D and marketing prowess, strategic foresight into technological requirement for end products, and rapid expansion in overseas operation. Taiyo has a global market share in solder resist of over 50% (fairly high share in high-function rigid products and about half in general rigid products). In particular, the company has an extremely high share of the semiconductor package materials market. The OPM has averaged around 20% since FY03/15. Taiyo has four focus areas: rigid board materials, semiconductor package substrate materials, build-up board materials, and flexible printed circuit (FPC) board materials.
- Under the new medium-term plan through FY03/20, the company aims to break free from its dependency on solder resist and transform into a comprehensive chemical company. As additional growth drivers, Taiyo is looking to new businesses in pharmaceuticals, energy, and food production. The company became an equity-method affiliate of DIC Corporation (TSE1: 4631), which paid about JPY24.8bn and now holds 19.5% of Taiyo's stock. This capital and business alliance will enable the acquisition of more technologies and reinforce Taiyo's financial position. As part of its M&A strategy, Taiyo is conducting more acquisitions to establish a pharmaceutical business. It is looking to improve its R&D capabilities (constantly invests over 5% of sales in R&D) while maintaining an overall OPM of at least 20%.

### Earnings

- Q1 FY03/19 results: In the electronic components industry, the company's core market, sales volume of dry film for package substrates increased YoY while that of dry film for rigid materials slightly decreased. Taiyo Pharma Co., Ltd. completed the transfer process of manufacturing and marketing approval regarding four products out of 13 products. In addition, the yen strengthened to JPY108.7/USD (from JPY111.6/USD in Q1 FY03/18), but remained below the assumed rate of JPY105.0/USD. Under such circumstances, Q1 FY03/19 sales rose 19.5% YoY to JPY14.9bn, operating profit decreased 0.7% YoY to JPY2.7bn, recurring profit fell 0.3% YoY to JPY2.7bn, and net income attributable to owners of parent increased 1.3% YoY to JPY1.9bn; OPM dropped to 18.2% from 21.8% in Q1 FY03/18. The company made no changes to 1H and full-year FY03/19 earnings forecasts.
- Full-year company forecast for FY03/19: For FY03/19, the company forecasts sales of JPY60.2bn (+15.2% YoY) and operating profit of JPY9.8bn (-13.6% YoY), assuming an average exchange rate of JPY102/USD. Using the same exchange rate assumption (JPY111/USD) the company used for FY03/18, the company forecasts FY03/19 sales of JPY63.8bn (+22.1% YoY) and operating profit of JPY11.4bn (+0.6% YoY).
- The company's overseas sales are denominated half in US dollars and half in local currencies. Taiyo estimates the full-year impact of a JPY1/USD change in forex rates at over JPY380mn for sales and JPY180mn for operating profit. The forex impact has increased recently due to a rising share of overseas sales of high-function rigid materials and semiconductor package substrate materials made in Japan.
- The company is conducting M&A in the pharmaceutical field and acquired Micro Network Technologies Corp. (MNT) using low-interest loans and the funds earned from the capital and business alliance with DIC Corp. (TSE1: 4631), maintaining its cash position (JPY446mn in cash equivalents at end-March 2018) as it plans for the next deal. Capital expenditures ended at a little over JPY1.5bn (JPY5.0bn in FY03/18 forecasts), and the company plans to spend JPY4.0bn in FY03/19 (around JPY2.0bn in depreciation expenses).

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## Strengths and weaknesses

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- Strengths: Rapid growth and high margins as the leading upstream specialist in the niche solder resist market; top management's decision speed and modern approach to financial management; and synergies from the capital and business alliance with DIC.
- Weaknesses: Dependence on solder resist, a mature product that lies in the shadow of the end-products it is used in; lack of personnel to stay ahead of technological innovation; and limited demonstrated ability to develop new businesses outside its core strength.

## Key financial data

| Income statement (JPY mn)                     | FY03/08       | FY03/09       | FY03/10       | FY03/11       | FY03/12       | FY03/13       | FY03/14       | FY03/15       | FY03/16       | FY03/17       | FY03/18       | FY03/19       |
|---|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
|   | Cons.         | Cons.         | Cons.         | Cons.         | Cons.         | Cons.         | Cons.         | Cons.         | Cons.         | Cons.         | Cons.         | Est.          |
| <b>Sales</b>                                  | <b>45,338</b> | <b>32,614</b> | <b>35,056</b> | <b>40,366</b> | <b>39,797</b> | <b>36,184</b> | <b>44,224</b> | <b>48,260</b> | <b>49,843</b> | <b>47,866</b> | <b>52,241</b> | <b>60,200</b> |
| YoY   | 8.1%          | -28.1%        | 7.5%          | 15.1%         | -1.4%         | -9.1%         | 22.2%         | 9.1%          | 3.3%          | -4.0%         | 9.1%          | 15.2%         |
| Cost of sales                                 | 29,512        | 22,635        | 24,123        | 28,428        | 29,822        | 25,319        | 28,348        | 28,865        | 27,355        | 26,220        | 27,304        |               |
| YoY   | 8.8%          | -23.3%        | 6.6%          | 17.8%         | 4.9%          | -15.1%        | 12.0%         | 1.8%          | -5.2%         | -4.1%         | 4.1%          |               |
| Cost ratio                                    | 65.1%         | 69.4%         | 68.8%         | 70.4%         | 74.9%         | 70.0%         | 64.1%         | 59.8%         | 54.9%         | 54.8%         | 52.3%         |               |
| <b>Gross profit</b>                           | <b>15,826</b> | <b>9,979</b>  | <b>10,932</b> | <b>11,938</b> | <b>9,974</b>  | <b>10,864</b> | <b>15,875</b> | <b>19,394</b> | <b>22,487</b> | <b>21,645</b> | <b>24,937</b> |               |
| YoY   | 6.7%          | -36.9%        | 9.6%          | 9.2%          | -16.5%        | 8.9%          | 46.1%         | 22.2%         | 15.9%         | -3.7%         | 15.2%         |               |
| GPM   | 34.9%         | 30.6%         | 31.2%         | 29.6%         | 25.1%         | 30.0%         | 35.9%         | 40.2%         | 45.1%         | 45.2%         | 47.7%         |               |
| SG&A expenses                                 | 6,930         | 6,647         | 6,089         | 6,557         | 5,933         | 6,479         | 8,307         | 10,139        | 11,522        | 12,424        | 13,599        |               |
| YoY   | 0.9%          | -4.1%         | -8.4%         | 7.7%          | -9.5%         | 9.2%          | 28.2%         | 22.1%         | 13.6%         | 7.8%          | 9.5%          |               |
| SG&A ratio                                    | 15.3%         | 20.4%         | 17.4%         | 16.2%         | 14.9%         | 17.9%         | 18.8%         | 21.0%         | 23.1%         | 26.0%         | 26.0%         |               |
| <b>Operating profit</b>                       | <b>8,896</b>  | <b>3,332</b>  | <b>4,843</b>  | <b>5,380</b>  | <b>4,040</b>  | <b>4,385</b>  | <b>7,568</b>  | <b>9,254</b>  | <b>10,964</b> | <b>9,221</b>  | <b>11,337</b> | <b>9,800</b>  |
| YoY   | 11.7%         | -62.5%        | 45.3%         | 11.1%         | -24.9%        | 8.5%          | 72.6%         | 22.3%         | 18.5%         | -15.9%        | 22.9%         | -13.6%        |
| OPM   | 19.6%         | 10.2%         | 13.8%         | 13.3%         | 10.2%         | 12.1%         | 17.1%         | 19.2%         | 22.0%         | 19.3%         | 21.7%         | 16.3%         |
| <b>Recurring profit</b>                       | <b>8,586</b>  | <b>3,546</b>  | <b>4,787</b>  | <b>5,316</b>  | <b>4,027</b>  | <b>4,743</b>  | <b>7,827</b>  | <b>9,529</b>  | <b>11,129</b> | <b>9,202</b>  | <b>11,199</b> | <b>9,600</b>  |
| YoY   | 3.9%          | -58.7%        | 35.0%         | 11.1%         | -24.2%        | 17.8%         | 65.0%         | 21.7%         | 16.8%         | -17.3%        | 21.7%         | -14.3%        |
| RPM   | 18.9%         | 10.9%         | 13.7%         | 13.2%         | 10.1%         | 13.1%         | 17.7%         | 19.7%         | 22.3%         | 19.2%         | 21.4%         | 15.9%         |
| <b>Net income attrib. to owners of parent</b> | <b>6,171</b>  | <b>1,958</b>  | <b>3,010</b>  | <b>3,402</b>  | <b>2,502</b>  | <b>3,367</b>  | <b>4,930</b>  | <b>6,667</b>  | <b>7,796</b>  | <b>6,398</b>  | <b>4,856</b>  | <b>6,700</b>  |
| YoY   | 11.1%         | -68.3%        | 53.7%         | 13.0%         | -26.5%        | 34.6%         | 46.4%         | 35.2%         | 16.9%         | -17.9%        | -24.1%        | 38.0%         |
| Net margin                                    | 13.6%         | 6.0%          | 8.6%          | 8.4%          | 6.3%          | 9.3%          | 11.1%         | 13.8%         | 15.6%         | 13.4%         | 9.3%          | 11.1%         |
| USD/JPY                                       | 114.1         | 100.6         | 93.0          | 85.8          | 79.3          | 83.2          | 100.0         | 110.0         | 120.1         | 109.0         | 111.0         | 102.0         |
| <b>Per share data (JPY)</b>                   |               |               |               |               |               |               |               |               |               |               |               |               |
| Shares issued (year end; '000)                | 27,464.0      | 27,464.0      | 27,464.0      | 27,464.0      | 27,464.0      | 27,464.0      | 27,464.0      | 27,464.0      | 27,485.6      | 28,841.1      | 28,865.2      |               |
| Treasury shares (year end; '000)              | 1,995.3       | 1,525.4       | 1,525.5       | 2,025.5       | 2,025.7       | 2,025.8       | 2,026.1       | 4,522.0       | 4,379.0       | 58.5          | 39.8          |               |
| Shares outstanding (average; '000)            | 25,468.7      | 25,938.6      | 25,938.5      | 25,821.9      | 25,438.4      | 25,438.3      | 25,438.0      | 25,249.4      | 23,066.8      | 24,014.6      | 28,812.1      |               |
| EPS   | 233.2         | 74.3          | 116.1         | 131.8         | 98.4          | 132.4         | 193.8         | 264.1         | 338.0         | 266.4         | 168.6         | 232.4         |
| Dividend per share                            | 115.0         | 90.0          | 90.0          | 115.0         | 90.0          | 90.0          | 120.0         | 90.0          | 110.0         | 120.1         | 160.2         | 130.2         |
| Payout ratio                                  | 49.3%         | 121.2%        | 77.5%         | 87.3%         | 91.5%         | 68.0%         | 61.9%         | 34.1%         | 32.5%         | 45.1%         | 95.0%         | 56.0%         |
| DOE   | 8.1%          | 6.5%          | 6.8%          | 8.6%          | 6.9%          | 6.6%          | 7.9%          | 5.5%          | 6.2%          | 5.5%          | 6.4%          |               |
| Book value per share                          | 1,450.9       | 1,313.2       | 1,349.6       | 1,316.5       | 1,297.2       | 1,423.3       | 1,596.5       | 1,703.1       | 1,865.9       | 2,469.0       | 2,520.7       |               |
| <b>Balance sheet (JPY mn)</b>                 |               |               |               |               |               |               |               |               |               |               |               |               |
| Total current assets                          | 31,057        | 23,880        | 27,516        | 27,675        | 26,380        | 26,979        | 37,798        | 37,942        | 39,340        | 67,401        | 68,373        |               |
| Cash and cash equivalents                     | 13,106        | 11,291        | 11,913        | 13,152        | 11,563        | 13,766        | 20,338        | 18,183        | 18,385        | 48,800        | 44,588        |               |
| Tangible fixed assets                         | 15,889        | 14,644        | 13,954        | 13,050        | 12,546        | 12,664        | 14,375        | 16,865        | 19,644        | 18,389        | 17,923        |               |
| Intangible fixed assets                       | 442           | 468           | 389           | 304           | 358           | 347           | 5,144         | 5,327         | 4,919         | 4,537         | 21,818        |               |
| Investments and other assets                  | 1,520         | 1,876         | 1,843         | 1,821         | 1,417         | 4,032         | 1,050         | 1,106         | 1,561         | 2,057         | 3,374         |               |
| Total assets                                  | 48,938        | 40,869        | 43,704        | 42,851        | 40,703        | 44,023        | 58,369        | 61,241        | 65,464        | 92,386        | 111,490       |               |
| Total current liabilities                     | 7,959         | 5,303         | 7,172         | 7,681         | 6,393         | 6,724         | 8,936         | 11,056        | 10,898        | 11,355        | 20,491        |               |
| Short-term liabilities                        | 0             | 0             | 0             | 0             | 0             | 0             | 534           | 1,069         | 1,372         | 1,774         | 8,261         |               |
| Total fixed liabilities                       | 1,839         | 981           | 845           | 983           | 833           | 488           | 6,776         | 8,872         | 9,315         | 9,184         | 17,975        |               |
| Long-term liabilities                         | 0             | 0             | 0             | 0             | 0             | 0             | 5,658         | 7,685         | 7,413         | 7,169         | 15,923        |               |
| Total liabilities                             | 9,798         | 6,285         | 8,018         | 8,664         | 7,227         | 7,213         | 15,713        | 19,929        | 20,214        | 20,540        | 38,467        |               |
| Total net assets                              | 39,140        | 34,584        | 35,685        | 34,186        | 33,476        | 36,809        | 42,655        | 41,312        | 45,250        | 71,846        | 73,023        |               |
| <b>Cash flow statement (JPY mn)</b>           |               |               |               |               |               |               |               |               |               |               |               |               |
| Cash flows from operating activities          | 9,241         | 4,581         | 3,126         | 4,575         | 2,793         | 6,109         | 7,020         | 9,232         | 10,546        | 9,042         | 8,100         |               |
| Cash flows from investing activities          | -3,390        | -1,470        | -70           | 758           | -1,343        | -2,477        | -3,839        | -2,913        | -6,750        | -1,063        | -24,161       |               |
| Cash flows from financing activities          | -1,969        | -4,428        | -2,366        | -3,696        | -2,978        | -2,314        | 2,350         | -9,919        | -2,740        | 20,342        | 11,319        |               |
| <b>Financial ratios</b>                       |               |               |               |               |               |               |               |               |               |               |               |               |
| Total interest-bearing debt                   | 0             | 0             | 0             | 0             | 0             | 0             | 6,192         | 8,754         | 8,785         | 8,943         | 24,184        |               |
| Debt/equity ratio                             | 0.0%          | 0.0%          | 0.0%          | 0.0%          | 0.0%          | 0.0%          | 14.5%         | 21.2%         | 19.4%         | 12.4%         | 33.1%         |               |
| ROA (RP-based)                                | 17.8%         | 7.9%          | 11.3%         | 12.3%         | 9.6%          | 11.2%         | 15.3%         | 15.9%         | 17.6%         | 11.7%         | 11.0%         |               |
| ROE   | 16.5%         | 5.4%          | 8.7%          | 9.9%          | 7.5%          | 9.7%          | 12.8%         | 16.7%         | 19.0%         | 11.2%         | 6.8%          |               |
| Equity ratio                                  | 78.5%         | 83.3%         | 80.1%         | 78.2%         | 81.1%         | 82.2%         | 69.6%         | 63.8%         | 65.9%         | 76.9%         | 65.2%         |               |
| <b>Per employee data (JPY mn)</b>             |               |               |               |               |               |               |               |               |               |               |               |               |
| Number of employees                           | 775           | 793           | 807           | 840           | 861           | 858           | 1,148         | 1,122         | 1,202         | 1,249         | 1,268         |               |
| Avg. temp. employees (not included in above)  | 123           | 61            | -             | -             | -             | -             | -             | -             | -             | -             | -             |               |
| Sales per employee                            | 50.5          | 38.2          | 43.4          | 48.1          | 46.2          | 42.2          | 38.5          | 43.0          | 41.5          | 38.3          | 41.2          |               |
| Operating profit per employee                 | 9.9           | 3.9           | 6.0           | 6.4           | 4.7           | 5.1           | 6.6           | 8.2           | 9.1           | 7.4           | 8.9           |               |
| <b>Capital expenditures and others</b>        |               |               |               |               |               |               |               |               |               |               |               |               |
| Capital expenditures                          | 1,414         | 1,238         | 445           | 527           | 682           | 605           | 2,555         | 3,321         | 4,055         | 1,722         | 1,565         | 4,000         |
| Depreciation                                  | 1,529         | 1,396         | 1,261         | 1,127         | 1,046         | 1,003         | 1,181         | 1,411         | 1,891         | 2,485         | 1,941         | 2,000         |
| Goodwill amortization                         | 28            | 38            | 38            | 26            | 14            | 18            | 168           | 253           | 280           | 241           | 3,535         | 1,661         |
| R&D expenses                                  | 877           | 979           | 1,016         | 995           | 963           | 1,199         | 1,594         | 2,213         | 2,441         | 3,235         | 3,089         | 3,000         |
| % of sales                                    | 1.9%          | 3.0%          | 2.9%          | 2.5%          | 2.4%          | 3.3%          | 3.6%          | 4.6%          | 4.9%          | 6.8%          | 5.9%          | 5.0%          |

Source: Shared Research based on company data

Note: Figures may differ from company materials due to differences in rounding methods.

Note: Cash and cash equivalents are cash and deposit accounts listed on consolidated balance sheet excluding time deposits with a maturity over three months.

Note: Sales and operating profit per employee calculated including average temporary employee numbers. From FY03/10 onward, average temporary employee numbers account for less than 10% of total so are omitted.

Note: Capital expenditures and depreciation do not include sales rights related to 13 long-listed products.

## Segment performance

### Segment information (new segments)

| Segment information<br>(Cumulative; JPYmn)              | FY03/17<br>Cons. FY | FY03/18<br>Cons. Q1 | FY03/18<br>Cons. FY | FY03/19<br>Cons. Q1 |
|---|---------------------|---------------------|---------------------|---------------------|
| <b>Sales (external customers)</b>                       | 47,866              | 12,425              | 52,241              | 14,852              |
| Electronics Materials                                   | 46,450              | 12,050              | 49,854              | 12,633              |
| Medical and Pharmaceuticals                             |                     |                     | 819                 | 1,579               |
| Other   | 1,415               | 374                 | 1,570               | 643                 |
| Internal sales and transfers                            |                     |                     | -3                  | -3                  |
| % of total sales  |                     |                     |                     |                     |
| Electronics Materials                                   | 97.0%               | 97.0%               | 95.4%               | 85.1%               |
| Medical and Pharmaceuticals                             |                     |                     | 1.6%                | 10.6%               |
| Other   | 3.0%                | 3.0%                | 3.0%                | 4.3%                |
| YoY   | -4.0%               | 9.9%                | 9.1%                | 19.5%               |
| Electronics Materials                                   |                     |                     | 7.3%                | 4.8%                |
| Medical and Pharmaceuticals                             |                     |                     |                     |                     |
| Other   |                     |                     | 11.0%               | 71.9%               |
| <b>Operating profit</b>                                 | 9,221               | 2,714               | 11,337              | 2,696               |
| Electronics Materials                                   | 9,801               | 2,917               | 12,114              | 2,951               |
| Medical and Pharmaceuticals                             |                     |                     | 8                   | 68                  |
| Other   | 7                   | 34                  | 97                  | 10                  |
| Goodwill amortization                                   | -241                |                     | -257                |                     |
| Company-wide, other                                     | -345                |                     | -626                |                     |
| % of total operating profit                             |                     |                     |                     |                     |
| Electronics Materials                                   | 99.9%               |                     | 99.1%               | 97.4%               |
| Medical and Pharmaceuticals                             |                     |                     | 0.1%                | 2.2%                |
| Other   | 0.1%                |                     | 0.8%                | 0.3%                |
| YoY   | -15.9%              | 26.9%               | 22.9%               | -0.7%               |
| Electronics Materials                                   |                     |                     | 23.6%               | 1.2%                |
| Medical and Pharmaceuticals                             |                     |                     |                     |                     |
| Other   |                     |                     | 1285.7%             | -70.6%              |
| OPM   | 19.3%               | 21.8%               | 21.7%               | 18.2%               |
| Electronics Materials                                   | 21.1%               | 24.2%               | 24.3%               | 23.4%               |
| Medical and Pharmaceuticals                             |                     |                     | 1.0%                | 4.3%                |
| Other   | 0.5%                | 9.1%                | 6.2%                | 1.6%                |
| <b>Depreciation</b>                                     | 2,485               |                     | 2,284               |                     |
| Electronics Materials                                   | 1,794               |                     | 1,331               |                     |
| Medical and Pharmaceuticals                             |                     |                     | 353                 |                     |
| Other   | 211                 |                     | 145                 |                     |
| Adjustments   | 479                 |                     | 454                 |                     |
| <b>Increase in tangible and intangible fixed assets</b> | 1,722               |                     | 22,513              |                     |
| Electronics Materials                                   | 732                 |                     | 993                 |                     |
| Medical and Pharmaceuticals                             |                     |                     | 20,948              |                     |
| Other   | 234                 |                     | 195                 |                     |
| Adjustments   | 756                 |                     | 375                 |                     |

Source: Shared Research based on company data

Note: Figures may differ from company materials due to differences in rounding methods.

## Segment information (old segments)

| Performance by product and region (JPY mn) | FY03/08 | FY03/09 | FY03/10 | FY03/11 | FY03/12 | FY03/13 | FY03/14 | FY03/15 | FY03/16 | FY03/17 | FY03/18 |
|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|  | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   |
| <b>Sales</b>                               | 45,338  | 32,614  | 35,056  | 40,366  | 39,797  | 36,184  | 44,224  | 48,260  | 49,843  | 47,866  | 52,241  |
| PWB insulated materials                    | 33,603  | 25,918  | 27,961  | 29,937  | 26,727  | 27,997  | 38,225  | 44,474  | 46,318  | 44,700  | 48,041  |
| Rigid board materials                      | 25,392  | 19,911  | 21,250  | 22,993  | 20,289  | 20,262  | 29,235  | 33,539  | 35,242  | 33,216  | 34,342  |
| High-function                              |         |         |         |         |         |         |         | 18,676  | 20,230  | 20,211  | 21,429  |
| General                                    |         |         |         |         |         |         |         | 14,863  | 15,012  | 13,005  | 12,913  |
| Substrates and flexible board materials    | 6,886   | 5,107   | 5,600   | 5,685   | 5,416   | 6,763   | 7,965   | 9,844   | 10,007  | 10,348  | 12,197  |
| Package substrates                         |         |         |         |         |         |         |         | 9,401   | 9,376   | 9,676   | 11,029  |
| Flexible boards                            |         |         |         |         |         |         |         | 443     | 631     | 672     | 1,168   |
| Build-up board materials                   | 1,325   | 900     | 1,111   | 1,259   | 1,022   | 972     | 1,025   | 1,091   | 1,069   | 1,136   | 1,502   |
| FPD materials                              | 10,238  | 5,683   | 6,099   | 9,455   | 12,307  | 7,316   | 4,554   | 1,976   | 292     |         |         |
| Other related products                     | 1,378   | 952     | 994     | 972     | 760     | 869     | 1,443   | 1,808   | 3,231   | 3,165   | 4,199   |
| Regional sales (incl. internal sales)      |         |         |         |         |         |         |         |         |         |         |         |
| Japan                                      | 26,866  | 18,970  | 20,379  | 18,491  | 11,787  | 13,065  | 14,005  | 15,786  | 17,002  | 17,917  | 19,807  |
| China                                      | 30,804  | 21,596  | 10,361  | 11,911  | 10,636  | 10,834  | 17,791  | 20,421  | 21,820  | 20,618  | 21,539  |
| Taiwan                                     |         |         | 4,083   | 4,414   | 3,706   | 3,936   | 8,398   | 9,614   | 9,854   | 10,042  | 9,116   |
| South Korea                                |         |         | 10,241  | 13,743  | 16,668  | 11,722  | 10,599  | 9,199   | 7,739   | 8,825   | 10,271  |
| Others                                     | 1,419   | 1,205   | 2,972   | 3,061   | 2,618   | 2,854   | 3,524   | 4,140   | 4,451   | 4,076   | 4,979   |
| Eliminations and company-wide              | -13,751 | -9,157  | -12,980 | -11,254 | -5,618  | -6,227  | -10,093 | -10,900 | -11,023 | -13,612 | -13,471 |
| Sales to external customers                |         |         |         |         |         |         |         |         |         |         |         |
| Japan                                      | 13,150  | 9,843   | 9,031   | 9,418   | 8,605   | 8,822   | 8,697   | 9,410   | 10,565  | 9,446   | 10,171  |
| China                                      | 30,786  | 21,585  | 10,348  | 11,911  | 10,543  | 10,682  | 16,203  | 18,837  | 20,687  | 19,923  | 21,063  |
| Taiwan                                     |         |         | 3,007   | 3,219   | 2,828   | 2,897   | 5,575   | 7,141   | 6,864   | 6,062   | 6,410   |
| South Korea                                |         |         | 9,709   | 12,784  | 15,233  | 10,985  | 10,312  | 8,835   | 7,385   | 8,459   | 9,771   |
| Others                                     | 1,401   | 1,186   | 2,958   | 3,031   | 2,585   | 2,796   | 3,436   | 4,034   | 4,340   | 3,974   | 4,824   |
| YoY  | 8.1%    | -28.1%  | 7.5%    | 15.1%   | -1.4%   | -9.1%   | 22.2%   | 9.1%    | 3.3%    | -4.0%   | 9.1%    |
| PWB insulated materials                    | 8.4%    | -22.9%  | 7.9%    | 7.1%    | -10.7%  | 4.8%    | 36.5%   | 16.3%   | 4.1%    | -3.5%   | 7.5%    |
| Rigid board materials                      | 5.9%    | -21.6%  | 6.7%    | 8.2%    | -11.8%  | -0.1%   | 44.3%   | 14.7%   | 5.1%    | -5.7%   | 3.4%    |
| High-function                              |         |         |         |         |         |         |         |         | 8.3%    | -0.1%   | 6.0%    |
| General                                    |         |         |         |         |         |         |         |         | 1.0%    | -13.4%  | -0.7%   |
| Substrates and flexible board materials    | 19.4%   | -25.8%  | 9.7%    | 1.5%    | -4.7%   | 24.9%   | 17.8%   | 23.6%   | 1.7%    | 3.4%    | 17.9%   |
| Package substrates                         |         |         |         |         |         |         |         |         | -0.3%   | 3.2%    | 14.0%   |
| Flexible boards                            |         |         |         |         |         |         |         |         | 42.4%   | 6.5%    | 73.8%   |
| Build-up board materials                   | 6.3%    | -32.1%  | 23.4%   | 13.3%   | -18.8%  | -4.9%   | 5.5%    | 6.4%    | -2.0%   | 6.3%    | 32.2%   |
| FPD materials                              | 7.0%    | -44.5%  | 7.3%    | 55.0%   | 30.2%   | -40.6%  | -37.8%  | -56.6%  | -85.2%  |         |         |
| Other related products                     | 22.9%   | -30.9%  | 4.4%    | -2.2%   | -21.8%  | 14.3%   | 66.1%   | 25.3%   | 78.7%   | -10.2%  | 32.7%   |
| Regional sales (incl. internal sales)      |         |         |         |         |         |         |         |         |         |         |         |
| Japan                                      | 2.6%    | -29.4%  | 7.4%    | -9.3%   | -36.3%  | 10.8%   | 7.2%    | 12.7%   | 7.7%    | 5.4%    | 10.5%   |
| China                                      | 17.2%   | -29.9%  | -52.0%  | 15.0%   | -10.7%  | 1.9%    | 64.2%   | 14.8%   | 6.9%    | -5.5%   | 4.5%    |
| Taiwan                                     |         |         |         | 8.1%    | -16.0%  | 6.2%    | 113.4%  | 14.5%   | 2.5%    | 1.9%    | -9.2%   |
| South Korea                                |         |         |         | 34.2%   | 21.3%   | -29.7%  | -9.6%   | -13.2%  | -15.9%  | 14.0%   | 16.4%   |
| Others                                     | -18.4%  | -15.1%  | 146.6%  | 3.0%    | -14.5%  | 9.0%    | 23.5%   | 17.5%   | 7.5%    | -8.4%   | 22.2%   |
| Eliminations and company-wide              |         |         |         |         |         |         |         |         |         |         |         |
| Sales to external customers                | -6.0%   | -25.1%  | -8.2%   | 4.3%    | -8.6%   | 2.5%    | -1.4%   | 8.2%    | 12.3%   | -10.6%  | 7.7%    |
| Japan                                      | 17.3%   | -29.9%  | -52.1%  | 15.1%   | -11.5%  | 1.3%    | 51.7%   | 16.3%   | 9.8%    | -3.7%   | 5.7%    |
| China                                      |         |         |         | 7.1%    | -12.1%  | 2.4%    | 92.4%   | 28.1%   | -3.9%   | -11.7%  | 5.7%    |
| Taiwan                                     |         |         |         | 31.7%   | 19.2%   | -27.9%  | -6.1%   | -14.3%  | -16.4%  | 14.5%   | 15.5%   |
| South Korea                                | -18.5%  | -15.3%  | 149.4%  | 2.5%    | -14.7%  | 8.2%    | 22.9%   | 17.4%   | 7.6%    | -8.4%   | 21.4%   |
| <b>Operating profit</b>                    | 8,896   | 3,332   | 4,843   | 5,380   | 4,040   | 4,385   | 7,568   | 9,254   | 10,964  | 9,221   | 11,337  |
| Japan                                      | 2,275   | 15      | 600     | 1,013   | 989     | 1,685   | 1,906   | 2,466   | 2,254   | 2,026   | 3,408   |
| China                                      | 6,301   | 3,059   | 2,463   | 2,813   | 1,751   | 1,584   | 2,617   | 3,507   | 4,775   | 4,582   | 4,602   |
| Taiwan                                     |         |         | 644     | 510     | 470     | 497     | 1,427   | 1,763   | 2,227   | 1,492   | 1,847   |
| South Korea                                |         |         | 988     | 979     | 649     | 591     | 1,073   | 1,212   | 1,414   | 1,275   | 1,663   |
| Others                                     | 267     | 190     | 129     | 238     | 272     | 323     | 453     | 555     | 597     | 534     | 514     |
| Eliminations and company-wide              | 51      | 66      | 19      | -173    | -91     | -295    | 92      | -249    | -303    | -688    | -697    |
| YoY  | 11.7%   | -62.5%  | 45.3%   | 11.1%   | -24.9%  | 8.5%    | 72.6%   | 22.3%   | 18.5%   | -15.9%  | 22.9%   |
| Japan                                      | 8.3%    | -99.3%  | 3900.0% | 68.8%   | -2.4%   | 70.4%   | 13.1%   | 29.4%   | -8.6%   | -10.1%  | 68.2%   |
| China                                      | 13.4%   | -51.5%  | -19.5%  | 14.2%   | -37.8%  | -9.5%   | 65.2%   | 34.0%   | 36.2%   | -4.0%   | 0.4%    |
| Taiwan                                     |         |         |         | -20.8%  | -7.8%   | 5.7%    | 187.1%  | 23.5%   | 26.3%   | -33.0%  | 23.8%   |
| South Korea                                |         |         |         | -0.9%   | -33.7%  | -8.9%   | 81.6%   | 13.0%   | 16.7%   | -9.8%   | 30.4%   |
| Others                                     | 3.5%    | -28.8%  | -32.1%  | 84.5%   | 14.3%   | 18.8%   | 40.2%   | 22.5%   | 7.6%    | -10.6%  | -3.7%   |
| OPM  | 19.6%   | 10.2%   | 13.8%   | 13.3%   | 10.2%   | 12.1%   | 17.1%   | 19.2%   | 22.0%   | 19.3%   | 21.7%   |
| Japan                                      | 8.5%    | 0.1%    | 2.9%    | 5.5%    | 8.4%    | 12.9%   | 13.6%   | 15.6%   | 13.3%   | 11.3%   | 17.2%   |
| China                                      | 20.5%   | 14.2%   | 23.8%   | 23.6%   | 16.5%   | 14.6%   | 14.7%   | 17.2%   | 21.9%   | 22.2%   | 21.4%   |
| Taiwan                                     |         |         | 15.8%   | 11.6%   | 12.7%   | 12.6%   | 17.0%   | 18.3%   | 22.6%   | 14.9%   | 20.3%   |
| South Korea                                |         |         | 9.6%    | 7.1%    | 3.9%    | 5.0%    | 10.1%   | 13.2%   | 18.3%   | 14.4%   | 16.2%   |
| Others                                     | 18.8%   | 15.8%   | 4.3%    | 7.8%    | 10.4%   | 11.3%   | 12.9%   | 13.4%   | 13.4%   | 13.1%   | 10.3%   |

Source: Shared Research based on company data

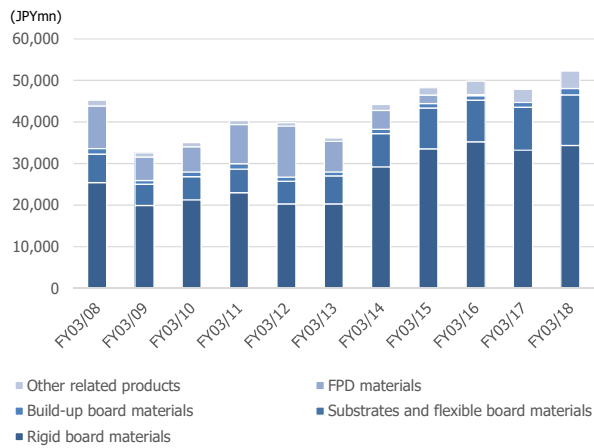
Note: Figures may differ from company materials due to differences in rounding methods.

Note: FY03/08 and FY03/09 sales figures for China are those for Asia including Taiwan and South Korea (figures for China alone from FY03/10).

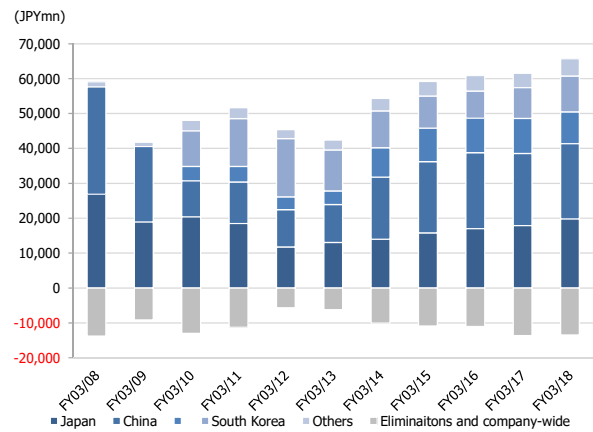
Note: From FY03/17, FPD is included in Other related products.

Note: Operating profit by product not disclosed.

### Sales for key products



### Sales by region



Source: Shared Research based on company data

Note: FY03/08 and FY03/09 sales figures for China are those for Asia including Taiwan and South Korea (figures for China alone from FY03/10).



## Recent updates

### Highlights

On **August 23, 2018**, Shared Research updated the report following interviews with Taiyo Holdings Co., Ltd.

On **August 3, 2018**, the company announced earnings results for Q1 FY03/19; see the results section for details.

On **July 5, 2018**, the company announced that its Board of Directors, at a meeting held the same day, had approved a new share issue in connection with a restricted stock award system and performance-based stock bonus system, as detailed below.

|                                    |  |
|------------------------------------|--|
| Payment date                       | July 20, 2018  |
| Number of shares to be issued      | 45,242 shares of common stock of the company   |
| Issue price                        | JPY4,410 per share   |
| Total value of shares to be issued | JPY199,517,220   |
| Funds to be procured               | JPY77,616,000  |
| Method of offer or allotment       | Allotment of special restricted stock for 27,642 shares to be issued<br>Third-party allotment for 17,600 shares to be issued   |
| Allottees                          | (Allotment of special restricted stock)<br>Five executive directors of the company 27,642 shares<br><br>(Third-party allotment)<br>Five executive directors of the company 17,600 shares |
| Method of contribution             | In-kind contribution of monetary compensation receivables for allotment of special restricted stock; payment of money for third-party allotment.   |
| Others                             | The issuance of new shares is subject to the effectiveness of the securities registration statement submitted in accordance with the Financial Instruments and Exchange Act.             |

#### New share issue purpose and rational

The new share issue was authorized in accordance with a resolution passed at a Board of Directors meeting on May 19, 2017, and subsequently approved at the 71st ordinary general shareholders meeting held on June 21, 2017, as part of a compensation scheme aimed at further increasing the motivation of executive directors to work toward a sustained increase in the enterprise value of the Taiyo group and further align their interests with those of shareholders. The restricted stock award system and performance-based stock bonus system cover the company's executive directors (directors, as mentioned in each provision of Article 363, Paragraph 1 of the Companies Act).

On **the same day**, the company also announced that it was acquiring all outstanding shares of Thou-Management Corporation (TMC), making it a wholly owned consolidated subsidiary.

TMC has a long track record in the systems integration business (contract design and development of business process systems, including servers, database, and terminal-related applications for PCs, smartphones, and tablet computers) as well as in ASP data and security solutions services, and going forward will work to expand its AI business utilizing IoT platforms, IoT security, and data (research) science. Taiyo believes the acquisition of TMC will help it speed up new system construction, something that it had previously identified as a high priority. Taiyo is also looking for the acquisition of TMC to help it sustain growth and increase the group's enterprise value, as the combination of TMC and subsidiary Micro Network Technologies Corp. (MNT) will give the group the internal resources needed to move quickly at every stage of the system construction process, from system planning and proposal to development and operation. Taiyo also expects the development of a close working relationship between TMC and MNT to be mutually beneficial and contribute greatly to the expansion of new business opportunities in the future.

In addition to the acquisition of TMC, Taiyo also announced that the Board of Directors, at a meeting held the same day, had approved the following personnel change effective the same day.

| New position   | Name           | Current position   |
|--|----------------|--|
| Managing Executive Officer<br>Chairman of the Board and Representative Director,<br>Micro Network Technologies Corp.<br>Representative Director and Chairman,<br>Thou-Management Corp. | Harutomo Kaiho | Managing Executive Officer<br>Chairman of the Board and Representative Director,<br>Micro Network Technologies Corp. |

On **June 20, 2018**, the company announced a partial revision to its FY03/18 consolidated financial results and released new segment information.

The company group had been reporting financial results under regional segments—the four reportable segments of Japan, China, Taiwan, and South Korea—that reflected the group’s manufacture and sales structure. However, starting FY03/18, Taiyo realigned its reportable segments to the two business-based segments of Electronics Materials and Medical and Pharmaceuticals.

In January 2018, Taiyo Pharma Co., Ltd. (a subsidiary established in August 2017) obtained manufacturing and sales authorization, manufacturing and sales rights, and all related assets for 13 long-listed products. In light of this development, which increased the quantitative significance of the group’s medical and pharmaceutical business, the company determined it was more appropriate to categorize its activities based on businesses rather than locations, and decided to change its reportable segments accordingly. Figures from the previous fiscal year have been adjusted to match the new segmentation for YoY comparison purposes.

FY03/18 results under the new segmentation are as follows:

#### **Electronics Materials**

Sales in the Electronics Materials segment increased 7.3% YoY to JPY49.9bn backed by strong demand for materials used in smartphones, servers for virtual currency, and automotive components, as well as the effect of yen depreciation. Segment profit was up 23.6% YoY to JPY12.1bn.

#### **Medical and Pharmaceuticals**

The company launched its Medical and Pharmaceuticals business on a full scale starting January 2018, when it obtained manufacturing and sales authorization, manufacturing and sales rights, and all related assets for 13 long-listed products. As a result, sales in FY03/18 reached JPY819mn, and segment profit JPY8mn. There is no YoY comparison for the segment as the business was newly launched during FY03/18.

## Segment information (new segments)

| Segment information<br>(Cumulative; JPYmn)              | FY03/17<br>Cons. FY | FY03/18<br>Cons. FY |
|---|---------------------|---------------------|
| <b>Sales (external customers)</b>                       | 47,866              | 52,241              |
| Electronics Materials                                   | 46,450              | 49,854              |
| Medical and Pharmaceuticals                             |                     | 819                 |
| Other   | 1,415               | 1,570               |
| Internal sales and transfers                            |                     | -3                  |
| % of total sales  |                     |                     |
| Electronics Materials                                   | 97.0%               | 95.4%               |
| Medical and Pharmaceuticals                             |                     | 1.6%                |
| Other   | 3.0%                | 3.0%                |
| YoY   | -4.0%               | 9.1%                |
| Electronics Materials                                   |                     | 7.3%                |
| Medical and Pharmaceuticals                             |                     |                     |
| Other   |                     | 11.0%               |
| <b>Operating profit</b>                                 | 9,221               | 11,337              |
| Electronics Materials                                   | 9,801               | 12,114              |
| Medical and Pharmaceuticals                             |                     | 8                   |
| Other   | 7                   | 97                  |
| Goodwill amortization                                   | -241                | -257                |
| Company-wide, other                                     | -345                | -626                |
| % of total operating profit                             |                     |                     |
| Electronics Materials                                   | 99.9%               | 99.1%               |
| Medical and Pharmaceuticals                             |                     | 0.1%                |
| Other   | 0.1%                | 0.8%                |
| YoY   | -15.9%              | 22.9%               |
| Electronics Materials                                   |                     | 23.6%               |
| Medical and Pharmaceuticals                             |                     |                     |
| Other   |                     | 1285.7%             |
| OPM   | 19.3%               | 21.7%               |
| Electronics Materials                                   | 21.1%               | 24.3%               |
| Medical and Pharmaceuticals                             |                     | 1.0%                |
| Other   | 0.5%                | 6.2%                |
| <b>Depreciation</b>                                     | 2,485               | 2,284               |
| Electronics Materials                                   | 1,794               | 1,331               |
| Medical and Pharmaceuticals                             |                     | 353                 |
| Other   | 211                 | 145                 |
| Adjustments   | 479                 | 454                 |
| <b>Increase in tangible and intangible fixed assets</b> | 1,722               | 22,513              |
| Electronics Materials                                   | 732                 | 993                 |
| Medical and Pharmaceuticals                             |                     | 20,948              |
| Other   | 234                 | 195                 |
| Adjustments   | 756                 | 375                 |

Source: Shared Research based on company data

Note: Figures may differ from company materials due to differences in rounding methods.

For previous releases and developments, please refer to the News and topics section.

## Trends and outlook

### Quarterly trends and results

| Cumulative<br>(JPY mn)                               | FY03/16 |        |        |         | FY03/17 |        |        |         | FY03/18 |        |         |         | FY03/19 |    |
|--|---------|--------|--------|---------|---------|--------|--------|---------|---------|--------|---------|---------|---------|----|
|  | Q1      | Q2     | Q3     | Q4      | Q1      | Q2     | Q3     | Q4      | Q1      | Q2     | Q3      | Q4      | Q1      | Q1 |
| Sales  | 12,447  | 25,400 | 38,300 | 49,843  | 11,306  | 23,442 | 35,922 | 47,866  | 12,425  | 25,784 | 39,022  | 52,241  | 14,852  |    |
| PWB insulated materials                              | 11,679  | 23,672 | 35,607 | 46,318  | 10,516  | 21,919 | 33,549 | 44,700  | 11,554  | 23,996 | 36,326  | 48,041  | 12,230  |    |
| Rigid board materials                                | 8,756   | 18,061 | 27,122 | 35,242  | 7,971   | 16,523 | 25,030 | 33,216  | 8,506   | 17,540 | 26,255  | 34,342  | 8,445   |    |
| High-function  | 4,939   | 10,320 | 15,496 | 20,230  | 4,802   | 10,123 | 15,172 | 20,211  | 5,287   | 10,903 | 16,318  | 21,429  | 5,278   |    |
| General  | 3,817   | 7,741  | 11,626 | 15,012  | 3,169   | 6,400  | 9,858  | 13,005  | 3,219   | 6,637  | 9,937   | 12,913  | 3,167   |    |
| Substrates and flexible board materials              | 2,666   | 5,065  | 7,680  | 10,007  | 2,270   | 4,861  | 7,688  | 10,348  | 2,704   | 5,706  | 8,941   | 12,197  | 3,405   |    |
| Package substrates                                   | 2,522   | 4,746  | 7,187  | 9,376   | 2,109   | 4,531  | 7,163  | 9,676   | 2,490   | 5,144  | 8,021   | 11,029  | 3,093   |    |
| Flexible boards                                      | 144     | 319    | 493    | 631     | 161     | 330    | 525    | 672     | 214     | 562    | 920     | 1,168   | 312     |    |
| Build-up board materials                             | 257     | 546    | 805    | 1,069   | 275     | 535    | 831    | 1,136   | 344     | 750    | 1,130   | 1,502   | 380     |    |
| FPD materials  | 76      | 191    | 267    | 292     |         |        |        |         |         |        |         |         |         |    |
| Other related products                               | 690     | 1,535  | 2,424  | 3,231   | 788     | 1,523  | 2,371  | 3,165   | 871     | 1,788  | 2,696   | 4,200   | 2,622   |    |
| Regional sales (incl. internal sales)                |         |        |        |         |         |        |        |         |         |        |         |         |         |    |
| Japan  | 4,282   | 8,651  | 12,976 | 17,002  | 4,052   | 8,594  | 13,239 | 17,917  | 4,334   | 9,568  | 14,887  | 19,807  | 5,183   |    |
| China  | 5,296   | 11,320 | 16,919 | 21,820  | 4,970   | 10,439 | 15,361 | 20,618  | 5,221   | 11,078 | 16,610  | 21,539  | 5,475   |    |
| Taiwan   | 2,559   | 5,014  | 7,581  | 9,854   | 2,007   | 4,128  | 7,677  | 10,042  | 2,235   | 4,579  | 7,059   | 9,116   | 2,192   |    |
| South Korea  | 1,992   | 3,889  | 5,922  | 7,739   | 1,837   | 4,073  | 6,453  | 8,825   | 2,369   | 5,035  | 7,629   | 10,271  | 2,596   |    |
| Others   | 1,097   | 2,263  | 3,360  | 4,451   | 992     | 1,990  | 3,033  | 4,076   | 1,062   | 2,098  | 3,141   | 4,979   | 1,032   |    |
| Eliminations and company-wide                        | -2,779  | -5,737 | -8,458 | -11,023 | -2,552  | -5,782 | -9,841 | -13,612 | -2,796  | -6,574 | -10,304 | -13,471 | -1,626  |    |
| Sales to external customers                          |         |        |        |         |         |        |        |         |         |        |         |         |         |    |
| Japan  | 2,668   | 5,249  | 7,959  | 10,565  | 2,413   | 4,694  | 7,134  | 9,446   | 2,450   | 4,889  | 7,542   | 10,171  |         |    |
| China  | 4,990   | 10,697 | 16,049 | 20,687  | 4,768   | 10,033 | 14,791 | 19,923  | 5,073   | 10,822 | 16,234  | 21,063  |         |    |
| Taiwan   | 1,808   | 3,528  | 5,356  | 6,864   | 1,408   | 2,880  | 4,851  | 6,062   | 1,595   | 3,228  | 4,962   | 6,410   |         |    |
| South Korea  | 1,908   | 3,718  | 5,659  | 7,385   | 1,746   | 3,896  | 6,189  | 8,459   | 2,254   | 4,799  | 7,255   | 9,771   |         |    |
| Others   | 1,072   | 2,207  | 3,274  | 4,340   | 968     | 1,938  | 2,953  | 3,974   | 1,051   | 2,044  | 3,027   | 4,824   |         |    |
| YoY  | 6.8%    | 2.5%   | 3.8%   | 3.3%    | -9.2%   | -7.7%  | -6.2%  | -4.0%   | 9.9%    | 10.0%  | 8.6%    | 9.1%    | 19.5%   |    |
| PWB insulated materials                              | 13.8%   | 7.3%   | 6.0%   | 4.1%    | -10.0%  | -7.4%  | -5.8%  | -3.5%   | 9.9%    | 9.5%   | 8.3%    | 7.5%    | 5.9%    |    |
| Rigid board materials                                | 14.4%   | 9.7%   | 7.7%   | 5.1%    | -9.0%   | -8.5%  | -7.7%  | -5.7%   | 6.7%    | 6.2%   | 4.9%    | 3.4%    | -0.7%   |    |
| High-function  |         | 14.0%  | 11.1%  | 8.3%    | -2.8%   | -1.9%  | -2.1%  | -0.1%   | 10.1%   | 7.7%   | 7.6%    | 6.0%    | -0.2%   |    |
| General  |         | 4.5%   | 3.6%   | 1.0%    | -17.0%  | -17.3% | -15.2% | -13.4%  | 1.6%    | 3.7%   | 0.8%    | -0.7%   | -1.6%   |    |
| Substrates and flexible board materials              | 14.3%   | 0.5%   | 1.1%   | 1.7%    | -14.9%  | -4.0%  | 0.1%   | 3.4%    | 19.1%   | 17.4%  | 16.3%   | 17.9%   | 25.9%   |    |
| Package substrates                                   |         | -1.4%  | -1.0%  | -0.3%   | -16.4%  | -4.5%  | -0.3%  | 3.2%    | 18.1%   | 13.5%  | 12.0%   | 14.0%   | 24.2%   |    |
| Flexible boards                                      |         | 39.9%  | 45.4%  | 42.4%   | 11.8%   | 3.4%   | 6.5%   | 6.5%    | 32.9%   | 70.3%  | 75.2%   | 73.8%   | 45.8%   |    |
| Build-up board materials                             | -6.9%   | -0.2%  | -1.7%  | -2.0%   | 7.0%    | -2.0%  | 3.2%   | 6.3%    | 25.1%   | 40.2%  | 36.0%   | 32.2%   | 10.5%   |    |
| FPD materials  | -92.1%  | -89.6% | -86.0% | -85.2%  |         |        |        |         |         |        |         |         |         |    |
| Other related products                               | 57.5%   | 72.9%  | 76.2%  | 78.7%   | 2.9%    | -11.8% | -11.9% | -10.2%  | 10.5%   | 17.4%  | 13.7%   | 32.7%   | 201.0%  |    |
| Regional sales (incl. internal sales)                |         |        |        |         |         |        |        |         |         |        |         |         |         |    |
| Japan  | 10.5%   | 5.3%   | 5.5%   | 7.7%    | -5.4%   | -0.7%  | 2.0%   | 5.4%    | 7.0%    | 11.3%  | 12.4%   | 10.5%   | 19.6%   |    |
| China  | 19.4%   | 13.6%  | 10.3%  | 6.9%    | -6.2%   | -7.8%  | -9.2%  | -5.5%   | 5.1%    | 6.1%   | 8.1%    | 4.5%    | 4.9%    |    |
| Taiwan   | 13.2%   | 4.4%   | 3.7%   | 2.5%    | -21.6%  | -17.7% | 1.3%   | 1.9%    | 11.4%   | 10.9%  | -8.1%   | -9.2%   | -1.9%   |    |
| South Korea  | -21.9%  | -26.7% | -19.2% | -15.9%  | -7.8%   | 4.7%   | 9.0%   | 14.0%   | 29.0%   | 23.6%  | 18.2%   | 16.4%   | 9.6%    |    |
| Others   | 6.9%    | 11.8%  | 9.8%   | 7.5%    | -9.6%   | -12.1% | -9.7%  | -8.4%   | 7.1%    | 5.4%   | 3.6%    | 22.2%   | -2.8%   |    |
| Cost of sales  | 7,016   | 13,981 | 21,093 | 27,355  | 6,311   | 13,160 | 19,739 | 26,220  | 6,544   | 13,551 | 20,563  | 27,304  | 7,833   |    |
| YoY  | -1.6%   | -7.4%  | -5.0%  | -5.2%   | -10.0%  | -5.9%  | -6.4%  | -4.1%   | 3.7%    | 3.0%   | 4.2%    | 4.1%    | 19.7%   |    |
| Cost ratio   | 56.4%   | 55.0%  | 55.1%  | 54.9%   | 55.8%   | 56.1%  | 54.9%  | 54.8%   | 52.7%   | 52.6%  | 52.7%   | 52.3%   | 52.7%   |    |
| Gross profit   | 5,431   | 11,419 | 17,206 | 22,487  | 4,994   | 10,282 | 16,182 | 21,645  | 5,880   | 12,233 | 18,459  | 24,937  | 7,019   |    |
| YoY  | 20.0%   | 18.1%  | 17.3%  | 15.9%   | -8.0%   | -10.0% | -6.0%  | -3.7%   | 17.7%   | 19.0%  | 14.1%   | 15.2%   | 19.4%   |    |
| GPM  | 43.6%   | 45.0%  | 44.9%  | 45.1%   | 44.2%   | 43.9%  | 45.0%  | 45.2%   | 47.3%   | 47.4%  | 47.3%   | 47.7%   | 47.3%   |    |
| SG&A expenses  | 2,829   | 5,612  | 8,559  | 11,522  | 2,855   | 5,725  | 8,993  | 12,424  | 3,166   | 6,489  | 9,759   | 13,599  | 4,322   |    |
| YoY  | 16.9%   | 14.2%  | 15.5%  | 13.6%   | 0.9%    | 2.0%   | 5.1%   | 7.8%    | 10.9%   | 13.3%  | 8.5%    | 9.5%    | 36.5%   |    |
| SG&A ratio   | 22.7%   | 22.1%  | 22.3%  | 23.1%   | 25.3%   | 24.4%  | 25.0%  | 26.0%   | 25.5%   | 25.2%  | 25.0%   | 26.0%   | 29.1%   |    |
| Operating profit                                     | 2,601   | 5,807  | 8,646  | 10,964  | 2,139   | 4,557  | 7,188  | 9,221   | 2,714   | 5,744  | 8,699   | 11,337  | 2,696   |    |
| Japan  | 766     | 1,490  | 1,952  | 2,254   | 316     | 862    | 1,439  | 2,026   | 766     | 1,622  | 2,732   | 3,408   | 1,147   |    |
| China  | 1,050   | 2,392  | 3,670  | 4,775   | 1,108   | 2,387  | 3,531  | 4,582   | 1,147   | 2,463  | 3,603   | 4,602   | 1,079   |    |
| Taiwan   | 556     | 1,159  | 1,749  | 2,227   | 396     | 833    | 1,338  | 1,492   | 487     | 960    | 1,473   | 1,847   | 358     |    |
| South Korea  | 339     | 727    | 1,109  | 1,414   | 318     | 605    | 964    | 1,275   | 368     | 846    | 1,295   | 1,663   | 368     |    |
| Others   | 135     | 293    | 441    | 597     | 141     | 295    | 391    | 534     | 130     | 213    | 226     | 514     | 134     |    |
| Eliminations and company-wide                        | -245    | -254   | -275   | -303    | -140    | -425   | -475   | -688    | -184    | -360   | -630    | -697    | -390    |    |
| YoY  | 23.7%   | 22.1%  | 19.1%  | 18.5%   | -17.8%  | -21.5% | -16.9% | -15.9%  | 26.9%   | 26.0%  | 21.0%   | 22.9%   | -0.7%   |    |
| Japan  | 22.2%   | 9.6%   | -4.8%  | -8.6%   | -58.7%  | -42.1% | -26.3% | -10.1%  | 142.4%  | 88.2%  | 89.9%   | 68.2%   | 49.7%   |    |
| China  | 45.4%   | 43.4%  | 39.1%  | 36.2%   | 5.5%    | -0.2%  | -3.8%  | -4.0%   | 3.5%    | 3.2%   | 2.0%    | 0.4%    | -5.9%   |    |
| Taiwan   | 38.0%   | 32.0%  | 29.3%  | 26.3%   | -28.8%  | -28.1% | -23.5% | -33.0%  | 23.0%   | 15.2%  | 10.1%   | 23.8%   | -26.5%  |    |
| South Korea  | 17.3%   | 18.0%  | 16.6%  | 16.7%   | -6.2%   | -16.8% | -13.1% | -9.8%   | 15.7%   | 39.8%  | 34.3%   | 30.4%   | 0.0%    |    |
| Others   | 1.5%    | 2.4%   | 4.3%   | 7.6%    | 4.4%    | 0.7%   | -11.3% | -10.6%  | -7.8%   | -27.8% | -42.2%  | -3.7%   | 3.1%    |    |
| OPM  | 20.9%   | 22.9%  | 22.6%  | 22.0%   | 18.9%   | 19.4%  | 20.0%  | 19.3%   | 21.8%   | 22.3%  | 22.3%   | 21.7%   | 18.2%   |    |
| Japan  | 17.9%   | 17.2%  | 15.0%  | 13.3%   | 7.8%    | 10.0%  | 10.9%  | 11.3%   | 17.7%   | 17.0%  | 18.4%   | 17.2%   | 22.1%   |    |
| China  | 19.8%   | 21.1%  | 21.7%  | 21.9%   | 22.3%   | 22.9%  | 23.0%  | 22.2%   | 22.0%   | 22.2%  | 21.7%   | 21.4%   | 19.7%   |    |
| Taiwan   | 21.7%   | 23.1%  | 23.1%  | 22.6%   | 19.7%   | 20.2%  | 17.4%  | 14.9%   | 21.8%   | 21.0%  | 20.9%   | 20.3%   | 16.3%   |    |
| South Korea  | 17.0%   | 18.7%  | 18.7%  | 18.3%   | 17.3%   | 14.9%  | 14.9%  | 14.4%   | 15.5%   | 16.8%  | 17.0%   | 16.2%   | 14.2%   |    |
| Others   | 12.3%   | 12.9%  | 13.1%  | 13.4%   | 14.2%   | 14.8%  | 12.9%  | 13.1%   | 12.2%   | 10.2%  | 7.2%    | 10.3%   | 13.0%   |    |
| Non-operating income                                 | 61      | 131    | 255    | 265     | 74      | 134    | 203    | 234     | 53      | 91     | 156     | 214     | 74      |    |
| Non-operating expenses                               | 45      | 49     | 71     | 100     | 60      | 89     | 89     | 253     | 84      | 144    | 196     | 352     | 96      |    |
| Recurring profit                                     | 2,616   | 5,889  | 8,831  | 11,129  | 2,153   | 4,602  | 7,302  | 9,202   | 2,683   | 5,690  | 8,659   | 11,199  | 2,675   |    |
| YoY  | 21.2%   | 20.7%  | 18.3%  | 16.8%   | -17.7%  | -21.9% | -17.3% | -17.3%  | 24.6%   | 23.6%  | 18.6%   | 21.7%   | -0.3%   |    |
| RPM  | 21.0%   | 23.2%  | 23.1%  | 22.3%   | 19.0%   | 19.6%  | 20.3%  | 19.2%   | 21.6%   | 22.1%  | 22.2%   | 21.4%   | 18.0%   |    |
| Extraordinary gains                                  | 37      | 38     | 40     | 40      | 0       | 0      | 0      | 575     | 0       | 0      | 16      | 40      | 0       |    |
| Extraordinary losses                                 | 33      | 33     | 32     | 32      | 0       | 0      | 0      | 1,021   | 19      | 19     | 19      | 3,298   | 0       |    |
| Pre-tax profit                                       | 2,621   | 5,894  | 8,839  | 11,137  | 2,153   | 4,602  | 6,433  | 8,756   | 2,664   | 5,671  | 8,657   | 7,941   | 2,675   |    |
| Income taxes   | 785     | 1,656  | 2,368  | 3,009   | 239     | 897    | 1,656  | 2,199   | 799     | 1,621  | 2,433   | 3,016   | 793     |    |
| Income taxes-current                                 | 1,234   | 1,824  | 2,338  | 2,855   | 938     | 1,466  | 2,053  | 2,588   | 1,025   | 1,583  | 2,318   | 3,040   | 1,050   |    |
| Income taxes-deferred                                | -457    | -168   | 30     | 153     | -698    | -569   | -397   | -388    | -225    | 44     | 115     | -24     | -257    |    |
| Implied tax rate                                     | 30.0%   | 28.1%  | 26.8%  | 27.0%   | 11.1%   | 19.5%  | 25.7%  | 25.1%   | 30.0%   | 28.6%  | 28.1%   | 38.0%   | 29.6%   |    |
| Net income   | 1,835   | 4,238  | 6,470  | 8,128   | 1,913   | 3,705  | 4,777  | 6,557   | 1,865   | 4,043  | 6,223   | 4,925   | 1,869   |    |
| Net income attributable to non-controlling interests | 71      | 149    | 243    | 331     | 37      | 81     | 142    | 158     | 20      | 45     | 62      | 69      | 12      |    |
| Net income attributable to owners of parent          | 1,764   | 4,088  | 6,226  | 7,796   | 1,876   | 3,623  | 4,635  | 6,398   | 1,844   | 3,998  | 6,160   | 4,856   | 1,869   |    |
| YoY  | 20.6%   | 22.5%  | 17.9%  | 16.9%   | 6.3%    | -11.4% | -25.6% | -17.9%  | -1.7%   | 10.4%  | 32.9%   | -24.1%  | 1.4%    |    |
| Net margin   | 14.2%   | 16.1%  | 16.3%  | 15.6%   | 16.6%   | 15.5%  | 12.9%  | 13.4%   | 14.8%   | 15.5%  | 15.8%   | 9.3%    | 12.6%   |    |
| USD/JPY  | 121.3   | 121.5  | 121.0  | 120.1   | 109.1   | 106.4  | 108.0  | 109.0   | 112.0   | 111.0  | 112.0   | 111.0   | 108.7   |    |

Source: Shared Research based on company data

Note: Figures may differ from company materials due to differences in rounding methods.

Note: Regional sales and operating profit for Q1 FY03/18 and Q1 FY03/

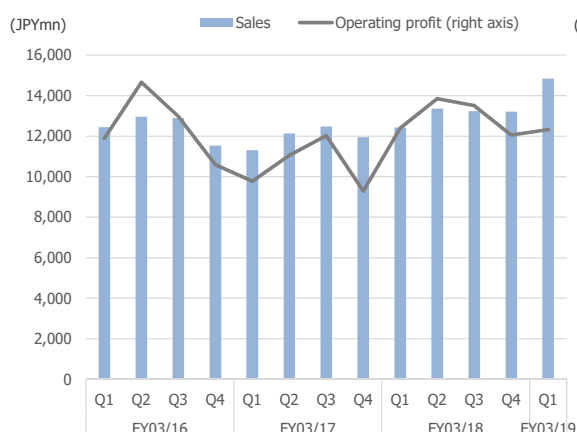
| Quarterly<br>(JPYmn)                                 | FY03/16 |        |        |        | FY03/17 |        |        |        | FY03/18 |        |        |         | FY03/19 |
|--|---------|--------|--------|--------|---------|--------|--------|--------|---------|--------|--------|---------|---------|
|  | Q1      | Q2     | Q3     | Q4     | Q1      | Q2     | Q3     | Q4     | Q1      | Q2     | Q3     | Q4      | Q1      |
| Sales  | 12,447  | 12,953 | 12,900 | 11,543 | 11,306  | 12,136 | 12,480 | 11,944 | 12,425  | 13,359 | 13,238 | 13,219  | 14,852  |
| PWB insulated materials                              | 11,679  | 11,993 | 11,935 | 10,711 | 10,516  | 11,403 | 11,630 | 11,151 | 11,554  | 12,442 | 12,330 | 11,715  | 12,230  |
| Rigid board materials                                | 8,756   | 9,305  | 9,061  | 8,120  | 7,971   | 8,552  | 8,507  | 8,186  | 8,506   | 9,034  | 8,715  | 8,087   | 8,445   |
| High-function  | 4,939   | 5,381  | 5,176  | 4,734  | 4,802   | 5,321  | 5,049  | 5,039  | 5,287   | 5,616  | 5,415  | 5,111   | 5,278   |
| General  | 3,817   | 3,924  | 3,885  | 3,386  | 3,169   | 3,231  | 3,458  | 3,147  | 3,219   | 3,418  | 3,300  | 2,976   | 3,167   |
| Substrates and flexible board materials              | 2,666   | 2,399  | 2,615  | 2,327  | 2,270   | 2,591  | 2,827  | 2,660  | 2,704   | 3,002  | 3,235  | 3,256   | 3,405   |
| Package substrates                                   | 2,522   | 2,224  | 2,441  | 2,189  | 2,109   | 2,422  | 2,632  | 2,513  | 2,490   | 2,654  | 2,877  | 3,008   | 3,093   |
| Flexible boards                                      | 144     | 175    | 174    | 138    | 161     | 169    | 195    | 147    | 214     | 348    | 358    | 248     | 312     |
| Build-up board materials                             | 257     | 289    | 259    | 264    | 275     | 260    | 296    | 305    | 344     | 406    | 380    | 372     | 380     |
| FPD materials  | 76      | 115    | 76     | 25     |         |        |        |        |         |        |        |         |         |
| Other related products                               | 690     | 845    | 889    | 807    | 788     | 735    | 848    | 794    | 869     | 917    | 908    | 1,504   | 2,622   |
| Regional sales (incl. internal sales)                |         |        |        |        |         |        |        |        |         |        |        |         |         |
| Japan  | 4,282   | 4,369  | 4,325  | 4,026  | 4,052   | 4,542  | 4,645  | 4,678  | 4,334   | 5,234  | 5,319  | 4,920   | 5,183   |
| China  | 5,296   | 6,024  | 5,599  | 4,901  | 4,970   | 5,469  | 4,922  | 5,257  | 5,221   | 5,857  | 5,532  | 4,929   | 5,475   |
| Taiwan   | 2,559   | 2,455  | 2,567  | 2,273  | 2,007   | 2,121  | 3,549  | 2,365  | 2,235   | 2,344  | 2,480  | 2,057   | 2,192   |
| South Korea  | 1,992   | 1,897  | 2,033  | 1,817  | 1,837   | 2,236  | 2,380  | 2,372  | 2,369   | 2,666  | 2,594  | 2,642   | 2,596   |
| Others   | 1,097   | 1,166  | 1,097  | 1,091  | 992     | 998    | 1,043  | 1,043  | 1,062   | 1,036  | 1,043  | 1,838   | 1,032   |
| Eliminations and company-wide                        | -2,779  | -2,958 | -2,721 | -2,565 | -2,552  | -3,230 | -4,059 | -3,771 | -2,796  | -3,778 | -3,730 | -3,167  | -1,626  |
| Sales to external customers                          |         |        |        |        |         |        |        |        |         |        |        |         |         |
| Japan  | 2,668   | 2,581  | 2,710  | 2,606  | 2,413   | 2,281  | 2,440  | 2,312  | 2,450   | 2,439  | 2,653  | 2,629   |         |
| China  | 4,990   | 5,707  | 5,352  | 4,638  | 4,768   | 5,265  | 4,758  | 5,132  | 5,073   | 5,749  | 5,412  | 4,829   |         |
| Taiwan   | 1,808   | 1,720  | 1,828  | 1,508  | 1,408   | 1,472  | 1,971  | 1,211  | 1,595   | 1,633  | 1,734  | 1,448   |         |
| South Korea  | 1,908   | 1,810  | 1,941  | 1,726  | 1,746   | 2,150  | 2,293  | 2,270  | 2,254   | 2,545  | 2,456  | 2,516   |         |
| Others   | 1,072   | 1,135  | 1,067  | 1,066  | 968     | 970    | 1,015  | 1,021  | 1,051   | 993    | 983    | 1,797   |         |
| YoY  | 6.8%    | -1.3%  | 6.6%   | 1.4%   | -9.2%   | -6.3%  | -3.3%  | 3.5%   | 9.9%    | 10.1%  | 6.1%   | 10.7%   | 19.5%   |
| PWB insulated materials                              | 13.8%   | 1.7%   | 3.4%   | -1.6%  | -10.0%  | -4.9%  | -2.6%  | 4.1%   | 9.9%    | 9.1%   | 6.0%   | 5.1%    | 5.9%    |
| Rigid board materials                                | 14.4%   | 5.6%   | 4.0%   | -2.9%  | -9.0%   | -8.1%  | -6.1%  | 0.8%   | 6.7%    | 5.6%   | 2.4%   | -1.2%   | -0.7%   |
| High-function  |         |        | 5.8%   | 0.2%   | -2.8%   | -1.1%  | -2.5%  | 6.4%   | 10.1%   | 5.5%   | 7.2%   | 1.4%    | -0.2%   |
| General  |         |        | 1.8%   | -6.9%  | -17.0%  | -17.7% | -11.0% | -7.1%  | 1.6%    | 5.8%   | -4.6%  | -5.4%   | -1.6%   |
| Substrates and flexible board materials              | 14.3%   | -11.5% | 2.3%   | 3.7%   | -14.9%  | 8.0%   | 8.1%   | 14.3%  | 19.1%   | 15.9%  | 14.4%  | 22.4%   | 25.9%   |
| Package substrates                                   |         |        | -0.2%  | 2.2%   | -16.4%  | 8.9%   | 7.8%   | 14.8%  | 18.1%   | 9.6%   | 9.3%   | 19.7%   | 24.2%   |
| Flexible boards                                      |         |        | 56.8%  | 32.7%  | 11.8%   | -3.4%  | 12.1%  | 6.5%   | 32.9%   | 105.9% | 83.6%  | 68.7%   | 45.8%   |
| Build-up board materials                             | -6.9%   | 6.6%   | -4.8%  | -2.9%  | 7.0%    | -10.0% | 14.3%  | 15.5%  | 25.1%   | 56.2%  | 28.4%  | 22.0%   | 10.5%   |
| FPD materials  | -92.1%  | -86.9% | -1.3%  | -61.5% |         |        |        |        |         |        |        |         |         |
| Other related products                               | 57.5%   | 87.8%  | 82.2%  | 86.8%  | 2.9%    | -23.4% | -12.1% | -4.6%  | 10.3%   | 24.8%  | 7.1%   | 89.4%   | 201.7%  |
| Regional sales (incl. internal sales)                |         |        |        |        |         |        |        |        |         |        |        |         |         |
| Japan  | 10.5%   | 0.7%   | 5.8%   | 15.5%  | -5.4%   | 4.0%   | 7.4%   | 16.2%  | 7.0%    | 15.2%  | 14.5%  | 5.2%    | 19.6%   |
| China  | 19.4%   | 8.9%   | 4.2%   | -3.6%  | -6.2%   | -9.2%  | -12.1% | 7.3%   | 5.1%    | 7.1%   | 12.4%  | -6.2%   | 4.9%    |
| Taiwan   | 13.2%   | -3.4%  | 2.4%   | -1.4%  | -21.6%  | -13.6% | 38.3%  | 4.0%   | 11.4%   | 10.5%  | -30.1% | -13.0%  | -1.9%   |
| South Korea  | -21.9%  | -31.0% | 0.2%   | -2.8%  | -7.8%   | 17.9%  | 17.1%  | 30.5%  | 29.0%   | 19.2%  | 9.0%   | 11.4%   | 9.6%    |
| Others   | 6.9%    | 16.7%  | 5.9%   | 1.1%   | -9.6%   | -14.4% | -4.9%  | -4.4%  | 7.1%    | 3.8%   | 0.0%   | 76.2%   | -2.8%   |
| Cost of sales  | 7,016   | 6,965  | 7,112  | 6,262  | 6,311   | 6,849  | 6,579  | 6,481  | 6,544   | 7,007  | 7,012  | 6,741   | 7,833   |
| YoY  | -1.6%   | -12.7% | 0.1%   | -5.9%  | -10.0%  | -1.7%  | -7.5%  | 3.5%   | 3.7%    | 2.3%   | 6.6%   | 4.0%    | 19.7%   |
| Cost ratio   | 56.4%   | 53.8%  | 55.1%  | 54.2%  | 55.8%   | 56.4%  | 52.7%  | 54.3%  | 52.7%   | 52.5%  | 53.0%  | 51.0%   | 52.7%   |
| Gross profit   | 5,431   | 5,988  | 5,787  | 5,281  | 4,994   | 5,288  | 5,900  | 5,463  | 5,880   | 6,353  | 6,226  | 6,478   | 7,019   |
| YoY  | 20.0%   | 16.3%  | 15.8%  | 11.8%  | -8.0%   | -11.7% | 2.0%   | 3.4%   | 17.7%   | 20.1%  | 5.5%   | 18.6%   | 19.4%   |
| GPM  | 43.6%   | 46.2%  | 44.9%  | 45.8%  | 44.2%   | 43.6%  | 47.3%  | 45.7%  | 47.3%   | 47.6%  | 47.0%  | 49.0%   | 47.3%   |
| SG&A expenses  | 2,829   | 2,783  | 2,947  | 2,963  | 2,855   | 2,870  | 3,268  | 3,431  | 3,166   | 3,323  | 3,270  | 3,840   | 4,322   |
| YoY  | 16.9%   | 11.5%  | 18.1%  | 8.7%   | 0.9%    | 3.1%   | 10.9%  | 15.8%  | 10.9%   | 15.8%  | 0.1%   | 11.9%   | 36.5%   |
| SG&A ratio   | 22.7%   | 21.5%  | 22.8%  | 25.7%  | 25.3%   | 23.6%  | 26.2%  | 28.7%  | 25.5%   | 24.9%  | 24.7%  | 29.0%   | 29.1%   |
| Operating profit                                     | 2,601   | 3,206  | 2,839  | 2,318  | 2,139   | 2,418  | 2,631  | 2,033  | 2,714   | 3,030  | 2,955  | 2,638   | 2,696   |
| Japan  | 766     | 724    | 462    | 302    | 316     | 546    | 577    | 587    | 766     | 856    | 1,110  | 676     | 1,147   |
| China  | 1,050   | 1,342  | 1,278  | 1,105  | 1,108   | 1,279  | 1,144  | 1,051  | 1,147   | 1,316  | 1,140  | 999     | 1,079   |
| Taiwan   | 556     | 603    | 590    | 478    | 396     | 437    | 505    | 154    | 487     | 473    | 513    | 374     | 358     |
| South Korea  | 339     | 388    | 382    | 305    | 318     | 287    | 359    | 311    | 368     | 478    | 449    | 368     | 368     |
| Others   | 135     | 158    | 148    | 156    | 141     | 154    | 96     | 143    | 130     | 83     | 13     | 288     | 134     |
| Eliminations and company-wide                        | -245    | -9     | -21    | -28    | -140    | -285   | -50    | -213   | -184    | -176   | -270   | -67     | -390    |
| YoY  | 23.7%   | 20.9%  | 13.5%  | 16.1%  | -17.8%  | -24.6% | -7.3%  | -12.3% | 26.9%   | 25.3%  | 12.3%  | 29.8%   | -0.7%   |
| Japan  | 22.2%   | -1.1%  | -33.1% | -27.4% | -58.7%  | -24.6% | 24.9%  | 94.4%  | 142.4%  | 56.8%  | 92.4%  | 15.2%   | 49.7%   |
| China  | 45.4%   | 41.9%  | 31.8%  | 27.2%  | 5.5%    | -4.7%  | -10.5% | -4.9%  | 3.5%    | 2.9%   | -0.3%  | -4.9%   | -5.9%   |
| Taiwan   | 38.0%   | 26.9%  | 24.2%  | 16.6%  | -28.8%  | -27.5% | -14.4% | -67.8% | 23.0%   | 8.2%   | 1.6%   | 142.9%  | -26.5%  |
| South Korea  | 17.3%   | 18.7%  | 14.0%  | 16.9%  | -6.2%   | -26.0% | -6.0%  | 2.0%   | 15.7%   | 66.6%  | 25.1%  | 18.3%   | 0.0%    |
| Others   | 1.5%    | 3.3%   | 8.0%   | 18.2%  | 4.4%    | -2.5%  | -35.1% | -8.3%  | -7.8%   | -46.1% | -86.5% | 101.4%  | 3.1%    |
| OPM  | 20.9%   | 24.8%  | 22.0%  | 20.1%  | 18.9%   | 19.9%  | 21.1%  | 17.0%  | 21.8%   | 22.7%  | 22.3%  | 20.0%   | 18.2%   |
| Japan  | 17.9%   | 16.6%  | 10.7%  | 7.5%   | 7.8%    | 12.0%  | 12.4%  | 12.5%  | 17.7%   | 16.4%  | 20.9%  | 13.7%   | 22.1%   |
| China  | 19.8%   | 22.3%  | 22.8%  | 22.5%  | 22.3%   | 23.4%  | 23.2%  | 20.0%  | 22.0%   | 22.5%  | 20.6%  | 20.3%   | 19.7%   |
| Taiwan   | 21.7%   | 24.6%  | 23.0%  | 21.0%  | 19.7%   | 20.6%  | 14.2%  | 6.5%   | 21.8%   | 20.2%  | 20.7%  | 18.2%   | 16.3%   |
| South Korea  | 17.0%   | 20.5%  | 18.8%  | 16.8%  | 17.3%   | 12.8%  | 15.1%  | 13.1%  | 15.5%   | 17.9%  | 17.3%  | 13.9%   | 14.2%   |
| Others   | 12.3%   | 13.6%  | 13.5%  | 14.3%  | 14.2%   | 15.4%  | 9.2%   | 13.7%  | 12.2%   | 8.0%   | 1.2%   | 15.7%   | 13.0%   |
| Non-operating income                                 | 61      | 70     | 124    | 10     | 74      | 60     | 69     | 31     | 53      | 38     | 65     | 58      | 74      |
| Non-operating expenses                               | 45      | 4      | 22     | 29     | 60      | 29     | 0      | 164    | 84      | 60     | 52     | 156     | 96      |
| Recurring profit                                     | 2,616   | 3,273  | 2,942  | 2,298  | 2,153   | 2,449  | 2,700  | 1,900  | 2,683   | 3,007  | 2,969  | 2,540   | 2,675   |
| YoY  | 21.2%   | 20.4%  | 13.7%  | 11.3%  | -17.7%  | -25.2% | -8.2%  | -17.3% | 24.6%   | 22.8%  | 10.0%  | 33.7%   | -0.3%   |
| RPM  | 21.0%   | 25.3%  | 22.8%  | 19.9%  | 19.0%   | 20.2%  | 21.6%  | 15.9%  | 21.6%   | 22.5%  | 22.4%  | 19.2%   | 18.0%   |
| Extraordinary gains                                  | 37      | 1      | 2      | 0      | 0       | 0      | 0      | 575    | 0       | 0      | 16     | 24      | 0       |
| Extraordinary losses                                 | 33      | 0      | -1     | 0      | 0       | 0      | 0      | 1,021  | 19      | 0      | 0      | 3,279   | 0       |
| Pre-tax profit                                       | 2,621   | 3,273  | 2,945  | 2,298  | 2,153   | 2,449  | 1,831  | 2,323  | 2,664   | 3,007  | 2,986  | -716    | 2,675   |
| Income taxes   | 785     | 871    | 712    | 641    | 239     | 658    | 759    | 543    | 799     | 822    | 812    | 583     | 793     |
| Income taxes-current                                 | 1,234   | 590    | 514    | 517    | 938     | 528    | 587    | 535    | 1,025   | 558    | 735    | 722     | 1,050   |
| Income taxes-deferred                                | -457    | 289    | 198    | 123    | -698    | 129    | 172    | 9      | -225    | 269    | 71     | -139    | -257    |
| Implied tax rate                                     | 30.0%   | 26.6%  | 24.2%  | 27.9%  | 11.1%   | 26.9%  | 41.5%  | 23.4%  | 30.0%   | 27.3%  | 27.2%  | -81.4%  | 29.6%   |
| Net income   | 1,835   | 2,403  | 2,232  | 1,658  | 1,913   | 1,792  | 1,072  | 1,780  | 1,865   | 2,178  | 2,180  | -1,298  | 1,869   |
| Net income attributable to non-controlling interests | 71      | 78     | 94     | 88     | 37      | 44     | 61     | 16     | 20      | 25     | 17     | 7       | 12      |
| Net income attributable to owners of parent          | 1,764   | 2,324  | 2,138  | 1,570  | 1,876   | 1,747  | 1,012  | 1,763  | 1,844   | 2,154  | 2,162  | -1,304  | 1,869   |
| YoY  | 20.6%   | 24.0%  | 10.0%  | 13.3%  | 6.3%    | -24.8% | -52.7% | 12.3%  | -1.7%   | 23.3%  | 113.6% | -174.0% | 1.4%    |
| Net margin   | 14.2%   | 17.9%  | 16.6%  | 13.6%  | 16.6%   | 14.4%  | 8.1%   | 14.8%  | 14.8%   | 16.1%  | 16.3%  | -9.9%   | 12.6%   |

Source: Shared Research based on company data

Note: Figures may differ from company materials due to differences in rounding methods.

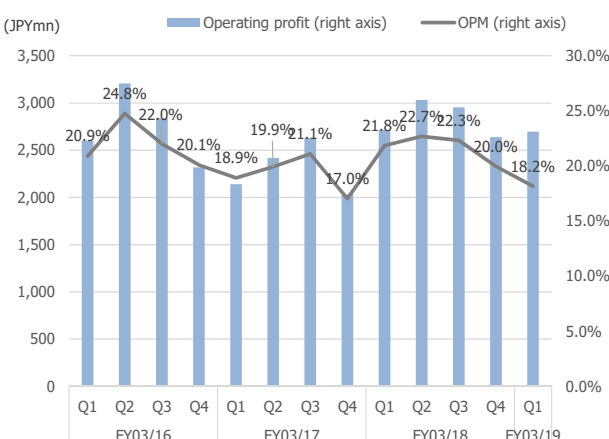
Note: Regional sales and operating profit for Q1 FY03/18 and Q1 FY03/19 exclude Taiyo Pharma, Chugai Kasei, Taiyo Green Energy, and MNT.

## Quarterly performance

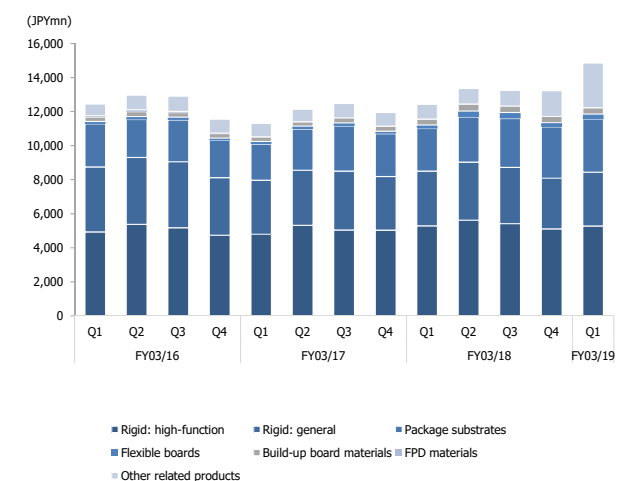


Source: Shared Research based on company data

## Operating profit and OPM

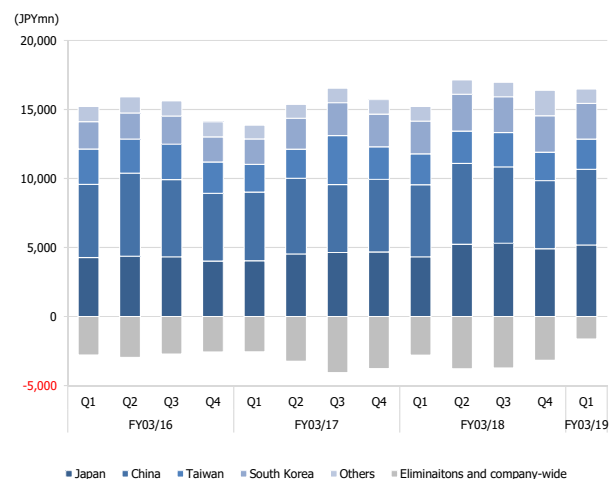


## Sales by product category



Source: Shared Research based on company data

## Sales by region



## Q1 FY03/19 results (out August 3, 2018)

### Overview

Q1 FY03/19 results: In the electronic components industry, the company's core market, sales volume of dry film for package substrates increased YoY while that of dry film for rigid materials slightly decreased. Taiyo Pharma Co., Ltd. completed the transfer process of manufacturing and marketing approval regarding four products out of 13 products. In addition, the yen strengthened to JPY108.7/USD (from JPY111.6/USD in Q1 FY03/18), but remained below the assumed rate of JPY105.0/USD. Under such circumstances, Q1 FY03/19 sales rose 19.5% YoY to JPY14.9bn, operating profit decreased 0.7% YoY to JPY2.7bn, recurring profit fell 0.3% YoY to JPY2.7bn, and net income attributable to owners of parent increased 1.3% YoY to JPY1.9bn; OPM fell to 18.2% from 21.8% in Q1 FY03/18. The company made no changes to 1H and full-year FY03/19 earnings forecasts.

By segment, sales rose 4.8% YoY in Electronics Materials and 71.9% YoY in Other. OPM was 23.4% for Electronics Materials (24.2% in Q1 FY03/18), 4.3% for Medical and Pharmaceuticals (no YoY comparison), and 1.6% for Other (9.1%).

**For details on previous quarterly and annual results, please refer to the Historical performance and financial statement section.**

## FY03/19 full-year forecasts (as of FY03/18 and Q1 FY03/19 earnings announcement)

### Overview

For FY03/19, the company forecasts full-year sales of JPY60.2bn (+15.2% YoY) and an operating profit of JPY9.8bn (-13.6%), assuming an average exchange rate of JPY101.5/USD for the full year (reflecting rate of JPY108.7/USD in Q1, and assumed rates of JPY100.0/USD for Q2, JPY102.9/USD for 1H, and JPY100.0/USD for 2H).

Using the same exchange rate assumption of JPY111/USD as the company did for FY03/18, the company forecasts sales of JPY63.8bn (+22.1% YoY) and operating profit of JPY11.4bn (+0.6% YoY).

In the electronic components industry, the company's core market, demand remained solid for smartphones, servers, and automotive components. According to the company, the high growth rate in flexible printed circuit board (FPC) materials reflected increased adoption in mobile devices. Materials for smartphones were somewhat sluggish due to delays in production of autumn model smartphones. In automotive products, the company has gradually secured qualification for its products not only from manufacturers in Japan, but also overseas, and deliveries appear to be progressing steadily. However, tariff hikes driven by trade friction between the US and China and related impact on auto production trends warrant monitoring. Demand for materials for logic chips used in servers that mine cryptocurrency weakened from late June, but demand for materials for memory chips used in servers is strong. In build-up board materials, demand for materials to plug holes in multilayer boards remained firm, supported by an increase in the number of layers and other factors.

Dry film has become more profitable as it became more cost competitive compared with outsourcers by steadily expanding in-house production at its Kitakyushu Plant (contributing to the significant profit growth in Japan). As the existing production line is operating at full capacity, Taiyo is building a new line with roughly the same capacity. Once the new line becomes operational, the company's in-house production ratio for dry film (capacity basis) is expected to reach about 50%. General liquid film struggled due to low prices from local manufacturers in the Chinese market, leading to lower market share. The company acknowledges that it must take some counter-measures during FY03/19 (costs related to these measures included in SG&A expenses).

The medium-term plan for 13 long-listed products in the Medical and Pharmaceuticals business calls for FY03/19 sales of JPY7.6bn and an operating loss of JPY334mn. Taiyo finished Q1 in the black, but the outlook for a loss over the full year assumes the booking of JPY500mn in one-time expenses associated with manufacturing transfers in 2H.

### YoY change factors analysis

In an analysis of the factors leading to YoY changes in sales, the company expects increased volume of solder resist products for printed wiring boards and the impact of an improved sales mix to boost sales up JPY3.3bn (both dry and liquid film contributing half each), the pharmaceutical business to boost sales up JPY6.8bn, and the newly consolidated MNT to boost sales up JPY1.5bn. On the other hand, the company expects yen appreciation in the currency exchange to drive down sales JPY3.6bn (=JPY400mn x JPY9 appreciation).

In an analysis of the factors leading to YoY changes in operating profit, the company expects increased volume of solder resist products for printed wiring boards and the impact of an improved sales mix to boost profits by JPY1.2bn. However, the company expects several factors to have a negative impact on YoY operating profit, including SG&A expenses (-JPY700mn), the pharmaceutical business (-JPY343mn, including JPY1.4bn in depreciation expenses on sales rights), the newly consolidated MNT (-JPY100mn, including JPY250mn for amortization of goodwill), and fluctuations in the currency exchange (-JPY1.6bn = JPY178mn x JPY9 appreciation). Expenses required for counter-measures to respond to local companies in the Chinese market (third competitors) are included in the JPY700mn forecasted increase in SG&A expenses.

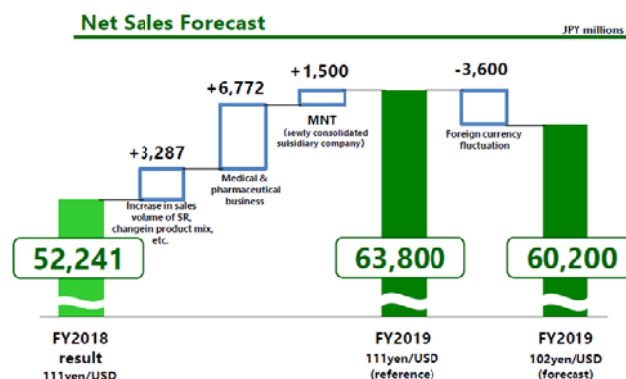
### Capital expenditures, M&A

The company is conducting M&A in the pharmaceutical field and acquired Micro Network Technologies Corp. (MNT) using low-interest loans and the funds earned from the capital and business alliance with DIC Corp (TSE1: 4631), maintaining its cash

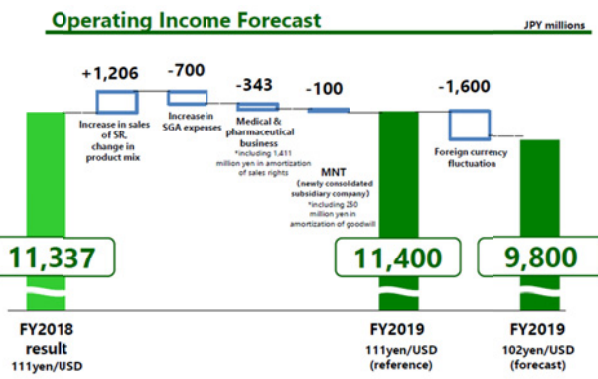


position (JPY446mn in cash equivalents at end-March 2018) as it plans for the next deal. Capital expenditures ended at a little over JPY1.5bn (JPY5.0bn in FY03/18 forecasts), and the company plans to spend JPY4.0bn in FY03/19\* (around JPY2.0bn in depreciation expenses).

**Factors impacting FY03/19 company forecasts for sales (YoY)**



**Factors impacting FY03/19 company forecasts for operating profit (YoY)**



**Full-year company forecasts for FY03/19**

| 損益計算書<br>(百万円)   | FY3/17 |        |        | FY3/18 |        |        | FY3/19     |            |            | FY3/19 (参考) |            |            |
|------------------|--------|--------|--------|--------|--------|--------|------------|------------|------------|-------------|------------|------------|
|                  | 上期     | 下期     | 通期     | 上期     | 下期     | 通期     | 上期<br>(会予) | 下期<br>(会予) | 通期<br>(会予) | 上期<br>(会予)  | 下期<br>(会予) | 通期<br>(会予) |
| 売上高              | 23,442 | 24,424 | 47,866 | 25,784 | 26,457 | 52,241 | 30,500     | 29,700     | 60,200     | 31,900      | 31,900     | 63,800     |
| YoY              | -7.7%  | -0.1%  | -4.0%  | 10.0%  | 8.3%   | 9.1%   | 18.3%      | 12.3%      | 15.2%      | 23.7%       | 20.6%      | 22.1%      |
| 売上総利益            | 10,282 | 11,363 | 21,645 | 12,233 | 12,704 | 24,937 |            |            |            |             |            |            |
| YoY              | -10.0% | 2.7%   | -3.7%  | 19.0%  | 11.8%  | 15.2%  |            |            |            |             |            |            |
| 売上総利益率           | 43.9%  | 46.5%  | 45.2%  | 47.4%  | 48.0%  | 47.7%  |            |            |            |             |            |            |
| 販管費              | 5,725  | 6,699  | 12,424 | 6,489  | 7,110  | 13,599 |            |            |            |             |            |            |
| YoY              | 2.0%   | 13.4%  | 7.8%   | 13.3%  | 6.1%   | 9.5%   |            |            |            |             |            |            |
| 販管费率             | 24.4%  | 27.4%  | 26.0%  | 25.2%  | 26.9%  | 26.0%  |            |            |            |             |            |            |
| 営業利益             | 4,557  | 4,664  | 9,221  | 5,744  | 5,593  | 11,337 | 5,100      | 4,700      | 9,800      | 5,700       | 5,700      | 11,400     |
| YoY              | -21.5% | -9.6%  | -15.9% | 26.0%  | 19.9%  | 22.9%  | -11.2%     | -16.0%     | -13.6%     | -0.8%       | 1.9%       | 0.6%       |
| 営業利益率            | 19.4%  | 19.1%  | 19.3%  | 22.3%  | 21.1%  | 21.7%  | 16.7%      | 15.8%      | 16.3%      | 17.9%       | 17.9%      | 17.9%      |
| 営業外収益            | 134    | 100    | 234    | 91     | 123    | 214    |            |            |            |             |            |            |
| 営業外費用            | 89     | 164    | 253    | 144    | 208    | 352    |            |            |            |             |            |            |
| 経常利益             | 4,602  | 4,600  | 9,202  | 5,690  | 5,509  | 11,199 | 5,000      | 4,600      | 9,600      | 5,600       | 5,600      | 11,200     |
| YoY              | -21.9% | -12.2% | -17.3% | 23.6%  | 19.8%  | 21.7%  | -12.1%     | -16.5%     | -14.3%     | -1.6%       | 1.7%       | 0.0%       |
| 経常利益率            | 19.6%  | 18.8%  | 19.2%  | 22.1%  | 20.8%  | 21.4%  | 16.4%      | 15.5%      | 15.9%      | 17.6%       | 17.6%      | 17.6%      |
| 特別利益             |        | 575    | 575    |        |        | 40     |            |            |            |             |            |            |
| 特別損失             |        | 1,021  | 1,021  | 19     | 3,279  | 3,298  |            |            |            |             |            |            |
| 税金等調整前当期純利益      | 4,602  | 4,154  | 8,756  | 5,671  | 2,270  | 7,941  |            |            |            |             |            |            |
| 法人税等             | 897    | 1,302  | 2,199  | 1,628  | 1,388  | 3,016  |            |            |            |             |            |            |
| 法人税、住民税及び事業税     | 1,466  | 1,122  | 2,588  | 1,583  | 1,457  | 3,040  |            |            |            |             |            |            |
| 法人税等調整額          | -569   | 181    | -388   | 44     | -68    | -24    |            |            |            |             |            |            |
| 税率               | 19.5%  | 31.3%  | 25.1%  | 28.7%  | 61.1%  | 38.0%  |            |            |            |             |            |            |
| 当期純利益            | 3,705  | 2,852  | 6,557  | 4,043  | 882    | 4,925  |            |            |            |             |            |            |
| 非支配株主に帰属する当期純利益  | 81     | 77     | 158    | 45     | 24     | 69     |            |            |            |             |            |            |
| 親会社株主に帰属する当期純利益  | 3,623  | 2,775  | 6,398  | 3,998  | 858    | 4,856  | 3,500      | 3,200      | 6,700      | 3,900       | 3,900      | 7,800      |
| YoY              | -11.4% | -25.2% | -17.9% | 10.4%  | -69.1% | -24.1% | -12.5%     | 273.0%     | 38.0%      | -2.5%       | 354.5%     | 60.6%      |
| 親会社株主に帰属する当期純利益率 | 15.5%  | 11.4%  | 13.4%  | 15.5%  | 3.2%   | 9.3%   | 11.5%      | 10.8%      | 11.1%      | 12.2%       | 12.2%      | 12.2%      |
| JPY/USD          | 106.4  | 111.6  | 109.0  | 111.0  | 111.0  | 111.0  | 102.9      | 100.0      | 101.5      | 111.0       | 111.0      | 111.0      |

Source: Shared Research based on company data

Note: Figures may differ from company materials due to differences in rounding methods.



## Historical performance compared with company forecasts

### Historical performance compared with company forecasts

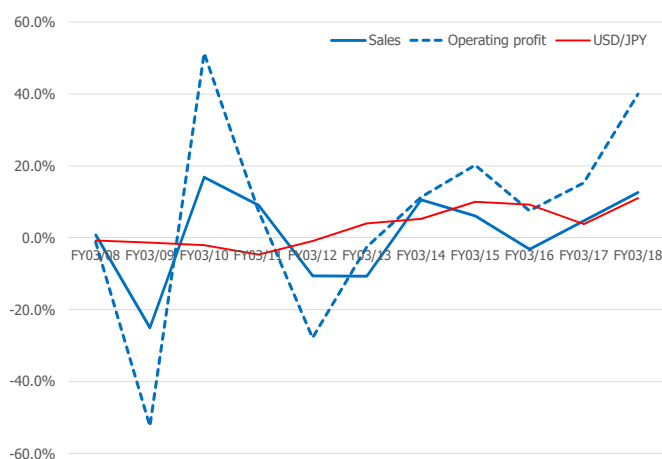
| Results versus Initial Est.<br>(JPYmn) | FY03/08 | FY03/09 | FY03/10 | FY03/11 | FY03/12 | FY03/13 | FY03/14 | FY03/15 | FY03/16 | FY03/17 | FY03/18 |
|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|  | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   |
| Sales (Initial Est.)                   | 45,000  | 43,500  | 30,000  | 37,000  | 44,500  | 40,500  | 40,000  | 45,500  | 51,500  | 45,700  | 46,400  |
| Sales (Results)                        | 45,338  | 32,614  | 35,056  | 40,366  | 39,797  | 36,184  | 44,224  | 48,260  | 49,843  | 47,866  | 52,241  |
| Results versus Initial Est.            | 0.8%    | -25.0%  | 16.9%   | 9.1%    | -10.6%  | -10.7%  | 10.6%   | 6.1%    | -3.2%   | 4.7%    | 12.6%   |
| Operating profit (Initial Est.)        | 9,000   | 7,000   | 3,200   | 5,000   | 5,600   | 4,500   | 6,800   | 7,700   | 10,200  | 8,000   | 8,100   |
| Operating profit (Results)             | 8,896   | 3,332   | 4,843   | 5,380   | 4,040   | 4,385   | 7,568   | 9,254   | 10,964  | 9,221   | 11,337  |
| Results versus Initial Est.            | -1.2%   | -52.4%  | 51.3%   | 7.6%    | -27.9%  | -2.6%   | 11.3%   | 20.2%   | 7.5%    | 15.3%   | 40.0%   |
| Recurring profit (Initial Est.)        | 9,000   | 7,300   | 3,300   | 5,000   | 5,600   | 4,500   | 6,800   | 7,700   | 10,300  | 7,800   | 8,000   |
| Recurring profit (Results)             | 8,586   | 3,546   | 4,787   | 5,316   | 4,027   | 4,743   | 7,827   | 9,529   | 11,129  | 9,202   | 11,199  |
| Results versus Initial Est.            | -4.6%   | -51.4%  | 45.1%   | 6.3%    | -28.1%  | 5.4%    | 15.1%   | 23.8%   | 8.0%    | 18.0%   | 40.0%   |
| Net income (Initial Est.)              | 6,000   | 4,700   | 2,000   | 3,500   | 3,800   | 3,200   | 4,700   | 5,000   | 7,000   | 5,500   | 5,600   |
| Net income (Results)                   | 6,171   | 1,958   | 3,010   | 3,402   | 2,502   | 3,367   | 4,930   | 6,667   | 7,796   | 6,398   | 4,856   |
| Results versus Initial Est.            | 2.9%    | -58.3%  | 50.5%   | -2.8%   | -34.2%  | 5.2%    | 4.9%    | 33.3%   | 11.4%   | 16.3%   | -13.3%  |
| USD/JPY (Initial Est.)                 | 115.0   | 102.0   | 95.0    | 90.0    | 80.0    | 80.0    | 95.0    | 100.0   | 110.0   | 105.0   | 100.0   |
| USD/JPY (Results)                      | 114.1   | 100.6   | 93.0    | 85.8    | 79.3    | 83.2    | 100.0   | 110.0   | 120.1   | 109.0   | 111.0   |
| Results versus Initial Est.            | -0.8%   | -1.3%   | -2.1%   | -4.7%   | -0.9%   | 4.0%    | 5.3%    | 10.0%   | 9.2%    | 3.8%    | 11.0%   |

Source: Shared Research based on company data

Note: Figures may differ from company materials due to differences in rounding methods.

Excluding the impact of the global financial crisis in 2008, differences between actual results and initial company forecasts tend to move more or less in line with the differences between currency fluctuations and assumptions (JPY/USD rates).

### Difference in historical performance compared with initial company estimates



Source: Shared Research based on company data

## Medium-term outlook

### Medium-term management plan: become a “comprehensive chemical company”

In June 2017, Taiyo unveiled a new medium-term management plan covering the three years from FY03/18 through FY03/20. This new plan does not include sales or profit targets, but instead sets minimum target ratios: OPM of at least 20%, ROE of at least 11%, DOE of at least 5%, and record high operating profit. It flags a shift from an emphasis on earnings quantity to quality. The company achieved an OPM in the 20% range in FY03/16, but this figure is the minimum, and all group companies target higher OPM. (Note: this is the first medium-term management plan in seven years. The last medium-term plan was announced in October 2010.)

Taiyo did not release medium-term sales and operating profit targets because three-year targets are not optimal for the five- to ten-year business cycle of printed wiring board materials (solder resist), its core business. It worried that three-year sales and earnings targets would lead to short-termism at the management level.

The company has released this new medium-term plan to reduce its dependency on solder resist products. Taiyo already has a market share of over 50% for solder resist materials. As overseas sales make up 80% of its solder resist business, it is vulnerable to macroeconomic factors including currency movements and changes in markets for end products such as smartphones and servers. In addition, the company withdrew from the flat panel display (FPD) materials business, previously its second core business, and has yet to develop successful new businesses. To break free of its dependency on solder resist products, Taiyo plans to transform into a comprehensive chemical company and has set targets accordingly.

The new medium-term plan has the following nine objectives.

- Strengthen the profitability of solder resist products
- Expand printed wiring board (PWB) products other than solder resist
- Establish the pharmaceutical business as an eventual second earnings driver
- Make profitable businesses in energy and food production (such as a solar power plant business and a plant factory), for which it has already established subsidiaries
- Strengthen research capabilities by building an efficient R&D structure; invest over 5% of sales in R&D while maintaining OPM of at least 20% (acquired Chugai Kasei to help strengthen its R&D capabilities)
- Strengthen balance sheet and access new technologies through capital and business alliance with DIC (DIC paid JPY24.8bn to hold a 19.5% stake in Taiyo)
- Conduct M&A to launch the pharmaceutical and other businesses
- Enhance CSR activities
- Invest in developing and utilizing proactive personnel, and continue to create a work environment that helps retain talented employees

## Key points of new medium-term business plan

### NEXT STAGE 2020

#### Targets

|                           |                               |
|---------------------------|-------------------------------|
| 1. Earnings structure     | OP: over 20%                  |
| 2. Profitability          | ROE: over 11%                 |
| 3. Shareholder returns    | DOE: over 5%                  |
| 4. Management performance | Exceed its historical high OP |

\* The company's historical high OP was JPY11bn in FY03/16

#### Objectives

1. Strengthen the profitability of solder resist products
2. Expand non-SR business related to printed wiring board (PWB)
3. Establish pharmaceutical business
4. Make energy and food businesses profitable
5. Enhance fundamental research capability
6. Business alliance with DIC Corporation
7. Execute M&A strategies
8. Expand CSR activities
9. Develop and utilize proactive personnel

Source: Shared Research based on company data

## Capital and business alliance with DIC

On February 10, 2017, DIC paid JPY24.8bn to acquire a 19.5% stake in Taiyo (Taiyo is now an equity-method affiliate of DIC). The objectives and overview of the tie-up are as follows.

- Joint development of new PWB materials such as MIDs (molded interconnect devices) using technology possessed by both the Taiyo Group and DIC
- Joint development of PWB materials using DIC's advanced resin development technology and pigment dispersion technology
- In new businesses involving electronics products that DIC is considering entering, improved products that match market needs and swift launch of these products using the Taiyo Group's established links with the industry and assessment technology
- Outsourced solder resist production to DIC's plants overseas to reduce production costs and improve operating rates at overseas plants

DIC is a veteran of the Japanese ink industry with a history of over 100 years. Its FY12/16 sales were 16x those of Taiyo in FY03/17, and operating profit was nearly 6x larger. If this capital and business alliance had taken place between two ink companies it might have been seen as a larger company swallowing the smaller one, but this deal is between companies in different industries, and is a mutually beneficial relationship as Taiyo offers experience in the electronic materials sector (an area DIC is interested in entering). The relationship with DIC is similar to the mutually beneficial capital alliances IBM entered with Intel and Microsoft in the US. Whereas DIC's OPM is just above 7%, Taiyo is significantly more profitable with an OPM of around 20%. Of the roughly JPY24.8bn in funds acquired from the capital alliance, Taiyo plans to spend around JPY8.2bn on M&A and R&D.

### Uses of funds

|   | (JPYbn)             |
|---|---------------------|
| Rebuilding the plant in Taiwan and improving productivity (consolidation with OTC Taiwan) | 7.5                 |
| Dry film line at the Kitakyushu Plant   | 2.5                 |
| Making Onstatic Technology (OTC) a wholly owned subsidiary                                | 2.5                 |
| Rebuilding core IT system   | 3.0                 |
| Improving productivity at the plants in Saitama and in South Korea                        | 1.0                 |
| Expanding existing businesses to PWB-related areas through R&D and M&A                    | Approx. 8.2         |
| <b>Total</b>  | <b>Approx. 24.7</b> |

Source: Shared Research based on company data

## Company comparison

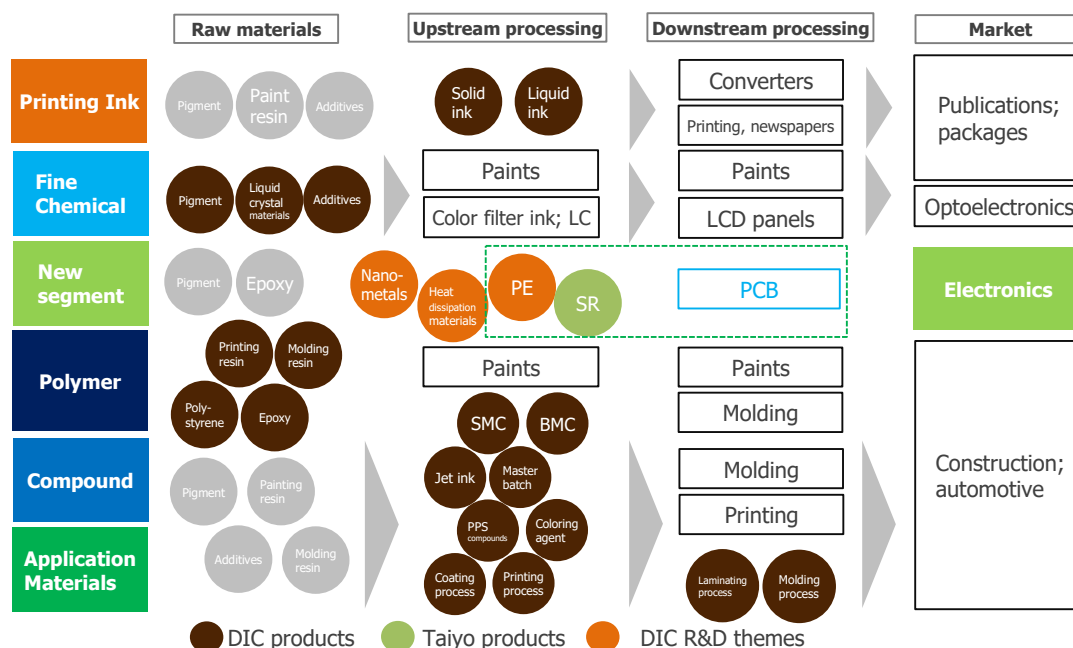
| Income statement<br>(JPYmn)                        | Taiyo Holdings (4626) |               |               | DIC (4631)     |                |                |
|--|-----------------------|---------------|---------------|----------------|----------------|----------------|
|  | FY03/16               | FY03/17       | FY03/18       | FY12/15        | FY12/16        | FY12/17        |
|  | Cons.                 | Cons.         | Cons.         | Cons.          | Cons.          | Cons.          |
| <b>Sales</b>                                       | <b>49,843</b>         | <b>47,866</b> | <b>52,241</b> | <b>819,999</b> | <b>751,438</b> | <b>789,427</b> |
| YoY  | 3.3%                  | -4.0%         | 9.1%          | -1.2%          | -8.4%          | 5.1%           |
| <b>Operating profit</b>                            | <b>10,964</b>         | <b>9,221</b>  | <b>11,337</b> | <b>51,068</b>  | <b>54,182</b>  | <b>56,483</b>  |
| YoY  | 18.5%                 | -15.9%        | 22.9%         | 24.3%          | 6.1%           | 4.2%           |
| OPM  | 22.0%                 | 19.3%         | 21.7%         | 6.2%           | 7.2%           | 7.2%           |
| <b>Recurring profit</b>                            | <b>11,129</b>         | <b>9,202</b>  | <b>11,199</b> | <b>48,995</b>  | <b>55,797</b>  | <b>56,960</b>  |
| YoY  | 16.8%                 | -17.3%        | 21.7%         | 22.7%          | 13.9%          | 2.1%           |
| RPM  | 22.3%                 | 19.2%         | 21.4%         | 6.0%           | 7.4%           | 7.2%           |
| <b>Net income attributable to owners of parent</b> | <b>7,796</b>          | <b>6,398</b>  | <b>4,856</b>  | <b>37,394</b>  | <b>34,767</b>  | <b>38,603</b>  |
| YoY  | 16.9%                 | -17.9%        | -24.1%        | 48.4%          | -7.0%          | 11.0%          |
| Net margin   | 15.6%                 | 13.4%         | 9.3%          | 4.6%           | 4.6%           | 4.9%           |
| <b>Per share data (JPY)</b>                        |                       |               |               |                |                |                |
| EPS  | 338.0                 | 266.4         | 168.6         | 389.4          | 366.7          | 407.6          |
| Dividend per share                                 | 110.0                 | 120.1         | 160.2         | 80.0           | 100.0          | 120.0          |
| Payout ratio                                       | 32.5%                 | 45.1%         | 95.0%         | 20.5%          | 27.3%          | 29.4%          |
| DOE  | 6.2%                  | 5.5%          | 6.4%          | 3.0%           | 3.5%           |                |
| Book value per share                               | 1,865.9               | 2,469.0       | 2,521         | 2,768.4        | 2,938.1        | 3,329.6        |
| <b>Balance sheet (JPYmn)</b>                       |                       |               |               |                |                |                |
| Total assets                                       | 65,464                | 92,386        | 111,490       | 778,857        | 764,828        | 832            |
| Net assets   | 45,250                | 71,846        | 73,023        | 289,857        | 307,017        | 344            |
| <b>Cash flow statement (JPYmn)</b>                 |                       |               |               |                |                |                |
| Cash flows from operating activities               | 10,546                | 9,042         | 8,100         | 29,113         | 62,504         | 54,196         |
| Cash flows from investing activities               | -6,750                | -1,063        | -24,161       | -9,973         | -32,202        | -58,938        |
| Cash flows from financing activities               | -2,740                | 20,342        | 11,319        | -24,801        | -26,852        | 11,375         |
| <b>Financial ratios</b>                            |                       |               |               |                |                |                |
| Cash and cash equivalents                          | 18,385                | 46,661        | 41,816        | 15,113         | 16,671         | 17,651         |
| ROA (RP-based)                                     | 17.6%                 | 11.7%         | 11.0%         | 6.2%           | 7.3%           | 7.1%           |
| ROE  | 19.0%                 | 11.2%         | 6.8%          | 14.6%          | 12.9%          | 13.0%          |
| Equity ratio                                       | 65.9%                 | 76.9%         | 65.2%         | 33.7%          | 36.4%          | 37.9%          |
| <b>Per employee data (JPYmn)</b>                   |                       |               |               |                |                |                |
| Number of employees                                | 1,202                 | 1,249         |               | 20,264         | 20,481         | 20,628         |
| Sales per employee                                 | 41.5                  | 38.3          |               | 40.5           | 36.7           | 38.3           |
| Operating profit per employee                      | 9.1                   | 7.4           |               | 2.5            | 2.6            | 2.7            |
| <b>Other metrics (JPYmn)</b>                       |                       |               |               |                |                |                |
| R&D expenses                                       | 2,441                 | 3,235         |               | 26,844         | 26,178         |                |
| % of sales   | 4.9%                  | 6.8%          |               | 3.3%           | 3.5%           |                |
| <b>Established</b>                                 | September 1953        |               |               | February 1908  |                |                |

Source: Shared Research based on company data

Note: Figures may differ from company data due to differences in rounding methods.

## Capital and business alliance with DIC

# Business portofolio of Taiyo HD and DIC



Source: Shared Research based on company data

## Overview of capital alliance with DIC

|                             |   |           |
|-----------------------------|---|-----------|
| Type and number of shares   | New shares issued (common stock)        | 1,312,600 |
|                             | Treasury shares disposed (common stock) | 4,304,700 |
|                             | Total number of shares                  | 5,617,300 |
| Amount paid                 | JPY4,428 per share                      |           |
| Total amount paid           | Approx. JPY24.8bn                       |           |
| Increase in capital stock   | Approx. JPY2.9bn                        |           |
| Increase in capital surplus | Approx. JPY2.9bn                        |           |

**Regarding price per share:** Issue price set at JPY4,428, a 10% discount compared to JPY4,920, the closing price on the business day prior to the resolution concerning the third-party allotment.

Note: this is more than 90% of the one-month, three-month, and six-month averages. This complies with the Japan Securities Dealers Association's "Guidelines Concerning Treatment of Capital Increase by Allotment to a Third Party" and is not considered a "favorable issue."

**Becoming an equity-method affiliate of DIC:** DIC will hold 19.5% of the voting rights of Taiyo, making Taiyo Holdings an equity-method affiliate. Further, DIC will dispatch one director to the company (proposal submitted to and approved by June 2017 ordinary general meeting of shareholders).

Source: Shared Research based on company data

## Pharmaceutical business strategy

On January 5, 2018, the company announced that it had completed a transfer of assets to receive the manufacturing and sales rights of 13 long-listed products from Chugai Pharmaceutical Co. (Chugai Pharmaceutical) for a price of JPY21.3bn, excluding inventories.

### 13 long-listed products

|    | Brand Name                 | Therapeutic Category  |
|----|----------------------------|---|
| 1  | BACTRAMIN®                 | Synthetic Antibacterial Agent / Agent for the treatment of Pneumocystis Pneumonia                     |
| 2  | DIGOSIN®                   | Digitalis Glycoside   |
| 3  | EUGLUCON®                  | Oral Hypoglycemic Agent   |
| 4  | FURTULON®                  | Anti-Tumor Agent  |
| 5  | GLYCEOL®                   | Drug for the treatment of Intracranial Hypertension and Intracranial Edema / Ocular Hypotensive Agent |
| 6  | KYTRIL®                    | 5-HT <sub>3</sub> receptor antagonist for the treatment of Nausea and Vomiting                        |
| 7  | MADOPAR®                   | Agent for the treatment of Parkinson's disease  |
| 8  | PROCARBAZINE HYDROCHLORIDE | Anti-Tumor Agent  |
| 9  | PYDOXAL®                   | Active Form of Vitamin B <sub>6</sub>   |
| 10 | RESPLEN®                   | Antitussive and Mucolytic Agent   |
| 11 | RIVOTRIL®                  | Anti-epileptic Agent  |
| 12 | ROCEPHIN®                  | Cephalosporin Antibiotic  |
| 13 | TIGASON®                   | Agent for the treatment of Hyperkeratosis   |

Source: Company data

## Medium-term forecasts for 13 long-listed products (five-year performance forecasts)

|  | FY03/18  | FY03/19  | FY03/20  | FY03/21  | FY03/22  | FY03/23  |
|--|----------|----------|----------|----------|----------|----------|
|  | Aug-Mar  | Apr-Mar  | Apr-Mar  | Apr-Mar  | Apr-Mar  | Apr-Mar  |
| (JPYmn)                                | (Year 0) | (Year 1) | (Year 2) | (Year 3) | (Year 4) | (Year 5) |
| Sales                                  | 820      | 7,592    | 9,113    | 8,634    | 8,362    | 7,732    |
| Gross profit                           | 820      | 3,816    | 4,053    | 3,920    | 4,626    | 4,093    |
| SG&A expenses                          | 811      | 4,151    | 3,701    | 3,388    | 3,363    | 2,961    |
| Operating profit                       | 9        | -334     | 351      | 532      | 1,263    | 1,132    |
| Amortization of sales rights           | 353      | 1,411    | 1,411    | 1,411    | 1,411    | 1,411    |
| OP before amortization of sales rights | 361      | 1,077    | 1,763    | 1,943    | 2,674    | 2,543    |

Source: Company data

\* Sales for the three months before the transfer of the manufacturing and sales rights (January to March 2018) is the amount after subtracting the manufacturing unit price for Chugai Pharmaceutical and Roche, sales expenses, and processing fees from sales of the 13 long-listed products.

\* The transfer of manufacturing and sales rights will be conducted in stages from April 2018 and is planned to be completed by December 2018.

\* FY03/19 SG&A expenses include initial expenses of JPY500mn for costs related to manufacturing transfers.

\* The period of the amortization of goodwill (purchasing price: JPY21.3bn) is 15 years (no generics exist) and 10 years (generics exist).

## Medium-term strategy

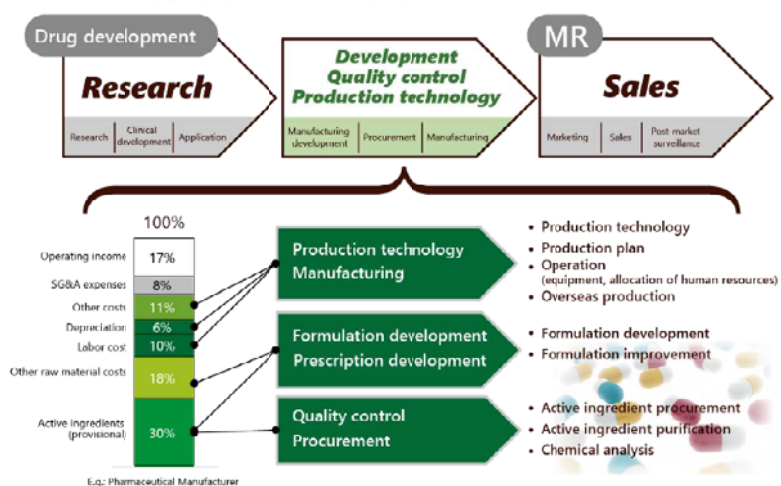
Long-listed products: Acquire additional manufacturing and sales rights

Regarding manufacturing factories, the company intends to acquire manufacturing factories to shift from outsourcing to in-house production for the company's long-listed products, compile pharmaceutical manufacturing know-how and develop personnel, manufacture products from other companies, and establish factories overseas. In R&D, the company intends to begin R&D at either purchased or company established facilities, and develop in-house products, such as new pharmaceuticals

As the purchasing price of long-listed products has fallen due to revisions in pharmaceutical prices, the market is becoming more favorable to purchasers, such as the company, which aims to acquire additional manufacturing and sales rights for long-listed products. The company is aiming for deals worth about JPY20bn. The market for long-listed products will continue to grow as Japanese pharmaceutical companies are focused on discovering new pharmaceuticals. According to the company, there is a high possibility that the pharmaceutical industry may experience a full shift from vertical integration to horizontal division of businesses, a trend which was also seen in the semiconductor industry. In FY03/19, the company plans to acquire factories (both Japanese and overseas factories are being considered) and establish R&D facilities to develop pharmaceuticals.

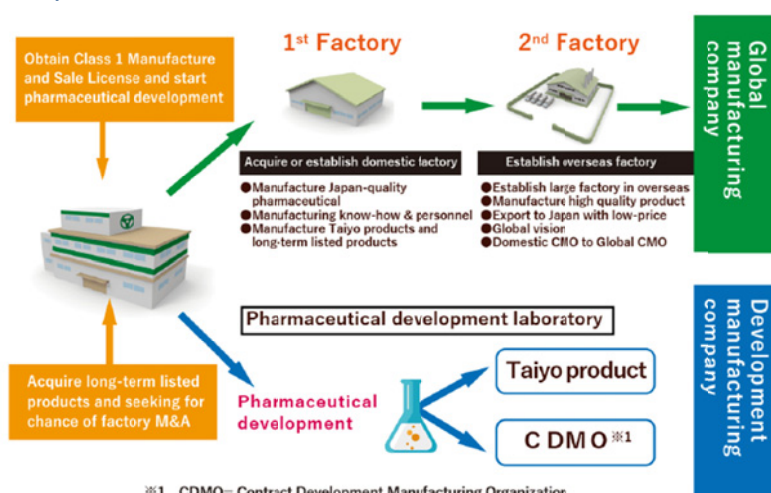
## Areas where the company should utilize its strengths

### Pharmaceutical Value Chain



Source: Company data

## Future plans



Source: Company data

## Taiyo Holdings makes systems company a consolidated subsidiary

On April 6, 2018, the company announced that it had acquired all shares of Micro Network Technologies Corp. (MNT), making it a consolidated subsidiary. MNT develops software for many industries, from core systems to contracted development of smartphone apps. MNT runs a technology support business using its own systems engineers and a network design and construction business to provide services in the infrastructure realm for servers and networks. By making MNT a consolidated subsidiary, the company was able to establish an environment in which it can dispatch necessary IT personnel at the necessary time. The company also believes that it can increase the speed of new system construction as well as reform IT systems, important business topics for the company, through MNT.

### Overview of share acquisition

One external factor to the share acquisition is the chronic labor shortage for IT personnel. Internally, the company expects rising risks of malfunctions and higher maintenance and operational costs for both hardware and software as 20 years have passed since the company's last large-scale investment in its IT systems. The company identifies IT systems renovation and the construction of new systems as urgent needs.

### Impact expected from acquisition of systems company

At the company group, Taiyo Holdings expects to be able to promptly renovate IT systems and construct new systems, areas of importance for the business, and to acquire knowledge related to software, including IoT, big data, and AI, which had been lacking. At MNT, the company expects strengthened business foundation and proactive investments, as well as an improvement in sales value by acquiring operational knowledge of chemicals manufacturers.

### Overview of Micro Network Technologies Corp.

#### Company information



「人 × 社会 × 技術」

未来を想遣し "デザイン" する Global Gateway Company

| Company             | Micro Network Technologies Corp., ("MNT")  |
|---------------------|--|
| Japanese            | 株式会社マイクロネットワークテクノロジーズ  |
| Head Office         | 18F, Otemachi Financial City Grand Cube, 1-9-2 Otemachi Chiyoda-ku, Tokyo  |
| Stockholders        | Taiyo Holdings Co., Ltd. 100%  |
| Capital             | 59,000 thousand yen  |
| Established         | March, 2013  |
| Number of Employee  | 232 (193 engineers) *as of January 2018  |
| Sales               | 1,240,810 thousand yen (FY17/7)  |
| Company Description | Micro Network Technologies Corp. is a Japanese company that engages in software development, network systems design, and provision of system engineering services. |



Source: Company data



## Business

### Business description

#### Growth drivers

The company's forerunner, Taiyo Ink Mfg., was established in 1953 as a manufacturer and marketer of printing ink. In 1970 Taiyo entered the resist ink field with its first shipment of etching resist products. In 1972 the company succeeded in developing an odorless solder resist using epoxy resin to replace the traditional melamine resin (which emitted formaldehyde when curing). The new product was rated highly for the hardness of the coating film and for being odorless. At the end of 1975 the company's UV curable solder resist (UVR-150G) passed the supplier evaluation of Sony Corp. (TSE1: 6758) and subsequently was adopted by Sony and other major electronics manufacturers including Toshiba Corporation (TSE2: 6502) and Matsushita Electronic Components Co., Ltd. (currently Panasonic Corp; TSE1: 6752), leading to a growth spurt for the company. In 1976, Taiyo decided to drastically shift its business strategy to make solder resist its core growth driver instead of printing ink.

**What is solder resist?:** Protects circuits by preventing shorts due to solder bridges by covering the portion of printed circuit (wiring) boards that do not have solder. In this case, the product is not removed after soldering, but is used as an insulating film. Green is a common color, but in recent years other colors have been used as well. Also known as SR or solder mask, varieties include LPSM (liquid photoimageable solder mask) and DFSM (dry film photoimageable solder mask).

The company leverages its execution speed (thanks to its independence), prowess in R&D and marketing, strategic foresight into technological requirement for end products, and rapid expansion in overseas operation, and has received supplier qualifications from multiple large client companies. As a result, for solder resist products, Taiyo has a global market share of over 50% (fairly high share in high-function products, and about half in general products). End products using solder resist include digital consumer electronics, flat-panel TVs, personal computers, semiconductors, smartphones, and automobiles. As use of these products has spread, there has been an increasing need for high-density mounting and improved reliability, and in response the company has been producing a widening variety of increasingly high-function solder resist.

Taiyo has an extremely high market share for solder resist materials used to protect semiconductor package surfaces. However, the industry of package substrate materials for semiconductors is seeing rapid technological innovation, such as the FOWLP (Fan Out Wafer Level Package). A single misstep and the company could be easily left behind.

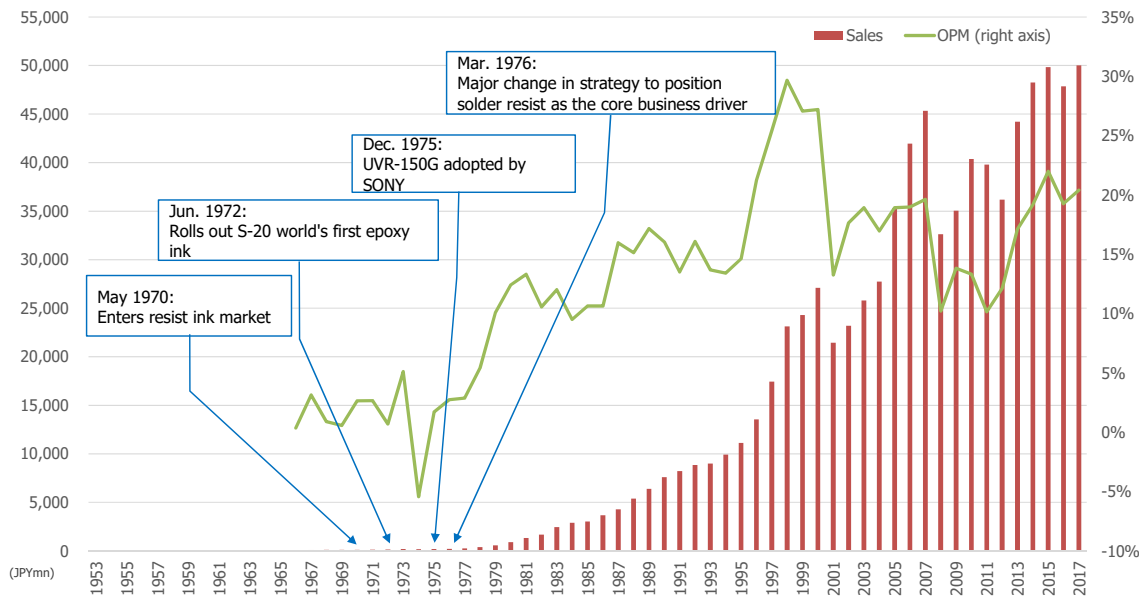
Solder resist will remain a growth driver, but there is diminishing scope for Taiyo to increase market share with just a single core product. CEO Eiji Sato recognizes the need to expand beyond solder resist to sustain long-term growth, and has been making preliminary moves to enter other businesses (solar power, food production, and pharmaceuticals). He spearheaded the acquisition of a competitor (Onstatic Technology Co., Ltd. or OTC, based in Taiwan) and an upstream company (Chugai Kasei Co., Ltd.), and also brokered a capital and business alliance with DIC. Still, the company does not yet know which business will become its second core earnings driver.

The new medium-term plan drafted by CEO Sato does not include sales or profit targets. Instead, it lays out base figures for margins and capital efficiency: OPM of at least 20%, ROE of at least 11%, DOE of at least 5%, and record high operating profit. By aggregating a number of businesses that meet these criteria, even if they are small, the company aims to create an organization resilient to economic fluctuations and unforeseen events.

CEO Sato says that the company works to develop proactive employees and sees that Taiyo's true growth driver is its employees. The company's history embodies the principle that "building things requires developing people." The company enjoys a high retention rate; in the company's Suzhou China subsidiary, only a few of its 250 employees leave every year and there is almost zero turnover at its Taiwan subsidiary.

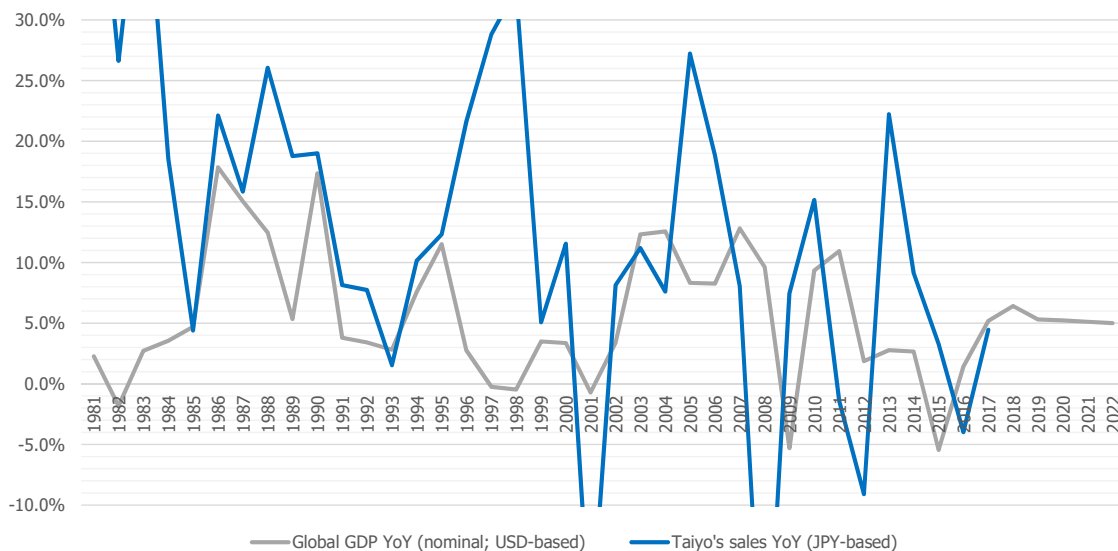


### Sales and OPM, major business shifts



**Reference: correlation with macro indicators:** Plotting the company's YoY sales growth against nominal global GDP growth shows a high degree of correlation. When global GDP growth is positive the company's sales grow at roughly twice the rate of global GDP, and when growth is zero, sales fall by a multiple. The IMF forecasts global GDP growth from 2018 to 2022 to average over 5% per annum in nominal terms (over 3.5% in real terms). If the hypothesis holds, the company can expect sales growth of 7–10% per annum. (Note: The Market and value chain section later in this report discusses the correlation between the company's sales and Japanese companies' printed wiring board production, as well as global electronic information industry production.)

### YoY growth in Taiyo's sales and global GDP



## Overview of key products

The company regularly reviews its product categorization based on sales. Currently, Taiyo divides products broadly into two groups: insulating materials for PWBs (printed wiring boards) and other related products. The company further breaks down PWB materials into four categories: rigid board materials, semiconductor package substrate materials, FPC (flexible printed circuit board) materials, and build-up wiring board materials. The company then further divides the rigid board category into high-function (PSR-4000 series) and general (such as the PSR-2000 series).

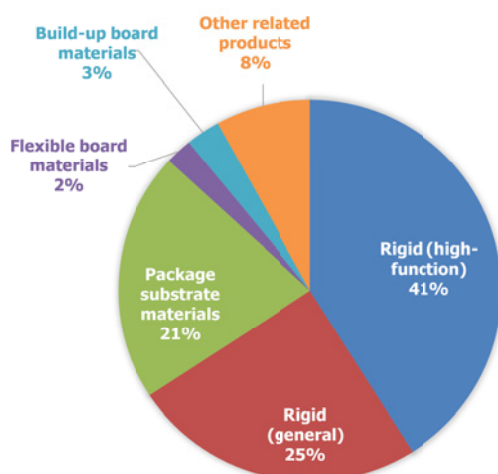
### Product classifications

| Field                    | Category | Characteristics  | Application  |
|--------------------------|----------|------------------|--|
| PWB insulating materials | Rigid    | High-function    | SR materials<br>for surface protection and insulation                                  |
|                          |          | General          |  |
|                          | Package  | Liquid, dry film | Build-up materials<br>for interlayer insulation and hole-plugging                      |
|                          | Flexible | Liquid, dry film |  |
|                          | Build-up | Liquid, dry film |  |
| Other related products   | Other    | Liquid           | Materials for marking, etching, and plating;<br>flux, solvent, conductive silver paste |

Source: Shared Research based on company data

In FY03/18, rigid board materials accounted for 65.7% of sales (high-function 41.0%, general 24.7%). High-function rigid board materials are used mainly in high-end smartphones, Japanese cars, and tablets. General rigid board materials are used mainly in PCs, LCD TVs, office automation equipment, and industrial equipment.

### Sales by product (JPY52.2bn in FY03/18)



Source: Shared Research based on company data

Sales of package substrate materials exceeded JPY11.0bn, and are now a mainstay product accounting for 21.1% of sales. Over half of package solder resist sales are dry film, rather than liquid, and have the benefit of uniform thickness measured in microns. Dry film was originally supplied by DuPont (US), but when photoimageable solder resists emerged, there was no technology to affix the dry film to the substrates, so it was supplanted by liquid. Then, around 2000, vacuum laminators for IC card manufacturing emerged, and dry film became used in substrate production as well. At that time, Taiyo launched dry resist products, used in smartphones and tablets. Further, it moved quickly to mass produce a next-generation product (AUS SR1) following qualification by major semiconductor manufacturers. For Taiyo, dry film sales have grown faster than liquid, and have higher margins.

Recently, Apple Inc. (US) and other final-stage manufacturers often bypass midstream manufacturers to qualify components themselves. As such, component makers positioned closest upstream risk being left behind if they only meet the standards required by their direct customers. The key to success is constantly anticipating developments at the final-stage manufacturing level and emerging technology trends while enhancing marketing power.

Although FPC (flexible printed circuit) and build-up board materials account for only 2.2% and around 2.9% of sales respectively, they are showing fast growth in recent years. There are many FPC applications including smartphones, camera modules, and precision equipment, so it is a growth market, but competition is fierce and the company's market share is still low. The

company's build-up board materials are mainly used for plugging holes and have not yet penetrated the interlayer insulation market. Ajinomoto Fine-Techno Co., Inc., a wholly owned subsidiary of Ajinomoto Co., Inc. (TSE1: 2802), has a virtual monopoly in interlayer insulation materials, as it has made its product the de facto standard by being the first to acquire qualification from manufacturers. Taiyo is aware from its own experience of taking the leading share of the solder resist market how difficult it is to penetrate a stronghold such as this.

Flat panel display or FPD materials (conductive silver paste used in plasma display panel [PDP] TVs) sales peaked in FY03/12 at JPY12.3bn and have declined in recent years, so in FY03/17 the company included them in its other related products group. Product prices for PDP materials are linked to the price of silver, a raw material. The price of silver rose by a factor of seven, from USD4.9/Troy ounce in 2003 to USD35.2 in 2011. Accordingly, this pushed up the company's FPD sales in FY03/12. Still, even if sales expand, it is difficult to improve margins for this product.

The company does not disclose OPM by product, but from highest to lowest the order is estimated as package substrate materials, high-function rigid, and general rigid products. This order is the same as the company's global market share: package substrates have an extremely high market share, high-function rigid fairly high share, and general rigid at roughly half.

#### Taiyo's market share (estimates)

| Field                    | Category | Application  | Global market share                 | Main end products  |
|--------------------------|----------|--|-------------------------------------|--|
| PWB insulating materials | Rigid    | SR materials for surface protection and insulation | Fairly high                         | Smartphones (high-end), cars (Japanese), tablets               |
|                          |          |  | High (Around half)                  | PC, LCD TVs, electronic office equipment, industrial equipment |
|                          | Package  |  | Extremely high                      | Semiconductors   |
|                          | Flexible |  | Rather low                          | Smartphones, cameras, precision equipment, others              |
|                          | Build-up | Interlayer insulation (dry film)                   | (Monopoly by Ajinomoto Fine-Techno) | Semiconductors   |

Source: Shared Research based on company data

#### Sales by product

| Sales by product (JPYmn)                | FY03/08 | FY03/09 | FY03/10 | FY03/11 | FY03/12 | FY03/13 | FY03/14 | FY03/15 | FY03/16 | FY03/17 | FY03/18 |
|---|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   |
| <b>Sales</b>                            | 45,338  | 32,614  | 35,056  | 40,366  | 39,797  | 36,184  | 44,224  | 48,260  | 49,843  | 47,866  | 52,241  |
| PWB insulated materials                 | 33,603  | 25,918  | 27,961  | 29,937  | 26,727  | 27,997  | 38,225  | 44,474  | 46,318  | 44,700  | 48,041  |
| Rigid board materials                   | 25,392  | 19,911  | 21,250  | 22,993  | 20,289  | 20,262  | 29,235  | 33,539  | 35,242  | 33,216  | 34,342  |
| High-function                           |         |         |         |         |         |         |         | 18,676  | 20,230  | 20,211  | 21,429  |
| General                                 |         |         |         |         |         |         |         | 14,863  | 15,012  | 13,005  | 12,913  |
| Substrates and flexible board materials | 6,886   | 5,107   | 5,600   | 5,685   | 5,416   | 6,763   | 7,965   | 9,844   | 10,007  | 10,348  | 12,197  |
| Package substrates                      |         |         |         |         |         |         |         | 9,401   | 9,376   | 9,676   | 11,029  |
| Flexible boards                         |         |         |         |         |         |         |         | 443     | 631     | 672     | 1,168   |
| Build-up board materials                | 1,325   | 900     | 1,111   | 1,259   | 1,022   | 972     | 1,025   | 1,091   | 1,069   | 1,136   | 1,502   |
| FPD materials                           | 10,238  | 5,683   | 6,099   | 9,455   | 12,307  | 7,316   | 4,554   | 1,976   | 292     |         |         |
| Other related products                  | 1,378   | 952     | 994     | 972     | 760     | 869     | 1,443   | 1,808   | 3,231   | 3,165   | 4,199   |
| <b>% of sales</b>                       |         |         |         |         |         |         |         |         |         |         |         |
| PWB insulated materials                 | 74.1%   | 79.5%   | 79.8%   | 74.2%   | 67.2%   | 77.4%   | 86.4%   | 92.2%   | 92.9%   | 93.4%   | 92.0%   |
| Rigid board materials                   | 56.0%   | 61.1%   | 60.6%   | 57.0%   | 51.0%   | 56.0%   | 66.1%   | 69.5%   | 70.7%   | 69.4%   | 65.7%   |
| High-function                           |         |         |         |         |         |         |         | 38.7%   | 40.6%   | 42.2%   | 41.0%   |
| General                                 |         |         |         |         |         |         |         | 30.8%   | 30.1%   | 27.2%   | 24.7%   |
| Substrates and flexible board materials | 15.2%   | 15.7%   | 16.0%   | 14.1%   | 13.6%   | 18.7%   | 18.0%   | 20.4%   | 20.1%   | 21.6%   | 23.3%   |
| Package substrates                      |         |         |         |         |         |         |         | 19.5%   | 18.8%   | 20.2%   | 21.1%   |
| Flexible boards                         |         |         |         |         |         |         |         | 0.9%    | 1.3%    | 1.4%    | 2.2%    |
| Build-up board materials                | 2.9%    | 2.8%    | 3.2%    | 3.1%    | 2.6%    | 2.7%    | 2.3%    | 2.3%    | 2.1%    | 2.4%    | 2.9%    |
| FPD materials                           | 22.6%   | 17.4%   | 17.4%   | 23.4%   | 30.9%   | 20.2%   | 10.3%   | 4.1%    | 0.6%    |         |         |
| Other related products                  | 3.0%    | 2.9%    | 2.8%    | 2.4%    | 1.9%    | 2.4%    | 3.3%    | 3.7%    | 6.5%    | 6.6%    | 8.0%    |
| <b>YoY</b>                              | 8.1%    | -28.1%  | 7.5%    | 15.1%   | -1.4%   | -9.1%   | 22.2%   | 9.1%    | 3.3%    | -4.0%   | 9.1%    |
| PWB insulated materials                 | 8.4%    | -22.9%  | 7.9%    | 7.1%    | -10.7%  | 4.8%    | 36.5%   | 16.3%   | 4.1%    | -3.5%   | 7.5%    |
| Rigid board materials                   | 5.9%    | -21.6%  | 6.7%    | 8.2%    | -11.8%  | -0.1%   | 44.3%   | 14.7%   | 5.1%    | -5.7%   | 3.4%    |
| High-function                           |         |         |         |         |         |         |         |         | 8.3%    | -0.1%   | 6.0%    |
| General                                 |         |         |         |         |         |         |         |         | 1.0%    | -13.4%  | -0.7%   |
| Substrates and flexible board materials | 19.4%   | -25.8%  | 9.7%    | 1.5%    | -4.7%   | 24.9%   | 17.8%   | 23.6%   | 1.7%    | 3.4%    | 17.9%   |
| Package substrates                      |         |         |         |         |         |         |         |         | -0.3%   | 3.2%    | 14.0%   |
| Flexible boards                         |         |         |         |         |         |         |         |         | 42.4%   | 6.5%    | 73.8%   |
| Build-up board materials                | 6.3%    | -32.1%  | 23.4%   | 13.3%   | -18.8%  | -4.9%   | 5.5%    | 6.4%    | -2.0%   | 6.3%    | 32.2%   |
| FPD materials                           | 7.0%    | -44.5%  | 7.3%    | 55.0%   | 30.2%   | -40.6%  | -37.8%  | -56.6%  | -85.2%  |         |         |
| Other related products                  | 22.9%   | -30.9%  | 4.4%    | -2.2%   | -21.8%  | 14.3%   | 66.1%   | 25.3%   | 78.7%   | -10.2%  | 32.7%   |

Source: Shared Research based on company data

Note: Figures may differ from company materials due to differences in rounding methods.

Note: From FY03/17, FPD is included in Other related products

Note: Operating profit by product category not disclosed.

#### Liquid solder resist

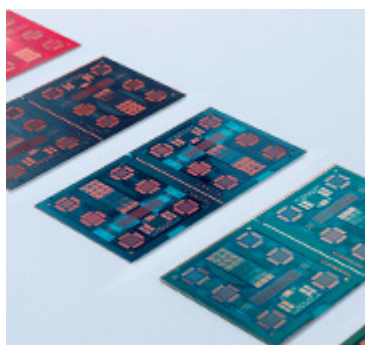


Source: Company data

#### Dry film solder resist

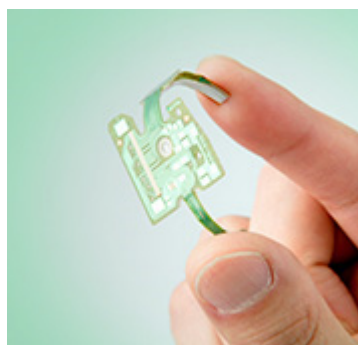


#### Rigid board

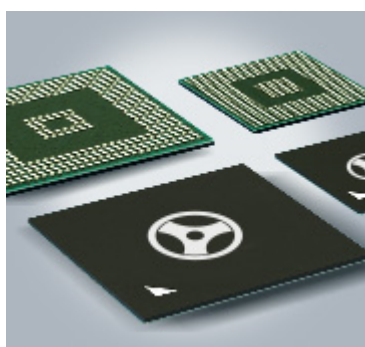


Source: Company data

#### Flexible printed circuit board

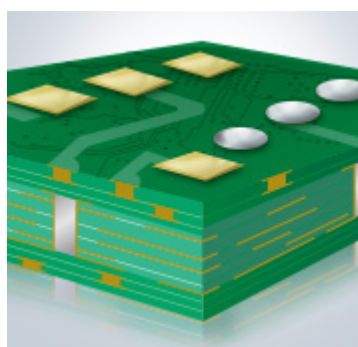


#### Semiconductor package substrate



Source: Company data

#### Build-up substrate



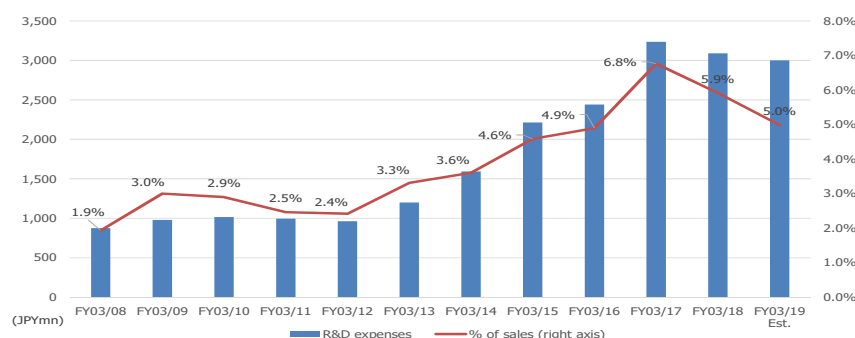
Other related products include marking, etching, and plating materials, flux, solvent, conductive silver paste, and FPD (flat panel display) materials. The company also has new businesses including solar power and food production. Sales from the acquisition of Chugai Kasei contributed around JPY1.1bn (11 months) in FY03/16 and JPY1.2bn (12 months) in FY03/17. Chugai Kasei makes and markets resins and pigments, so is more upstream than Taiyo. The company said Chugai Kasei's pigments are used in LCD color filters and recently have been used in aluminum exteriors for major brand smartphones. Taiyo acquired Chugai Kasei for its R&D capabilities.

Taiyo spent 2.4% of its sales on R&D in FY03/12, and has steadily increased this ratio every year to reach 6.8% in FY03/17 (5.9% in FY03/18). The company looks to spend at least 5% of sales on R&D while maintaining a high OPM and aims to build a structure where the fruits of its R&D efforts are efficiently used to launch products.

The company's subsidiary Taiyo Green Energy Co., Ltd., operates the solar power business, which is a stable source of earnings that generates sales of several tens of millions of yen per annum due to Japan's feed-in tariff (FIT) scheme, which is based on a system of purchasing all output at a fixed price.

On August 2, 2017, the company established a subsidiary, Taiyo Pharma Co., Ltd., to enter the pharmaceutical market. The company's internal project team is the core of the new company for now. On November 14, 2017, the company announced that it entered a contract for the transfer of marketing and manufacturing rights of 13 long-listed products from Chugai to Taiyo Pharma.

#### R&D expenses, % of sales



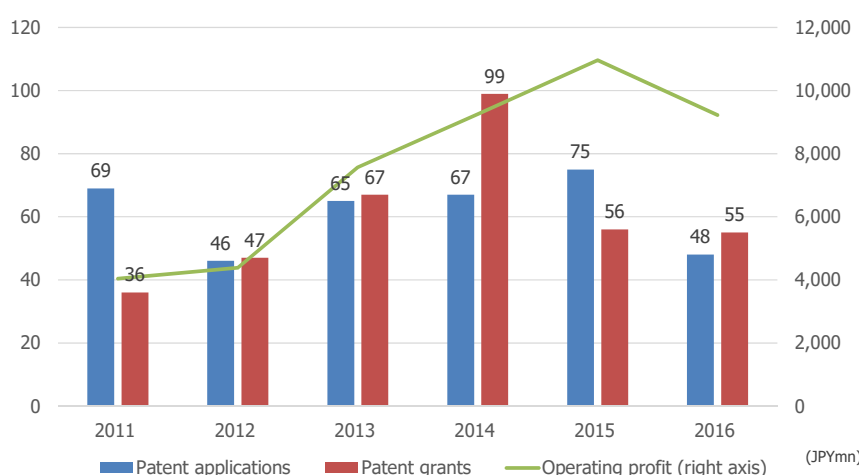
Source: Shared Research based on company data

## R&D and new development areas

### Patents and intellectual property strategy

Patents can be used to measure how effectively R&D results are being utilized in product launches. The company is focusing on patent acquisition, and employees who submit outstanding patents receive special bonuses. Having a web of patents enables the company to enter cross-licensing agreements with competitors, part of its intellectual property strategy. Looking at patent applications and approvals versus operating profit from 2011 until 2014 (see the following chart), patent approvals rose sharply and operating profit also increased (with a one- or two-year lag). Patent approvals have declined since a peak in 2014, but this seems to be due to the company strengthening its R&D capabilities through acquisitions and alliances, such as acquiring Chugai Kasei and entering an alliance with DIC.

#### Patent applications and acquisitions, and operating profit



Source: Shared Research based on company materials and interviews  
 Note: Aggregate number of patents for Taiyo Holdings and Taiyo Ink Mfg.  
 Note: OP figures are for fiscal years (e.g., 2016 means FY03/17)

Acquiring patents under the intellectual property strategy prevents other companies from obtaining the patent rights. The following box shows extracts of a survey by Patent Result Co., Ltd., a patent analysis company. Ajinomoto Fine-Techno, a

subsidiary of Ajinomoto Co., Inc. (TSE1: 2802), has a virtual monopoly in interlayer insulation materials used in build-up substrates. The difficulty of breaching this stronghold is underscored by the survey.

Based on its own food industry classifications, Patent Result compiled a 2016 ranking of food companies by their ability to prevent other companies from obtaining patent rights in patent review process. Patent Result compiled cases where existing patents by other companies were reasons to reject patent applications in 2016. The data clearly show which companies hold numerous leading-edge technologies as competitors work to secure rights for recent technological developments. In order of number of citations, the 2016 rankings were: 1) Ajinomoto (353 cases), 2) Kirin Holdings Co., Ltd. (243), and 3) Meiji Holdings Co., Ltd. (183). Ajinomoto's most cited patent was that for a resin composition used in multilayer printed wiring boards (Patent No. 5786327), and was the reason for rejection in 10 cases, including four for Sumitomo Bakelite and two for Taiyo Ink Mfg. Another patent often cited was No. 5596902 regarding production of metabolites using bacteria. The companies most affected by Ajinomoto's patents in 2016 were Kao Corporation and CJ CheilJedang Corporation (South Korea) with nine cases each, followed by Hitachi Chemical Co., Ltd. and Kirin Holdings (eight cases each).

Source: Patent Result website

## R&D activities

According to the company's FY03/17 annual securities report, Taiyo's R&D focus areas and results are as follows.

### Solder resist

Key focus areas in rigid board materials

HDI (High Density Interconnection) substrates used in smartphones

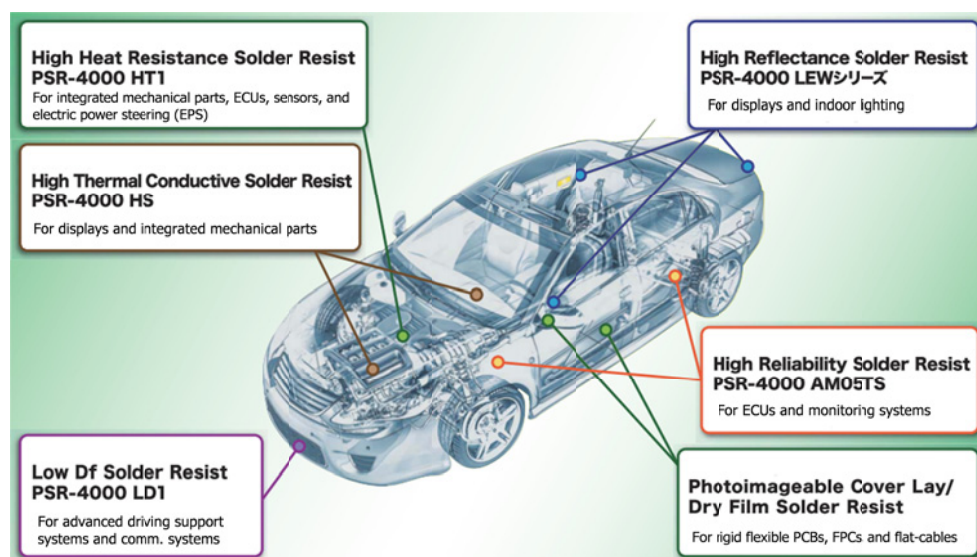
The adoption of the MSAP (Modified Semi-Additive Process) as a method for manufacturing HDI substrates sparked demand for greater-than-ever positioning accuracy, making direct imaging exposure systems using digital exposure mainstream. Also, at the request of large smartphone manufacturers, colors for solder resist used in HDI substrates other than green, such as black and blue, are being used. The Taiyo Group has also been developing high-function solder resist in these colors that can work with direct imaging exposure systems. Shared Research understands that many large manufacturers including Apple and Samsung have adopted it.

### Automotive substrates

There is demand for increasingly diverse characteristics in solder resist for automotive substrates with the emergence of hybrid and electric vehicles. Automotive substrate solder resist must withstand harsh conditions, and its performance in high temperatures is particularly important. The company was able to produce the desired characteristics in solder resist by improving the resin composition. Currently, Taiyo is working toward qualification by the end customer of next-generation solder resist for automotive substrates. The company's solder resist is in wide use after receiving qualification from Japanese automakers, but non-Japanese auto manufacturers have yet to increase uptake. The product life of automobiles is around 10 years, and safety is paramount, so once a product is qualified there is little room for other companies to supply their product.



### Automotive solder resist



Source: Shared Research based on company data

### Solder resist for package substrates

The company's solder resist for package substrates is commonly used in CSPs (chip scale packages) for SSD memory media as well as memory and application processors for smartphones. The reliability of connections between semiconductor chips and package substrates is an important element in solder resist for package substrates, and demand for dry film is growing each year due to its superior smoothness. Following are specific examples of product development.

- I. The company developed a matte finish for the solder resist surface in dry film, which was thought to be difficult. It is working to acquire customer qualification.
- II. The company is developing solder resist that can be used in a variety of sensor types.
- III. The company is developing solder resist that can effectively dissipate heat generated in the components where it is mounted, which customers are currently evaluating.
- IV. The company is developing a new solder resist suitable for high-speed telecommunications substrates, which require accurate signal transmission.

### Interlayer insulating material

- I. The company has developed a dry film interlayer insulating material used in package substrates, and has made concerted approaches to customers in the Chinese market. Customer evaluation is currently in progress.
- II. The company is evaluating material for use in passive components as a new market, and is working on uptake among customers.
- III. As an interlayer insulating material, the company is developing not just dry film but a film with copper foil that can meet new customer needs.

### Photoimageable coverlay

Amid the trend to make smaller and lighter smartphones and tablets, the internal space where circuit boards are installed is shrinking, leading toward growth in demand for soft, flexible substrates and away from the traditional rigid substrates that predominated. The Taiyo Group has developed photoimageable coverlay to simultaneously meet market needs for mechanical properties such as fine processing, heat resistance, and flexibility.

### Conductive adhesives

The company developed anisotropic conductive adhesives, which can be cured quickly at low temperatures, for bonding substrates used in devices such as smartphones and tablets. Using soldering powder in the conductive particles gives greater

bonding reliability, and altering the solder powder's particle diameter enables it to deal with the shift to fine pitch. The company has also developed a product that bonds at lower temperatures for materials that are not as heat-resistant.

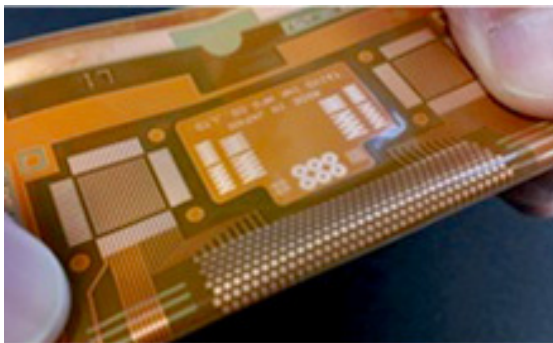
#### Materials for wearable devices

The market for wearable devices has spread beyond accessories such as smart watches and smart glasses, to those that come in direct contact with the body such as activity-measuring devices and conducting textiles used in sports and health care, and biosensors used in medical equipment such as electronic skin devices. As wearable devices are used in close contact with the body, materials used not only need to be flexible, but also stretchable. The company is developing such stretchable conductive materials.

#### Inkjet solder resist

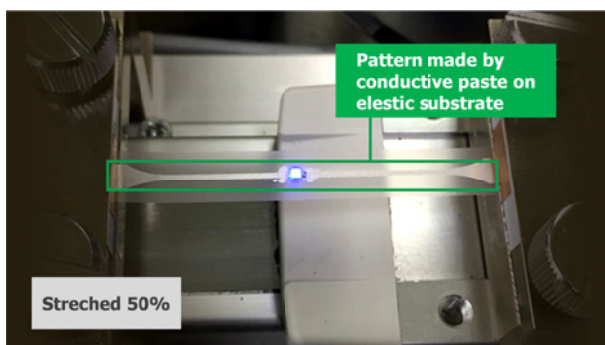
The company has developed solder resist for inkjet coating machines, and is conducting assessments with inkjet coating machine manufacturers and customers. Solder resist coating using inkjet coaters is an environmentally friendly way to manufacture substrates. It shortens the drying, exposure, and developing processes, and enables selective coating of necessary areas in a limited space. The company is developing applications other than for solder resist with the same equipment, including plating and etching resist materials, insulating materials for QFPs (Quad Flat Packages), and flexible materials.

#### Photoimageable overlay



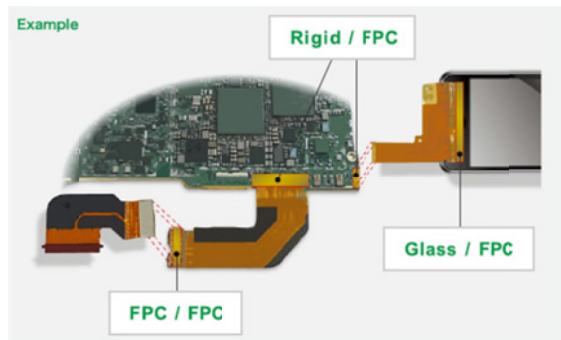
Source: Shared Research based on company data

#### Stretchable conductive paste

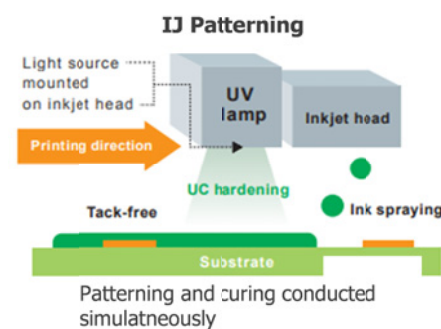


Source: Shared Research based on company data

#### Anisotropic conductive adhesive



#### Inkjet solder resist





## Sales by region

Trends in the company's sales by region over the past decade can be summed up by "shift to China." This coincides with the period where China emerged as the world's electronics workshop. Taiyo purchased Taiwan's OTC (Onstatic Technology Co., Ltd.) in May 2013 and made it a consolidated subsidiary. Following this, the company's sales to China (external customers) grew from 29.5% of the total (FY03/13) to 36.6% (FY03/14), and subsequently reached 41.6% of total sales in FY03/17. This does not mean domestic sales are declining. Domestic sales are still nearly 20% of sales as the company focuses on high-function rigid board materials, package substrate materials, and new materials. OPMs have stayed in the 20% range in China and Taiwan over the past few years (except for Taiwan in FY03/17, which was 14.9%). Note: the company discloses three types of figures for sales by region: external sales only, inter-segment sales or transfers, and regional sales (see the company's annual securities report for details).

### FY03/18 earnings by segment (by region)

Sales to external customers by region: Japan, JPY10.2bn (+7.7% YoY, 19.5% of total); China, JPY21.1bn (+5.7%, 40.3%); Taiwan, JPY6.4bn (+5.7%, 12.3%); South Korea, JPY9.8bn (+15.5%, 18.7%); and Others, JPY4.8bn (+21.4%, 9.2%).

Sales by region including intragroup sales: Japan, JPY19.8bn (+10.5% YoY, 30.1% of total); China, JPY21.5bn (+4.5%, 32.8%); Taiwan, JPY9.1bn (-9.2%, 13.9%); South Korea, JPY10.3bn (+16.4%, 15.6%); and Others, JPY5.0bn (+22.2%, 7.6%).

Operating profit by region: Japan, JPY3.4bn (+68.2% YoY); China, JPY4.6bn (+0.4%); Taiwan, JPY1.8bn (+23.8%); South Korea, JPY1.7bn (+30.4%); and Others, JPY514mn (-3.7%).

OPM by region: Japan, 17.2%; China, 21.4%; Taiwan, 20.3%; South Korea, 16.2%; and Others, 10.3%.

## Segment information (by region)

| Segments (regions)<br>(JPY mn)                          | FY03/08 | FY03/09 | FY03/10 | FY03/11 | FY03/12 | FY03/13 | FY03/14 | FY03/15 | FY03/16 | FY03/17 | FY03/18 |
|---|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   |
| <b>Sales</b>  | 45,338  | 32,614  | 35,056  | 40,366  | 39,797  | 36,184  | 44,224  | 48,260  | 49,843  | 47,866  | 52,241  |
| Japan   | 26,866  | 18,970  | 20,379  | 18,491  | 11,787  | 13,065  | 14,005  | 15,786  | 17,002  | 17,917  | 19,807  |
| China   | 30,804  | 21,596  | 10,361  | 11,911  | 10,636  | 10,834  | 17,791  | 20,421  | 21,820  | 20,618  | 21,539  |
| Taiwan  |         |         | 4,083   | 4,414   | 3,706   | 3,936   | 8,398   | 9,614   | 9,854   | 10,042  | 9,116   |
| South Korea   |         |         | 10,241  | 13,743  | 16,668  | 11,722  | 10,599  | 9,199   | 7,739   | 8,825   | 10,271  |
| Others  | 1,419   | 1,205   | 2,972   | 3,061   | 2,618   | 2,854   | 3,524   | 4,140   | 4,451   | 4,076   | 4,979   |
| Eliminations, company-wide expenses                     | -13,751 | -9,157  | -12,980 | -11,254 | -5,618  | -6,227  | -10,093 | -10,900 | -11,023 | -13,612 | -13,471 |
| <b>% of sales</b>                                       |         |         |         |         |         |         |         |         |         |         |         |
| Japan   | 45.5%   | 45.4%   | 42.4%   | 35.8%   | 26.0%   | 30.8%   | 25.8%   | 26.7%   | 27.9%   | 29.1%   | 30.1%   |
| China   | 52.1%   | 51.7%   | 21.6%   | 23.1%   | 23.4%   | 25.5%   | 32.8%   | 34.5%   | 35.8%   | 33.5%   | 32.8%   |
| Taiwan  |         |         | 8.5%    | 8.6%    | 8.2%    | 9.3%    | 15.5%   | 16.3%   | 16.2%   | 16.3%   | 13.9%   |
| South Korea   |         |         | 21.3%   | 26.6%   | 36.7%   | 27.6%   | 19.5%   | 15.5%   | 12.7%   | 14.4%   | 15.6%   |
| Others  | 2.4%    | 2.9%    | 6.2%    | 5.9%    | 5.8%    | 6.7%    | 6.5%    | 7.0%    | 7.3%    | 6.6%    | 7.6%    |
| <b>YoY</b>  | 8.1%    | -28.1%  | 7.5%    | 15.1%   | -1.4%   | -9.1%   | 22.2%   | 9.1%    | 3.3%    | -4.0%   | 9.1%    |
| Japan   | 2.6%    | -29.4%  | 7.4%    | -9.3%   | -36.3%  | 10.8%   | 7.2%    | 12.7%   | 7.7%    | 5.4%    | 10.5%   |
| China   | 17.2%   | -29.9%  | -52.0%  | 15.0%   | -10.7%  | 1.9%    | 64.2%   | 14.8%   | 6.9%    | -5.5%   | 4.5%    |
| Taiwan  |         |         |         | 8.1%    | -16.0%  | 6.2%    | 113.4%  | 14.5%   | 2.5%    | 1.9%    | -9.2%   |
| South Korea   |         |         |         | 34.2%   | 21.3%   | -29.7%  | -9.6%   | -13.2%  | -15.9%  | 14.0%   | 16.4%   |
| Others  | -18.4%  | -15.1%  | 146.6%  | 3.0%    | -14.5%  | 9.0%    | 23.5%   | 17.5%   | 7.5%    | -8.4%   | 22.2%   |
| <b>Operating profit</b>                                 | 8,896   | 3,332   | 4,843   | 5,380   | 4,040   | 4,385   | 7,568   | 9,254   | 10,964  | 9,221   | 11,337  |
| Japan   | 2,275   | 15      | 600     | 1,013   | 989     | 1,685   | 1,906   | 2,466   | 2,254   | 2,026   | 3,408   |
| China   | 6,301   | 3,059   | 2,463   | 2,813   | 1,751   | 1,584   | 2,617   | 3,507   | 4,775   | 4,582   | 4,602   |
| Taiwan  |         |         | 644     | 510     | 470     | 497     | 1,427   | 1,763   | 2,227   | 1,492   | 1,847   |
| South Korea   |         |         | 988     | 979     | 649     | 591     | 1,073   | 1,212   | 1,414   | 1,275   | 1,663   |
| Others  | 267     | 190     | 129     | 238     | 272     | 323     | 453     | 555     | 597     | 534     | 514     |
| Eliminations, company-wide expenses                     | 51      | 66      | 19      | -173    | -91     | -295    | 92      | -249    | -303    | -688    | -697    |
| <b>YoY</b>  | 11.7%   | -62.5%  | 45.3%   | 11.1%   | -24.9%  | 8.5%    | 72.6%   | 22.3%   | 18.5%   | -15.9%  | 22.9%   |
| Japan   | 8.3%    | -99.3%  | 3900.0% | 68.8%   | -2.4%   | 70.4%   | 13.1%   | 29.4%   | -8.6%   | -10.1%  | 68.2%   |
| China   | 13.4%   | -51.5%  | -19.5%  | 14.2%   | -37.8%  | -9.5%   | 65.2%   | 34.0%   | 36.2%   | -4.0%   | 0.4%    |
| Taiwan  |         |         |         | -20.8%  | -7.8%   | 5.7%    | 187.1%  | 23.5%   | 26.3%   | -33.0%  | 23.8%   |
| South Korea   |         |         |         | -0.9%   | -33.7%  | -8.9%   | 81.6%   | 13.0%   | 16.7%   | -9.8%   | 30.4%   |
| Others  | 3.5%    | -28.8%  | -32.1%  | 84.5%   | 14.3%   | 18.8%   | 40.2%   | 22.5%   | 7.6%    | -10.6%  | -3.7%   |
| <b>OPM</b>  | 19.6%   | 10.2%   | 13.8%   | 13.3%   | 10.2%   | 12.1%   | 17.1%   | 19.2%   | 22.0%   | 19.3%   | 21.7%   |
| Japan   | 8.5%    | 0.1%    | 2.9%    | 5.5%    | 8.4%    | 12.9%   | 13.6%   | 15.6%   | 13.3%   | 11.3%   | 17.2%   |
| China   | 20.5%   | 14.2%   | 23.8%   | 23.6%   | 16.5%   | 14.6%   | 14.7%   | 17.2%   | 21.9%   | 22.2%   | 21.4%   |
| Taiwan  |         |         | 15.8%   | 11.6%   | 12.7%   | 12.6%   | 17.0%   | 18.3%   | 22.6%   | 14.9%   | 20.3%   |
| South Korea   |         |         | 9.6%    | 7.1%    | 3.9%    | 5.0%    | 10.1%   | 13.2%   | 18.3%   | 14.4%   | 16.2%   |
| Others  | 18.8%   | 15.8%   | 4.3%    | 7.8%    | 10.4%   | 11.3%   | 12.9%   | 13.4%   | 13.4%   | 13.1%   | 10.3%   |
| <b>Depreciation</b>                                     |         |         | 1,261   | 1,127   | 1,046   | 1,003   | 1,181   | 1,411   | 1,891   | 2,485   | 2,284   |
| Japan   |         |         | 848     | 524     | 284     | 193     | 242     | 398     | 832     | 1,068   | 914     |
| China   |         |         | 181     | 167     | 164     | 186     | 210     | 237     | 288     | 252     | 253     |
| Taiwan  |         |         | 122     | 128     | 132     | 149     | 193     | 207     | 189     | 474     | 125     |
| South Korea   |         |         | 86      | 90      | 82      | 103     | 203     | 154     | 134     | 118     | 142     |
| Others  |         |         | 23      | 16      | 13      | 12      | 15      | 14      | 16      | 93      | 393     |
| Eliminations, company-wide expenses                     |         |         | 0       | 199     | 368     | 357     | 316     | 399     | 429     | 479     | 454     |
| <b>Increase in tangible and intangible fixed assets</b> |         |         | 445     | 527     | 682     | 605     | 2,555   | 3,321   | 4,055   | 1,722   | 22,513  |
| Japan   |         |         | 170     | 151     | 140     | 164     | 1,266   | 2,033   | 2,586   | 526     | 542     |
| China   |         |         | 16      | 107     | 99      | 97      | 275     | 414     | 348     | 272     | 250     |
| Taiwan  |         |         | 66      | 127     | 80      | 91      | 171     | 98      | 94      | 48      | 110     |
| South Korea   |         |         | 189     | 61      | 178     | 154     | 443     | 108     | 74      | 98      | 123     |
| Others  |         |         | 3       | 16      | 1       | 10      | 10      | 16      | 8       | 20      | 21,109  |
| Eliminations, company-wide expenses                     |         |         | 0       | 61      | 182     | 86      | 388     | 649     | 941     | 756     | 375     |
| <b>Number of employees</b>                              | 775     | 793     | 807     | 840     | 861     | 858     | 1,148   | 1,122   | 1,202   | 1,249   |         |
| Avg. temporary employees (not included in above)        | 123     | 61      | -       | -       | -       | -       | -       | -       | -       | -       |         |
| Japan   |         |         |         | 222     | 219     | 207     | 238     | 232     | 302     | 326     |         |
| China   |         |         |         | 274     | 290     | 298     | 464     | 437     | 422     | 418     |         |
| Taiwan  |         |         |         | 108     | 107     | 111     | 224     | 223     | 234     | 249     |         |
| South Korea   |         |         |         | 102     | 108     | 111     | 114     | 108     | 118     | 124     |         |
| Others  |         |         |         | 41      | 40      | 39      | 41      | 42      | 46      | 47      |         |
| Company-wide  |         |         |         | 93      | 97      | 92      | 67      | 80      | 80      | 85      |         |
| <b>Sales per employee</b>                               | 50.5    | 38.2    | 43.4    | 48.1    | 46.2    | 42.2    | 38.5    | 43.0    | 41.5    | 38.3    |         |
| <b>Operating profit per employee</b>                    | 9.9     | 3.9     | 6.0     | 6.4     | 4.7     | 5.1     | 6.6     | 8.2     | 9.1     | 7.4     |         |

Source: Shared Research based on company data

Note: Figures may differ from company materials due to differences in rounding methods.

Note: FY03/09 and FY03/10 sales figures for China are those for Asia including Taiwan and South Korea.

## Key manufacturing locations, capex, and utilization by product (as of end-FY03/18)

The company's principal manufacturing site is located in Ranzan (Hiki-gun, Saitama Prefecture), where it manufactures high-function rigid solder resist products, package substrate materials, and new products. The location has a technological development building and serves as the company's R&D center. The head office has also been relocated to Ranzan.

In order to avoid risks of concentrating domestic production, the company completed another plant, the Kitakyushu Plant, in September 2015 (investment of roughly JPY3.6bn, annual capacity of 1,500 tons of liquid materials, 2.8mn sqm dry film, and expected IRR of 15.4%). The aim was to disperse geographic risk from a BCP (business continuity planning) viewpoint, reducing risk of earthquakes and other disasters, and to be closer to key shipment destinations such as China and South Korea.

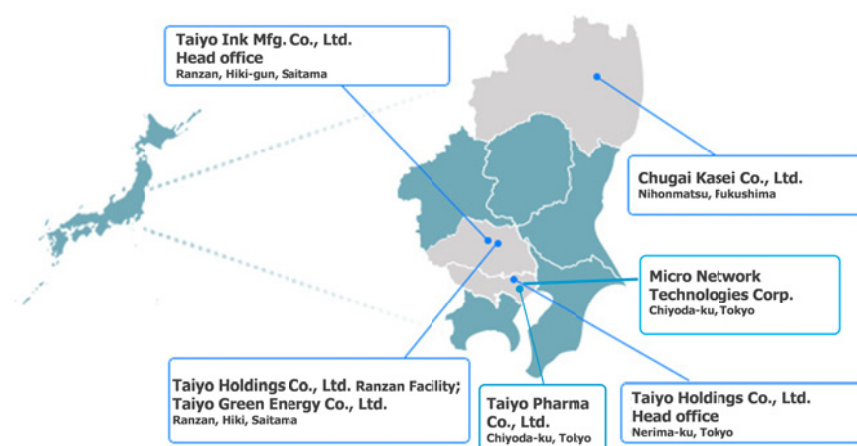
Subsidiary Taiyo Green Energy has completed a mega-solar project with an investment of roughly JPY400mn (expected IRR: 5.1%). The company has also started cultivating vegetables at a plant factory. Taiyo aims to retain employees by improving the work environment and offering attractive benefits, such as employee cafeterias at three locations and a daycare center in Japan.

From FY03/16, Chugai Kasei became a consolidated subsidiary, bringing with it its Nihonmatsu Factory and Urawa Factory as well as R&D facilities. The subsidiary makes and markets dyes (for textiles and leather), functional colorings such as pigments, and specialty chemicals.

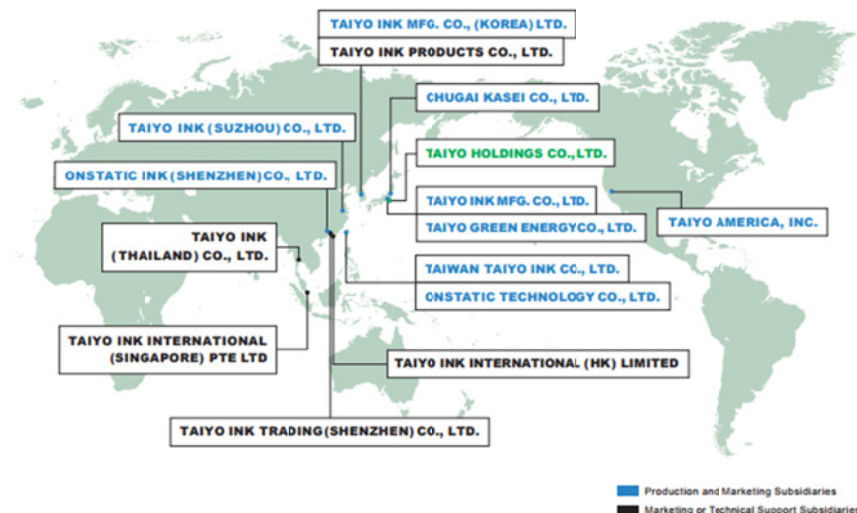
Capex in Japan: JPY1.3bn in FY03/14; JPY2.0bn in FY03/15; JPY2.6bn in FY03/16; JPY526mn in FY03/17; and JPY542mn in FY03/18.

The company's main production facilities overseas are in China (Suzhou), Taiwan, South Korea, and the US (Nevada). Overseas, Taiyo mainly produces high-function rigid products, general rigid products, and customized solder resist products.

#### Domestic locations



#### Overseas locations



Source: Shared Research edited based on company data

## Forex impact

Half of the company's overseas sales are denominated in US dollars and half in local currencies. Taiyo estimates the full-year impact of a JPY1/USD change in forex rates at over JPY380mn for sales and JPY180mn for operating profit. It said the impact of forex on earnings was increasing because overseas sales of domestically produced high-function rigid and semiconductor materials are taking up an increasing portion of total sales.

Taiyo has shifted its production of general solder resist overseas and is working to procure raw materials locally. The company has confined its package substrate material production to Japan to avoid the risk of being copied by overseas competitors.

Even if exchange rates and raw material prices (excluding silver) fluctuate, Taiyo's earnings are not affected. This is because the company's products are core components and it has the leading market share, particularly for high-function rigid products, meaning it can set prices to be relatively stable due to qualification from final-stage manufacturers and midstream board manufacturers.

Determinants of forex impact as follows.

Share of sales in foreign currencies: about 80%

Share of expenses in foreign currencies: about 50%

Main reasons foreign currency expenses have a smaller share than sales:

1) Advanced R&D is carried out in Japan

2) Advanced products are manufactured in Japan

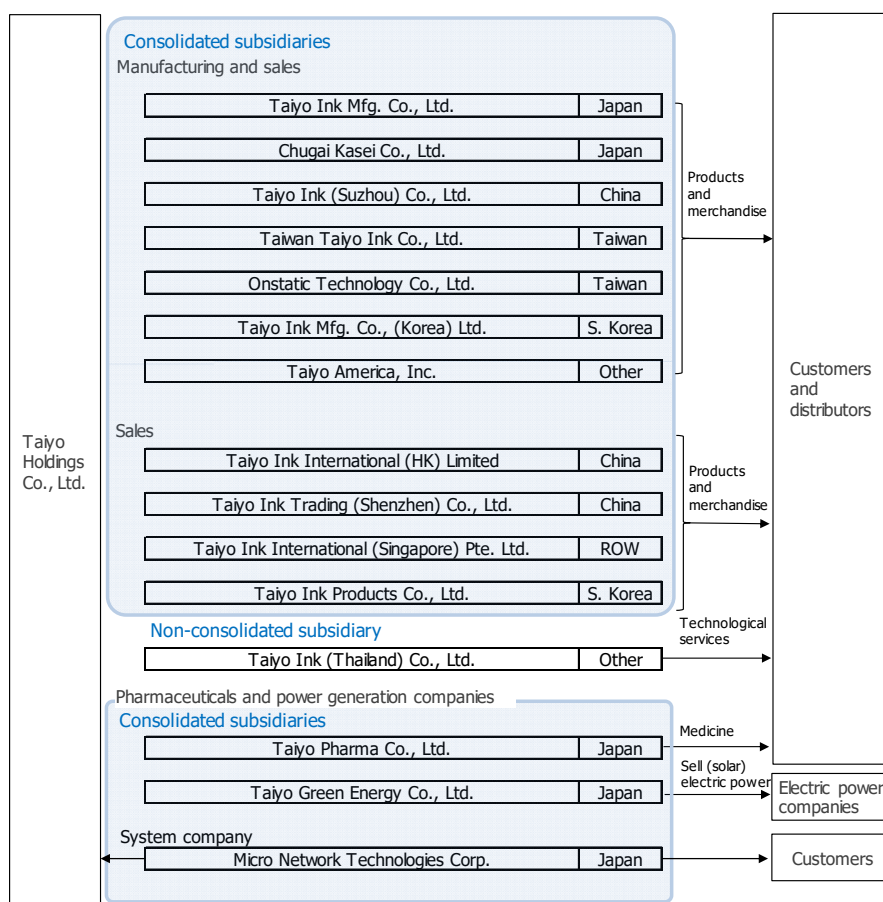
Forex: transactions occur primarily in USD and CNY, but also in other currencies (KRW, NTD, HKD). As currency movements (versus JPY) are primarily from currencies that fluctuate in line with the US dollar, forex sensitivity is calculated using just USD.

Source: Shared Research based on company interviews

## Main group companies (as of May 2018)

The Taiyo Group consists of Taiyo Holdings (the company), 17 subsidiaries, and one affiliate. In May 2013 Taiyo purchased its Taiwanese competitor OTC (Onstatic Technology Co., Ltd.) and in June 2015 it acquired Chugai Kasei Co., Ltd., making them consolidated subsidiaries. In December 2014 the company established Taiyo Green Energy Co., Ltd., a solar power generation subsidiary, and in August 2017 established Taiyo Pharma Co., Ltd., a subsidiary to develop and market drugs, to set up new businesses in these areas. In April 2018, the company acquired all shares of Micro Network Technologies Corp (MNT), making it a consolidated subsidiary.

## Major subsidiaries



Source: Shared Research based on company data

## Fundamental technologies

### Technology sources, origin

Taiyo started out as a manufacturer and marketer of black ink for letterpress printing. Major ink makers, who are also pigment manufacturers, did not produce carbon, the key ingredient in black ink. As such, in raw materials it was possible for the company to compete with these large ink manufacturers just with technical ability and product quality. The company's first encounter with resist ink (the forerunner of solder resist) was in July 1963. At that time, a user of Taiyo's plate-making chemicals, Fuji Gosei Kagaku Kenkyujo, made a request for acid resistant ink. The request was for Mylar film to be immersed in concentrated sulfuric acid at 80 degrees Celsius, with only the printed area not dissolved. Manufacturing ink and solder resist are similar in many ways, as they involve taking a wide variety of fine powder materials, mixing them with solvents or resins, kneading, and homogenizing. Expertise and fundamental technologies from these products can be applied to other areas.

There are several hundred varieties of solder resist. As such, Taiyo handles multiple products, operating end-to-end production processes from raw material procurement through shipment. The basic manufacturing expertise is in compounding (formulation) and dispersion techniques. The manufacturing process entails weighing and inputting 10 to 20 varieties of raw materials in line with the formulation prescription, pre-mixing in a mixer, using a rolling mill to make the product finer and more homogenous, and finally packaging the product. Using different materials changes the insulation, conductivity, adhesion, heat conduction, UV curing, and thermosetting functions.

The company's raw materials are fine powder particles with a diameter of a few microns. While the uses differ, powder particles are handled similarly to those in pharmaceutical and cosmetic manufacturing. Fuji Film Corporation, the subsidiary of Fujifilm Holdings Corp. (TSE1: 4901), saw some success in the pharmaceutical and cosmetics industries because it had the base

technologies and the core technologies and manufacturing expertise gained from its manufacture of silver halide photographic film. Similarly, Taiyo is aiming to enter the pharmaceutical industry by leveraging its existing competencies.

The company acquired Chugai Kasei for its R&D capabilities. Chugai Kasei develops and manufactures functional pigments including dyes for electronic materials, photosensitive dyes, and specialty pigments. By having a company further upstream under its corporate umbrella, Taiyo has widened its business territories.

#### Fundamental technologies

##### Taiyo Group Accumulated Technology

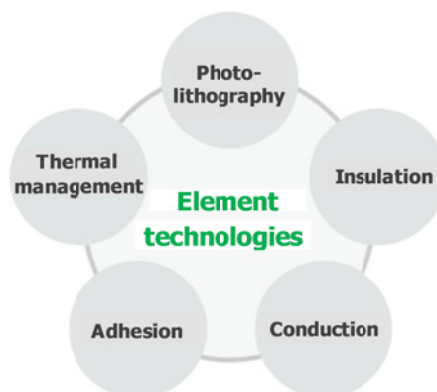


#### Formulation Technology

"Formulation Technology" refers to the accurate, efficient, and prompt development of the optimal combination of materials from amongst countless prospective candidates (e.g. synthetic resins, fillers, etc.) in order to achieve the various characteristics and performance required by products.

#### Mixing and Dispersion Technology

"Mixing and Dispersion Technology" refers to the manufacture of uniformly-dispersed and precisely-balanced ink formulations. In recent years, in conjunction with the ever-decreasing size of electronics, finer ink dispersions have become increasingly more critical and required.



Source: Shared Research based on company data

## Comparison with similar and benchmark companies

### A shift in comparable companies, as Taiyo is on the brink of a third growth period

As Taiyo shifts from its second to third growth phase, it should be compared against a different set of companies. During its second growth phase, Taiyo changed course and narrowed its focus to the solder resist industry. Investors who favor growth were interested in Taiyo due to it being an innovation stock and involved in basic materials. An innovation stock is one that creates a market through business renewal and is a leading company in its niche area. In Japan, many of these are upstream (resources and raw materials) companies. Over the past three years Taiyo has had an OPM of around 20%, and at the same time both sales and operating profit were growing by double digits. After the company became the market share leader in the solder resist industry, profit growth rates have plateaued. Still, the company is on the brink of a third growth spurt in light of the aggressive M&A, tie-up with DIC, and move into different business fields spearheaded by CEO Sato.

### Similar companies to the current Taiyo

Similar companies to Taiyo during its second growth phase include JCU (TSE: 4975), Japan Pure Chemical (TSE: 4973), and MEC (TSE: 4971). Each of these companies is in an upstream industry, has one core product, high margins, and an electronic material product with a leading market share. Compared with Taiyo, which is already poised to move into its third phase, these companies are still growing, with relatively shorter histories and lower sales.



## Comparison with similar companies

|  | Taiyo Holdings (4626) |               |               | JCU (4975)    |               |               | Japan Pure Chemical (4973) |              |               | MEC (4971)   |              |              |
|--|-----------------------|---------------|---------------|---------------|---------------|---------------|----------------------------|--------------|---------------|--------------|--------------|--------------|
| Income statement (JPYmn)                           | FY03/16               | FY03/17       | FY03/18       | FY03/16       | FY03/17       | FY03/18       | FY03/16                    | FY03/17      | FY03/18       | FY03/16      | FY03/17      | FY12/17      |
|  | Cons.                 | Cons.         | Cons.         | Cons.         | Cons.         | Cons.         | Parent                     | Parent       | Parent        | Cons.        | Cons.        | Cons.        |
| <b>Sales</b>                                       | <b>49,843</b>         | <b>47,866</b> | <b>52,241</b> | <b>19,818</b> | <b>20,760</b> | <b>23,120</b> | <b>8,429</b>               | <b>8,229</b> | <b>10,668</b> | <b>9,078</b> | <b>9,259</b> | <b>9,641</b> |
| YoY  | 3.3%                  | -4.0%         | 9.1%          | 0.1%          | 4.8%          | 11.4%         | -11.8%                     | -2.4%        | 2.9%          | 0.2%         | 2.0%         |              |
| <b>Operating profit</b>                            | <b>10,964</b>         | <b>9,221</b>  | <b>11,337</b> | <b>4,906</b>  | <b>5,500</b>  | <b>6,948</b>  | <b>957</b>                 | <b>900</b>   | <b>1,078</b>  | <b>2,185</b> | <b>1,887</b> | <b>1,993</b> |
| YoY  | 18.5%                 | -15.9%        | 22.9%         | 6.5%          | 12.1%         | 12.7%         | -13.7%                     | -6.0%        | 4.4%          | 8.8%         | -13.6%       |              |
| OPM  | 22.0%                 | 19.3%         | 21.7%         | 24.8%         | 26.5%         | 30.1%         | 11.4%                      | 10.9%        | 10.1%         | 24.1%        | 20.4%        | 20.7%        |
| <b>Recurring profit</b>                            | <b>11,129</b>         | <b>9,202</b>  | <b>11,199</b> | <b>4,926</b>  | <b>5,502</b>  | <b>6,972</b>  | <b>1,047</b>               | <b>1,002</b> | <b>1,179</b>  | <b>2,207</b> | <b>1,888</b> | <b>2,063</b> |
| YoY  | 16.8%                 | -17.3%        | 21.7%         | 1.9%          | 11.7%         | 11.8%         | -10.9%                     | -4.3%        | 2.7%          | 3.7%         | -14.5%       |              |
| RPM  | 22.3%                 | 19.2%         | 21.4%         | 24.9%         | 26.5%         | 30.2%         | 12.4%                      | 12.2%        | 11.1%         | 24.3%        | 20.4%        | 21.4%        |
| <b>Net income attributable to owners of parent</b> | <b>7,796</b>          | <b>6,398</b>  | <b>4,856</b>  | <b>3,410</b>  | <b>4,124</b>  | <b>4,906</b>  | <b>708</b>                 | <b>716</b>   | <b>829</b>    | <b>1,514</b> | <b>1,642</b> | <b>1,567</b> |
| YoY  | 16.9%                 | -17.9%        | -24.1%        | 6.4%          | 20.9%         | 9.1%          | -7.8%                      | 1.1%         | 1.9%          | 12.7%        | 8.4%         |              |
| Net margin   | 15.6%                 | 13.4%         | 9.3%          | 17.2%         | 19.9%         | 21.2%         | 8.4%                       | 8.7%         | 7.8%          | 16.7%        | 17.7%        | 16.3%        |
| Per share data (JPY)                               |                       |               |               |               |               |               |                            |              |               |              |              |              |
| EPS  | 338.0                 | 266.4         | 168.6         | 120.9         | 147.6         | 176.3         | 121.3                      | 124.4        | 144.1         | 76.3         | 84.4         | 81.8         |
| Dividend per share                                 | 110.0                 | 120.1         | 160.2         | 120.0         | 130.0         | 85.0          | 80.0                       | 80.0         | 80.0          | 18.0         | 20.0         | 22.0         |
| Payout ratio                                       | 32.5%                 | 45.1%         | 95.0%         | 24.8%         | 22.0%         | 24.1%         | 65.9%                      | 64.3%        | 55.5%         | 23.6%        | 23.6%        | 26.9%        |
| DOE  | 6.2%                  | 5.5%          | 6.4%          | 5.8%          | 5.4%          | 5.7%          | 5.4%                       | 5.2%         | 4.5%          | 2.9%         | 3.0%         | 3.1%         |
| Book value per share                               | 1,865.9               | 2,469.0       | 2,521         | 553.7         | 661.1         | 823.7         | 1,443.2                    | 1,649.9      | 1,911.2       | 632.4        | 683.9        | 760.9        |
| Balance sheet (JPYmn)                              |                       |               |               |               |               |               |                            |              |               |              |              |              |
| Total assets                                       | 65,464                | 92,386        | 111,490       | 22,208        | 26,095        | 32,266        | 9,619                      | 11,153       | 13,420        | 15,715       | 17,993       | 19,247       |
| Net assets   | 45,250                | 71,846        | 73,023        | 15,704        | 18,457        | 22,996        | 8,494                      | 9,548        | 11,101        | 12,250       | 13,110       | 14,587       |
| Cash flow statement (JPYmn)                        |                       |               |               |               |               |               |                            |              |               |              |              |              |
| Cash flows from operating activities               | 10,546                | 9,042         | 8,100         | 3,123         | 4,847         | 5,255         | 650                        | 478          | 699           | 1,796        | 1,633        | 1,591        |
| Cash flows from investing activities               | -6,750                | -1,063        | -24,161       | -1,057        | -1,579        | -1,061        | -69                        | -44          | 27            | -1,372       | -2,461       | -832         |
| Cash flows from financing activities               | -2,740                | 20,342        | 11,319        | -1,510        | -1,188        | -870          | -454                       | -676         | -430          | -912         | 1,128        | -885         |
| Financial ratios                                   |                       |               |               |               |               |               |                            |              |               |              |              |              |
| Cash and cash equivalents                          | 18,385                | 46,661        | 41,816        | 6,799         | 8,764         | 12,234        | 4,039                      | 3,797        | 4,093         | 3,422        | 3,723        | 3,664        |
| ROA (RP-based)                                     | 17.6%                 | 11.7%         | 11.0%         | 22.5%         | 22.8%         | 23.9%         | 10.3%                      | 9.7%         | 9.6%          | 14.5%        | 11.2%        | 11.1%        |
| ROE  | 19.0%                 | 11.2%         | 6.8%          | 23.4%         | 24.3%         | 23.7%         | 8.1%                       | 8.0%         | 8.1%          | 12.5%        | 13.0%        | 11.3%        |
| Equity ratio                                       | 65.9%                 | 76.9%         | 65.2%         | 70.4%         | 70.5%         | 71.1%         | 87.6%                      | 85.0%        | 82.0%         | 78.0%        | 72.9%        | 75.8%        |
| Per employee data (JPYmn)                          |                       |               |               |               |               |               |                            |              |               |              |              |              |
| Number of employees                                | 1,202                 | 1,249         |               | 528           | 544           |               | 51                         | 47           |               | 320          | 342          |              |
| Avg. temporary employees (not included in above)   |                       |               |               | 11            | 15            |               | 6                          | 6            |               |              |              |              |
| Sales per employee                                 | 41.5                  | 38.3          |               | 36.8          | 37.1          |               | 147.9                      | 155.3        |               | 28.4         | 27.1         |              |
| Operating profit per employee                      | 9.1                   | 7.4           |               | 9.1           | 9.8           |               | 16.8                       | 17.0         |               | 6.8          | 5.5          |              |
| Other  |                       |               |               |               |               |               |                            |              |               |              |              |              |
| R&D expenses                                       | 2,441                 | 3,235         | 3,089         | 1,145         | 1,075         |               | 235                        | 220          |               | 798          | 902          |              |
| % of sales   | 4.9%                  | 6.8%          | 5.9%          | 5.8%          | 5.2%          |               | 2.8%                       | 2.7%         |               | 8.8%         | 9.7%         |              |
| Established  | September 1953        |               |               | April 1968    |               |               | July 1971                  |              |               | May 1969     |              |              |

Source: Shared Research based on company data

Note: Figures may differ from company materials due to differences in rounding methods.

## Benchmark companies

Taiyo benchmarks itself against companies that represent its near-term future, such as Nissan Chemical Industries Ltd. (TSE1: 4021) and Nippon Kayaku Co., Ltd. (TSE1: 4272). Both of these are in the chemical industry and have a history of over 100 years, sales of more than three times that of Taiyo, high R&D-to-sales ratios and OPMs, and several major sources of earnings such as pharmaceuticals. Both have lasted for more than 100 years, one of Taiyo's goals, and are also prime examples of where the company hopes to see itself in the future.

## Companies Taiyo looks to as examples

Taiyo is just starting to transition from a leading company in a niche area to a comprehensive chemicals manufacturer. That said, being a member of the DIC group positions Taiyo at roughly fifth in the chemical industry, in line with Asahi Kasei Corp. (TSE1: 3407) and Nitto Denko Corp. (TSE1: 6988). We will see whether CEO Sato can use its alliance with DIC to grow the company, similar to how Intel and Microsoft grew thanks to alliances with IBM.

CEO Sato says there is much to learn from overseas companies. Regarding human resources, he looks at the way 3M Company (US) treats its employees (refer to the comments in the following box). Further, in order to anticipate the direction of final demand, the company looks at the business development of upstream materials companies and downstream companies such as Google and Apple, and aims to enhance its marketing strategies to reach these companies.

3M is a long-established company known for numerous innovative products including Post-it® Notes and Scotch® Tape. The hit-producing company has a "15% culture," under which engineers can spend up to 15% of their working hours studying a field of interest. The company also has management indicators such as new products' share of total sales and numerous other value creating arrangements. The company's technological capabilities can be seen in the sheer number of products it handles (currently around 55,000 types). 3M has roughly 90,000 employees worldwide, around 8,300 in R&D, which gives a good indication of how many products the company develops. 3M's policies and track record are also widely lauded, and in Booz & Co.'s 2013 Global Innovation 1000 Study, 3M was ranked fifth, following the renowned companies of Apple, Google, Samsung (South Korea), and Amazon. Of these top five companies, only 3M has a history of over 100 years.

Source: HR Tech, 3M Japan

## Benchmark companies

| FY (consolidated)<br>Income statement<br>(JPYmn)   | Taiyo Holdings (4626) |                  |                  | Nissan Chemical (4021) |                  |                  | Nippon Kayaku (4272) |                  |                  |
|--|-----------------------|------------------|------------------|------------------------|------------------|------------------|----------------------|------------------|------------------|
|  | FY03/16<br>Cons.      | FY03/17<br>Cons. | FY03/18<br>Cons. | FY03/16<br>Cons.       | FY03/17<br>Cons. | FY03/18<br>Cons. | FY03/16<br>Cons.     | FY03/17<br>Cons. | FY03/18<br>Cons. |
| <b>Sales</b>                                       | <b>49,843</b>         | <b>47,866</b>    | <b>52,241</b>    | <b>176,894</b>         | <b>180,289</b>   | <b>193,389</b>   | <b>162,922</b>       | <b>159,117</b>   | <b>167,888</b>   |
| YoY  | 3.3%                  | -4.0%            | 9.1%             | 3.3%                   | 1.9%             | 7.3%             | 0.7%                 | -2.3%            | 5.5%             |
| <b>Operating profit</b>                            | <b>10,964</b>         | <b>9,221</b>     | <b>11,337</b>    | <b>28,606</b>          | <b>31,438</b>    | <b>34,988</b>    | <b>21,713</b>        | <b>19,646</b>    | <b>22,606</b>    |
| YoY  | 18.5%                 | -15.9%           | 22.9%            | 12.9%                  | 9.9%             | 11.3%            | -2.6%                | -9.5%            | 15.1%            |
| OPM  | 22.0%                 | 19.3%            | 21.7%            | 16.2%                  | 17.4%            | 18.1%            | 13.3%                | 12.3%            | 13.5%            |
| <b>Recurring profit</b>                            | <b>11,129</b>         | <b>9,202</b>     | <b>11,199</b>    | <b>29,531</b>          | <b>31,713</b>    | <b>36,235</b>    | <b>21,016</b>        | <b>19,947</b>    | <b>22,471</b>    |
| YoY  | 16.8%                 | -17.3%           | 21.7%            | 11.9%                  | 7.4%             | 14.3%            | -16.5%               | -5.1%            | 12.7%            |
| RPM  | 22.3%                 | 19.2%            | 21.4%            | 16.7%                  | 17.6%            | 18.7%            | 12.9%                | 12.5%            | 13.4%            |
| <b>Net income attributable to owners of parent</b> | <b>7,796</b>          | <b>6,398</b>     | <b>4,856</b>     | <b>22,350</b>          | <b>24,026</b>    | <b>27,142</b>    | <b>17,291</b>        | <b>15,635</b>    | <b>15,472</b>    |
| YoY  | 16.9%                 | -17.9%           | -24.1%           | 22.8%                  | 7.5%             | 13.0%            | 10.5%                | -9.6%            | -1.0%            |
| Net margin   | 15.6%                 | 13.4%            | 9.3%             | 12.6%                  | 13.3%            | 14.0%            | 10.6%                | 9.8%             | 9.2%             |
| <b>Per share data</b>                              |                       |                  |                  |                        |                  |                  |                      |                  |                  |
| EPS  | 338.0                 | 266.4            | 168.6            | 143.4                  | 157.0            | 180.3            | 96.1                 | 90.2             | 89.4             |
| Dividend per share                                 | 110.0                 | 120.1            | 160.2            | 44.0                   | 52.0             | 68.0             | 30.0                 | 30.0             | 30.0             |
| Payout ratio                                       | 32.5%                 | 45.1%            | 95.0%            | 30.7%                  | 33.1%            | 37.7%            | 31.2%                | 33.2%            | 33.6%            |
| DOE  | 6.2%                  | 5.5%             | 6.4%             | 4.5%                   | 5.0%             | 6.1%             | 2.8%                 | 2.7%             | 2.6%             |
| Book value per share                               | 1,865.9               | 2,469.0          | 2,521            | 1,006.6                | 1,067.8          | 1,168.1          | 1,075.6              | 1,120.7          | 1,203.1          |
| <b>Balance sheet (JPYmn)</b>                       |                       |                  |                  |                        |                  |                  |                      |                  |                  |
| Total assets                                       | 65,464                | 92,386           | 111,490          | 228,169                | 231,748          | 249,043          | 272,679              | 272,791          | 287,565          |
| Net assets   | 45,250                | 71,846           | 73,023           | 156,924                | 163,707          | 176,364          | 200,492              | 205,866          | 220,602          |
| <b>Cash flow statement (JPYmn)</b>                 |                       |                  |                  |                        |                  |                  |                      |                  |                  |
| Cash flows from operating activities               | 10,546                | 9,042            | 8,100            | 29,989                 | 32,491           | 37,691           | 19,603               | 31,390           | 20,121           |
| Cash flows from investing activities               | -6,750                | -1,063           | -24,161          | -8,416                 | -13,152          | -15,244          | -5,090               | -11,913          | -16,171          |
| Cash flows from financing activities               | -2,740                | 20,342           | 11,319           | -17,317                | -19,042          | -20,268          | -9,432               | -14,103          | -6,241           |
| <b>Financial ratio</b>                             |                       |                  |                  |                        |                  |                  |                      |                  |                  |
| Cash and cash equivalents                          | 18,385                | 46,661           | 41,816           | 35,335                 | 35,701           | 37,702           | 47,464               | 51,785           | 50,532           |
| ROA (RP-based)                                     | 17.6%                 | 11.7%            | 11.0%            | 13.1%                  | 13.8%            | 15.1%            | 7.8%                 | 7.3%             | 8.0%             |
| ROE  | 19.0%                 | 11.2%            | 6.8%             | 14.6%                  | 15.1%            | 16.1%            | 9.2%                 | 8.2%             | 7.7%             |
| Equity ratio                                       | 65.9%                 | 76.9%            | 65.2%            | 68.1%                  | 69.9%            | 70.1%            | 69.3%                | 71.1%            | 72.1%            |
| <b>Per employee data (JPYmn)</b>                   |                       |                  |                  |                        |                  |                  |                      |                  |                  |
| Number of employees                                | 1,202                 | 1,249            |                  | 2,371                  | 2,402            |                  | 5,188                | 5,517            |                  |
| Avg. temporary employees (not included in above)   |                       |                  |                  | 345                    | 313              |                  | 830                  | 822              |                  |
| Sales per employee                                 | 41.5                  | 38.3             |                  | 65.1                   | 66.4             |                  | 27.1                 | 25.1             |                  |
| Operating profit per employee                      | 9.1                   | 7.4              |                  | 10.5                   | 11.6             |                  | 3.6                  | 3.1              |                  |
| <b>Others (JPYmn)</b>                              |                       |                  |                  |                        |                  |                  |                      |                  |                  |
| R&D expenses                                       | 2,441                 | 3,235            | 3,089            | 15,778                 | 16,078           |                  | 13,000               | 13,900           |                  |
| % of sales   | 4.9%                  | 6.8%             | 0.1              | 8.9%                   | 8.9%             |                  | 8.0%                 | 8.7%             |                  |
| <b>Established</b>                                 | September 1953        |                  |                  | February 1887          |                  |                  | June 1916            |                  |                  |

Source: Shared Research based on company data

Note: Figures may differ from company materials due to differences in rounding methods.



## Earnings analysis

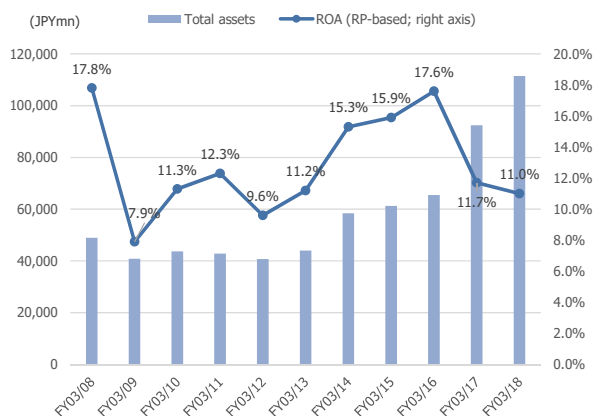
| Profitability (JPYmn)                       | FY03/08 | FY03/09 | FY03/10 | FY03/11 | FY03/12 | FY03/13 | FY03/14 | FY03/15 | FY03/16 | FY03/17 | FY03/18 |
|---|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   |
| Sales                                       | 45,338  | 32,614  | 35,056  | 40,366  | 39,797  | 36,184  | 44,224  | 48,260  | 49,843  | 47,866  | 52,241  |
| Cost of sales                               | 29,512  | 22,635  | 24,123  | 28,428  | 29,822  | 25,319  | 28,348  | 28,865  | 27,355  | 26,220  | 27,304  |
| Cost ratio                                  | 65.1%   | 69.4%   | 68.8%   | 70.4%   | 74.9%   | 70.0%   | 64.1%   | 59.8%   | 54.9%   | 54.8%   | 52.3%   |
| Gross profit                                | 15,826  | 9,979   | 10,932  | 11,938  | 9,974   | 10,864  | 15,875  | 19,394  | 22,487  | 21,645  | 24,937  |
| Cost ratio                                  | 34.9%   | 30.6%   | 31.2%   | 29.6%   | 25.1%   | 30.0%   | 35.9%   | 40.2%   | 45.1%   | 45.2%   | 47.7%   |
| Operating profit                            | 8,896   | 3,332   | 4,843   | 5,380   | 4,040   | 4,385   | 7,568   | 9,254   | 10,964  | 9,221   | 11,337  |
| OPM   | 19.6%   | 10.2%   | 13.8%   | 13.3%   | 10.2%   | 12.1%   | 17.1%   | 19.2%   | 22.0%   | 19.3%   | 21.7%   |
| EBITDA                                      | 10,453  | 4,766   | 6,142   | 6,533   | 5,100   | 5,406   | 8,917   | 10,918  | 13,135  | 11,947  | 16,813  |
| EBITDA margin                               | 23.1%   | 14.6%   | 17.5%   | 16.2%   | 12.8%   | 14.9%   | 20.2%   | 22.6%   | 26.4%   | 25.0%   | 32.2%   |
| Net income attributable to owners of parent | 6,171   | 1,958   | 3,010   | 3,402   | 2,502   | 3,367   | 4,930   | 6,667   | 7,796   | 6,398   | 4,856   |
| Net margin                                  | 13.6%   | 6.0%    | 8.6%    | 8.4%    | 6.3%    | 9.3%    | 11.1%   | 13.8%   | 15.6%   | 13.4%   | 9.3%    |
| <b>Financial ratios</b>                     |         |         |         |         |         |         |         |         |         |         |         |
| ROA (RP-based)                              | 17.8%   | 7.9%    | 11.3%   | 12.3%   | 9.6%    | 11.2%   | 15.3%   | 15.9%   | 17.6%   | 11.7%   | 11.0%   |
| ROE   | 16.5%   | 5.4%    | 8.7%    | 9.9%    | 7.5%    | 9.7%    | 12.8%   | 16.7%   | 19.0%   | 11.2%   | 6.8%    |
| Total asset turnover                        | 0.9     | 0.8     | 0.8     | 0.9     | 1.0     | 0.8     | 0.8     | 0.8     | 0.8     | 0.5     | 0.5     |
| Working capital (JPYmn)                     | 7,896   | 6,585   | 7,536   | 7,586   | 7,848   | 7,398   | 10,845  | 11,975  | 11,087  | 11,592  | 13,686  |
| Current ratio                               | 390.2%  | 450.3%  | 383.7%  | 360.3%  | 412.6%  | 401.2%  | 423.0%  | 343.2%  | 361.0%  | 593.6%  | 333.7%  |
| OCF / Current liabilities                   | 1.2     | 0.9     | 0.4     | 0.6     | 0.4     | 0.9     | 0.8     | 0.8     | 1.0     | 0.8     | 0.4     |
| Net debt / Equity                           | 24.7%   | 22.5%   | 21.2%   | 23.0%   | 19.4%   | 18.9%   | 39.2%   | 55.9%   | 48.3%   | 29.3%   | 54.0%   |
| OCF / Total liabilities                     | 0.9     | 0.7     | 0.4     | 0.5     | 0.4     | 0.8     | 0.4     | 0.5     | 0.5     | 0.4     | 0.2     |
| Cash conversion cycle (days)                | 68      | 77      | 70      | 63      | 68      | 74      | 71      | 81      | 76      | 75      | 77      |
| Change in working capital                   | -2,209  | -1,311  | 951     | 50      | 262     | -450    | 3,447   | 1,130   | -888    | 505     | 2,094   |

Source: Shared Research based on company data

Note: Figures may differ from company materials due to differences in rounding methods.

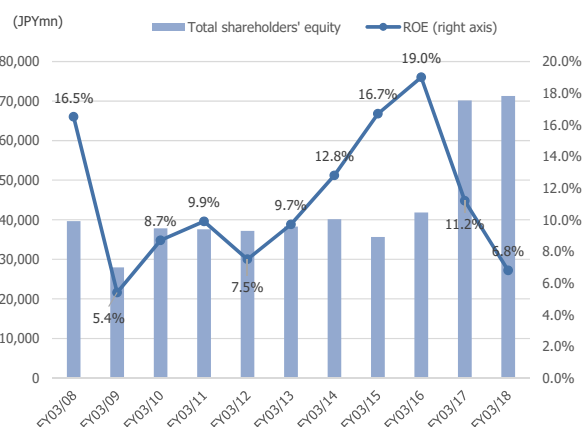
EBITDA = operating profit + depreciation + goodwill amortization

### Total assets and ROA (RP-based)

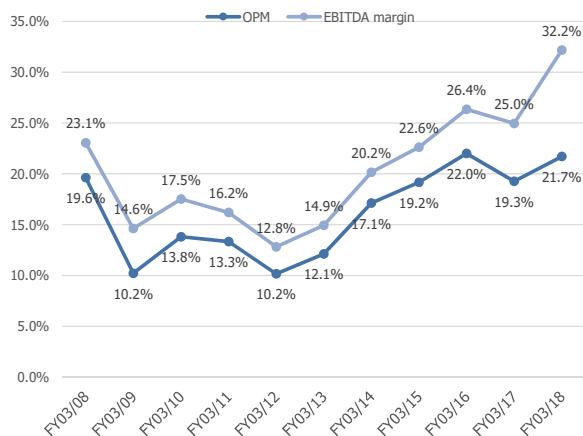


Source: Shared Research based on company data

### Shareholders' equity and ROE

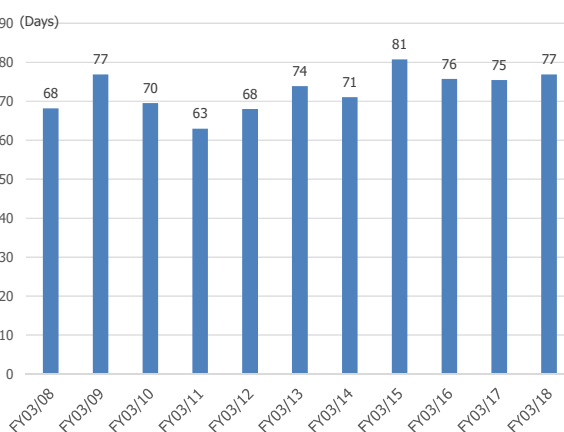


### Operating profit margin and EBITDA margin



Source: Shared Research based on company data

### Cash conversion cycle



## Market and value chain

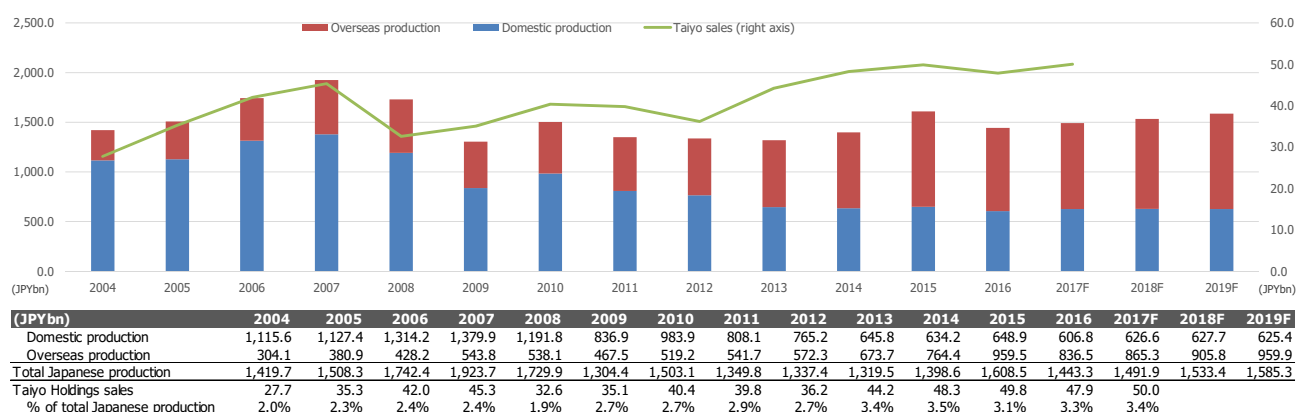
### Size of target markets

The company's mainstay product, solder resist, is a basic material essential to protect the surface of printed wiring boards, the heart of all devices in the electronic information industry. The market drivers have moved from personal computers, digital consumer electronics, and flat-panel displays, to smartphones. In recent years applications for printed wiring boards have spread to automobiles, robots, and medical equipment. The industry is growing, and facing a growing variety of requirements in terms of cost and functionality demanded by the market.

In terms of the industry value chain, Taiyo is positioned upstream (resources and raw materials). Compared with midstream (product development and manufacturing) and downstream (marketing and sales) companies, upstream companies are niche companies that single-handedly supply certain resources and raw materials and reap benefits from the added value.

As shown in the following graph, printed wiring board (PWB) production by Japanese companies and Taiyo's sales move in close step. Compared to the 2007 peak, domestic production of PWBs by Japanese corporations has more than halved, while overseas production has doubled. Total value has trended sideways and has not topped the peak levels of 2007. The company has developed production centers in Asia, brought a Taiwanese competitor under its corporate umbrella, and progressively shifted to overseas production. Taiyo has also cultivated overseas customers and entered other industries, and is working to transform its structure so that it does not rely on the PWB market alone.

**PWB production by Japanese companies and Taiyo Holdings sales**



Source: Shared Research, based on JPCA statistics and company data (including estimates)

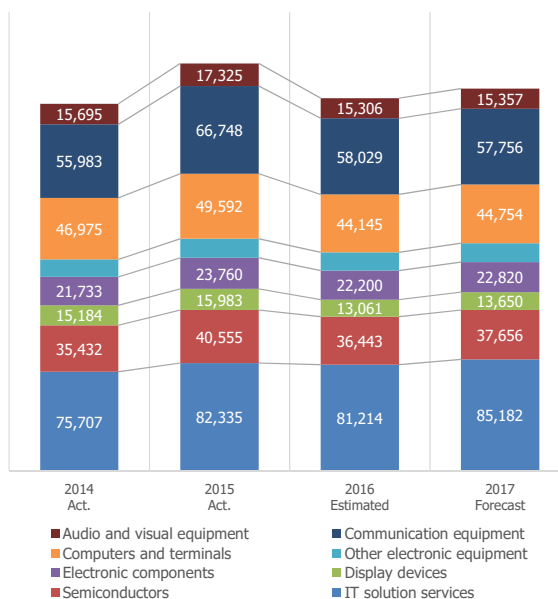
Note: JPCA statistics are for calendar years, excluding Taiyo Holdings sales, which are for its fiscal year (e.g., 2015 means FY03/16)

Note: Definition and scope of overseas production for Japanese companies does not cover only consolidated entities but also those where Japanese companies have management rights, regardless of shareholding percentage.

In 2016, global electronic information industry production in yen terms was JPY284.2tn (-8.6% YoY). This was due to slowing growth in smartphones, which had been the driver in developed economies and in China, and the effect of yen strength when sales figures were translated into yen. Japanese PWB manufacturing also declined to JPY1.5tn (-10.3% YoY). Meanwhile, Taiyo's FY03/17 sales were JPY47.9bn (-4.0%). For 2017, the Japan Electronics and Information Technology Industries Association (JEITA) forecast 2.6% YoY growth in global electronic information industry production value, due to rising demand for cars with driver assist technology, as well as moves to apply AI, sensors, and actuators in a variety of industrial fields. Meanwhile, the Japan Electronics Packaging and Circuits Association (JPCA) forecast Japanese PWB production value to rise by 3.4% YoY in 2017 and the company's FY03/18 sales forecast is +4.5% YoY. Taiyo's sales basically follow PWB production by Japanese companies and global electronic information industry production. Recently, fluctuations in Taiyo's sales have been less drastic than the YoY fluctuations of sales in relevant industries. This can be assumed to be because the company's products are basic materials used in upstream processes, meaning it does not directly feel the impact of changes in downstream demand. Long-term contracts with customers mean price movements are relatively small.

## Global electronic information industry production (Japanese companies' PWB production value vs Taiyo Holdings' sales) (JPY100mn, %)

| (JPYbn)  | 2014<br>Act. | 2015<br>Act. | 2016<br>Estimated | 2017<br>Forecast |
|--|--------------|--------------|-------------------|------------------|
| IT solution services                           | 75,707       | 82,335       | 81,214            | 85,182           |
| Semiconductors                                 | 35,432       | 40,555       | 36,443            | 37,656           |
| Display devices                                | 15,184       | 15,983       | 13,061            | 13,650           |
| Electronic components                          | 21,733       | 23,760       | 22,200            | 22,820           |
| Other electronic equipment                     | 13,322       | 14,563       | 13,848            | 14,439           |
| Computers and terminals                        | 46,975       | 49,592       | 44,145            | 44,754           |
| Communication equipment                        | 55,983       | 66,748       | 58,029            | 57,756           |
| Audio and visual equipment                     | 15,695       | 17,325       | 15,306            | 15,357           |
| Total (global electronic equipment production) | 280,029      | 310,861      | 284,245           | 291,613          |
| Japanese companies' production of PWB          | 1,399        | 1,608        | 1,443             | 1,492            |
| % of global electronic equipment production    | 0.5%         | 0.5%         | 0.5%              | 0.5%             |
| Taiyo Holdings sales                           | 48.3         | 49.8         | 47.9              | 50.0             |
| % of total Japanese PWB production             | 3.5%         | 3.1%         | 3.3%              | 3.4%             |
| YoY  |              |              |                   |                  |
| IT solution services                           | 8.0%         | 8.8%         | -1.4%             | 4.9%             |
| Semiconductors                                 | 19.5%        | 14.5%        | -10.1%            | 3.3%             |
| Display devices                                | 11.2%        | 5.3%         | -18.3%            | 4.5%             |
| Electronic components                          | 10.8%        | 9.3%         | -6.6%             | 2.8%             |
| Other electronic equipment                     | 7.4%         | 9.3%         | -4.9%             | 4.3%             |
| Computers and terminals                        | 1.5%         | 5.6%         | -11.0%            | 1.4%             |
| Communication equipment                        | 19.6%        | 19.2%        | -13.1%            | -0.5%            |
| Audio and visual equipment                     | -3.2%        | 10.4%        | -11.7%            | 0.3%             |
| Total (global electronic equipment production) | 10.0%        | 11.0%        | -8.6%             | 2.6%             |
| Japanese companies' production of PWB          | 6.0%         | 15.0%        | -10.3%            | 3.4%             |
| Taiyo Holdings sales                           | 9.1%         | 3.3%         | -4.0%             | 4.5%             |



Source: Shared Research, based on JEITA and JPCA statistics and company data (includes estimates)

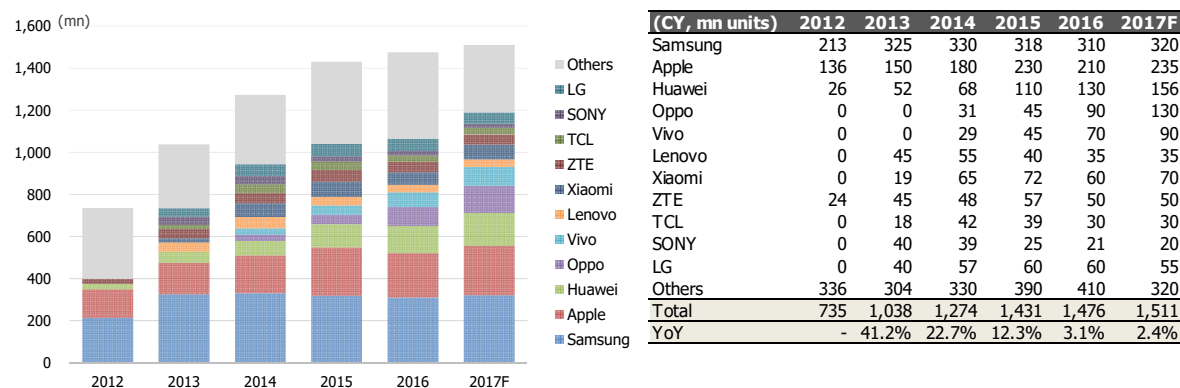
Note: All figures are for calendar years, excluding Taiyo Holdings sales, which are for its fiscal year (e.g., 2015 means FY03/16)

## Market growth potential

### Smartphone market growth potential

In 2016, there were 1.5bn global smartphone shipments (+3.1% YoY), a sudden deceleration from the double-digit growth seen through 2015. This was due to a slump by leading companies Apple and Samsung. Sales of Apple's new iPhone 7 and iPhone 7 Plus stagnated, while phones catching fire hurt Samsung's sales. Smartphone companies from Greater China still have some momentum. There is expected to be some impact from new product launches in 2017, but the smartphone market is facing a structural issue of near saturation (penetration is 79.0% in China, 74.0% in the UK, 72.0% in the US, and 67.0% in Nigeria). Of the 38 countries surveyed, 36 had penetration rates of over 50%. (Source: AUN Consulting, Inc.) The market is now primarily replacement demand, making it difficult to generate new demand.

### Global smartphone shipments (mn units)



Source: Shared Research based on data from *Electronic Device Industry News*

### Technological trends for smartphone PCBs

#### FOWLP (Fan Out Wafer Level Package)

In 2016 there was a major development in smartphone substrates. Previously, smartphone processors used Flip Chip Scale Packages (FCCSPs), which were seen as the new battlefield for semiconductor package substrates, instead of personal computer CPUs. However, iPhone 7 and iPhone 7 Plus employed InFO (Integrated Fan-Out), a Fan Out Wafer Level Package (FOWLP) developed by Taiwan Semiconductor Manufacturing Company Limited (TSMC), the largest semiconductor foundry. This positioned the semiconductor package industry at a crossroads. In other words, FOWLP made the traditional semiconductor package substrate unnecessary, as it enabled simultaneous formation of packages for semiconductors with a redistribution layer

(RDL) with a chip on top of a silicon wafer. In fact, Ibiden Co., Ltd. (TSE1:4062), which had been supplying FCCSP substrates for Apple's application processors, was forced to respond through modified semi additive process (MSAP) methodology (see the following paragraph). InFO is a means for TSMC, a semiconductor manufacturer, to make inroads in its core wafer foundry business. (Previously, TSMC and Samsung Electronics Co., Ltd. split contract manufacturing of Apple's application processors (APs), but it appears that TSMC has become the sole supplier for iPhone 7, iPhone 7 Plus, iPhone 8, iPhone 8 Plus, and iPhone X.)

#### Switch to MSAP (Modified Semi Additive Process)

Production methods for the main substrate of the new iPhones released at the end of 2017 (iPhone 8, iPhone 8 Plus, and iPhone X) appear to have changed dramatically. Instead of the traditional subtractive method, an MSAP is employed to create plated circuits. MSAP enables a 30% reduction in main substrate area via miniaturization of the circuits. The new iPhone (iPhone X) uses organic LED (OLED) on its main screen. As battery capacity increases, it has been necessary to shrink the main substrate area. In the HDI substrate manufacturing process using MSAP, positioning accuracy is more important than before so direct exposure systems (which use digital exposure) have come into general use.

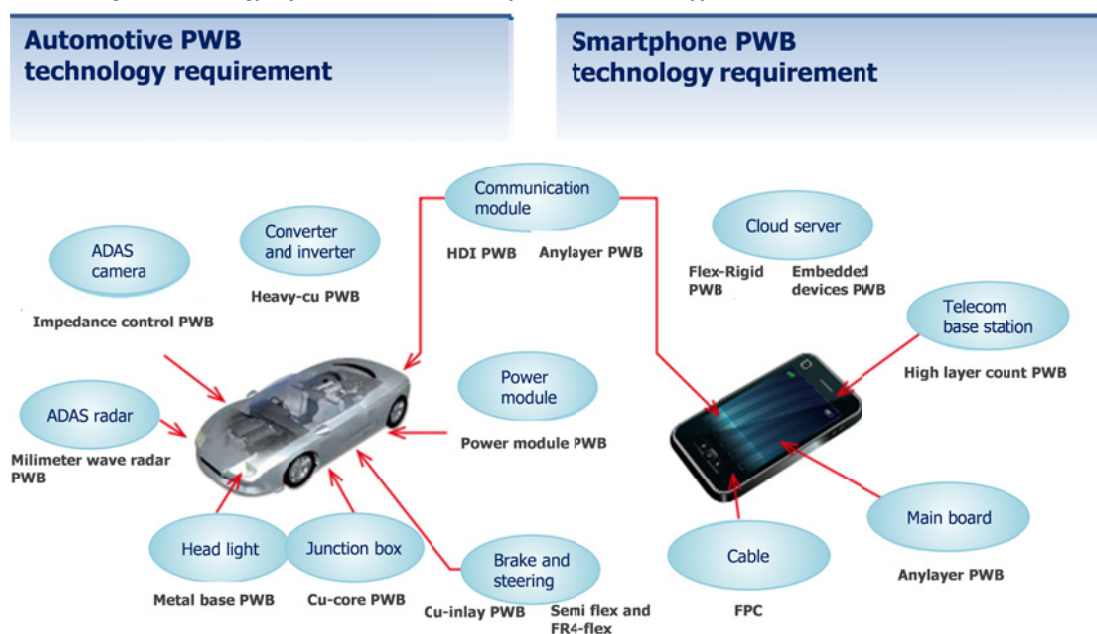
**Printed wiring board manufacturing processes:** The subtractive process starts with copper clad laminate, and then removes the unneeded copper foil by dissolving it with a chemical, leaving the desired pattern. Dissolving the copper foil with chemicals is also known as etching, and is the mainstream printed wiring board manufacturing process.

The additive process starts with a laminate without copper foil, then involves precipitating and fixing the conductive material to form the pattern.

There are also conductive paste printing and semi-additive processes (a combination of both the subtractive and additive processes).

Source: OK Print Corporation

#### Printed wiring board technology required for automotive, smartphone, and wearable applications



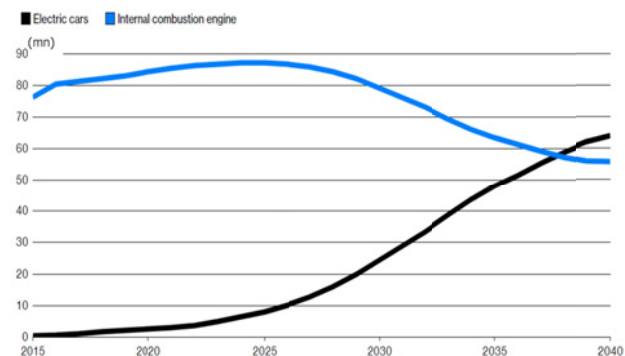
Source: Shared Research based on Meiko Electronics Co., Ltd. data

#### Automobile market growth potential

Automobile penetration rates per 1,000 people are 846 in US, 714 in Australia, 611 in Japan, and 598 in Germany; that is, over 50% of the population own automobiles in developed economies in the West and Japan. On the other hand, motorcycle penetration is high in emerging markets: one of every three people in Thailand and Malaysia, one of every six in Greece, and one of every 15 in China (as of end-2015, source: Japan Automobile Manufacturers Association). Automobiles, like smartphones, are mainly seeing replacement demand, but forecasts are for a rapid switch to electric vehicles amid mounting environmental concerns and falling battery prices. Also, for conventional fossil fuel-powered (internal combustion) vehicles, the spread of advanced driver assist systems such as automatic brakes and automated driving systems is forecast to lead to acceleration in installed electronics. For the printed wiring board industry, automobile demand is still an untapped area, unlike the mature smartphone market.

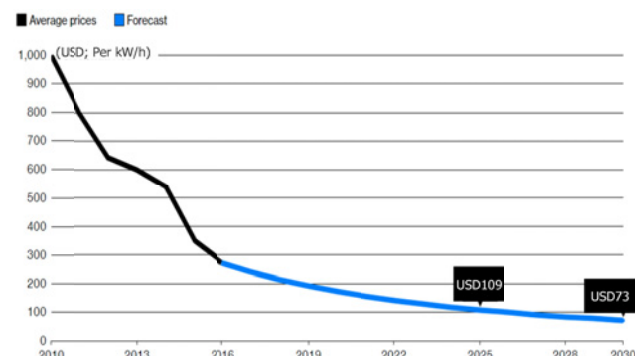
Due to several factors, electric vehicles look likely to close the gap with conventional fossil fuel automobiles in the near future in terms of driving range, convenience, and price. As battery technology advances, driving ranges are becoming longer and charging times shorter. Furthermore, battery prices are dropping. Bloomberg New Energy Finance forecasts that sales of electric vehicles will outstrip those of fossil fuel-powered vehicles by 2040.

**Global electric vehicle sales forecasts (mn units)**



Source: Shared Research based on Bloomberg New Energy Finance

**Electric vehicle battery price forecasts**



Recently, the UK and France have announced bans on fossil fuel-powered automobile sales from 2040. The Indian government announced its intention to regulate the sale of fossil fuel-powered automobiles from 2030. The Chinese government also appears to be considering when to switch to new energy vehicles (NEVs). Automobile makers and conglomerate auto parts manufacturers will have to respond, and Toyota Motor Corporation (TSE1: 7203), which had been hesitant regarding electric vehicles, announced its entry into the market and appears ready to install its high-function solid-state battery currently under development in automobiles in 2020–22. Fully solid-state batteries are similar to lithium-ion batteries in structure, but have a solid, not liquid, electrolyte (such as ceramics). Furthermore, they do not require separators, so there is a smaller risk of fluid leaks or abnormal ignition, and opportunities in terms of major reductions in charging times and further driving ranges.

## Technological issues in automotive printed wiring boards

Printed wiring boards (PWBs) for automotive applications need to be much more durable than for smartphones and tablets. Requirements include the ability to withstand high temperatures and impacts and a longer product life. Furthermore, automobiles must clear safety and environmental regulatory hurdles. Accordingly, automobile manufacturers subject component makers to rigorous, conservative qualification processes. Once a company is qualified, automobile manufacturers are unlikely to switch to another manufacturer for 10 years or so. Car prices are 10–100x those of smartphones, and have a much longer product life. Electrical equipment is used in a number of applications, including information systems, the body, powertrain, and driving safety. With forecasts of increasing electronics use in cars, this is the most important new frontier for electronics components and PWB manufacturers to seize the first mover advantage.

## Technological trends

PWBs are used in all electronic equipment including smartphones, PCs, servers, and audiovisual equipment. They play an important role in making electrical connections between the semiconductors, electronic components, sensors, and other components that are installed in these electronic devices and help them function as system circuitry. They are akin to the capillaries and neural circuits that extend throughout the body in humans. Solder resist that insulates and protects the wiring parts from the external environment can be compared to skin or mucous membranes.

As electronic equipment such as smartphones and wearable devices gets smaller and more sophisticated, PWBs face increasing requirements to be compact, thin, and supple. The Apple watch does not have a main substrate similar to a motherboard, but rather something called S1 (SiP, System in Package), a highly integrated module substrate just 2.5sq cm. This is a coreless substrate with a bare chip semiconductor and passive components directly installed and sealed with resin. Further, to prevent parts from interfering with each other, it is covered with sputtered metal material.

In 2016 the value of domestic PWB production growth by product category was as follows: flexible and module PWBs fell by double digits YoY and multilayer PWBs fell by a single digit YoY, primarily in build-up board products. Meanwhile, rigid flexible, ceramic, and metal core PWBs grew by double digits YoY. From 2017 onward, the JPCA forecast build-up module and flexible PWBs to resume growing, and for multilayer wiring boards also to return to growth, driven by build-up PWBs with 10 layers or more. In the past, amid constant change in the computer and information device industry, the key driver shifted from general purpose computers to minicomputers, office computers, personal computers, and smartphones. The printed wiring board industry also faced continuous demand for new technology. The upstream solder resist industry felt the effects of these constant changes in the downstream and midstream sectors. Recently, an increasing number of downstream companies are directly qualifying materials of companies further upstream. The key to survival is increasingly keeping an eye on the direction of technological trends and always staying one step ahead.

## Domestic PWB production by category and forecasts

| (JPYbn)                          |                        | 2012                      | 2013  | 2014  | 2015  | 2016  | 2017F | 2018F | 2019F |
|----------------------------------|------------------------|---------------------------|-------|-------|-------|-------|-------|-------|-------|
| Printed wiring board (PWB)       | Single sided PWB       | 15.9                      | 15.4  | 14.3  | 14.6  | 14.0  | 13.9  | 14.0  | 13.8  |
|                                  | Double sided PWB       | 95.1                      | 86.2  | 90.5  | 84.5  | 78.4  | 79.2  | 78.4  | 78.5  |
|                                  | Four layers            | 88.6                      | 80.7  | 78.0  | 70.0  | 69.2  | 69.9  |       |       |
|                                  | Six layers             | 63.6                      | 56.4  | 53.0  | 47.7  | 46.3  | 48.0  |       |       |
|                                  | Eight layers           | 47.4                      | 35.6  | 32.6  | 32.8  | 28.0  | 29.6  |       |       |
|                                  | Ten layers or more     | 58.8                      | 52.0  | 42.3  | 43.3  | 39.9  | 43.1  |       |       |
|                                  | SUM                    | 258.3                     | 224.7 | 205.9 | 193.8 | 183.4 | 190.5 | 192.5 | 191.5 |
|                                  | Multilayer PWB         |                           |       |       |       |       |       |       |       |
|                                  |                        | Four                      | 6.3   | 6.48  | 4.83  | 4.57  | 4.99  | 5.18  |       |
|                                  |                        | Six                       | 21.9  | 20.83 | 18.18 | 17.73 | 16.21 | 16.31 |       |
|                                  |                        | Eight                     | 25.6  | 18.05 | 16.48 | 16.67 | 9.28  | 10.19 |       |
|                                  |                        | Ten or more               | 26.6  | 21.11 | 14.47 | 19.42 | 14.91 | 15.96 |       |
|                                  |                        | SUM                       | 80.4  | 66.5  | 54.0  | 58.4  | 45.4  | 47.6  |       |
|                                  |                        | Build-up, % of multilayer | 31.1% | 29.6% | 26.2% | 30.1% | 24.8% | 25.0% |       |
|                                  | Flexible printed board |                           |       |       |       |       |       |       |       |
|                                  |                        | Single sided              | 23.5  | 16.4  | 15.9  | 20.9  | 18.4  | 17.9  |       |
|                                  |                        | Double sided              | 55.0  | 42.9  | 39.7  | 43.4  | 37.1  | 40.6  |       |
|                                  |                        | Multilayer                | 27.1  | 21.8  | 19.3  | 26.0  | 24.4  | 22.7  |       |
|                                  |                        | Build-up boards           | 5.9   | 5.0   | 4.7   | 6.2   | 4.7   | 4.9   |       |
|                                  |                        | Build-up, % of flex       | 5.6%  | 6.2%  | 6.3%  | 6.8%  | 5.9%  | 6.1%  |       |
|                                  |                        | SUM                       | 105.6 | 81.1  | 74.9  | 90.3  | 79.9  | 81.3  | 83.5  |
|                                  | Flex rigid             | 14.3                      | 10.0  | 9.0   | 8.9   | 9.3   | 9.9   |       |       |
|                                  | Ceramics               | 15.8                      | 16.2  | 16.4  | 16.3  | 18.9  | 18.7  |       |       |
|                                  | Metal core             | 11.0                      | 11.0  | 10.6  | 10.4  | 12.0  | 12.1  |       |       |
|                                  | Others                 | 3.0                       | 2.4   | 2.8   | 3.0   | 2.5   | 2.2   |       |       |
|                                  | Total                  | 519.0                     | 447.0 | 424.4 | 421.8 | 398.3 | 407.8 | 410.6 | 410.6 |
| Module boards                    | Rigid                  | 206.3                     | 170.6 | 181.1 | 197.4 | 177.4 | 187.3 |       |       |
|                                  | Tape                   | 14.9                      | 6.9   | 6.0   | 6.0   | 6.7   | 6.7   |       |       |
|                                  | Ceramics               | 25.1                      | 21.3  | 22.8  | 23.8  | 24.5  | 24.8  |       |       |
|                                  | Build-up               | 158.0                     | 143.7 | 143.1 | 159.6 | 138.9 | 147.6 |       |       |
|                                  | Build-up, % of module  | 64.2%                     | 72.3% | 68.2% | 70.3% | 66.6% | 67.4% |       |       |
| Total                            |                        | 246.2                     | 198.8 | 209.8 | 227.1 | 208.6 | 218.8 | 217.1 | 214.8 |
| Total PWB and module boards      |                        | 765.2                     | 645.8 | 634.2 | 648.9 | 606.9 | 626.6 | 627.7 | 625.4 |
| Total build-up                   |                        | 244.3                     | 215.2 | 201.8 | 224.2 | 189.0 | 200.2 |       |       |
| % of total PWB and module boards |                        | 31.9%                     | 33.3% | 31.8% | 34.5% | 31.1% | 31.9% |       |       |

Source: Shared Research based on JPCA data

Note: Build-up figures are totals for build-up products in the PWB and module board categories

## Barriers to entry

As with the chemical and pharmaceutical industries, building barriers to entry in the solder resist industry with an intellectual property strategy via patents is fundamental. Taiyo has high market share in high-function liquid resist products for rigid PWBs and dry film for package substrates using its patents. Meanwhile, in interlayer insulating materials for build-up circuit boards, the company is blocked by other companies' (Ajinomoto Fine-Techno) patents. In this environment, with a web of patents a company can aim for cross licensing agreements with competitors.

A major barrier to entry is handling high-function materials in addition to general materials. Taiyo was previously involved in a fierce market share war with OTC in Taiwan. CEO Sato visited OTC's largest shareholder, Unimicron Technology Corp., and made a direct takeover proposal to the CEO of OTC. The offer was immediately rebuffed, but two years later OTC caved in and Taiyo succeeded in bringing its largest competitor under its umbrella. CEO Sato saw that Taiyo was highly profitable and had a high share in high-function products, which OTC did not have. Taiyo was not going to lose to low-priced general products. As such, the company's M&A strategy was a success.



## Competitive environment

In solder resist alone, Taiyo has a global market share of over 50%. However, solder resist is merely one variety of the company's insulating materials for PWBs. For insulating materials overall, the company's market share is around 20–40%. As new technologies emerge, instead of looking at solder resist as a single market, the definition of the market can be broadened to include interlayer insulating materials and other insulating materials for electronics. As such, there are no concerns from the viewpoint of antimonopoly law, and the company's acquisition of OTC did not violate Taiwan's antimonopoly legislation.

Following is a list of companies involved in solder resist. Huntsman International LLC is a major US chemical manufacturer. In May 2017, it agreed to buy Clariant in a share swap deal, giving rise to a giant chemical manufacturer. Huntsman has qualification from a wide range of overseas car manufacturers and is the supplier of solder resist for automotive printed wiring boards for Bosch. Ajinomoto Fine-Techno is a subsidiary of the major food manufacturer Ajinomoto. Until now Taiyo has effectively built up its market share as the leading independent player in the niche market of solder resist, but if considering insulating materials overall, the market is several times larger, leaving more room for major corporations to enter. The alliance with DIC is partly to give Taiyo more strength to handle competition with major corporations.

**Japanese manufacturers:** Asahi Chemical Research Laboratory Co., Ltd., Ajinomoto Fine-Techno, Ube Industries Ltd. (TSE1: 4280), Goo Chemical Co., Ltd. (TSE2: 4962), San-ei Kagaku Co., Ltd., Sanwa Chemical Industrial Co., Ltd., Tamura Corporation (TSE1: 6768), Toagosei Co., Ltd. (TSE1: 4045), Nikko-Materials Co., Ltd., Nippon Polytech Corp., Hitachi Chemical (TSE1: 4217), Fujifilm (wholly owned subsidiary of Fujifilm Holdings Corp. [TSE1: 4901]), Taiyo Ink Mfg. (wholly owned subsidiary of Taiyo Holdings)

**Non-Japanese manufacturers:** E. I. du Pont de Nemours and Company, Electra Polymers Ltd, Elga Europe S.R.L., MacDermid, Inc. (MacDermid Enthone Electronics Solutions), Eternal Chemical Co., Ltd., Huntsman International LLC (Huntsman Advanced Materials LLC), Jiang Su Kuangshun Photosensitivity New-material Stock Co., Ltd., Lackwerke Peters GmbH & Co. KG, LG Chem Ltd., Nan Ya Plastics Corporation, Rogers Corporation, Seoul Chemical Research Laboratory Co., Ltd., Sun Chemical Corporation (wholly owned subsidiary of DIC), Onstatic Technology (wholly owned subsidiary of Taiyo Holdings)

Source: Shared Research based on Japan Marketing Survey data



## Strengths and weaknesses

### Strengths

- Rapid growth and high margins as the leading upstream player in niche solder resist business:** Taiyo has fully leveraged the speed enabled by being independent, as well as its development and marketing prowess and strategic foresight. It has received supplier qualifications from large domestic manufacturers by anticipating final demand and expanding rapidly overseas. Taiyo has a global market share of over 50% for solder resist (fairly high share for high-function rigid products and about half for general products). It has an extremely high share of the market in materials for semiconductor packages. OPM has trended at around 20% since FY03/15. When a final-stage manufacturer or board manufacturer qualifies a product, prices and supply become relatively stable. Industry leaders such as Taiyo are well-placed to win customer loyalty, enabling them to maintain high market share and margins, as well as negotiate favorable prices in procuring raw materials through economies of scale.
- Speed of top-management decisions and a modern approach to financial management:** After his appointment in April 2011, CEO Sato made a series of bold moves: purchased Taiwanese competitor OTC, acquired Chugai Kasei, brokered an alliance with DIC, and established subsidiaries in new business areas. With a background in consulting and accounting, he emphasizes the financial perspective in management, which has unified the company, as well as HR development, which enables swift decision-making. In a rapidly changing market, delegating authority to subsidiaries is crucial for nimble decision-making. Still, to avoid a loss in group cohesiveness stemming from too much delegation, Taiyo is streamlining global communications by developing proactive employees and by recruiting non-Japanese to work at the head office (over 8% of HQ employees are non-Japanese). Retention rates at overseas subsidiaries are high (in the Suzhou China subsidiary, only a few out of 250 employees quit every year, and almost none quit in Taiwan). Shuichi Omi, who holds CPA qualifications in Japan and Vietnam, acts as a kind of CFO in his capacity as executive officer and general manager, administration division.
- Synergies from a proactive capital and business alliance:** The company's balance sheet was already strong, but the capital alliance with DIC generated about JPY24.8bn, which Taiyo is using to strengthen existing businesses and enter new businesses. If this alliance had taken place between two ink companies, it might have been seen as DIC, the larger company, swallowing Taiyo. But this deal is across different industries and is a mutually beneficial relationship, as Taiyo has experience in the electronic materials sector, an area that DIC wants to enter.

### Weaknesses

- Dependence on solder resist, a mature product that lies in the shadow of the end-products it is used in:** Solder resist, the company's main product, is subject to external factors including forex and market trends of smartphones and other end-products. The company has exited the FPD business, formerly its second core business, making it even more reliant on solder resist. Taiyo aims to escape this reliance and become a comprehensive chemical company by entering the energy, food production, and pharmaceuticals markets, but it is still at the starting point in these areas.
- Lack of personnel to stay ahead of technological innovation:** Market development and technological innovation is accelerating, amid a shift in the core products that use PWB materials and trends toward miniaturization and sophistication. Taiyo has established a solid position in solder resist used as a protective film, but lags in interlayer insulating materials. It also has yet to receive qualifications from overseas car manufacturers. The company is focusing on training proactive personnel, but unlike larger, more general companies, it does not have as many employees to stay ahead of the trends in technological innovation.
- Limited demonstrated ability to develop new businesses outside of its core strength:** An overly successful existing business makes the company a victim of its own success. Taiyo sets high hurdles when trying to develop new core businesses, meaning new businesses are lagging. The company's number of patent approvals has been declining from a peak of 99 in 2014, to 56 in 2015 and 55 in 2016. We assume this is because Taiyo was focusing on enhancing R&D through the acquisition of Chugai Kasei and the alliance with DIC. Still, relying on others can be a double-edged sword.

## Historical performance and financial statement

### Income statement

| Income statement (JPYmn)                             | FY03/08       | FY03/09       | FY03/10       | FY03/11       | FY03/12       | FY03/13       | FY03/14       | FY03/15       | FY03/16       | FY03/17       | FY03/18       |
|--|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
|  | Cons.         | Cons.         | Cons.         | Cons.         | Cons.         | Cons.         | Cons.         | Cons.         | Cons.         | Cons.         | Cons.         |
| <b>Sales</b>   | <b>45,338</b> | <b>32,614</b> | <b>35,056</b> | <b>40,366</b> | <b>39,797</b> | <b>36,184</b> | <b>44,224</b> | <b>48,260</b> | <b>49,843</b> | <b>47,866</b> | <b>52,241</b> |
| YoY  | 8.1%          | -28.1%        | 7.5%          | 15.1%         | -1.4%         | -9.1%         | 22.2%         | 9.1%          | 3.3%          | -4.0%         | 9.1%          |
| Cost of sales  | 29,512        | 22,635        | 24,123        | 28,428        | 29,822        | 25,319        | 28,348        | 28,865        | 27,355        | 26,220        | 27,304        |
| YoY  | 8.8%          | -23.3%        | 6.6%          | 17.8%         | 4.9%          | -15.1%        | 12.0%         | 1.8%          | -5.2%         | -4.1%         | 4.1%          |
| Cost ratio   | 65.1%         | 69.4%         | 68.8%         | 70.4%         | 74.9%         | 70.0%         | 64.1%         | 59.8%         | 54.9%         | 54.8%         | 52.3%         |
| <b>Gross profit</b>                                  | <b>15,826</b> | <b>9,979</b>  | <b>10,932</b> | <b>11,938</b> | <b>9,974</b>  | <b>10,864</b> | <b>15,875</b> | <b>19,394</b> | <b>22,487</b> | <b>21,645</b> | <b>24,937</b> |
| YoY  | 6.7%          | -36.9%        | 9.6%          | 9.2%          | -16.5%        | 8.9%          | 46.1%         | 22.2%         | 15.9%         | -3.7%         | 15.2%         |
| GPM  | 34.9%         | 30.6%         | 31.2%         | 29.6%         | 25.1%         | 30.0%         | 35.9%         | 40.2%         | 45.1%         | 45.2%         | 47.7%         |
| SG&A expenses  | 6,930         | 6,647         | 6,089         | 6,557         | 5,933         | 6,479         | 8,307         | 10,139        | 11,522        | 12,424        | 13,599        |
| YoY  | 0.9%          | -4.1%         | -8.4%         | 7.7%          | -9.5%         | 9.2%          | 28.2%         | 22.1%         | 13.6%         | 7.8%          | 9.5%          |
| SG&A ratio   | 15.3%         | 20.4%         | 17.4%         | 16.2%         | 14.9%         | 17.9%         | 18.8%         | 21.0%         | 23.1%         | 26.0%         | 26.0%         |
| <b>Operating profit</b>                              | <b>8,896</b>  | <b>3,332</b>  | <b>4,843</b>  | <b>5,380</b>  | <b>4,040</b>  | <b>4,385</b>  | <b>7,568</b>  | <b>9,254</b>  | <b>10,964</b> | <b>9,221</b>  | <b>11,337</b> |
| YoY  | 11.7%         | -62.5%        | 45.3%         | 11.1%         | -24.9%        | 8.5%          | 72.6%         | 22.3%         | 18.5%         | -15.9%        | 22.9%         |
| OPM  | 19.6%         | 10.2%         | 13.8%         | 13.3%         | 10.2%         | 12.1%         | 17.1%         | 19.2%         | 22.0%         | 19.3%         | 21.7%         |
| Non-operating income                                 | 381           | 343           | 234           | 139           | 132           | 382           | 299           | 376           | 265           | 234           | 214           |
| Interest income                                      | 224           | 186           | 63            | 55            | 50            | 88            | 103           | 113           | 103           | 57            | 78            |
| Dividends received                                   | 85            | 45            | 115           | 16            | 22            | 61            | 46            | 13            | 8             | 39            | 18            |
| Foreign exchange gains                               |               |               |               |               |               | 149           | 23            | 127           | 24            | 14            |               |
| Others   | 72            | 112           | 56            | 68            | 60            | 84            | 127           | 123           | 130           | 124           | 118           |
| Non-operating expenses                               | 690           | 129           | 289           | 203           | 145           | 24            | 40            | 101           | 100           | 253           | 352           |
| Interest expenses                                    | 6             | 8             | 1             | 3             | 2             | 1             | 32            | 30            | 69            | 86            | 127           |
| Commission fee                                       | 3             | 6             | 6             |               |               |               |               |               |               | 101           | 0             |
| Foreign exchange losses                              | 661           | 91            | 276           | 177           | 125           |               |               |               |               |               | 208           |
| Others   | 20            | 24            | 6             | 23            | 18            | 23            | 8             | 71            | 31            | 66            | 17            |
| <b>Recurring profit</b>                              | <b>8,586</b>  | <b>3,546</b>  | <b>4,787</b>  | <b>5,316</b>  | <b>4,027</b>  | <b>4,743</b>  | <b>7,827</b>  | <b>9,529</b>  | <b>11,129</b> | <b>9,202</b>  | <b>11,199</b> |
| YoY  | 3.9%          | -58.7%        | 35.0%         | 11.1%         | -24.2%        | 17.8%         | 65.0%         | 21.7%         | 16.8%         | -17.3%        | 21.7%         |
| RPM  | 18.9%         | 10.9%         | 13.7%         | 13.2%         | 10.1%         | 13.1%         | 17.7%         | 19.7%         | 22.3%         | 19.2%         | 21.4%         |
| Extraordinary gains                                  | 31            | 564           | 32            | 3             | 1             | 28            | 118           | 406           | 40            | 575           | 40            |
| Extraordinary losses                                 | 47            | 1,653         | 9             | 111           | 467           | 73            |               |               | 32            | 1,021         | 3,298         |
| <b>Pre-tax profit</b>                                | <b>8,571</b>  | <b>2,457</b>  | <b>4,811</b>  | <b>5,208</b>  | <b>3,561</b>  | <b>4,698</b>  | <b>7,593</b>  | <b>9,920</b>  | <b>11,137</b> | <b>8,756</b>  | <b>7,941</b>  |
| Income taxes   | 2,160         | 408           | 1,695         | 1,694         | 1,005         | 1,264         | 2,393         | 2,947         | 3,009         | 2,199         | 3,016         |
| Income taxes-current                                 | 2,038         | 1,400         | 1,257         | 1,897         | 1,002         | 1,430         | 1,908         | 2,670         | 2,855         | 2,588         | 3,040         |
| Income taxes-deferred                                | 121           | -992          | 438           | -202          | 3             | -166          | 485           | 277           | 153           | -388          | -24           |
| Implied tax rate                                     | 25.2%         | 16.6%         | 35.2%         | 32.5%         | 28.2%         | 26.9%         | 31.5%         | 29.7%         | 27.0%         | 25.1%         | 38.0%         |
| Net income   | 6,410         | 2,049         | 3,114         | 3,514         | 2,555         | 3,434         | 5,199         | 6,972         | 8,128         | 6,557         | 4,925         |
| Net income attributable to non-controlling interests | 239           | 91            | 104           | 111           | 52            | 67            | 269           | 305           | 331           | 158           | 69            |
| <b>Net income attributable to owners of parent</b>   | <b>6,171</b>  | <b>1,958</b>  | <b>3,010</b>  | <b>3,402</b>  | <b>2,502</b>  | <b>3,367</b>  | <b>4,930</b>  | <b>6,667</b>  | <b>7,796</b>  | <b>6,398</b>  | <b>4,856</b>  |
| YoY  | 11.1%         | -68.3%        | 53.7%         | 13.0%         | -26.5%        | 34.6%         | 46.4%         | 35.2%         | 16.9%         | -17.9%        | -24.1%        |
| Net margin   | 13.6%         | 6.0%          | 8.6%          | 8.4%          | 6.3%          | 9.3%          | 11.1%         | 13.8%         | 15.6%         | 13.4%         | 9.3%          |
| USD/JPY  | 114.1         | 100.6         | 93.0          | 85.8          | 79.3          | 83.2          | 100.0         | 110.0         | 120.1         | 109.0         | 111.0         |
| Per share data (JPY)                                 | 300           | 217           | 171           | 68            | 70            | 148           | 117           | 96            | 42            | -91           | -31           |
| Shares issued (year end; '000)                       | -309          | 214           | -55           | -64           | -13           | 358           | 259           | 275           | 165           | -19           | -138          |
| Treasury shares (year end: '000)                     | -16           | -1,089        | 23            | -108          | -466          | -45           | 118           | 406           | 8             | -446          | -3,258        |

Source: Shared Research based on company data

Note: Figures may differ from company materials due to differences in rounding methods.

Following the slump triggered by the global financial crisis in FY03/09, it took seven years until Taiyo again posted record profits in FY03/16. The company's OPM has been steady at around 20% in the three years from FY03/15 due to a shift in the product mix to high value-added products and cost reductions following the shift to overseas production. Over this timeframe R&D spending increased by roughly 3x, employee numbers by around 50% (note: includes effect of consolidating OTC), and costs to improve the workplace environment increased, driving up SG&A expenses. Sales and operating profit per employee were not diluted and OPM improved. This is a result of R&D and progress in changing employee mindsets.

In May 2013, the company purchased its Taiwanese competitor OTC (Onstatic Technology), and in June 2015 it acquired Chugai Kasei, and both were made consolidated subsidiaries. The company and OTC had engaged in fierce price competition, but Taiyo said that selling prices stabilized after the acquisition. It acquired Chugai Kasei to access its R&D capabilities of upstream materials, and to streamline its R&D structure. In January 2017 Taiyo entered a capital and business alliance with DIC, and plans to use the funds from the tie-up for capex, acquisitions, and R&D.

## Balance sheet

| Balance sheet<br>(JPYmn)                        | FY03/08       | FY03/09       | FY03/10       | FY03/11       | FY03/12       | FY03/13       | FY03/14       | FY03/15       | FY03/16       | FY03/17       | FY03/18        |
|---|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|
|   | Cons.         | Cons.         | Cons.         | Cons.         | Cons.         | Cons.         | Cons.         | Cons.         | Cons.         | Cons.         | Cons.          |
| <b>Assets</b>                                   |               |               |               |               |               |               |               |               |               |               |                |
| Cash and cash equivalents                       | 16,440        | 13,812        | 14,174        | 13,972        | 12,964        | 14,652        | 21,150        | 19,766        | 21,408        | 48,800        | 44,588         |
| Notes and accounts receivable                   | 9,532         | 6,644         | 9,173         | 8,792         | 8,452         | 8,199         | 11,891        | 13,111        | 12,836        | 13,346        | 15,509         |
| Merchandise and products                        | 4,262         | 1,356         | 1,944         | 1,860         | 2,154         | 1,816         | 2,227         | 2,348         | 2,013         | 2,182         | 3,499          |
| Work in process                                 | 0             | 187           | 255           | 185           | 199           | 195           | 319           | 291           | 410           | 437           | 405            |
| Raw materials and supplies                      | 0             | 1,403         | 1,646         | 2,075         | 1,894         | 1,674         | 1,841         | 1,886         | 1,593         | 1,797         | 2,042          |
| Deferred tax assets                             | 145           | 548           | 103           | 282           | 63            | 93            | 90            | 99            | 72            |               |                |
| Others  | 949           | 377           | 538           | 622           | 750           | 453           | 490           | 778           | 1,345         | 936           | 2,456          |
| Allowance for doubtful accounts                 | -256          | -450          | -321          | -177          | -98           | -105          | -272          | -341          | -339          | -99           | -127           |
| <b>Total current assets</b>                     | <b>31,057</b> | <b>23,880</b> | <b>27,516</b> | <b>27,675</b> | <b>26,380</b> | <b>26,979</b> | <b>37,798</b> | <b>37,942</b> | <b>39,340</b> | <b>67,401</b> | <b>68,373</b>  |
| <b>Total tangible fixed assets</b>              | <b>15,889</b> | <b>14,644</b> | <b>13,954</b> | <b>13,050</b> | <b>12,546</b> | <b>12,664</b> | <b>14,375</b> | <b>16,865</b> | <b>19,644</b> | <b>18,389</b> | <b>17,923</b>  |
| Goodwill  | 124           | 85            | 47            | 20            | 48            | 29            | 4,745         | 4,849         | 4,432         | 4,104         | 674            |
| Sales rights                                    |               |               |               |               |               |               |               |               |               |               | 20,555         |
| Others  | 318           | 383           | 342           | 284           | 310           | 318           | 399           | 478           | 486           | 433           | 589            |
| <b>Total intangible fixed assets</b>            | <b>442</b>    | <b>468</b>    | <b>389</b>    | <b>304</b>    | <b>358</b>    | <b>347</b>    | <b>5,144</b>  | <b>5,327</b>  | <b>4,919</b>  | <b>4,537</b>  | <b>21,818</b>  |
| Investment securities                           | 997           | 640           | 572           | 529           | 497           | 587           | 748           | 361           | 656           | 1,058         | 2,231          |
| Shares and investments in capital of affiliates | 125           | 990           | 990           | 980           | 628           | 3,200         | 19            | 39            | 39            | 19            | 19             |
| Deferred tax assets                             | 7             | 10            | 38            | 88            | 56            | 72            | 16            | 63            | 97            | 230           | 264            |
| Net defined retirement benefit asset            | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 339           | 356           | 332           | 326            |
| Others  | 537           | 271           | 413           | 580           | 607           | 578           | 267           | 302           | 413           | 570           | 677            |
| Allowance for doubtful accounts                 | -148          | -39           | -171          | -358          | -373          | -408          | -1            | -1            | -1            | -154          | -144           |
| <b>Investments and other assets</b>             | <b>1,520</b>  | <b>1,876</b>  | <b>1,843</b>  | <b>1,821</b>  | <b>1,417</b>  | <b>4,032</b>  | <b>1,050</b>  | <b>1,106</b>  | <b>1,561</b>  | <b>2,057</b>  | <b>3,374</b>   |
| <b>Total fixed assets</b>                       | <b>17,863</b> | <b>16,989</b> | <b>16,187</b> | <b>15,175</b> | <b>14,322</b> | <b>17,043</b> | <b>20,570</b> | <b>23,298</b> | <b>26,124</b> | <b>24,984</b> | <b>43,116</b>  |
| <b>Total assets</b>                             | <b>48,938</b> | <b>40,869</b> | <b>43,704</b> | <b>42,851</b> | <b>40,703</b> | <b>44,023</b> | <b>58,369</b> | <b>61,241</b> | <b>65,464</b> | <b>92,386</b> | <b>111,490</b> |
| <b>Liabilities</b>                              |               |               |               |               |               |               |               |               |               |               |                |
| Notes and accounts payable                      | 5,898         | 3,005         | 5,482         | 5,326         | 4,851         | 4,486         | 5,433         | 5,661         | 5,765         | 6,170         | 7,769          |
| Short-term debt                                 | 0             | 0             | 0             | 0             | 0             | 0             | 534           | 729           | 932           | 1,274         | 2,145          |
| Current portion of long-term debt               | 0             | 0             | 0             | 0             | 0             | 0             | 0             | 340           | 440           | 500           | 6,116          |
| Accounts payable-other and accrued expenses     | 848           | 1,726         | 705           | 1,193         | 896           | 921           | 1,633         | 2,345         | 1,697         | 1,210         | 1,853          |
| Income taxes payable                            | 748           | 249           | 400           | 608           | 190           | 508           | 562           | 1,139         | 776           | 884           | 1,448          |
| Deferred tax liabilities                        | 3             | 0             | 221           | 190           | 87            | 253           | 286           | 403           | 412           |               |                |
| Provision for bonuses                           | 388           | 269           | 311           | 261           | 268           | 353           | 413           | 387           | 398           | 436           | 510            |
| Others  | 70            | 51            | 51            | 100           | 97            | 198           | 71            | 48            | 476           | 877           | 648            |
| <b>Total current liabilities</b>                | <b>7,959</b>  | <b>5,303</b>  | <b>7,172</b>  | <b>7,681</b>  | <b>6,393</b>  | <b>6,724</b>  | <b>8,936</b>  | <b>11,056</b> | <b>10,898</b> | <b>11,355</b> | <b>20,491</b>  |
| Deferred tax liabilities                        | 1,304         | 703           | 547           | 597           | 429           | 173           | 701           | 1,069         | 1,258         | 1,387         | 1,458          |
| Long-term debt                                  | 0             | 0             | 0             | 0             | 0             | 0             | 5,658         | 7,685         | 7,413         | 7,169         | 15,923         |
| Net defined retirement liabilities              | 529           | 271           | 288           | 318           | 307           | 226           | 326           | 10            | 116           | 127           | 116            |
| Asset retirement obligations                    | 0             | 0             | 0             | 52            | 53            | 54            | 54            | 55            | 331           | 352           | 397            |
| Others  | 4             | 6             | 10            | 15            | 42            | 33            | 34            | 50            | 194           | 147           | 79             |
| <b>Total fixed liabilities</b>                  | <b>1,839</b>  | <b>981</b>    | <b>845</b>    | <b>983</b>    | <b>833</b>    | <b>488</b>    | <b>6,776</b>  | <b>8,872</b>  | <b>9,315</b>  | <b>9,184</b>  | <b>17,975</b>  |
| <b>Total liabilities</b>                        | <b>9,798</b>  | <b>6,285</b>  | <b>8,018</b>  | <b>8,664</b>  | <b>7,227</b>  | <b>7,213</b>  | <b>15,713</b> | <b>19,929</b> | <b>20,214</b> | <b>20,540</b> | <b>38,467</b>  |
| <b>Net assets</b>                               |               |               |               |               |               |               |               |               |               |               |                |
| Capital stock                                   | 6,134         | 6,134         | 6,134         | 6,134         | 6,134         | 6,134         | 6,134         | 6,134         | 6,188         | 9,171         | 9,232          |
| Capital surplus                                 | 7,102         | 7,102         | 7,102         | 7,102         | 7,102         | 7,102         | 7,102         | 7,143         | 7,304         | 14,824        | 14,717         |
| Retained earnings                               | 32,519        | 27,985        | 28,661        | 29,724        | 29,301        | 30,379        | 32,257        | 36,997        | 42,490        | 46,308        | 47,415         |
| Treasury stock                                  | -6,137        | -4,060        | -4,060        | -5,372        | -5,372        | -5,372        | -5,373        | -14,598       | -14,141       | -178          | -121           |
| <b>Total shareholders' equity</b>               | <b>39,618</b> | <b>27,985</b> | <b>37,838</b> | <b>37,589</b> | <b>37,166</b> | <b>38,243</b> | <b>40,120</b> | <b>35,676</b> | <b>41,841</b> | <b>70,125</b> | <b>71,244</b>  |
| Accumulated other comprehensive income          | -1,215        | -3,100        | -2,832        | -4,098        | -4,168        | -2,038        | 489           | 3,396         | 1,274         | 938           | 1,415          |
| Non-controlling interests                       | 737           | 522           | 679           | 696           | 478           | 604           | 2,045         | 2,238         | 2,135         | 782           | 363            |
| <b>Total net assets</b>                         | <b>39,140</b> | <b>34,584</b> | <b>35,685</b> | <b>34,186</b> | <b>33,476</b> | <b>36,809</b> | <b>42,655</b> | <b>41,312</b> | <b>45,250</b> | <b>71,846</b> | <b>73,023</b>  |
| <b>Total liabilities</b>                        | <b>48,938</b> | <b>40,869</b> | <b>43,704</b> | <b>42,851</b> | <b>40,703</b> | <b>44,023</b> | <b>58,369</b> | <b>61,241</b> | <b>65,464</b> | <b>92,386</b> | <b>111,490</b> |
| Capital expenditures                            | 1,414         | 1,238         | 445           | 527           | 682           | 605           | 2,555         | 3,321         | 4,055         | 1,722         | 22,513         |
| Depreciation                                    | 1,529         | 1,396         | 1,261         | 1,127         | 1,046         | 1,003         | 1,181         | 1,411         | 1,891         | 2,485         | 2,284          |
| Amortization of goodwill                        | 28            | 38            | 38            | 26            | 14            | 18            | 168           | 253           | 280           | 241           | 3,535          |
| R&D expenses                                    | 877           | 979           | 1,016         | 995           | 963           | 1,199         | 1,594         | 2,213         | 2,441         | 3,235         |                |
| Working capital                                 | 7,896         | 6,585         | 7,536         | 7,586         | 7,848         | 7,398         | 10,845        | 11,975        | 11,087        | 11,592        | 13,686         |
| Total interest-bearing debt                     | 0             | 0             | 0             | 0             | 0             | 0             | 6,192         | 8,754         | 8,785         | 8,943         | 24,184         |
| Net debt  | -16,440       | -13,812       | -14,174       | -13,972       | -12,964       | -14,652       | -14,958       | -11,012       | -12,623       | -39,857       | -20,404        |

Source: Shared Research based on company data

Note: Figures may differ from company materials due to differences in rounding methods.

## Assets

Tangible fixed assets declined in the wake of the global financial crisis, but started growing again from FY03/13. Management has been proactive, buying OTC, constructing the Kitakyushu Plant, and establishing Taiyo Green Energy. The company has continued to operate effectively debt-free, and is cash-rich following the financial tie-up with DIC.

## Liabilities

Taiyo has USD-denominated assets, and in these past few years of low interest rates it has accumulated USD-denominated liabilities as a forex hedge.

## Net assets

Net assets have been on an uptrend in line with the company's business performance recovery. At end-FY03/17, following DIC's capital participation, net assets increased by JPY26.6bn YoY to JPY71.8bn. Shareholders' equity ratio was 76.9% at end-FY03/17.

## Statement of cash flows

| Statement of cash flows (JPYmn)            | FY03/08      | FY03/09      | FY03/10      | FY03/11      | FY03/12      | FY03/13      | FY03/14      | FY03/15      | FY03/16      | FY03/17      | FY03/18        |
|--|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|----------------|
|  | Cons.        | Cons.        | Cons.        | Cons.        | Cons.        | Cons.        | Cons.        | Cons.        | Cons.        | Cons.        | Cons.          |
| Cash flows from operating activities (1)   | 9,241        | 4,581        | 3,126        | 4,575        | 2,793        | 6,109        | 7,020        | 9,232        | 10,546       | 9,042        | 8,100          |
| Cash flows from investing activities (2)   | -3,390       | -1,470       | -70          | 758          | -1,343       | -2,477       | -3,839       | -2,913       | -6,750       | -1,063       | -24,161        |
| <b>Free cash flow (1+2)</b>                | <b>5,851</b> | <b>3,111</b> | <b>3,056</b> | <b>5,333</b> | <b>1,450</b> | <b>3,632</b> | <b>3,181</b> | <b>6,319</b> | <b>3,796</b> | <b>7,979</b> | <b>-16,061</b> |
| Cash flows from financing activities       | -1,969       | -4,428       | -2,366       | -3,696       | -2,978       | -2,314       | 2,350        | -9,919       | -2,740       | 20,342       | 11,319         |
| Depreciation and goodwill amortization (A) | 1,557        | 1,434        | 1,299        | 1,153        | 1,060        | 1,021        | 1,349        | 1,664        | 2,171        | 2,726        | 5,819          |
| Capital expenditures (B)                   | 1,161        | 766          | 406          | 454          | 578          | 548          | 2,436        | 3,192        | 3,897        | 1,645        | 22,513         |
| Change in working capital (C)              | -2,209       | -1,311       | 951          | 50           | 262          | -450         | 3,447        | 1,130        | -888         | 505          | 2,094          |
| <b>Simple FCF (NI+A-B-C)</b>               | <b>8,776</b> | <b>3,937</b> | <b>2,952</b> | <b>4,051</b> | <b>2,722</b> | <b>4,290</b> | <b>396</b>   | <b>4,009</b> | <b>6,958</b> | <b>6,974</b> | <b>-13,932</b> |
| Working capital                            | 7,896        | 6,585        | 7,536        | 7,586        | 7,848        | 7,398        | 10,845       | 11,975       | 11,087       | 11,592       | 13,686         |

Source: Shared Research based on company data

Note: Figures may differ from company materials due to differences in rounding methods.

## Cash flows from operating activities

Cash flows from operating activities move more or less in line with pretax profit and depreciation, but as fluctuations in pretax profit accompany fluctuations in sales, some of the correlation is offset by changes in working capital.

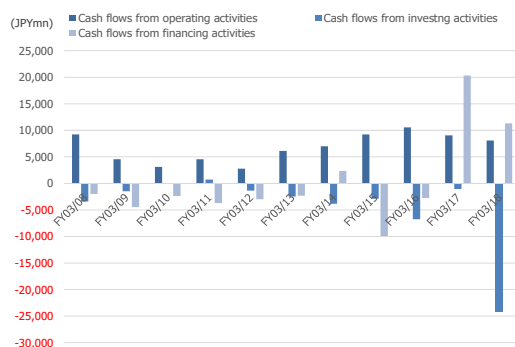
## Cash flows from investing activities

Taiyo has been investing actively in renewing existing facilities, building the Kitakyushu Plant, making acquisitions, and entering new businesses. Investments are expected to remain at high levels as the company uses M&A and other means to become a comprehensive chemical company.

## Cash flows from financing activities

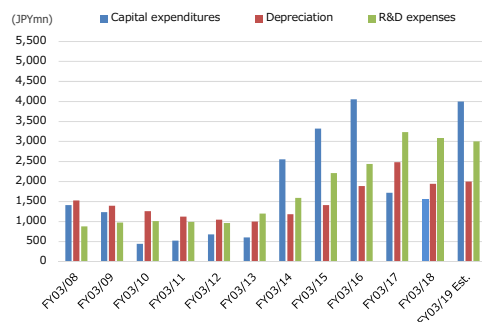
Cash inflows were JPY20.3bn in FY03/17 due to the disposal of treasury stock and share placement to DIC. As the company does not increase interest-bearing debt other than for USD-hedging purposes, net debt is negative (Taiyo has maintained a cash-rich position). As the company works to transform into a comprehensive chemical company, there will be increasing need to consider the balance between capital efficiency, investments, and returns to shareholders.

### Cash flows



Source: Shared Research based on company data

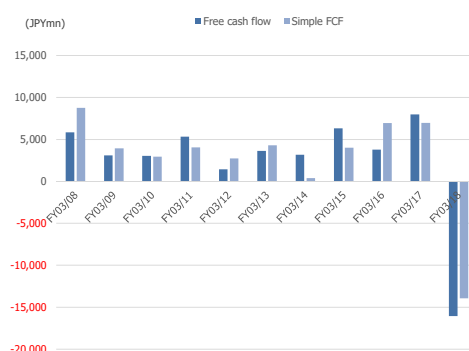
### Capital expenditures, depreciation, and R&D expenses



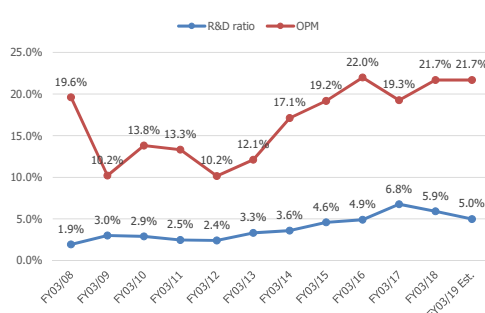
Source: Shared Research based on company data

Note: Does not include capex and amortization related to the marketing and manufacturing rights of 13 long-listed products (below left graph).

### FCF and simple FCF



### R&D ratio and OPM



## Historical performance

### FY03/18 full-year results

#### Markets

In the electronic components industry, the group's core market, demand for smartphones, virtual currency servers, and automotive electronics-related materials was solid.

#### Topics of interest

- The realized average exchange rate for the full year was JPY111/USD, in line with company's projection of JPY111/USD (announced February 2, 2018)
- Sales volume of general rigid board materials declined, but sales volume of dry film and flexible printed circuit (FPC) board materials rose YoY
- Completed transfer of the manufacturing and sales authorization, manufacturing and sales rights, and all related assets for 13 long-listed products to subsidiary Taiyo Pharma Co., Ltd. in January 2018
- Acquired systems engineering company Micro Network Technologies Corp., making it a consolidated subsidiary (announced April 6, 2018)

#### Overview of company earnings

In FY03/18, sales rose 9.1% YoY to JPY52.2bn and operating profit rose 22.9% to JPY11.3bn; the OPM rose to 21.7% versus 19.3% the previous year. The company made a one-time write-off of goodwill of JPY3.3bn, booking it as an extraordinary loss.

Q4 sales of JPY13.2bn were up 10.7% YoY and operating profit of JPY2.6bn was up 29.8%; the Q4 OPM of 20.0% compares with 17.0% in Q4 FY03/17.

#### Causes of YoY changes

Sales and operating profit grew YoY saw positive contributions from rising sales volume of dry film (+JPY1.1bn to sales, +JPY629mn to operating profit), foreign-exchange impact/changes in the product mix (+JPY2.9bn to sales, +JPY1.7bn to operating profit), and rising sales at the medical/pharmaceutical business (+JPY820mn to sales, +JPY9mn to operating profit, and +JPY353mn if the amortization of sales rights is included), which together easily offset the negative impact of a decline in sales volume of liquid solder resist for printed wiring boards (-JPY453mn to sales, -JPY223mn to operating profit).

#### Sales by product category

Sales of high-function rigid board materials were JPY21.4bn (+6.0% YoY), general rigid board materials were JPY12.9bn (-0.7%), package substrate materials were JPY11.0bn (+14.0%), flexible printed circuit (FPC) board materials were JPY1.2bn (+73.8%), build-up board materials were JPY1.5bn (+32.2%), and other products were JPY4.2bn (+32.7%). Sales of general rigid board materials fell due to an intensifying price competition with local companies in the Chinese market.

#### Segment (regional) performance

Sales to external customers by region: Japan, JPY10.2bn (+7.7% YoY, 19.5% of total); China, JPY21.1bn (+5.7%, 40.3%); Taiwan, JPY6.4bn (+5.7%, 12.3%); South Korea, JPY9.8bn (+15.5%, 18.7%); and Others, JPY4.8bn (+21.4%, 9.2%).

Sales by region including intragroup sales: Japan, JPY19.8bn (+10.5% YoY; 30.1% of total sales); China, JPY21.5bn (+4.5%; 32.8%); Taiwan, JPY9.1bn (-9.2%; 13.9%); South Korea, JPY10.3bn (+16.4%; 15.6%); and Others, JPY5.0bn (+22.2%; 7.6%).

Operating profit by region: Japan, JPY3.4bn (+68.2% YoY); China, JPY4.6bn (+0.4%); Taiwan, JPY1.8bn (+23.8%); South Korea, JPY1.7bn (+30.4%); and Others, JPY514mn (-3.7%).

OPM by region: Japan, 17.2%; China, 21.4%; Taiwan, 20.3%; South Korea, 16.2%; and Others, 10.3%.

Extraordinary losses: Booking JPY3.3bn on one-time amortization of goodwill (consolidated earnings)

Because of tax reforms in Taiwan, a tax deduction for distributing profit surplus which had built up after not distributing surplus in the previous year will no longer be valid as of end-December 2018. As such, the company decided to distribute the profit surplus. Onstatic Technology Co., Ltd. (OTC) had built up in March 2018. Due to the decrease in net assets from this and a calculation of the real value of OTC based on the most recent business plan, the company booked JPY4.2bn in valuation losses on shares of an affiliate in its non-consolidated earnings and JPY3.3bn in one-time amortization of goodwill in the consolidated earnings.

## Q3 FY03/18 results

### Markets

In the electronic components industry, the group's core market, demand for automotive components, smartphones, and servers increased.

### Topics of interest

- The yen, at JPY112/USD was weaker than the expected rate of JPY108/USD
- Sales volume of general rigid board materials declined, but sales volume of dry film and flexible printed circuit (FPC) board materials rose YoY
- Taiyo revised up consolidated full-year forecasts
- Taiyo Pharma announced the acquisition of 13 long-listed products

### Overview of company earnings

Aided by both rising sales volumes and a weaker yen, sales for cumulative Q3 rose 8.6% YoY to JPY39.0bn and operating profit rose 21.0% YoY to JPY8.7bn; the OPM rose to 22.3% versus 20.0% during the same period last year. In cumulative Q3 the forex rate fell by JPY4 to JPY112/USD from JPY108/USD during the same period last year.

For Q3 alone, sales of JPY13.2bn were up 6.1% YoY and operating profit of JPY3.0bn was up 12.3% YoY; the OPM rose to 22.3% versus 21.1% during the same period last year.

### Progress

Sales have reached 76.1%, operating profit has reached 80.5%, recurring profit has reached 80.9%, and net income attributable to owners of parent has reached 81.1% of the company's forecasts.

### Causes of YoY changes

Sales and operating profit grew YoY on increased sales volume of dry film (contributed +JPY554mn to sales and +JPY304mn to operating profit) and foreign-exchange impact and changes in the product mix (contributed +JPY2.7bn to sales and +JPY1.3bn to operating profit), despite the negative impact of a decline in sales volume of liquid solder resist for printed wiring boards (-JPY126mn to sales and -JPY65mn to operating profit).

### Sales by product category

Sales of high-function rigid board materials were JPY16.3bn (+7.6% YoY), general rigid board materials were JPY9.9bn (+0.8%), package substrate materials were JPY8.0bn (+12.0%), flexible printed circuit (FPC) board materials were JPY920mn (+75.2%), build-up board materials were JPY1.1bn (+36.0%), and other products were JPY2.7bn (+13.7%).

### Segment (regional) performance

Sales to external customers by region: Japan, JPY7.5bn (+5.7% YoY, 19.3% of total); China, JPY16.2bn (+9.8%, 41.6%); Taiwan, JPY5.0bn (+2.3%, 12.7%); South Korea, JPY7.3bn (+17.2%, 18.6%); and Others, JPY3.0bn (+2.5%, 7.8%).

Sales by region including intragroup sales: Japan, JPY14.5bn (+12.4% YoY, 30.2% of total); China, JPY16.6bn (+12.4%, 33.7%); Taiwan, JPY7.1bn (-8.1%, 14.3%); South Korea, JPY7.6bn (+18.2%, 15.5%); and Others, JPY3.1bn (+3.6%, 6.4%).



Operating profit by region: Japan, JPY2.7bn (+89.9% YoY); China, JPY3.6bn (+2.0%); Taiwan, JPY1.5bn (+10.1%); South Korea, JPY1.3bn (+34.3%); and Others, JPY226mn (-42.2%).

OPM by region: Japan, 18.4%; China, 21.7%; Taiwan, 20.9%; South Korea, 17.0%; and Others, 7.2%.

- In Japan and China, rigid printed wiring board (PWB) materials for automotive and other applications were solid, and semiconductor package substrate materials performed well, primarily for high-end smartphones
- In Taiwan, rigid printed wiring board materials for automotive components performed well
- In South Korea, package substrate materials performed well, primarily for high-performance smartphones and servers
- In Others, rigid printed wiring board materials performed in line with last year but profits fell below those of last year due to increased expenditure involved in the initiation of the pharmaceutical business

Source: the company's annual securities report

## Key points

- Sales of general rigid board materials declined due to loss of market share resulting from initiatives of competitors (local businesses in the Asia region). Taiyo Holdings' policy is to work on countermeasures that involve the introduction of new products at reduced cost, rather than lowering the price of existing products. The company recognizes the need to halt the erosion of its market share of general, as local businesses are more likely to advance into high-end products if they develop capability in general purpose products.
- Sales of dry film for package substrates are increasing steadily in terms of volume and value. That the company has a very high market share is a driver of growth, with the increasing usage of dry film for package substrate. Increased volume and smooth production at the company's Kitakyushu Plant were major factors contributing to increased profit. The large increases in profit in Japan and South Korea are largely attributable to dry film.
- "Others" include Taiyo America, Inc., Chugai Kasei Co., Ltd., Taiyo Green Energy Co., Ltd., and Taiyo Pharma Co., Ltd.
- In December 2017 Taiyo Green Energy Co., Ltd. began operating the Ranzan Onuma Floating Solar Power Plant. All of the electricity generated by the plant is used for the operation of Taiyo Ink Mfg.'s Saitama Plant, and corresponds to approximately 5% of the total electricity used by that plant. This approach follows the intent and policy of major clients to preferentially procure materials from businesses that actively implement environmental policies. The company is also bolstering various other ESG initiatives, such as donating solar power equipment regionally in response to emergency, operating a plant factory from which it sells locally, and taking local children into its office nursery.
- Taiyo Pharma Co., Ltd. recorded expenses (investigation, consultation, etc.) in relation to the execution of the transfer of the marketing and manufacturing rights of 13 long-listed products from Chugai Pharmaceutical. As manufacture and marketing approvals will be transferred sequentially between April 2018 and December 2018, the substantial recording of sales will be from FY03/19.
- The company is progressing concrete arrangements relating to one of the objectives of the capital and business alliance with DIC, namely outsourcing solder resist production to DIC's plants overseas to reduce production costs and improve operating rates at overseas plants. It seems that it is not only the production of solder resist that is to be outsourced to DIC's plants overseas, but also the production of pharmaceutical products.

## R&D expenses

R&D spending was JPY2.3bn (5.8% of sales, +5.6% YoY).

## 1H FY03/18 results

### Business environment

In the US, business conditions remained solid and a gentle economic recovery continued. The economy has stayed steady in Europe and kept up a mild recovery. However, the Chinese economy lacked vigor, with slowing growth in production, exports, investment, and consumption. In Japan, a mild recovery in personal consumption continued amid favorable employment and income conditions.

Real global GDP growth forecasts for 2017 and 2018 by the International Monetary Fund (IMF) released on October 10 call for +3.6% and +3.7% YoY growth, each up 0.1pp from the previous April and July forecasts. For the US, the IMF forecasts growth at +2.2% YoY in 2017 (up 0.1pp) and +2.3% in 2018 (up 0.2pp).

### Topics of interest

- Yen rate (JPY/USD) was in line with forecasts. 1H assumption: JPY111/USD
- Sales volumes increased YoY overall, driven by dry film
- Costs improved on enhanced negotiating clout in outsourcing due to increased operating rates at Kitakyushu Plant and bringing dry film production in-house
- Taiyo revised up consolidated full-year forecasts
- Taiyo established a subsidiary (Taiyo Pharma Co., Ltd.)

### Markets

Demand was solid for automotive components, smartphones, and servers in the electronic components industry, the main area in which the group operates.

### Overview of company earnings

In 1H FY03/18, Taiyo's sales were JPY25.8bn (+10.0% YoY) and operating profit JPY5.7bn (+26.0%) on increased sales volume and a weaker yen. The OPM improved from 19.4% in 1H FY03/17 to 22.3%. The forex rate fell by JPY5 YoY from JPY106/USD to JPY111/USD.

### Causes of YoY changes

Sales and operating profit grew YoY on increased sales volume of liquid solder resist for printed wiring boards (contributed +JPY179mn to sales growth and +JPY91mn to operating profit); increased sales volume of dry film for semiconductor packages (+JPY395mn to sales, +JPY215mn to operating profit); and foreign-exchange impact and changes in the product mix (+JPY1.8bn to sales, +JPY881mn to operating profit).

### Sales by product category

Sales of high-function rigid board materials were JPY10.9bn (+7.7% YoY), general rigid board materials were JPY6.6bn (+3.7%), package substrate materials were JPY5.1bn (+13.5%), build-up board materials were JPY750mn (+40.2%), flexible printed circuit (FPC) board materials were JPY562mn (+70.3%), and other products were JPY1.8bn (+17.2%).

### Uses of the company's products

Main applications for the company's high-function rigid board materials are automotive, smartphones (high-end), and tablets. General rigid board materials are used in general consumer electronics such as LCD TVs and low-priced smartphones that do not require supplier qualification. Package substrate materials are used in semiconductors. The market for general rigid board materials has stagnated and the company's response to new competitors from China appears to have been too late, leading to a dip in market share. Build-up board materials used to plug holes (liquid product) are performing well, but dry film used in interlayer insulating has yet to establish a track record. Flexible printed circuit (FPC) board materials still make up a small share of sales, but liquid material used in high-end smartphones has grown strongly. The company has received qualification for its dry film FPC board materials. Small-scale shipments have started and the company expects further increase in shipments to get underway in 2H. Other product sales include sales by subsidiaries Chugai Kasei Co., Ltd. and Taiyo Green Energy Co., Ltd.

## Segment (regional) performance

Sales to external customers by region: Japan JPY4.9bn (+4.2% YoY, 19.0% of total sales); China JPY10.8bn (+7.9% YoY, 42.0% of sales); Taiwan, JPY3.2bn (+12.1% YoY, 12.5% of sales); South Korea, JPY4.8bn (+23.2% YoY, 18.6% of sales); and Others, JPY2.0bn (+5.5% YoY, 7.9% of sales).

Sales by region including intragroup sales: Japan, JPY9.6bn (+11.3% YoY, 29.6% of sales); China, JPY11.1bn (+6.1% YoY, 34.2% of sales); Taiwan, JPY4.6bn (+10.9% YoY, 14.2% of sales); South Korea, JPY5.0bn (+23.6% YoY, 15.6% of sales); and Others, JPY2.1bn (+5.4% YoY, 6.5% of sales).

OPM by region: Japan, 17.0%; China, 22.2%; Taiwan, 21.0%; South Korea 16.8%; and Others, 10.2%.

- In Japan, rigid printed wiring board (PWB) materials for automotive and other applications were solid, and semiconductor package substrate materials performed well, primarily for high-end smartphones
- In China and Taiwan, rigid PWB materials for automotive components performed well
- In South Korea, automotive rigid PWB materials slumped on declining market share of South Korean automobiles in China. However, package substrate materials performed well, primarily for high-end smartphones.

Source: the company's annual securities report

## R&D expenses

R&D spending was JPY1.6bn (6.0% of sales, +22.0% YoY).

## Forecast revisions released with Q2 earnings announcement

Taiyo revised up its full-year FY03/18 forecasts (for the second time, following revisions with the Q1 earnings announcement). This reflected higher demand and a weaker yen versus initial forecasts. Taiyo revised its currency assumption for the full year from JPY106/USD to JPY108/USD. The company estimates the full-year impact of a JPY1/USD change in the forex rate at over JPY350mn on sales and over JPY150mn on operating profit.

The company increased its full-year sales forecasts by JPY1.8bn, from JPY48.2bn (+0.7% YoY) to JPY50.0bn (+4.5%). It raised full-year operating profit forecasts by JPY1.0bn, from JPY9.2bn (-0.2%) to JPY10.2bn (+10.6%). The company revised its currency assumption for 2H from JPY100/USD to JPY105/USD, sales from JPY23.2bn to JPY24.2bn, operating profit from JPY4.0bn to JPY4.5bn. The company has not revised 2H forecasts regarding volume.

Taiyo planned to use the funds (roughly JPY24.8bn) and improved R&D capability from the alliance with DIC (TSE1: 4631) to boost full-year capex to roughly JPY5bn and to maintain the R&D-to-sales ratio in line with the previous year at 6.6% (about JPY3.3bn), forecasting an OPM of 20.4%. The company expected depreciation expenses of roughly JPY2bn.

### Full-year company forecasts (as of Q2)

| Income statement<br>(JPYmn)                     | FY03/15 | FY03/16 | FY03/17 |        |        | FY03/18        |                |                |                |                |                |
|---|---------|---------|---------|--------|--------|----------------|----------------|----------------|----------------|----------------|----------------|
|   | FY      | FY      | 1H      | 2H     | FY     | 1H<br>Old Est. | 1H<br>New Est. | 2H<br>Old Est. | 2H<br>New Est. | FY<br>Old Est. | FY<br>New Est. |
| Sales   | 48,260  | 49,843  | 23,442  | 24,424 | 47,866 | 25,000         | 25,784         | 23,200         | 24,216         | 48,200         | 50,000         |
| YoY   | 9.1%    | 3.3%    | -7.7%   | -0.1%  | -4.0%  | 6.6%           | 10.0%          | -5.0%          | -0.9%          | 0.7%           | 4.5%           |
| Gross profit                                    | 19,394  | 22,487  | 10,282  | 11,363 | 21,645 |                | 12,233         |                |                |                |                |
| YoY   | 22.2%   | 15.9%   | -10.0%  | 2.7%   | -3.7%  |                | 19.0%          |                |                |                |                |
| GPM   | 40.2%   | 45.1%   | 43.9%   | 46.5%  | 45.2%  |                | 47.4%          |                |                |                |                |
| SG&A expenses                                   | 10,139  | 11,522  | 5,725   | 6,699  | 12,424 |                | 6,489          |                |                |                |                |
| YoY   | 22.1%   | 13.6%   | 2.0%    | 13.4%  | 7.8%   |                | 13.3%          |                |                |                |                |
| SG&A ratio                                      | 21.0%   | 23.1%   | 24.4%   | 27.4%  | 26.0%  |                | 25.2%          |                |                |                |                |
| Operating profit                                | 9,254   | 10,964  | 4,557   | 4,664  | 9,221  | 5,200          | 5,744          | 4,000          | 4,456          | 9,200          | 10,200         |
| YoY   | 22.3%   | 18.5%   | -21.5%  | -9.6%  | -15.9% | 14.1%          | 26.0%          | -14.2%         | -4.5%          | -0.2%          | 10.6%          |
| OPM   | 19.2%   | 22.0%   | 19.4%   | 19.1%  | 19.3%  | 20.8%          | 22.3%          | 17.2%          | 18.4%          | 19.1%          | 20.4%          |
| Non-operating income                            | 376     | 265     | 134     | 100    | 234    |                | 91             |                |                |                |                |
| Non-operating expenses                          | 101     | 100     | 89      | 164    | 253    |                | 144            |                |                |                |                |
| Recurring profit                                | 9,529   | 11,129  | 4,602   | 4,600  | 9,202  | 5,100          | 5,690          | 4,000          | 4,410          | 9,100          | 10,100         |
| YoY   | 21.7%   | 16.8%   | -21.9%  | -12.2% | -17.3% | 10.8%          | 23.6%          | -13.0%         | -4.1%          | -1.1%          | 9.8%           |
| RPM   | 19.7%   | 22.3%   | 19.6%   | 18.8%  | 19.2%  | 20.4%          | 22.1%          | 17.2%          | 18.2%          | 18.9%          | 20.2%          |
| Extraordinary gains                             | 406     | 40      |         | 575    | 575    |                |                |                |                |                |                |
| Extraordinary losses                            |         | 32      |         | 1,021  | 1,021  |                | 19             |                |                |                |                |
| Pre-tax profit                                  | 9,920   | 11,137  | 4,602   | 4,154  | 8,756  |                | 5,671          |                |                |                |                |
| Income taxes                                    | 2,947   | 3,009   | 897     | 1,302  | 2,199  |                | 1,628          |                |                |                |                |
| Income taxes—current                            | 2,670   | 2,855   | 1,466   | 1,122  | 2,588  |                | 1,583          |                |                |                |                |
| Income taxes—deferred                           | 277     | 153     | -569    | 181    | -388   |                | 44             |                |                |                |                |
| Implied tax rate                                | 29.7%   | 27.0%   | 19.5%   | 31.3%  | 25.1%  |                | 28.7%          |                |                |                |                |
| Net income                                      | 6,972   | 8,128   | 3,705   | 2,852  | 6,557  |                | 4,043          |                |                |                |                |
| Net income attrib. to non-controlling interests | 305     | 331     | 81      | 77     | 158    |                | 45             |                |                |                |                |
| Net income attrib. to owners of parent          | 6,667   | 7,796   | 3,623   | 2,775  | 6,398  | 3,600          | 3,998          | 2,800          | 3,002          | 6,400          | 7,000          |
| YoY   | 35.2%   | 16.9%   | -11.4%  | -25.2% | -17.9% | -0.6%          | 10.4%          | 0.9%           | 8.2%           | 0.0%           | 9.4%           |
| Net margin                                      | 13.8%   | 15.6%   | 15.5%   | 11.4%  | 13.4%  | 14.4%          | 15.5%          | 12.1%          | 12.4%          | 13.3%          | 14.0%          |
| JPY/USD   | 110.0   | 120.1   | 106.4   | 111.6  | 109.0  | 111.0          | 111.0          | 100.0          | 105.0          | 106.0          | 108.0          |

Source: Shared Research based on company data

Note: Figures may differ from company materials due to differences in rounding methods.

## Q1 FY03/18 results

### Business environment

In the US, corporate investment is slowing down, but a mild economic recovery continued amid a recovery in consumer spending due to an improved labor market. Europe was seeing a solid economic recovery against a backdrop of a mild recovery in consumer spending. Economic growth is slowing in China, although expansion continues. In Japan, personal consumption and the economy continued to recover gradually amid favorable employment and income conditions.

Forecasts for 2017 by the International Monetary Fund (IMF) released on July 24 call for global economic growth of +3.5% YoY, unchanged from the figures released in April, but with a wider difference among regions. Forecasts for the US were trimmed by 0.2pp from April to +2.1% YoY and those for the UK by 0.3pp to +1.7%. Meanwhile, forecasts for Japan were lifted by 0.1pp to +1.3% and those for the euro zone by 0.2pp to +1.9%. IMF forecasts maintained accelerating growth in China and in emerging and developing economies, with growth forecasts revised up by 0.1pp each to +6.7% and +4.6% respectively. (Note: on October 10, the IMF revised its 2017 and 2018 forecasts for global GDP growth, raising the forecasts by 0.1pp to 3.6% and 3.7% YoY growth, respectively.)

### Topics of interest

- Yen rate (JPY/USD) was weaker than assumed. Actual: JPY112/USD versus forecast of JPY100/USD (announced May 2, 2017)
- Sales volumes increased YoY overall, driven by dry film
- Taiyo revised up consolidated 1H and full-year forecasts
- Taiyo announced establishment of subsidiary (Taiyo Pharma Co., Ltd.)

### Markets

Demand was solid for automotive components and smartphones in the electronic components industry, the main area in which the group operates.

## Overview of company earnings

In Q1 FY03/18, Taiyo's sales were JPY12.4bn (+9.9% YoY) and operating profit JPY2.7bn (+26.9%) on increased sales volume amid global economic expansion and a weaker yen. The OPM improved from 18.9% in Q1 FY03/17 to 21.8%. The JPY/USD rate depreciated by JPY3 YoY from JPY109/USD to JPY112/USD.

## Causes of YoY changes

Sales and operating profit grew YoY on increased sales volume of liquid solder resist for printed wiring boards (contributed +JPY251mn to sales growth and +JPY128mn to operating profit); increased sales volume of dry film for semiconductor packages (+JPY260mn to sales, +JPY141mn to operating profit); and foreign-exchange impact and changes in the product mix (+JPY608mn to sales, +JPY306mn to operating profit).

## Sales by product category

Sales of high-function rigid board materials were JPY5.3bn (+10.1% YoY), general rigid board materials were JPY3.2bn (+1.6%), package substrate materials were JPY2.5bn (+18.1%), build-up board materials were JPY344mn (+25.1%), flexible printed circuit (FPC) board materials were JPY214mn (+32.9%), and other products were JPY869mn (+10.3%).

## Uses of the company's products

Main applications for the company's high-function rigid board materials are smartphones (high-end), tablets, and automotive (Japanese car manufacturers). General rigid board materials are used in consumer electronics such as LCD TVs. Package substrate materials are used in semiconductors. Build-up board materials are mainly used to plug holes, not for interlayer insulating at this point. FPC board materials still make up a small share of sales, but applications are expanding amid the trend toward miniaturization. Other product sales include sales by subsidiaries Chugai Kasei Co., Ltd. and Taiyo Green Energy Co., Ltd.

## Segment (regional) performance

Sales to external customers by region: Japan JPY2.5bn (+1.5% YoY, 19.7% of total); China JPY5.1bn (+6.4%, 40.8%); Taiwan, JPY1.6bn (+13.3%, 12.8%); South Korea, JPY2.3bn (+29.1%, 18.1%); and Others, JPY1.1bn (+8.6%, 8.5%).

Sales by region including intragroup sales: Japan, JPY4.7bn (+15.7% YoY, 30.0% of total); China, JPY5.2bn (+5.1%, 33.5%); Taiwan, JPY2.2bn (+11.4%, 14.3%); South Korea, JPY2.4bn (+29.0%, 15.2%); and Others, JPY1.1bn (+9.3%, 6.9%).

OPM by region: Japan, 17.2%; China, 22.0%; Taiwan, 21.8%; South Korea 15.5%; and Others, 11.6%.

- In Japan, rigid printed wiring board (PWB) materials for automotive and other applications were solid, and semiconductor package substrate materials performed well, primarily for high-end smartphones
- In China and Taiwan, rigid printed wiring board materials for automotive components performed well
- In South Korea, automotive rigid printed wiring board materials slumped on declining market share of South Korean automobiles in China. However, package substrate materials for semiconductors performed well, primarily those for high-end smartphones.

Source: the company's annual securities report

## R&D expenses

R&D spending was JPY741mn (6.0% of sales, +21.9% YoY).

## Forecast revisions released with Q1 earnings announcement

Taiyo revised up its 1H and full-year FY03/18 forecasts. This reflected higher demand and a weaker yen versus initial forecasts. Taiyo revised its 1H currency assumptions from JPY100/USD to JPY111/USD, and from JPY100/USD to JPY106/USD for the full year. The company estimates the full-year impact of a JPY1/USD change in the forex rate at over JPY350mn on sales and over JPY150mn on operating profit.

The company increased its 1H and full-year sales forecasts by JPY1.8bn, from JPY23.2bn (-1.0% YoY) to JPY25.0bn (+6.6%) for 1H and from JPY46.4bn (-3.1%) to JPY48.2bn (+0.7%) for the full year. It raised 1H and full-year operating profit forecasts by

JPY1.1bn, from JPY4.1bn (-10.0%) to JPY5.2bn (+14.1%) for 1H and from JPY8.1bn (-12.2%) to JPY9.2bn (-0.2%) for the full year. This means Taiyo left its 2H assumptions unchanged (with the assumption of JPY100/USD also unchanged).

Taiyo planned to use the funds (roughly JPY24.8bn) from the alliance with DIC (TSE1: 4631) to boost full-year capex to roughly JPY5bn. The company also aimed to maintain the R&D-to-sales ratio in line with the previous year at 6.8% (about JPY3.3bn) and forecast an OPM of 19.1%. The company expected depreciation expenses of roughly JPY2bn.

R&D expenses: Until the Kitakyushu Plant (completed in October 2015) begins full-scale operations, the plant's expenses will be included in R&D spending, meaning temporarily higher R&D expenses. Full-scale shipments are expected by the end of FY03/18, so from FY03/19, these expenses (roughly JPY800mn) will be shifted from R&D to cost of sales.

Source: Shared Research through company interviews

#### Full-year company forecasts (as of Q1)

| Income statement                                | FY03/15 | FY03/16 | FY03/17 |        |        | FY03/18 |         |             |             |             |             |             |             |                 |  |  |
|---|---------|---------|---------|--------|--------|---------|---------|-------------|-------------|-------------|-------------|-------------|-------------|-----------------|--|--|
| (JPYmm)   | FY      | FY      | 1H      | 2H     | FY     | Q1      | Q2 Est. | 1H Old Est. | 1H New Est. | 2H Old Est. | 2H New Est. | FY Old Est. | FY New Est. | Ref. (Old Est.) |  |  |
| Sales   | 48,260  | 49,843  | 23,442  | 24,424 | 47,866 | 12,425  | 12,575  | 23,200      | 25,000      | 23,200      | 23,200      | 46400       | 48200       | 49,700          |  |  |
| YoY   | 9.1%    | 3.3%    | -7.7%   | -0.1%  | -4.0%  | 9.9%    | 3.6%    | -1.0%       | 6.6%        | -5.0%       | -5.0%       | -3.1%       | 0.7%        | 3.8%            |  |  |
| Gross profit                                    | 19,394  | 22,487  | 10,282  | 11,363 | 21,645 | 5,880   |         |             |             |             |             |             |             |                 |  |  |
| YoY   | 22.2%   | 15.9%   | -10.0%  | 2.7%   | -3.7%  | 17.7%   |         |             |             |             |             |             |             |                 |  |  |
| GPM   | 40.2%   | 45.1%   | 43.9%   | 46.5%  | 45.2%  | 47.3%   |         |             |             |             |             |             |             |                 |  |  |
| SG&A expenses                                   | 10,139  | 11,522  | 5,725   | 6,699  | 12,424 | 3,166   |         |             |             |             |             |             |             |                 |  |  |
| YoY   | 22.1%   | 13.6%   | 2.0%    | 13.4%  | 7.8%   | 10.9%   |         |             |             |             |             |             |             |                 |  |  |
| SG&A ratio                                      | 21.0%   | 23.1%   | 24.4%   | 27.4%  | 26.0%  | 25.5%   |         |             |             |             |             |             |             |                 |  |  |
| Operating profit                                | 9,254   | 10,964  | 4,557   | 4,664  | 9,221  | 2,714   | 2,486   | 4,100       | 5,200       | 4,000       | 4,000       | 8100        | 9200        | 9,700           |  |  |
| YoY   | 22.3%   | 18.5%   | -21.5%  | -9.6%  | -15.9% | 26.9%   | 2.8%    | -10.0%      | 14.1%       | -14.2%      | -14.2%      | -12.2%      | -0.2%       | 5.2%            |  |  |
| OPM   | 19.2%   | 22.0%   | 19.4%   | 19.1%  | 19.3%  | 21.8%   | 19.8%   | 17.7%       | 20.8%       | 17.2%       | 17.2%       | 17.5%       | 19.1%       | 19.5%           |  |  |
| Non-operating income                            | 376     | 265     | 134     | 100    | 234    | 53      |         |             |             |             |             |             |             |                 |  |  |
| Non-operating expenses                          | 101     | 100     | 89      | 164    | 253    | 84      |         |             |             |             |             |             |             |                 |  |  |
| Recurring profit                                | 9,529   | 11,129  | 4,602   | 4,600  | 9,202  | 2,683   | 2,417   | 4,000       | 5,100       | 4,000       | 4,000       | 8000        | 9100        | 9,600           |  |  |
| YoY   | 21.7%   | 16.8%   | -21.9%  | -12.2% | -17.3% | 24.6%   | -1.3%   | -13.1%      | 10.8%       | -13.0%      | -13.0%      | -13.1%      | -1.1%       | 4.3%            |  |  |
| RPM   | 19.7%   | 22.3%   | 19.6%   | 18.8%  | 19.2%  | 21.6%   | 19.2%   | 17.2%       | 20.4%       | 17.2%       | 17.2%       | 17.2%       | 18.9%       | 19.3%           |  |  |
| Extraordinary gains                             | 406     | 40      |         | 575    | 575    |         |         |             |             |             |             |             |             |                 |  |  |
| Extraordinary losses                            |         | 32      |         | 1,021  | 1,021  | 19      |         |             |             |             |             |             |             |                 |  |  |
| Pre-tax profit                                  | 9,920   | 11,137  | 4,602   | 4,154  | 8,756  | 2,664   |         |             |             |             |             |             |             |                 |  |  |
| Income taxes                                    | 2,947   | 3,009   | 897     | 1,302  | 2,199  | 799     |         |             |             |             |             |             |             |                 |  |  |
| Income taxes-current                            | 2,670   | 2,855   | 1,466   | 1,122  | 2,588  | 1,025   |         |             |             |             |             |             |             |                 |  |  |
| Income taxes-deferred                           | 277     | 153     | -569    | 181    | -388   | -225    |         |             |             |             |             |             |             |                 |  |  |
| Implied tax rate                                | 29.7%   | 27.0%   | 19.5%   | 31.3%  | 25.1%  | 30.0%   |         |             |             |             |             |             |             |                 |  |  |
| Net income                                      | 6,972   | 8,128   | 3,705   | 2,852  | 6,557  | 1,865   |         |             |             |             |             |             |             |                 |  |  |
| Net income attrib. to non-controlling interests | 305     | 331     | 81      | 77     | 158    | 20      |         |             |             |             |             |             |             |                 |  |  |
| Net income attrib. to owners of parent          | 6,667   | 7,796   | 3,623   | 2,775  | 6,398  | 1,844   | 1,756   | 2,800       | 3,600       | 2,800       | 2,800       | 5600        | 6400        | 6,700           |  |  |
| YoY   | 35.2%   | 16.9%   | -11.4%  | -25.2% | -17.9% | -1.7%   | 0.5%    | -23%        | -1%         | 1%          | 1%          | -12%        | 0%          | 5%              |  |  |
| Net margin                                      | 13.8%   | 15.6%   | 15.5%   | 11.4%  | 13.4%  | 14.8%   | 14.0%   | 12.1%       | 14.4%       | 12.1%       | 12.1%       | 12.1%       | 13.3%       | 13.5%           |  |  |
| JPY/USD   | 110.0   | 120.1   | 106.4   | 109.0  | 112.0  | 112.0   |         | 100.0       | 111.0       | 100.0       | 100.0       | 100.0       | 106.0       | 109.0           |  |  |

Source: Shared Research based on company data

Note: Figures may differ from company materials due to differences in rounding methods.

## FY03/17 full-year results

### Business environment

In North America, a gentle economic recovery continued amid ongoing robust personal consumption and a rebound in corporate investment. In Europe, despite several terrorist incidents, personal consumption was solid, underpinning a mild economic recovery. Meanwhile in China, a decline in housing investment growth and strong pressure to reduce excess production capacity was cause for caution about the future, but solid personal incomes underpinned growth. In Japan, while improvements lagged in some areas, a moderate economic recovery continued.

### Topics

- The forex (JPY/USD) rate was in line with assumptions (as of the forecast revision on January 24, 2017) at JPY109/USD (JPY120.1/USD in FY03/16)
- Slight YoY increase in full-year sales volumes
- Cost increase following completion of Kitakyushu Plant in September 2015
- Impairment loss on appraised real estate value of JPY1.0bn as management functions consolidated and relocated, so headquarters land and buildings likely to be idle in the future
- Entered a capital and business alliance with DIC

### Markets

In the electronic components industry, smartphone demand lost its previous vigor, but there was solid demand for automotive components.

### Overview

FY03/17 sales were JPY47.9bn (-4.0% YoY) and operating profit JPY9.2bn (-15.9%) with the declines primarily due to yen appreciation. The OPM fell from 22.0% to 19.3%. The forex rate rose by JPY11 to JPY109.0/USD from JPY120.1/USD.

### Factors in YoY growth

Factors in YoY sales growth: increased volumes of liquid solder resist for PWBs (+JPY624mn) and increased volumes of dry film for semiconductor packages (+JPY814mn) pushed up sales by a total of +JPY1.4bn. Still, forex and the product mix pulled down sales by JPY3.4bn.

Factors in operating profit growth: increased volumes of liquid solder resist for printed wiring boards (+JPY300mn) and increased volumes of dry film for semiconductor packages (+JPY427mn) pushed up operating profit by a total of +JPY727mn. Forex and a less favorable product mix pulled down sales by JPY2.5bn.

### Sales by product category

Sales by product category: high-function rigid JPY20.2bn (flat YoY), general rigid JPY13.0bn (-13.4%), package substrate materials JPY9.7bn (+3.2%), build-up materials JPY1.1bn (+6.3%), FPC materials JPY672mn (+3.2%), and other JPY3.2bn (-10.2%).

### Use of the company's products

High-function rigid materials are used mainly in high-end smartphones, tablets, and automotive (Japanese car manufacturers). General rigid materials are used mainly in PCs and LCD TVs. Package substrate materials are used in semiconductor packages. Build-up materials are mainly used for plugging holes and have not yet penetrated the interlayer insulation market. The company's flexible PWB materials still have a small market share, but applications are increasing amid the trend toward miniaturization. Other sales include some FPD materials sales, which were disclosed separately through FY03/16, and sales from Chugai Kasei (since FY03/16) and Taiyo Green Energy (since FY03/15).



## Performance by region

### Sales to external customers

|               |                                       |
|---------------|---------------------------------------|
| ▷ Japan       | JPY9.4bn (-10.6% YoY, 19.7% of sales) |
| ▷ China       | JPY19.9bn (-3.7%, 41.6%)              |
| ▷ Taiwan      | JPY6.1bn (-11.7%, 12.7%)              |
| ▷ South Korea | JPY8.5bn (+14.5%, 17.7%)              |
| ▷ Other       | JPY4.0bn (-8.4%, 8.3%)                |

### Sales including intragroup sales

|               |                                       |
|---------------|---------------------------------------|
| ▷ Japan       | JPY17.9bn (+5.4% YoY, 29.1% of sales) |
| ▷ China       | JPY20.6bn (-5.5%, 33.5%)              |
| ▷ Taiwan      | JPY10.0bn (+1.9%, 16.3%)              |
| ▷ South Korea | JPY8.8bn (+14.0%, 14.3%)              |
| ▷ Other       | JPY4.1bn (-8.4%, 6.6%)                |

### OPM

|               |       |
|---------------|-------|
| ▷ Japan       | 11.3% |
| ▷ China       | 22.2% |
| ▷ Taiwan      | 14.8% |
| ▷ South Korea | 14.4% |
| ▷ Other       | 13.1% |

## Capital expenditures, depreciation, and R&D expenses

While capital spending for the Kitakyushu Plant has run its course, Taiyo plans to continue spending to strengthen existing businesses and develop new businesses. In FY03/17, capex was JPY1.7bn (-57.5% YoY), and depreciation was JPY2.5bn (+31.4%). R&D expenses were JPY3.2bn (+32.5%), at 6.8% of sales.

Note about R&D expenses: Until the company's Kitakyushu Plant (completed in October 2015) begins full-scale operations, its expenses are included in R&D spending, boosting them temporarily in FY03/17. Full-scale shipments are expected by the end of FY03/18, so from FY03/19, these expenses (roughly JPY800mn) will be shifted from R&D to cost of sales.

Source: Confirmed by Shared Research through company interviews

## Extraordinary loss

There was impairment loss on real estate appraisal value of JPY1.0bn as management functions consolidated and relocated, so headquarters land and buildings are likely to be idle in the future.

## Balance sheet

Due to the capital and business alliance with DIC, cash and deposits rose by JPY27.4bn YoY to JPY48.8bn, capital by JPY3.0bn to JPY9.2bn, and capital reserves by JPY7.5bn to JPY14.8bn. As a result, total assets rose by JPY26.9bn to JPY92.4bn.

## Other information

### News and topics

#### March 2018

On **March 23, 2018**, the company announced a revision to its dividend forecast and a plan to buy back shares.

##### Revision to dividend forecast

The company revised its FY03/18 year-end dividend forecast to JPY95.10 per share, adding JPY30.00 as commemorative dividend (commemorating the 65th anniversary since the company's founding) to the initial JPY65.10 forecast. The revision brings up the annual dividend for FY03/18 to JPY160.20 per share, which includes the interim dividend of JPY65.10 per share that has already been paid out.

##### Share repurchase

- ▷ Type of shares to be repurchased: common shares of Taiyo Holdings
- ▷ Number of shares to be repurchased: 375,000 shares (upper limit; 1.30% of total shares issued excluding treasury stock)
- ▷ Total repurchase amount: JPY1.5bn (upper limit)
- ▷ Repurchase period: April 2, 2018 to March 22, 2019

#### February 2018

On **February 2, 2018**, the company announced a revision to its full-year forecast, as detailed below:

- ▷ Sales: JPY51.3bn (versus JPY50.0bn previously)
- ▷ Operating profit: JPY10.8bn (JPY10.2bn)
- ▷ Recurring profit: JPY10.7bn (JPY10.1bn)
- ▷ Net income\*: JPY7.6bn (JPY7.0bn)
- ▷ EPS: JPY263.81 (JPY243.50)

\*Net income attributable to owners of parent

Explaining the revision, the company said demand is running ahead of its initial expectations and the yen is also weaker than expected.

The company said that the impact of the execution of the asset transfer (announced on January 5, 2018) under the agreement it had entered into with Chugai Pharmaceutical and F. Hoffmann-La Roche regarding the transfer of marketing and manufacturing rights of 13 long-listed products had not yet been determined and was therefore not reflected in the revisions to its full-year forecast.

#### November 2017

On **November 14, 2017**, the company announced that it entered into an agreement with Chugai Pharmaceutical Co., Ltd. (TSE1: 4519) and F. Hoffmann-La Roche, Ltd. regarding the transfer of marketing and manufacturing rights of 13 long-listed products. Chugai and Roche will transfer the marketing authorizations including marketing and manufacturing rights of 13 long-listed products manufactured and marketed in Japan by Chugai, to Taiyo Pharma Co., Ltd., a wholly owned subsidiary of Taiyo Holdings. The manufacturing and marketing rights will be transferred to Taiyo Pharma for JPY21.3bn plus the value of inventories.

## June 2017

On **June 22, 2017**, the company announced the establishment of a subsidiary, Taiyo Pharma, to develop, manufacture, and sell drugs and quasi-drugs.

On **June 21, 2017**, the company relocated headquarters. New headquarters location: 388 Ohkura, Ranzan-machi, Hiki-gun, Saitama.

On **June 7, 2017**, the company unveiled a new three-year management plan starting in FY03/18, entitled “Next Stage 2020.”

## February 2017

On **February 10, 2017**, the company announced the completion of procedures for payment regarding new share issue by a third-party allotment and disposal of treasury stock.

## January 2017

On **January 25, 2017**, the company announced upward revision to forecast for year-end dividend per share.

On **the same day**, the company announced business and capital alliance with DIC, new share issue by third party allotment, and disposal of treasury stock.

## History

|      |           |   |
|------|-----------|---|
| 1953 | September | Taiyo Ink Mfg. Co., Ltd. established  |
| 1970 | August    | Starts sales of printed wiring board (PWB) materials  |
| 1973 | May       | Develops and sells epoxy resin thermal curable one-component solder resist  |
| 1976 |           | Major change in strategy to position solder resist as the core business driver  |
| 1982 | March     | Establishes Ranzan Plant (current Ranzan Facility)  |
| 1984 | June      | Announced liquid photoimageable SR at a JPCA tradeshow  |
| 1988 | September | Establishes Taiyo Ink Mfg. Co., (Korea) Ltd., a joint-venture in South Korea  |
|      |           | Starts overseas production  |
| 1990 | March     | Constructs Technology Development Center at the Ranzan Facility   |
|      | September | Listed as an over-the-counter (OTC) stock   |
|      | December  | Establishes a sales subsidiary Taiyo America, Inc. in Nevada, US  |
| 1992 | February  | Starts research and development of PDP materials  |
|      | March     | Relocates the head office to a new building in Nerima, Tokyo  |
|      | January   | Develops and sells solder resist for package substrates (in particular, SR for BGA)   |
|      | November  | Basic patent for alkaline photoimageable solder resist registered in Japan  |
| 1994 | December  | Obtains ISO 9001 certification for the head office and the Ranzan Facility  |
| 1995 | February  | Makes Taiyo America, Inc. a manufacturing and sales subsidiary, and starts production   |
| 1996 | September | Establishes a production subsidiary Taiwan Taiyo Ink Co., Ltd.  |
| 1999 | January   | Establishes sales subsidiaries Taiyo Ink International (Singapore) Pte. Ltd. and Taiyo Ink International (HK) Ltd.                |
| 2000 | January   | Obtains certification of QS 9000 for the head office and Ranzan Facility, and ISO 14001 for Ranzan Facility                       |
| 2001 | January   | Listed on the First Section of Tokyo Stock Exchange   |
|      | April     | Opens Ranzan-Kitayama Facility as the main domestic production base   |
|      | July      | Establishes a technology support subsidiary Taiyo Ink (Thailand) Co., Ltd.  |
|      | December  | Establishes a production subsidiary Taiyo Ink (Suzhou) Co., Ltd. in China   |
| 2003 | January   | Obtains ISO 14001 certification for the head office and Ranzan Facility   |
|      | September | Observes the 50th anniversary   |
| 2005 |           | Expand sales of PDP materials   |
| 2010 | September | Establishes sales subsidiary Taiyo Ink Trading (Shenzhen) Co., Ltd.   |
|      | October   | Implements a company split and changes the trading name to Taiyo Holdings Co., Ltd.   |
| 2013 | May       | Acquires shares of Onstatic Technology Co., Ltd. in Taiwan and makes it a subsidiary  |
| 2014 | December  | Establishes solar power generation subsidiary Taiyo Green Energy Co., Ltd.  |
| 2015 | April     | Establishes a Taiyo Ink Products Co., Ltd., a sales subsidiary of Taiyo Ink Mfg. Co., Ltd.  |
|      | June      | Obtains shares of Chugai Kasei Co., Ltd. through a stock swap and makes it a subsidiary   |
|      | October   | Opens Kitakyushu Facility in Kitakyushu, Fukuoka, as the second production base for Taiyo Ink Mfg. Co., Ltd.                      |
| 2017 | January   | Enters a capital and business alliance with DIC Corporation   |
|      | August    | Establishes pharmaceuticals development and sales subsidiary Taiyo Pharma Co., Ltd.   |
|      | November  | Enters an agreement for the transfer of manufacturing and marketing rights of 13 long-listed products from Chugai to Taiyo Pharma |

Source: Shared Research based on company data

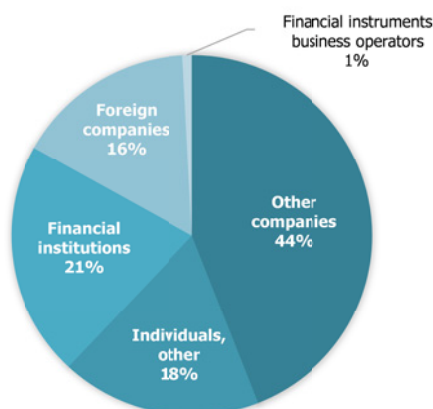
## Major shareholders

| Major shareholders   | Shares held ('000) | Shareholding ratio |
|--|--------------------|--------------------|
| DIC Corporation  | 5,617              | 19.46%             |
| KOWA Co., Ltd.   | 5,136              | 17.79%             |
| Japan Trustee Services Bank, Ltd. (Trust account)  | 1,475              | 5.11%              |
| Japan Trustee Services Bank, Ltd. (Sumitomo Mitsui Trust Bank Retirement Benefit Trust Account re-entrusted by Sumitomo Mitsui Trust Bank) | 1,116              | 3.86%              |
| Misaki Engagement Master Fund  | 960                | 3.32%              |
| The Master Trust Bank of Japan, Ltd. (Trust account)   | 919                | 3.18%              |
| Shikoku Chemicals Corporation  | 745                | 2.58%              |
| Toshin Yushi Co., Ltd.   | 538                | 1.86%              |
| Mitsuo Kawahara  | 500                | 1.73%              |
| Takato Kawahara  | 487                | 1.68%              |
| <b>Total</b>   | <b>17,496</b>      | <b>60.61%</b>      |
| Treasury shares  | 40                 | 0.14%              |
| <b>Total shares issued</b>   | <b>28,865</b>      | <b>100.00%</b>     |

Source: Shared Research based on company data as of September 30, 2017

Note: Figures may differ from company materials due to differences in rounding methods.

### Shareholders by investor type



Source: Shared Research based on company data as of September 30, 2017

## Dividend policy

| Dividends (JPY) | FY03/08 | FY03/09 | FY03/10 | FY03/11 | FY03/12 | FY03/13 | FY03/14 | FY03/15 | FY03/16 | FY03/17 | FY03/18 |
|-----------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|                 | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   | Cons.   |
| DPS             | 115.0   | 90.0    | 90.0    | 115.0   | 90.0    | 90.0    | 120.0   | 90.0    | 110.0   | 120.1   | 160.2   |
| Payout ratio    | 49.3%   | 121.2%  | 77.5%   | 87.3%   | 91.5%   | 68.0%   | 61.9%   | 34.1%   | 32.5%   | 45.1%   | 95.0%   |
| DOE             | 8.1%    | 6.5%    | 6.8%    | 8.6%    | 6.9%    | 6.6%    | 7.9%    | 5.5%    | 6.2%    | 5.5%    | 6.4%    |

Source: Shared Research based on company data

Note: Figures may differ from company materials due to differences in rounding methods.

The company's medium-term management plan targets a DOE of at least 5%. This is because Taiyo aims to pay a stable dividend not subject to fluctuations in earnings. Taiyo does not have a particular payout ratio policy, but rather focuses on the DOE.

## Top management

### President and Representative Director, CEO, Eiji Sato

Born May 3, 1969

|              |   |
|--------------|---|
| April 1992   | Joins Tohmatsu (a DRT International company, now Deloitte Touche Tohmatsu LLC)                                      |
| July 1995    | Opens Eiji Sato Certified Public Accountant Office  |
| October 1999 | Establishes es Networks Co., Ltd., and becomes President and Representative Director                                |
| May 2001     | Becomes the auditor for Taiwan Taiyo Ink Co., Ltd.  |
| June 2008    | Director, Taiyo Holdings Co., Ltd.  |
| October 2009 | Executive Officer and Group CFO of Taiyo Holdings Co., Ltd.   |
| April 2010   | Vice President and Representative Director, Taiyo Holdings Co., Ltd.  |
| March 2011   | Director, es Holdings Co., Ltd. (now es Networks Co., Ltd.; current position)                                       |
| April 2011   | President and Representative Director, Taiyo Holdings Co., Ltd. (present position) and Group CEO (current position) |
| April 2014   | President and Representative Director, Taiyo Ink Co., Ltd. (current position)                                       |

Co-author of "Corporate Management by CFO" (with Shintaro Suhara), 2010 (published in Japanese)

Source: Shared Research based on company data

CEO Sato argues (in a book he co-authored called *Corporate Management by CFO*) that a CFO's financial perspective is crucial to cope with complexities dealing with all stakeholders. He states that companies should be managed by a unified CEO, COO, and CFO. The roles are clearly delineated as the CEO looks at finances from a business perspective, whereas the CFO looks at the business from a financial perspective. Sato also states that unlike a traditional finance manager or accounting manager, a CFO must maintain a longer-term outlook of the company's finances while also looking at the business.

Shuichi Omi, who holds CPA qualifications in Japan and Vietnam, acts as a kind of CFO in his capacity as executive officer and general manager, administration division.

## Employees

| Per employee data                                    | FY03/08 | FY03/09 | FY03/10 | FY03/11 | FY03/12 | FY03/13 | FY03/14 | FY03/15 | FY03/16 | FY03/17 | FY03/18 |
|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Number of employees                                  | 775     | 793     | 807     | 840     | 861     | 858     | 1,148   | 1,122   | 1,202   | 1,249   | 1,268   |
| Avg. temporary employees (not included in the above) | 123     | 61      | -       | -       | -       | -       | -       | -       | -       | -       | -       |
| Electronics Materials                                |         |         |         |         |         |         |         |         |         |         | 1,106   |
| Medical and Pharmaceuticals                          |         |         |         |         |         |         |         |         |         |         | 20      |
| Other  |         |         |         |         |         |         |         |         |         |         | 61      |
| Corporate  |         |         |         |         |         |         |         |         |         |         | 81      |
| Japan  |         |         |         | 222     | 219     | 207     | 238     | 232     | 302     | 326     |         |
| China  |         |         |         | 274     | 290     | 298     | 464     | 437     | 422     | 418     |         |
| Taiwan   |         |         |         | 108     | 107     | 111     | 224     | 223     | 234     | 249     |         |
| Korea  |         |         |         | 102     | 108     | 111     | 114     | 108     | 118     | 124     |         |
| Other  |         |         |         | 41      | 40      | 39      | 41      | 42      | 46      | 47      |         |
| Corporate  |         |         |         | 93      | 97      | 92      | 67      | 80      | 80      | 85      |         |
| Sales per employee (JPYmn)                           | 50.5    | 38.2    | 43.4    | 48.1    | 46.2    | 42.2    | 38.5    | 43.0    | 41.5    | 38.3    | 41.2    |
| Operating profit per employee (JPYmn)                | 9.9     | 3.9     | 6.0     | 6.4     | 4.7     | 5.1     | 6.6     | 8.2     | 9.1     | 7.4     | 8.9     |

Source: Shared Research based on company materials.

Note: Employees noted as company-wide (shared) are those who work for the holding company (the company).

Onstatic Technology (OTC) was consolidated in FY03/14.

Employee numbers have been growing consistently since FY03/08, even in the wake of the global financial crisis. The company boosted its workforce chiefly in Asia accompanying the shift to overseas production and increase in overseas sales offices. Taiyo said it hires personnel of various nationalities at the head office in Japan, and there were 85 non-Japanese employees at headquarters as of March 31, 2017, accounting for over 8% of head office employees.

## Corporate philosophy and CSR initiatives

### Speed and communication

CEO Sato prioritizes speed and communication. The market changes extremely quickly so swift decision-making is key, only made possible by delegating authority to subsidiaries. On the other hand, too much delegation puts group cohesiveness at risk. To prevent this, Taiyo emphasizes global communication, and was developing employees who can thrive in a global setting and recruiting non-japanese employees to work at the head office (85 non-japanese employees or over 8% as of March 31, 2017).

### Developing proactive human resources

CEO Sato says the company is working to develop proactive employees. The company's history has embodied the principle that building things requires developing people, and Taiyo sees employees as its true growth driver. At the company's Suzhou China subsidiary, only a few of its 250 employees leave every year, and there is almost zero turnover at the Taiwan subsidiary. This high retention rate is a reflection of the company's human resources management.

### Corporate social responsibility and quality control

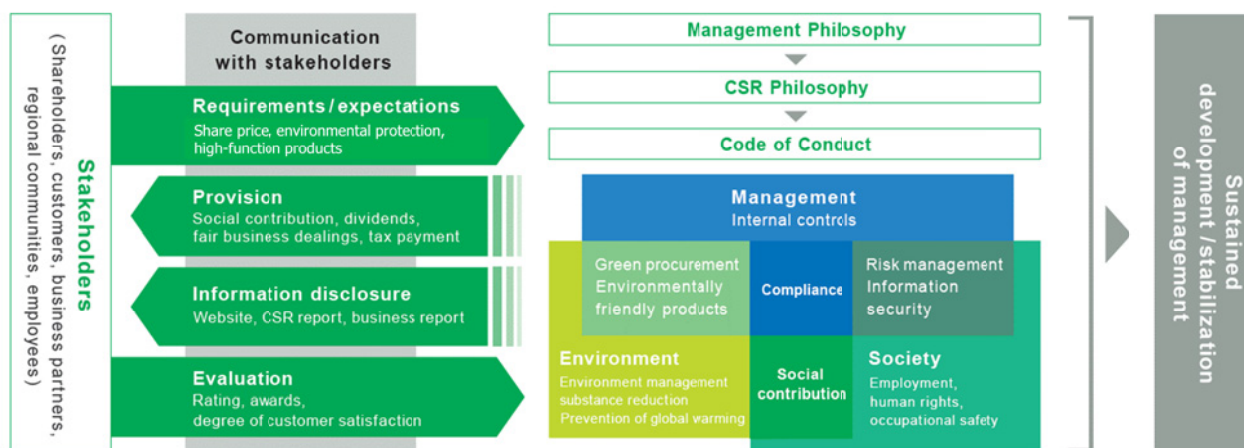
Because Taiyo is in the chemical industry, it pays special attention to protecting the environment for residents near its factories. The company is working to achieve a balance between the wealth generated by chemical substances and the impact on the global environment and human health by creating products that are high-function and do not put a heavy burden on the environment. Taiyo employs management systems based on ISO 9001:2008 and conducts quality assurance, quality control, and quality improvement activities.

**Corporate philosophy:** "Realize a pleasant society by further advancing every technology the Group has and creating a wide range of products to help fulfill the dreams for the whole world with our innovative products."

**CSR philosophy:** "We will discharge our corporate social responsibility with regard to the achievement of our management philosophy, including complying with the law, protecting the environment, ensuring thorough quality management, and contributing to society."

Source: Company materials

#### Corporate philosophy, CSR philosophy, and Code of Conduct



Source: Company materials. Refer to the company's annual report for further details on CSR initiatives: [http://www.taiyo-hd.co.jp/en/environment\\_csr/csr/](http://www.taiyo-hd.co.jp/en/environment_csr/csr/)



## Glossary

### Solder resist

Solder resist is a resist ink that covers the surface of printed wiring boards (PWBs) and protects the circuit patterns. A key role of solder resist is to prevent solder from adhering to areas where it is not needed when components are mounted on the substrate. At the same time, solder resist also acts as a permanent protective coating, protecting the circuit pattern from dust, heat, and moisture as well as insulating the circuitry. (Source: Company materials)

### FPD (Flat Panel Display)

A generic term for liquid crystal displays (LCDs) and other thin displays. (Source: Company materials)

### Rigid board

A printed wiring board (PWB) made with a rigid insulated substrate. A motherboard is a rigid board, primarily installed inside electronic devices, which is mounted with LSIs, resistors, capacitors, and other components. Marking ink, meanwhile, is printed onto a PWB to indicate the names and predetermined positions of the electronic components to be mounted. (Source: Company materials)

### Package substrate

A type of printed wiring board used as an interposer when mounting dies (blocks of semiconducting materials on which a circuit is fabricated) such as computer CPUs, smartphone APs (application processors), or memory. (Source: Company materials)

### Flexible printed circuit (FPC) board

A soft, flexible board made from polyester or polyimide film coated with copper foil. (Source: Company materials)

### Build-up

Build-up refers to a method of manufacturing heavily layered PWBs by alternately laminating insulated and conductive layers on a core board (or base board). The ink used to fill conductive holes in a core board is called hole-plugging ink. The laminated insulation is called interlayer insulation. (Source: Company materials)

### FOWLP (Fan Out Wafer Level Package)

A type of semiconductor component package that helps minimize the area required when mounting a highly integrated chip on a PWB. The predecessor of FOWLP was wafer level chip scale package (WLCSP), which had the same area for both the package area and the semiconductor die. In FOWLP, the package area is larger than the area for the semiconductor die. The terminals can be “fanned out” to the edges of the chip, enabling applications that require a larger number of terminals relative to the die area. In contrast to WLCSP, there is no package substrate in FOWLP, and instead, a redistribution layer is made in semiconductor manufacturing processes to connect chip terminals with external terminals. FOWLP is thinner, as package substrate is not needed, and the wiring is short so inductance and capacitance are low, leading to high-speed signal transmission. Manufacturing costs should be lower due to lack of package substrate.

### Printed wiring board processes

- **Subtractive process:** Starts with copper clad laminate, and then removes the unneeded copper foil by dissolving it with a chemical, leaving the desired pattern. Dissolving the copper foil with chemicals is also known as etching, and is the mainstream printed circuit board manufacturing process.
- **Additive process:** Starts with a laminate with no copper foil on it, then precipitating and fixing the conductive material to form the desired conductive pattern.

\*Other than these, there are conductive paste printing and semi-additive processes. (Source: Based on OK Print materials)

## Profile

| Company Name  | Head Office   |
|---|---|
| Taiyo Holdings Co., Ltd.  | 2-7-1 Hazawa, Nerima-ku, Tokyo 176-8508, Japan  |
| Phone   | Listed On   |
| +81-3-5999-1511   | Tokyo Stock Exchange First Section  |
| Established   | Exchange Listing  |
| September 29, 1953  | January 18, 2001  |
| Website   | Fiscal Year-End   |
| <a href="https://www.taiyo-hd.co.jp/en/">https://www.taiyo-hd.co.jp/en/</a>     | March   |
| IR Contact  | IR Web  |
| Planning Section, Accounting and Finance Department,<br>Administrative Division | <a href="https://www.taiyo-hd.co.jp/en/investor/">https://www.taiyo-hd.co.jp/en/investor/</a> |

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|--------------------------------------|--------------------------------------|---------------------------------------|
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| Adastria Co., Ltd.                   | FRONTEO, Inc.                        | ONO SOKKI Co., Ltd.                   |
| ADJUVANT COSME JAPAN CO., LTD.       | Fujita Kanko Inc.                    | ONWARD HOLDINGS CO.,LTD.              |
| Aeon Delight Co., Ltd.               | FURYU CORPORATION                    | PARIS MIKI HOLDINGS Inc.              |
| Aeon Fantasy Co., Ltd.               | Gamecard-Joyco Holdings, Inc.        | PIGEON CORPORATION                    |
| Ai Holdings Corporation              | GCA Corporation                      | RACCOON CO., LTD.                     |
| AnGes Inc.                           | Grandy House Corporation             | RESORTTRUST, INC.                     |
| Anicom Holdings, Inc.                | Hakuto Co., Ltd.                     | ROUND ONE Corporation                 |
| Anritsu Corporation                  | Happinet Corporation                 | RVH Inc.                              |
| Apaman Co., Ltd.                     | Harmonic Drive Systems Inc.          | RYOHIN KEIKAKU CO., LTD.              |
| Arealink Co.,Ltd.                    | HOUSEDO Co., Ltd.                    | SanBio Company Limited                |
| Artspark Holdings Inc.               | IDOM Inc.                            | SANIX INCORPORATED                    |
| AS ONE CORPORATION                   | IGNIS LTD.                           | Sanrio Company, Ltd.                  |
| Ateam Inc.                           | Inabata & Co., Ltd.                  | SATO HOLDINGS CORPORATION             |
| Aucfan Co., Ltd.                     | Infocom Corporation                  | SBS Holdings, Inc.                    |
| Axell Corporation                    | Infomart Corporation                 | Seikagaku Corporation                 |
| Azbil Corporation                    | Intelligent Wave, Inc.               | Seria Co.,Ltd.                        |
| AZIA CO., LTD.                       | istyle Inc.                          | SHIP HEALTHCARE HOLDINGS, INC.        |
| BEEENOS Inc.                         | Itochu Enex Co., Ltd.                | Showcase-Tv Inc.                      |
| Bell-Park Co., Ltd.                  | JSB Co., Ltd.                        | SMS Co., Ltd.                         |
| Benefit One Inc.                     | J Trust Co., Ltd                     | Snow Peak, Inc.                       |
| B-lot Co.,Ltd.                       | Japan Best Rescue System Co., Ltd.   | Solasia Pharma K.K.                   |
| Canon Marketing Japan Inc.           | JINS Inc.                            | SOURCENEXT Corporation                |
| Carna Biosciences, Inc.              | JP-HOLDINGS, INC.                    | Star Mica Co., Ltd.                   |
| CERES INC.                           | KAMEDA SEIKA CO., LTD.               | Strike Co., Ltd.                      |
| Chiyoda Co., Ltd.                    | Kenedix, Inc.                        | SymBio Pharmaceuticals Limited        |
| Chugoku Marine Paints, Ltd.          | KFC Holdings Japan, Ltd.             | Synchro Food Co., Ltd.                |
| cocokara fine Inc.                   | KI-Star Real Estate Co., Ltd.        | TAIYO HOLDINGS CO., LTD.              |
| COMSYS Holdings Corporation          | Kumiai Chemical Industry Co., Ltd.   | Takashimaya Company, Limited          |
| CRE, Inc.                            | LAC Co., Ltd.                        | Take and Give Needs Co., Ltd.         |
| CREEK & RIVER Co., Ltd.              | Lasertec Corporation                 | Takihyo Co., Ltd.                     |
| Daiseki Co., Ltd.                    | LUCKLAND CO., LTD.                   | TAMAGAWA HOLDINGS CO., LTD.           |
| DIC Corporation                      | MATSUI SECURITIES CO., LTD.          | TEAR Corporation                      |
| Digital Arts Inc.                    | Medical System Network Co., Ltd.     | 3-D Matrix, Ltd.                      |
| Digital Garage Inc.                  | MEDINET Co., Ltd.                    | TKC Corporation                       |
| DIGITAL HEARTS HOLDINGS Co., Ltd     | Milbon Co., Ltd.                     | TOKAI Holdings Corporation            |
| Don Quijote Holdings Co., Ltd.       | MIRAIT Holdings Corporation          | Tri-Stage Inc.                        |
| Dream Incubator Inc.                 | Monex Goup Inc.                      | VISION INC.                           |
| EARTH CHEMICAL CO., LTD.             | NAGASE & CO., LTD                    | VISIONARY HOLDINGS CO., LTD.          |
| Elecom Co., Ltd.                     | NAIGAI TRANS LINE LTD.               | VOYAGE GROUP, INC.                    |
| Emergency Assistance Japan Co., Ltd. | NanoCarrier Co., Ltd.                | WirelessGate, Inc.                    |
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| euglena Co., Ltd.                    | Nichi-Iko Pharmaceutical Co., Ltd.   | YUMESHIN HOLDINGS CO., LTD.           |
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