

Freund Corporation (6312) World's Leader in Pharmaceutical Product Use, Cultivating New Business Realms

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JASDAQ

Key Points

- Formulation equipment orders for generic drug applications have suddenly begun to slow. And because orders take over six months to process, Freund's profits are anticipated to see a decline in the coming term. While the abating of the generic drugs boom has been factored into the Medium Term Business Plan, it appears to have arrived earlier than anticipated. Furthermore, pharmaceutical companies have become cautious with regards to capital investments ahead of the medical fee pricing revisions expected to be implemented in April 2018.

- The New Five Year Medium Term Business Plan starting from the current fiscal year is based on the assumption of an end to the boom in generic drugs within Japan and will focus upon efforts to cultivate business outside the realm of formulation equipment. In addition, Freund's will deploy its unique pharmaceutical excipients globally, develop lithium ion battery electrode coating equipment and cultivate and develop new applications for formulation equipment. Freund looks forward to achieving success these various efforts, which have already been launched.

- Freund has identified financial targets to be achieved in fiscal year February 2022 for sales, operating profit, operating margins and return on equity (ROE) of JPY30.0 billion, JPY3.0 billion, 10% and over 8% respectively. These targets are based on the outlook for an adjustment in the formulation equipment market within Japan and are therefore believed to be conservative. Therefore, the success of efforts to cultivate opportunities in new business realms may enable Freund to surpass these targets. This Medium Term Business Plan will be updated on a rolling basis.

- Orders for formulation equipment within Japan remained weak and declined by 40% year-on-year during the second quarter. Orders within Japan had trended around JPY6.0 billion annually until now, and they expanded to JPY8.0 billion during the fiscal year February 2017. However, they are now expected to fall to between JPY4.0 to JPY6.0 billion.

- Freund will endeavor to offset this weakening order trend by cultivating new orders for the revolutionary tablet printing equipment (TABREX), cultivating the market for drug formulation equipment in Asia, and launching new lithium ion battery electrode coating materials and equipment

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for elective vehicle (EV) applications. Freund's lithium ion battery electrode coating equipment boast of high levels of competitive strengths, and are expected to rapidly diffuse into the market. Consequently, strong latent potential may be realized should Freund be able to successfully expand its business realm from generic drugs applications to electric vehicle applications.

• Consequently, the outlook for earnings in the coming term is still unclear, and a decline in profits may be recorded if the Company cannot offset the decline in generic drug formulation equipment orders. However, earnings could recover to a growth trend should a bottom in orders be confirmed. Furthermore, the superior competitive position of Freund remains unchallenged and close attention should be plaid to the Company's efforts to cultivate demand in the global market.

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Corporate Rating: A

Share Price (2017/10/27): JPY1,486

Market Capitalization: JPY28.3 billion (18.4 million shares)

PBR: 2.04x

ROE: 11.2%

PER: 18.3x

Dividend Yield: 1.3%

Company Rating Definition: Corresponding companies are evaluated on the following qualitative criteria of 1) strength of management, 2) growth and sustainability of business, and 3) potential for downward earnings revisions. Based upon evaluations of the above mentioned qualitative criteria, the following four ratings are assigned to each company.

A: Favorable

B: Some improvement needed

C: Significant improvement needed

D: Extremely difficult conditions

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(Units: JPY Million)

FY End	Sales	Operating Profit	Current Profit	Net Profit	EPS (Yen)	Dividend (Yen)
2010.2	12943	970	951	563	32.7	7.5
2011.2	13257	680	698	516	30.0	7.5
2012.2	15236	1065	1123	608	35.3	7.5
2013.2	16396	1470	1618	765	44.4	10.0
2014.2	17616	1286	1341	787	45.7	12.5
2015.2	17424	1150	1249	695	40.4	15.0
2016.2	19027	1346	1394	961	55.7	12.5
2017.2	21164	2041	2097	1064	61.7	20.0
2018.2 (Est.)	21000	2100	2100	1400	81.2	20.0
2019.2 (Est.)	20000	1800	1800	1200	69.6	20.0

(Based upon August 2017 data)

Assets:	JPY19.122 billion
Net Assets:	JPY12.532 billion
Capital Adequacy Ratio:	65.5%
BPS:	JPY726.7

(Note) ROE, PER, Dividend Yield are based upon fiscal year February 2016 earnings estimate data. Stock splits of 2 for 1 were conducted in June 2009 and February 2016, and EPS and dividends have been adjusted to reflect these splits. A special dividend of JPY2.5 per share (Revised basis) has been issued in fiscal year February 2015 to commemorate the 50th anniversary of operations, and a special JPY5.0 per share dividend is expected to be paid to commemorate the 20th anniversary of Freund's listing.

Chief Analyst: Yukio Suzuki
Belle Investment Research of Japan

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1. Characteristics: Development of Unique Pharmaceutical Product Formulation Equipment

Main Products of Pharmaceutical Product Formulation Equipment and Excipients

Freund Corporation bases its business on the main products of granulating and coating equipment used in the process of manufacturing pharmaceutical products and manufacturing and sale of pharmaceutical excipients. In these realms, the Company is highly unique as it is the only one in the world to produce both equipment and the consumable products used by its equipment.

The longstanding relationship between these equipment and products is similar to that of “pen and ink”, and the development of this relationship has evolved in recent years. Currently, Freund maintains a business strategy that focuses upon 1) the equipment and chemical products (Hardware) and 2) technologies used to manufacture these products (Software). Furthermore, the core competence of Freund lies in its development technologies used to manufacture products.

The term equipment refers to manufacturing machinery and equipment for drug formulations which use adjuvants (Excipients) as the main constituent of drugs to make them into tablet forms which are easier to ingest. They are not made in the form of liquid pharmaceuticals, but as orally ingested solid agents. Nearly half of the world’s pharmaceuticals are made in the form of tablets, capsules, granules, powders and other solid agents.

In some instances, the pharmaceutical and food manufacturers produce pharmaceuticals on their own, and in other instances they outsource the manufacture of these products. In both cases, there is a high possibility that the drug formulation manufacturing equipment they use are made by Freund.

Freund Corporation, Freund Vector (United States), and Freund Turbo are involved in the machinery business. Freund Vector is responsible for covering the markets in North, Central and South Americas, Europe, and the Middle East. Freund Turbo was acquired in 2010 and manufactures mainly industrial equipment used to make cosmetics, toners and other non-pharmaceutical products. In the machinery business, the Freund Group boasts of 70% share of the granulating and coating use equipment used within Japan, and it ranks as one of the top three companies globally.

With regards to the chemical and food business, pharmaceutical excipients, food quality preserving agents, dietary supplements and other products are manufactured. With regards to tablets and powder pharmaceutical excipients, the active ingredients used in drugs account for only 1% to 3% of the total, with harmless secondary materials including lactose, starch and other sugars added to make up the rest. With regards to food quality preserving agents, ethanol based transpiration agents are commonly used to preserve “baumkuchen” and other non-fully cooked cakes and confectionaries to prevent spoilage by blocking the growth of bacteria.

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Freund Business Overview

(%)

	Sales		Operating Profit		Characteristics
	FY2/16	FY2/17	FY2/16	FY2/17	
Machinery	62.8	68.5	69.6	70.0	Pharmaceutical, food, fine chemical use Granulating, coating equipment manufacture, sales Coating Equipment domestic share 70%, Global rank #3
Pharmaceutical	88	83			
Industrial	12	17			
Subtotal	100	100			
Chemical, Foods	37.2	31.5	30.4	30.0	Pharmaceutical excipients, food quality preserving agents, dietary supplement manufacture, sales Good manufacturing practices compliant manufacturing facilities
Pharmaceutical Excipients	36	38			
Food Quality Preserving Agent	33	31			
New Products	31	31			
Subtotal	100	100			

Expanding Product Range from Pharmaceutical Excipients to Food Quality Preserving Agents, Dietary Supplements

Drug formulation technologies and equipment are also used in the food realm. The strong growth in health foods is leading to the creation of new business models. For example, food and houseware manufacturers are marketing dietary supplements for sale mainly through catalog channels. These dietary supplements often take the form of tablets and are commonly manufactured using Freund equipment that leverage its highly advanced drug formulation technologies. A main difference between supplements and pharmaceutical products is that supplements lack the active agents used in pharmaceutical products.

In addition, food product quality preserving agents are manufactured and used to preserve the quality and flavor of “baumkuchen”, “castella” and other half-cooked cakes and confectionaries. Spoilage of these and other foods is caused by oxidation. So to prevent spoilage, foods must be prevented from oxidizing by limiting their contact with oxygen. There are two main ways to prevent spoilage, the first through use of deoxidants, and the second through use of ethanol alcohol transpiration agents. Deoxidants often lead to drying out of cakes and confectionary products and contributes to degradation in their texture.

In these examples, silica impregnated with alcohol is packaged in small bags for use as alcohol transpiration agents to prevent the occurrence of fungus. Freund is a pioneer in alcohol transpiration agents and began developing them in 1977.

The Japanese market for deoxidants and alcohol transpiration agent type food quality preserving agents is estimated to total JPY20.0 and JPY3.0 billion respectively. And while market scale of the alcohol transpiration agents is smaller than that of deoxidant type agents, Freund maintains a superior position within this market. Because the Company has long promoted development of the ethanol transpiration agent segment of the market, its share is currently over 50%. At the same time, Freund

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also maintains a product lineup of and participates in the deoxidant agent segment of the market.

Freund's Main Products

Machinery	Chemicals and Foods
Granulating Equipment	Pharmaceutical Excipients
Flow Coater (Fluid bed granulation coating equipment)	Direct Compression Manitol Lactose
Flow Coater High Speed Granulating Model (Fluid bed granulation drying equipment)	Spherical granules
Granuformer (Continuous granulating equipment)	Absorbents, solidifying agents, fluidizers
Coating Equipment	Food Quality Preserving Agents
High Coater Model FZ (Fully Automated Sugar Film Coating Equipment)	Food additives
Tablet Printing Equipment	Food quality preserving agents
Tabrex	Dietary Supplements
Seamless Capsules	Seamless mini-capsules
Spherex	Drug delivery system responses
Pulverizing Equipment	AQ shelax supplement
V Turbo, Balance Gran	Coenzyme Q10, lactoferrin
	Bifidobacteria

(Note: DDS is an acronym for drug delivery system)

Independent Development at the Hamamatsu Technology Development Research Center

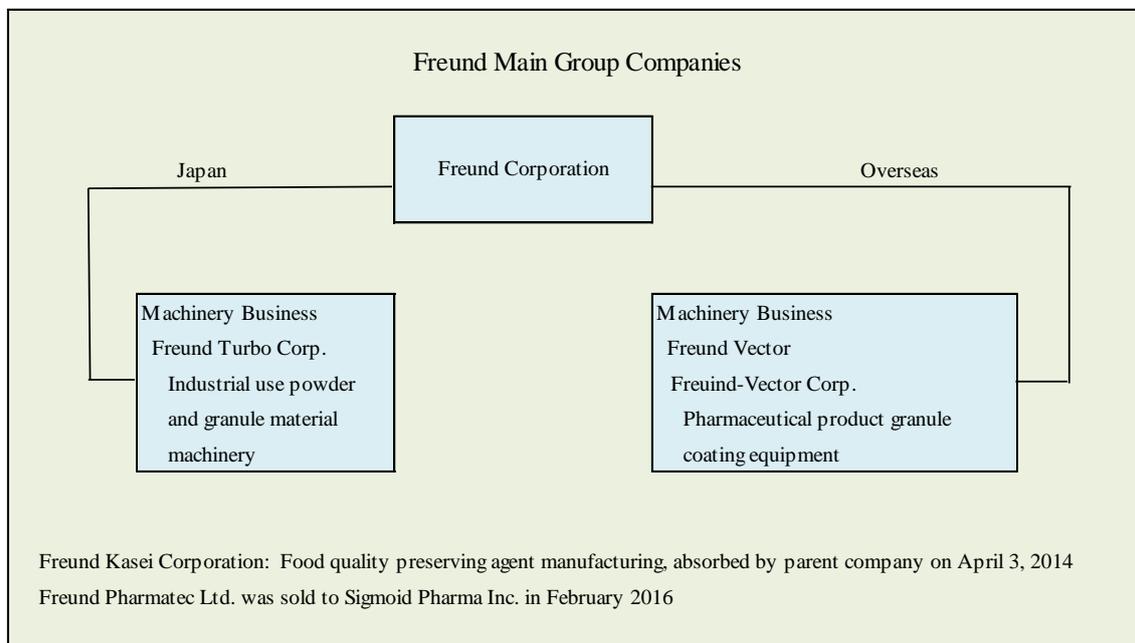
At the core of Freund lies its “Technology Development Research Center” in Hamamatsu City. Based upon its corporate philosophy of “Paving the Way to the Future through Creativity”, the Company’s driving force is its ability to develop unique technologies. Research and development activities are conducted by 30 staff within this division with a focus upon developing technologies in the three main realms of drug formulation equipment, excipients and food quality preserving agents.

In the realm of drug formulation equipment, research and development based upon powder, granule and coating processing technologies is conducted for both pharmaceutical product and other applications. With regards to excipients, Freund conducts unique research and development not only for applications within Japan but also for global applications as well. In addition, the Company also prioritizes research and development in the realms of food quality preserving agents and dietary supplements.

The Hamamatsu “Technology Development Research Center” also boasts of a library of over 300 intellectual properties (Patents and trademarks), and it provides customers with the facility to conduct tests of sample products because it maintains various machinery and equipment which has been

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developed in-house. Clients can also access knowhow on various applied uses of machinery in the realms of new drugs and food related products. In this manner, Freund is able to leverage this facility in its marketing strategy and come up with improvements of its machinery.



53 Years of Operations since Its Founding, President Iwao Fusejima Leads Global Marketing

Freund celebrated its 50th year of operations in April 2014. Yasutoyo Fusejima (Currently 78 years of age, Honorary Chairman) founded Freund in 1964. His father's company manufactured industrial use rubber products and Yasutoyo himself became aware of and impressed by the high profit margins of pharmaceutical products at the time he graduated from the Commerce Department of Waseda University in Japan.

While his friends joined trading companies, Yasutoyo decided to work at his father's business of rubber product manufacture and considered the potential to cultivate other new businesses. After graduating from university, he decided to start up his own business while continuing to work at his father's rubber product company. At the time, Yasutoyo visited one of his high school classmates who worked for a major pharmaceutical company and discovered that drugs were manufactured in a labor intensive process using tweezers and a spray bottles. Upon seeing this highly labor intensive manufacturing process, he recognized the strong potential for automation to be introduced to this manufacturing process and he created his first machine in 1963. In principle, this machine used a spray gun to spray liquid on tablets, which were then dried in a drying machine. This is the basic

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principle for coating technologies used today.

Because he was interested in machinery, he had his friend's steel factory make this machine. The film coating agent used was purchased from Shin-Etsu Chemical Co., Ltd. When shown the final machine he created, his friend was impressed by how well it was made. In the following year 1964, Yasutoyo and his friend Shimesu Motoyama (Worked at the major pharmaceutical company, and later to become a managing director at Freund) established Freund (The German word meaning "friend").

At the age of 25, Yasutoyo Fusejima created his first prototype equipment, and established his company at the age of 26. The strong sales of both the first and second machines allowed his business to get off to a strong start. Film coating machine FM2 (This product name FM was taken from the two initials of the founders of Freund, Fusejima and Motoyama) were sold to pharmaceutical companies. This machine continued to sell strongly, despite having doubled in price because of its reputation for being too inexpensive. He developed automated film coating equipment, and started manufacture of coating liquids as well. Because of the strong sales of the first machine, Freund became profitable in its first year of operations. Since then, Freund has focused upon the two main business segments of machinery, and chemicals and foods.

He learned about the business model of copying machines from his uncle, who was the president of a copying machine company at the time, and how profits were generated by manufacture and sale of consumables which were used in wet type copying machines. Therefore, Yasutoyo decided to manufacture film coating use fluids within his company. At the time, the color of organic solvents was important and he was able to expand sales and profits by developing a coating technology that other companies could not duplicate.

The Company got its start in the tablet coating business. He used plasticizer in coating fluids to make it soft and acquired patents for both this fluid and machinery, in addition to acquiring patents in the United States for drug formulation equipment.

Yasutoyo Fusejima is the founder, and the next President Hori is the brother of Yasutoyo's wife. And in March 2012, Iwao Fusejima (The eldest son of Yasutoyo) became president of Freund. Iwao Fusejima was born in 1969. He boasts of overseas experience since he attended Coe College in Cedar Rapids, Ohio of the United States where he studied management. In 1997 at the age of 28, he joined Freund. After spending a number of years working in the overseas division of the Company, and also holding positions of manager of the machinery business and chemical and food business before he became President of Freund.

Cultivating Human Resources, Corporate Culture Based upon the Four "S's"

President Iwao Fusejima spoke with us at the start of the year about his views on "cultivating human

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resources based upon the Four S's". The Four S's are represented by 1) sense (maintaining curiosity about all things), 2) speed (coming up with responses quickly) 3) study (studying up on competitors and understanding our own company) and 4) smile (always remembering to smile and stay healthy). Efforts will also be made to strengthen the corporate culture of taking proactive steps to prioritize and uphold compliance. Currently, Iwao is focusing the bulk of his efforts on changing the corporate culture.

Founder and Corporate Governance

As part of the Company's corporate governance activities, the number of corporate auditors has been increased to four from three as of the general meeting of shareholders held in May, and three outside corporate auditors were newly appointed. Of the five managing directors, two are outside directors to provide objective direction and advice. President Iwao Fusejima views 1) performance of functions that cannot be fulfilled within the Company and 2) provision of opinions about our management as the most important capabilities of these outside directors.

As of the end of February 2017, the total number of shareholders stood at 6,570. By shareholder classification, individual investors accounted for 38.9% and financial institutions 28.7%, reflecting an increase in the shareholdings of institutional investors. The Founder Fusejima and other family members maintain about 30% of total shares.

The board of directors is comprised of five members including President Iwao Fusejima, Managing Director Norio Shiratori (Corporate Management), Director Narimichi Takei (Technology Development), Outside Director Tomohikio Manabe (Accountant), and Outside Director Ryuji Nakatake (Rugby coach). Iwao Fusejima has acted as President since 2012, and has led the global deployment of Freund's business and collaboration with overseas subsidiaries.

The two outside directors were appointed to the board in May 2015. Tomohikio Manabe is a certified public accountant, and Ryuji Nakatake previously assumed positions as the coach of Waseda University's rugby team and managing director of the Japan Rugby Football Union. They have been selected for their ability to take on an objective and fresh view of the management because of their roles outside of Freund.

The founder and Honorary Chairman Yasutoyo Fusejima has led the company using his keen insight to develop highly unique products, and poured his passion into the development process. To this day, Yasutoyo still comes up with numerous ideas for business opportunities and still maintains an active support role within the company that is important to the operations of Freund.

The total number of managing directors of five is small. And while the number of executive managing directors of three also appears small, future potential changes to the management structure

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along with the growth of Freund in the future has not been clearly determined. The next in line to the managing directors in terms of executing responsibilities are general managers and managers. Therefore, one key issue is how the overall executive structure will be strengthened for not only Freund but its main subsidiaries including Freund Vector and Freund Turbo. At the same time, another key issue is how to implement an effective corporate governance structure. The implementation of these fortified structures is expected to be a positive step in achieving an effective global consolidated management system.

Group Company Earnings

(JPY mn, %)

		Sales	Operating Profit	Operating Margin
Freund Corporation	FY2/11	10,669	495	4.9
	FY2/12	12,248	839	6.8
	FY2/13	13,506	1,350	10.0
	FY2/14	13,694	1,241	9.1
	FY2/15	13,364	1,126	8.4
	FY2/16	13,741	1,096	8.0
	FY2/17	15,696	1,537	9.8
Freund Vector Corporation	FY2/11	2,757	112	4.0
	FY2/12	2,812	277	9.9
	FY2/13	2,943	147	5.0
	FY2/14	3,892	169	4.3
	FY2/15	3,905	291	7.5
	FY2/16	4,686	293	6.3
	FY2/17	4,727	388	8.2
Freund Turbo Corporation	FY2/11	561	63	11.2
	FY2/12	930	15	1.6
	FY2/13	1,022	81	7.9
	FY2/14	782	-8	-1.0
	FY2/15	999	-12	-1.2
	FY2/16	1,205	94	7.8
	FY2/17	1,641	79	4.8

(Note) Freund Turbo was acquired in June 2010

Freund Pharmatec was sold to Sigmoid Pharma in February 2016

Freund Vector of the United States Is a Cornerstone of Freund

Freund Vector manufactures and sells drug formulation equipment at its own plant in the state of Iowa in the United States. Freund in Japan and Freund Vector mutually share technologies, and in principle Freund Vector develops and manufactures its own products with a limited number of parts such as spray guns being imported from Japan.

The total number of employees of the Freund Group as of end February 2017 stood at 342, of whom 189, 114 and 39 were employed by Freund Corporation, Freund Vector and Freund Turbo respectively.

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Freund Corporation established a local sales agent in the United States in 1966. In the following year, marketing activities for its machinery to major pharmaceutical companies within the United States began being conducted. Initially, the automated coating machinery received high regard. In 1979, a collaborative arrangement was formed with Vector Corporation of the United States, which was thereafter turned into a subsidiary. Vector is based in Marion, Iowa (Next to Cedar Rapids), and manufactures tableting and coating machinery. This company is responsible for the markets in North and South Americas, Europe and the Middle East.

Vector was turned into a subsidiary in 1997. Vector's largest shareholder was its founder, whom Yasutoyo Fusejima knew well and trusted highly. Vector developed equipment that matched the needs of United States customers based upon a license from Freund and was able to establish a strong track record.

Iwao Fusejima, the current President of Freund Corporation, is the Chief Executive Officer of Vector, and Masaaki Kubota took on the position of Chief Operating Officer, also responsible for technology, from the previous COO Steve Jensen in February 2014. While the President of Freund Vector is a Japanese national, local staff, some with 25 years of experience, assume responsibility for marketing and technology functions. Moreover, Iwao and Masaaki have been able to establish strong communications with and understanding of the staff of Freund Vector.

Freund Geographical Sales

		(JPY mn)						
		Japan	North America	Europe	South Central America	Asia	Total	Overseas
FY2/13	Sales	12,800	948	772	1,875		15,236	3,596
	% Share	[78.1]	[5.8]	[4.7]	[11.4]		[100.0]	[21.9]
FY2/14	Sales	13,233	1,503	701	2,177		17,616	4,382
	% Share	[75.1]	[8.5]	[4.0]	[12.4]		[100.0]	[24.9]
FY2/15	Sales	13,056	1,599	450	1,071	1,246	17,424	4,367
	% Share	[74.9]	[9.2]	[2.6]	[6.1]	[7.2]	[100.0]	[25.1]
FY2/16	Sales	13,547	2,190	937	1,325	1,027	19,027	5,480
	% Share	[71.2]	[11.5]	[4.9]	[7.0]	[5.4]	[100.0]	[28.8]
FH2/17	Sales	15,601	3,331	553	830	847	21,164	5,563
	% Share	[73.7]	[15.7]	[2.6]	[3.9]	[4.0]	[100.0]	[26.3]

(Note) South and Central America, and Asia have been separated as of fiscal year February 2015

Freund Vector Business Deployment – Headquarters in Marion, Iowa

Freund Vector maintains its headquarters in Marion, Iowa of the United States. Marion is adjacent to Cedar Rapids and only a one hour airplane flight from Chicago. The state capitol of Iowa is Des Moines and is the first voting location in the United States Presidential primary elections. Cedar

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Rapids is the second largest city after Des Moines in the state of Iowa. Marion is a small city with a population of about 170,000 people.

Marion saw a large influx of immigrants from Czechoslovakia and the founder of Vector was Jerry Zahradnik, the son of an immigrant family from Czechoslovakia. Vector was established in 1972 as a press machinery company.

At the time, Freund's founder Yasutoyo Fusejima visited various American companies with the goal of cultivating the market for his drug formulating equipment. And in 1974, Freund signed a licensing agreement with the newly formed Vector for the manufacture of drug formulating equipment. Consequently, Freund was able to establish a foothold in the United States market through this agreement.

At the same time, Danforth Jr., who was a major shareholder of Vector, was asked to liquidate his position in Vector. And while Freund acquired the position from the major shareholder amounting to 88.08% of the shares of Vector in 1998, the remaining 11.92% of shares were held by Jerry Zahradnik who was the President of Vector at the time.

In 2003, Steve Jensen took over the role of President of Vector from Danforth Jr. Steve Jensen had been the Chief Financial Officer of Vector, and Matsugaki from Vector Japan was sent to replace Steve in his former position as CFO. Matsugaki joined Freund Corporation from Sanwa Bank at the time and is still the CFO at Freund Vector to this day. After 10 years of service as the President of Vector, Steve Jensen resigned from his post three years ago. At that time, Kubota assumed the position of Chief Operating Officer and still maintains this role. Kubota previously worked at a Japanese automaker and a metal mold company in the United States and has bountiful experience in management and technologies.

Vector founder Zahradnik passed away in May 2015. Subsequently, Freund was able to acquire his stake of 11.92% of the outstanding shares of Vector and Freund was able to turn Vector into a 100% owned consolidated subsidiary. Reflecting upon the 45 years of operations of Vector, it has operated independently for 25 years since the licensed manufacturing agreement for Freund equipment was started, and ties have been strengthened with Freund during the past 10 years despite its maintenance of an independent management structure.

While manufacturing and sales of drug formulating equipment is conducted, Freund Vector does not currently deal in the foods and chemicals business like Freund in Japan. And while manufacturing began under a licensing agreement, Vector is manufacturing equipment that has been modified to match the needs of the local market.

Freund Corporation in Japan implements a "fabless" manufacturing process where the machinery manufacturing process is outsourced after technology development and design processes have been

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completed in-house. However, Vector in the United States performs its own manufacturing in-house at its own plant, with final assembly being done after parts are purchased externally. In this manner, they have placed a high priority upon developing manufacturing technologies in-house. Over 90% of Vector's sales are derived from drug formulating equipment, with the remaining sales derived from manufacture of formulation equipment for foods and agricultural chemical products. Consigned manufacture of seed coating and other processes are conducted within the contracted services business.

Strengthening of Group Capabilities – Fabless Manufacturing Process for Equipment in Japan

Demand for manufacturing equipment from generic drug manufacturers remains strong. Freund Corporation is a fabless manufacturer without its own manufacturing plant, and therefore needs to increase the number of cooperating manufacturing companies to match its growing demand. The Company had conducted business with four manufacturing companies, but they added two new companies during 2015, bringing the total to six companies.

Freund's first collaborative partnership was formed with Okawara Manufacturing Co., Ltd. back in 1980. Okawara Manufacturing became one of the companies to which manufacturing of equipment was outsourced. Currently, Freund outsources the manufacturing of its equipment to six different companies, but Okawara Manufacturing still maintains a high share of Freund's outsourced equipment manufacturing.

Furthermore, Freund entered the market for alcohol tablet type food quality preserving agents in 1977. Freund Kasei Corporation, which was responsible for manufacturing of food quality preserving agents, was merged with Freund Corporation in March 2014 to pursue management efficiencies.

Freund also acquired the company Turbo Corporation five years ago at a cost of JPY400 million. Turbo is a powder processing equipment manufacturer with numerous patents. Turbo decided to sell itself to Freund as it faced the issue of a lack of appropriate persons to take over management. Turbo had sales of JPY900 million and was included into the machinery business segment. While it is also a powder processing equipment manufacturer, Turbo boasted of specialization in realms differing from those of Freund, including food and industrial powders use, and particularly hard powder equipment.

Commercialization of Drug Formulation Technologies in Ireland, Facilities Sold

Freund Pharmatec Ltd. was sold to Sigmoid Pharma in Ireland in February 2016.

Sigmoid Pharma is a start-up new drug development company established in 2003 which uses Freund's seamless mini-capsule technology and has plans to list its shares in the United States capital markets. Because Freund maintains patents on this technology in the United States, the listing of

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Sigmoid could contribute to expanded use and lead to further recognition of this technology within the pharmaceutical industry.

Sigmoid Pharma has leveraged this mini-capsule technology as a drug delivery system for an orally administered ulcerative colitis treatment, which shows promise of growth. Freund has also invested in Sigmoid Pharma, creating a strong relationship that can continue to bear fruit after it becomes more successful in the future.

Freund is the only company in the world able to produce this cutting edge seamless mini-capsule manufacturing equipment (Spherex). Spherex uses this technology to manufacture capsules, allowing medicines to be administered as oral agents, which were previously administered in liquid form through injection.

Freund Pharmatec was established in January 2010 and incurred losses of between JPY100 to JPY200 million per year. Because Sigmoid sought to develop drug delivery systems, the timing of this sale was good.

2. Strengths: Top Ranking Company within Japan, One of the Top Three Companies Globally

Unique for Its Handling of Both Drug Formulation Equipment, Food and Chemical Products

Freund maintains a two segment business model where both segments complement each other. In the drug formulation equipment realm, excipients are used to form chemicals products and solid agents are used to make drugs and food products. Looking at the manufacturing process for tablet forms of drugs, the flow chart below shows the manufacturing processes for tablet drugs.

Pulverizing, Sorting→Mixing→Pelleting→Drying, Granulating→Tableting→Coating→Printing

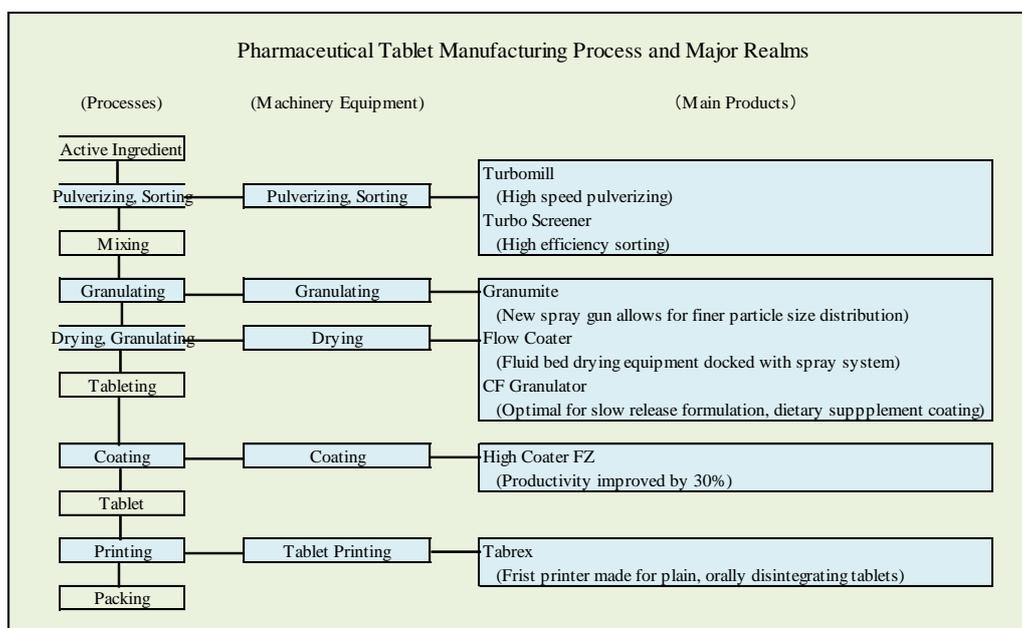
Within the above mentioned process, Freund provides equipment for the pulverizing, sorting, pelletization (granulating), drying, coating and printing functions.

Moreover, equipment and machinery is a niche realm in which Freund boasts of 300 intellectual properties. At the same time, the Company is extremely well versed in the manufacturing processes and specifications of major pharmaceutical companies. Therefore, it is difficult for large machinery and equipment manufacturers to enter this niche market.

In addition to Freund, GLATT (Privately owned) and GEA (Publicly traded) of Germany are amongst the world's top three machinery manufacturers. Consolidation of German pharmaceutical companies has progressed through the formation of alliances along with Manety and Hutlin. While

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GEA manufactures tableting machinery, Freund outsources the manufacture of its equipment within Japan to Kikusui Seisakusho Ltd., Hata Tekkosho Co., Ltd. and other specialized manufacturing companies. Furthermore, strengthened collaboration with Kikusui Seisakusho Ltd. is also being pursued.



Freund is the leader in Japan followed by the second placed company Powerex Corp. (Privately owned), which maintains a technological collaborative agreement with GLATT. Within Japan, Freund boasts of a share of over two thirds of the total market, with Powerex claiming the remaining one third of the market.

Within the Japanese market, Freund is in direct competition with the second placed Powerex, which has adopted a strategy of introducing lower priced products into the market by leveraging their license with an overseas company. In response, Freund has promoted a strategy of introducing products with strong brand image and high levels of functionality to avoid being drawn into pricing competition.

Freund Vector operating in North America is ranked second within the industry, and it is a key company in Freund's global business deployment strategy.

Freund ranks within the top five companies in the pharmaceutical excipients market behind the first, second and third placed companies Shin-Etsu Chemical Co., Ltd., Asahi Kasei Corp. and Sanwa Chemical Industry Co., Ltd respectively.

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Expanding Its Specialized Business Globally

Freund maintains major facilities within Japan and the United States and seeks to expand its business globally. In contrast, rival Powerex acts as both an import agent through its agreement with Glatt and maintains its own manufacturing capability.

Within the Japanese market, Freund is in direct competition with the second placed Powerex, which has adopted a strategy of introducing lower priced products into the market by leveraging their license with an overseas company. In response, Freund has promoted a strategy of introducing products with strong brand image and high levels of functionality to avoid being drawn into pricing competition.

Freund boasts of strengths in granulating and coating processes. Furthermore, Powerex (GLATT) and GEA (Japan offices) lack an adequate maintenance and service structure and cannot duplicate the ability of Freund to respond with services within 24 to 48 hours within Japan.

At the same time, GLATT and GEA maintain overwhelming position of strength within the European market. Freund Vector of the United States has opened a machinery sales function in Milan, Italy to cultivate the European market. And while Freund Vector's business within the United States declined in the aftermath of the Lehman Shock in 2008, it has begun to recover recently. Also, it is seeing growth in Brazil and other South American markets as a result of its efforts to cultivate business in South America from the United States.

Hosokawa Micron Group and Dalton Corp. manufacture powder processing equipment, but neither of these companies produces equipment for pharmaceutical industry applications and Freund actually uses some of their equipment.

Freund's Main Facilities

- ☆ Freund Hamamatsu Technology Development Research Center, Japan
 - Focus upon cutting edge product development as a R&D company
 - Provide samples, application testing to clients
 - Patents for over 300 intellectual properties held

- ☆ Freund Turbo (Japan)
 - Freund Corporation's granulating, coating technologies complement Turbo's pulverizing, sorting technologies to create new applications of powder processing for lithium ion batteries electrode materials
 - Strengthen collaboration with Freund Vector

- ☆ Freund Vector (United States)
 - Development capabilities of Freund combined with the design, manufacturing capabilities of Freund Vector to develop products matching the local markets
 - Deploy business into Central, South Americas, Europe, Middle East, Asia

(Note) Freund Pharmatec (Ireland) was sold in February 2016

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Hamamatsu “Technology Development Research Center” – Advanced Application

Development, Alliances

The “Technology Development Research Center” is located about 13 kilometers north of Hamamatsu City at an elevation of 50 meters at the foot of the Japan Southern Alps, with a reputation for having a relatively sound geological foundation. Experiment facilities, two manufacturing facilities, and a distribution warehouse have been constructed at this location. Furthermore, there is ample space at this site and plans call for a third manufacturing facility to be constructed sometime in the future.

At the “Hamamatsu Technology Development Research Center”, two manufacturing facilities are operated. One of Freund’s main products is called Flow Coater (Fluid bed granulation coating equipment) and it boasts of a capability for continuous production including uniform mixing and granulating, coating, and drying processes. Granulating is the process where granules are created from powders. Active pharmaceutical ingredient chemical compounds, which are active ingredients in pharmaceuticals, are combined with excipients in a predetermined ratio to control their function and made into particle format. Flow Coater uses a spray gun to spray mist upon the particles to increase their size and coat them. Actual production of this machinery is outsourced to Okawara Manufacturing Co., Ltd.

The large High Coater FZ (Fully automated sugar film coating equipment) is a revolutionary piece of equipment that allows for short and efficient coating of tablets and tablet shaped candies. This tablet surface coating allows for the control of the rate of dissolution of drugs within the human body. In addition, this coating also provides a masking function to hide the bitter taste of pharmaceuticals. In this coating process, polymer materials are used as a film and sugars as coverings.

High Coater FZ 1) increases the drying capability of the heated air by raising the heating efficiency, 2) raises the stirring and mixing efficiency and 3) improves the capability of the spray gun to spray a larger area more uniformly. The improved capabilities of this revolutionary equipment cannot be duplicated by competitors.

Spherex (Seamless capsule manufacturing equipment) manufactures capsules from liquid and not solid materials. The surface tension of the liquid is used to make a near perfect sphere in continuous production. Thereby, a capsule is formed that has a hard outer shell and liquid center. The 1 to 7 millimeter in diameter liquid center is encapsulated by a gelatin, and then dipped in glycerin from top to bottom. After drying, this glycerin casing hardens and forms a seamless mini-capsule. This is a technology which only a few companies in the world possess.

While this containment technology was first developed in Europe and the United States, unique applications of this technology have been developed in Japan to match needs of the local market.

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Consequently, containment technology developed within Japan won the Nakai Award (Presented to companies for superior manufacturing technological developments) in 2013.

Continuous granulating equipment Granuformer forgoes the conventional batch type production format and allows for continuous production of granules, allowing mass production to be conducted in a more time effective manner. This capability allows the cost of pharmaceutical manufacturing to be reduced and eliminates the need for new manufacturing processes. Both of these capabilities are called for by the policies of the United States Food and Drug Administration. Freund's technology entails the continuous running of conventional chemical processes. While continuous running of chemical processes to manufacture liquid or gas products is easy, it is extremely difficult for solid products and Freund is one of the few companies to realize this difficult manufacturing process. Commercial applications of this drug formulation process were begun in Europe and the United States, but they have yet to start in Japan.

Development of drug formulating equipment for emerging markets has been completed. Unnecessary functions of the most up-to-date version of High Coater FZ have been eliminated to create a new version for emerging markets. Furthermore, the highly detailed specifications required by clients in Japan have been reviewed, and functions which were deemed to be unnecessary in emerging markets were eliminated to reduce the price of this machinery. Furthermore, ongoing efforts to tailor equipment to match the needs of local emerging markets will be conducted while at the same time maintaining competitive capabilities.

World Leading Drug Formulation Technology

The food and chemical plant in Hamamatsu manufactures spherical granules. The ability to produce near perfectly round spheres is a unique core competence of Freund. Spheres are processed to facilitate them with the ability to maintain sustained-release (Gradually melt to prolong effectiveness).

Pharmaceutical excipients are based upon the main raw material of sugar used as an outer coating for pharmaceutical products. The nucleus of granulated sugars is octahedron in shape, and they grow in size like snow balls.

The spherical granules come in sizes of between 710 to 850, 500 to 710, 355 to 500, 200, and 100 microns (Micro-nanometers) in size. Sizes below 300 microns are ideal for orally disintegrating tablet because they do not have a rough texture when ingested without water. Freund has developed Granutol F as an excipient used in orally disintegrating tablets to achieve a perfect balance between hardness and ease of dissolving, as has been long required by the market. Consequently, this product is expected to act as support for new drug formulation designs.

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Aside from this, another method employs crystal cellulose to be added to lactose. Lactose is shaped like a spear, is low in calories, and inexpensive. Furthermore, they are easy to mix with medicines because they have no nucleus and are small in size. Freund has taken anticipatory steps to conduct research to achieve commercialization of this application. Lactose is now the most commonly used excipient. DFE Pharma of Europe is the largest manufacturer of lactose based pharmaceutical products in the world, and Freund imports products from this company.

Along with the advance of the aging society, the need for small diameter tablets that are easy to swallow with sustained release to allow for prolonged drug efficacy is on the rise. Therefore, drug formulation technologies which match this market need are also required. There is no need for nucleus and the key is to come up with near perfectly round forms. The ability to make near perfectly round forms can only be accomplished by a company with advanced and unique technologies like Freund, which leads the world.

Cellulose is added to lactose to act as a starch. Freund boasts of technology which does not require starch and allows for forming agents to be created from 100% lactose alone. There are instances where drugs do not respond to starches.

Freund's main pharmaceutical excipient product Nonpareil is close to a perfect sphere form, and represents the world's leading technology. Therefore, there are numerous proposals to use Nonpareil in scientific research.

Nonpareil 108 is a round form of Mannitol (Bar shaped crystal) that is made in extremely small sizes of 100 microns. Because of its extremely small size, it does not have a rough texture when ingested and matches the need to make medicines easier to swallow for the elderly. It also allows for medicines to be swallowed without water. Mannitol's limited reaction with drugs and refreshing feeling leads to increased usage. Nonpareil does not have any competitors globally.

Maltitol Granule and Isomalt Granule have been developed as food use direct compression excipients. Direct compression excipients can be used to efficiently manufacture tablets. Until now, there were no granulated products that had the appropriate flow property and formability for use in direct tableting. However, Freund developed a granulated product that solves this problem.

This new product has good flow property and is very stable at the time of compression. Maltitol Granule tablets are also strongly resistant to moisture absorption and deterioration in hardness. Isomalt Granule can be easily adjusted for use in tablets which have low formability such as glucosamine.

Efforts are being conducted to collaborate with companies in the United States, with a collaboration being formed between Freund Vector and Dow Pharma and Food, a subsidiary of Dow Chemicals. Research is being conducted for polymer powder coating techniques using Vectors' drug formulating

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equipment Granurex. This research is investigating the potential for coating using 10 micron polymers instead of liquids to 1) dramatically shorten the production process, and 2) reduce the bitterness of drugs and the sense of roughness when dissolved by saliva in the mouth.

Internal manufacture of pharmaceutical excipients and food quality preserving agents is being raised. Currently, about 60% to 70% of excipients and 10% to 20% of food quality preserving agents are manufactured within the Company. However, Freund will endeavor to raise in-house manufacture of both products. Excipients are required for both new and generic drugs, and they become long selling products once adopted by pharmaceutical companies. Collaboration with Shin-Etsu Chemical Co., Ltd. is conducted for excipient applications to leverage Freund's superior drug formulation technologies, and Shin-Etsu Chemical's superior excipients diversification capabilities and marketing in the United States.

While the manufacture of machinery and equipment is outsourced, chemical and food products are manufactured internally. In addition to alcohol type (Antimold Mild), deoxidant type (Negamold G) food quality preserving agents are manufactured. While Freund only has one manufacturing line for food quality preserving agents, they are considering addition of capacity to handle increased production internally with the possibility of adding a third manufacturing facility.

Second Place in the United States, Brazil

Freund Vector is ranked second within the United States market overall, and it ranks as the top manufacturer of fluid bed equipment. While it boasts of strong market position of second place in both the United States and Brazil, its position within Europe is not as strong. However this suggests that the potential for growth in the European Community and neighboring countries is strong. Freund Vector opened a facility in Milan, Italy in November 2014.

Sales are conducted directly in the United States and divided into four geographic sales regions. Because the bulk of Freund's business is derived from repeat customers, efforts to increase the number of geographic sales regions may prove to be ineffective but the marketing capability still needs to be strengthened. Within the sales force, Freund Vector maintains one sales person each for South America and Europe and relies upon sales agents in the local markets. The sales agent in Brazil has been effective in growing Freund's presence in the local markets. And while the use of sales agents reduces the profits derived from sales, this structure is deemed to be the most effective at this point in time. Consequently, Freund will take steps to strengthen its own marketing capability for both South America and Europe.

While the bulk of Freund's business 10 years ago was derived from the United States, exports to this region are on the rise. Exports to South America and Europe now account for about half each.

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Shipments of products to generic drug manufacturers in Brazil are a large part of the shipments to South America. And in Europe, products are sold to clients in countries such as Ireland, Iceland, Turkey, Israel and others where competition from Freund's German competitors is not as fierce.

3. Medium Term Business Plan: Strengthening New Product Development Capabilities, Overseas Market Development Efforts

Japanese Generic Drug Market Capital Investments Peaked

The New Five Year Medium Term Business Plan envisions an end to the boom in generic drugs. Therefore, the main focus of the New Five Year Medium Term Business Plan is how Freund can offset the weakness caused by the end of the generic drug boom.

Capital investments by generic drug manufacturers have risen dramatically during the past several years. This trend has been spawned by the Japanese Government efforts to restrain growth in medical spending by raising the generic drug usage target to 80% by 2020, but a slowing in this trend has now appeared.

Increases in the size of drug formulation equipment had progressed in response to the growing need for mass production. For example, there is a trend for flow bed equipment capacity to expand from the previous level of between 120 and 200 kilograms to 300 kilograms. In the future, close attention should be paid to the ability of generic drug manufacturers to expand their businesses in overseas markets. Furthermore, increases in the ratio of their overseas manufacture point to the potential for increased usage of Freund equipment.

The demands for high quality levels are no different for generic drug manufactures than new drug manufacturers. And while price negotiations are difficult, Freund leverages its superior quality and services to achieve appropriate pricing for its products.

The problem for Freund is coming up with responses to the abating of demand in the wake of the generic drug boom and subsequent capacity issues. In response to these issues, Freund has adopted a strategy of using a "fabless" structure where it does not have its own production facilities. Beyond this, collaboration with Freund Vector is expected to be strengthened, and diligent efforts will be made to cultivate overseas markets.

New Five Year Medium Term Business Plan

Freund has established the concept of "One Freund" (Number One, Only One, Be One) as a key theme for its new (Seventh) Five Year Medium Term Business Plan starting from the coming term,

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and seeks to achieve sales, operating profit, operating profit margin and return on equity ratio of JPY30.0 billion, JPY3.0 billion, 10% and over 8% respectively by fiscal year February 2022. This reflects an average compound annual growth rate of 9.3%.

The New Medium Term Business Plan will address the issues of strengthening trend for drug price reductions and outlook for further restraint in capital investments within the pharmaceutical industry. In order to overcome these issues, Freund management believes that it needs to adopt a vision that covers a longer time period and has subsequently extended its Medium Term Business Plan to cover five years.

New Five Year Medium Term Business Plan Overview

(Corporate Philosophy)	Paving the Way to the Future through Creativity
(Management Vision)	Freund Group will contribute to the future treatments and health of people around the world, and create, cultivate technologies that support rich lifestyles, safety and security of foods
(Corporate Image)	Value: ONE FREUND Number One (Creating Extraordinary Value) Become the number one company in various realms, businesses Only One (Adopting the Client Viewpoint) Become the "Only One" company to effectively serve clients, society Be One (Networking) Creating a united Group
(Basic Strategy)	Responding to client needs with technological capabilities, creating a management structure able to achieve sustained growth in profits
(Management Targets)	Sales: JPY30.0bn, Operating Profit: JPY3.0bn, Operating Profit Margin: Over 10%, ROE: Over 8%

In the New Medium Term Business Plan, a new vision for management has been created based upon a goal of “contributing to the future of medicine and the health of people around the world, and cultivating technologies to support rich lifestyles and safety of foods”.

The concept of “One Freund” calls for Freund to 1) achieve “Number One” top position in each of its business realms through “creation of special value”, 2) becoming of the “Only One” partner of its customers by “fully understanding customers’ view point”, and 3) realizing “Be One” unity of the entire Freund Group through active "networking”.

The three main directives of the new Plan include 1) further strengthening of efforts to develop new products, 2) increasing the synergies between machinery and chemical products, and 3) expanding sales channels in the global market.

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Main Strategies by Business Segment

	Pharmaceutical Products	Industrial, Lifestyle Related
Machinery	Expand tablet printing machine sales	Expand development, sales of lithium battery machinery
	Expand development, sales of inspection equipment	Develop new materials equipment
	Commercialize continuous manufacturing equipment	Expand sales of high speed fluid bed granulation equipment for foods
	Expand business in India, China	
Chemicals	Integrate sales for machine, excipients	Cultivate ASEAN markets for food quality preserving agents
	Expand sales of excipients globally	
	Cultivate market for excipients in India	

The New Five Year Medium Term Business Plan is based upon the outlook for a weakening of the boom in generic drugs within Japan and is created in two steps, including the first three year and second two year periods. The three main directives of the Plan mentioned above will be implemented during the first three year period, and the anticipated decline in machinery orders resulting from the termination of the generic drug boom will be covered by other anticipatory measures to ensure the continued growth of the Company.

In the near term, President Iwao Fusejima recognizes the importance of these three directives. First, efforts will be implemented to promote the diffusion of the tablet printing machine TABREX Rev., which has been launched in the market during the second half of the previous term. Second, a stable supply structure for pharmaceutical excipients will be established from a global supply chain standpoint. And third, the Freund Group will strengthen its overseas marketing capability.

Five Year Medium Term Business Plan Key Performance Indicators

(JPY mn. %)

	FY2/14 5th Plan		FY2/17 6th Plan			FY2/22 7th Plan Final Year Target	
	Sales	OP	Sales	OP	(Revised)	Sales	OP
Machinery	11,004	1,242	14,914	1,750	1,430	21,340	2,260
Freund (Parent)	7,081	1,032	9,946	1,537	963	13,540	1,460
Freund Vector	3,892	169	4,727	388	388	6,600	500
Freund Turbo	782	-8	1,641	79	79	2,400	300
Chemical, Food	6,612	379	6,249	748	611	8,660	740
(SG&A Expenses)		-335		-456			
Total	17,616	1,286	21,164	2,041	2,041	30,000	3,000
		7.3		9.6	9.6		10.0

(Note) Revised data reflects the allocation of SG&A expenses (Approximate)

Data for the 7th Plan reflects the allocation of SG&A expenses

Progress in Achieving Medium Term Business Plan Objectives

With regard to progress in achieving objectives of the New Medium Term Business Plan, 1) Freund expanded sales of TABREX equipment in the realm of pharmaceutical products, and favorable demand

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is expected to lead to securing of orders for 10 units in the current term. 2) Demand for formulation equipment in India and China is improving with preparations beginning for local manufacturing in India. At the same time, Chinese Government regulations for pharmaceutical product quality levels are becoming increasingly stringent. Consequently, demand for Freund equipment is expanding and the number of business opportunities is also expected to grow. 3) With regard to continuous production equipment (GF), orders are expected to be booked during the second half of the current term, in light of the switch from batch production to continuous production by pharmaceutical companies.

In the realm of industrial applications, 5) full scale efforts to cultivate lithium ion battery related applications are beginning to ramp up. 6) Furthermore, efforts to strengthen the sales network for excipients are also being implemented, with growth expected to ramp up on the back of the securing of distributors in both the United States and India. And 7) marketing efforts for food quality preserving agents in convenience store applications in Asia have been started.

Main Overall Strategies

- Corporate Culture Reform Promotion Project
- Establishing services as 3rd cornerstone of business including machinery, chemical and foods
- Investing in promising business realms
- Strengthen technology development capability, output capacity, overseas laboratories
- Cultivate next generation of leaders, global human resources
- Fundamental reforms of business processes for development of management systems
- Improving the supervisory levels as a Tokyo Stock Exchange First Section listed company
- Fortify ESG, promote CSR in line with the United Nations Global Compact (10 Principles)
- Promote IR activities including constructive communications with investors, shareholders in line with disclosure policies

Responses to End of the Generic Drug Boom

Within the realm of generic drugs, the influence of authorized generics (AG) is being closely monitored. Authorized generics are off-patent drugs that contain the exact same active and inactive ingredients and are manufactured using identical processes as branded drugs, and may lead to selection and differentiation of specific generic drug manufacturers. Furthermore, this trend may also influence capital investment plans of generic drug manufacturers.

With regard to responses to the abating of the generic drug boom within Japan, Freund has already taken action to offset any negative influences including 1) new product development within Japan (TABREX sales expansion), 2) cultivating overseas markets for formulation equipment (Asia and Europe), 3) cultivating overseas markets for excipients and food quality preserving agents, and 4)

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cultivating new markets for lithium ion battery applications.

There is a need to prepare for a decline in machinery demand, excluding TABREX, within Japan to the levels that existed two years ago. Orders within Japan stood at JPY6.1, JPY6.0, JPY7.9 and JPY8.0 in fiscal years February 2013, 2014, 2015 and 2016 respectively. Given that first half orders in the current term stood at JPY3.3 billion, orders in the current full term may be about JPY6.0 billion.

Over the same period of time, overseas orders have risen from JPY4.0 to JPY5.0 billion. But they need to rise a step further to between JPY6.0 to JPY7.0 billion in order to cover the impending period of weakness in Japan. In addition, the weakness within Japan can be offset if orders of new TABREX machines can be boosted to between JPY1.0 to JPY2.0 billion. Furthermore, the overall machinery business can be expected to see growth if the above mentioned conditions are met along with expansion in the lithium ion battery applications from their current level of JPY2.0 to between JPY3.0 to JPY4.0 billion.

Epoch Making New Tablet Printing Equipment TABREX – Highly Competitive Products

The second generation TABREX Rev. tablet printing machine was launched in July 2016 and the new machine has come to be regarded as highly superior.

The new machinery is compact in size, but boasts of large improvements in performance with a capability to respond to demands for increases in output. Capacity can easily be increased by using machinery in module format and increasing their numbers. The machine has been kept to a compact size because it employs a guideless transport mechanism that does not use guides. In addition, the yields of the printing function have increased dramatically due to improvement in the accuracy of the optical inspection function. Moreover, the ink used comes in a cartridge format that allows for easy replacement of ink and contributes to reductions in loss of ink.

The new TABREX machinery costs about JPY100 million and is capable of printing 100,000 tablets per hour. Cartridges cost about several hundreds of thousands of yen, and color ink cartridges are available. Freund leads the industry and has created a “stock type business model” where they can derive sustained income from sales of cartridges. Strong orders are also anticipated.

TABREX is also expected to be a product that can compete in the global market as well. Therefore, product development and marketing structures will be further strengthened.

While all of the first generation TABREX machines introduced until now are still in operation, efforts were conducted for the development of the second generation machine during 2015. And while there are seven companies within the industry making similar machinery, the second generation TABREX machine is highly differentiated from competitors’ equipment. Highly skilled development staff have been hired from outside Freund to work on the development of TABREX, and

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they have contributed to an increase in the development capability of Freund overall. A team of engineers with particular strengths in mechatronics and semiconductors have been assembled and have been highly effective in the development process.

The new machine allows for printing directly to iodine tablets, which had proven to be a technological challenge until now. While iodine tablets are difficult to distinguish from other tablets visually, the ability to clearly print on these tablets will reduce the risk of mistaken administration. While coating tablets before they can be printed on increases the price of their manufacture, it is not yet clear whether or not printing made directly to the surface of the tablet will remain intact or not.

While initial versions of this machine were developed through collaboration between Okabe Kikai Kogyo Co., Ltd. and major pharmaceutical manufacturing companies, the addition of Freund's revolutionary drug formulation ink (pharmaceutical excipient) technologies have contributed the development of this most advanced machine in the world.

The character legibility of the new tablet printing machinery has improved dramatically compared to conventional machines. This new machine uses dot-on-demand (DOD) ink jet printing format to print characters that are four times finer than conventional methods. In addition, this new machine allows for printing on both sides of tablets and parallel printing for secant and non-secant applications. Patent applications for this printing technology have been submitted.

One of the main points of superiority of TABREX is the light resistance quality and the easy of handling of the cartridge package for ink. Furthermore, this ink cartridge will lead to sustained income after the sale of the printing machinery.

Highly Competitive TABREX

The leading quality performance of TABREX makes it superior. Conventional printing equipment can produce 300,000 tablets. Consequently, use of three machines in parallel applications could satisfy conventional capacity demands. The new second generation equipment allows for 1) reductions of wasted ink due to its modular format, 2) elimination of separate inspection equipment due to internalized ability to conduct external inspection, 3) easy replenishment of ink by simply replacing a cartridge, and 4) easy disassembly and assembly (15 minutes) due to the use of a simple mechanical system.

TABREX REV also uses a new technology that allows for printing over engraved marks on tablets which cannot be duplicated by competitors. Also, the edges of the tablet can also be printed and invisible printing can be conducted. Invisible printing uses special ink that is invisible to the human eye under normal light but can be seen when special lighting is shone on the printed tablet. This technology can be used as a method to prevent falsification of products.

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Compared with conventional equipment, TABREX is becoming the industry standard with its ability for mass production. Sales of tableting equipment will also contribute to sustained sales of ink, which can become another significant contributor to profits.

Sales efforts will also be made to sell TABREX in overseas markets. Falsified products are estimated to account for more than 10% of the market in Europe and represent a loss of about JPY1 trillion. TABREX equipment will allow for each tablet to be printed with a unique identification number. Therefore, Freund Vector will assume responsible for marketing this product in Europe and North America. TABREX is highly effective because it has been developed internally and is compact in size. Moreover, it can be expected to contribute largely to profits as it is a high value added product.

Capital Investment, Research and Development Expenses

(JPY mn, %)

	FY2/12	FY2/13	FY2/14	FY2/15	FY2/16	FY2/17	FY2/18 Est.	5 Year Plan
Capital Investment	218	221	477	545	266	564	650	JPY2.8 billion expected over 5 years JPY1.2bn,JPY1.2bn for Machinery, Chemical & Food JPY0.4bn company wide
Depreciation	264	232	303	308	321	338	360	
R&D	390	435	464	592	687	640	550	JPY1.9 billion expected over 5 years
R&D / Sales Ratio	2.6	2.7	2.6	3.4	3.6	3.0	2.6	JPY1.2bn, JPY0.7bn for Machinery, Chemical & Food JPY1.5bn, JPY0.4bn for new product, component development

New Products beyond TABREX

The development team of TABREX leverages external human resources to develop new applications for mechatronics, and this team is expanding the realm of its product development capabilities. Consequently, Freund is developed new products following on the heels of TABREX and made an announcement of these new products at the Interphex Japan Conference June 2017.

This new equipment TABREX I takes into account the inspection needs for tablets by simply removing the external inspection function from TABREX Rev. Inspection for ultra-variant tablet which had only been possible by manual viewing with conventional equipment has been automated. Consequently, demand from global markets is anticipated.

In addition, a small 3.5 kilogram version of the printing equipment called TABREX Portable that responds to customer needs for an experimental portable type printer.

Revolutionary Continuous Granulating Machinery Development

Granuformer made by Freund Turbo was introduced in June 2017 at the Interphex Japan Exhibition. The basic principles and systems used in this equipment has been developed by Freund, but was adapted to match needs in the United States market. Marketing for this product is expected to be conducted not only in the United States, but globally as well.

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Continuous integrated production allows for the processes ranging from pharmaceutical product raw material weighing, mixing, granulating, drying and tableting to be conducted. Also, Vector's control systems allow for the most recent version of COMPU to be applied.

Globally, GEA has delivered continuous production equipment to Pfizer. And while attempts at making continuous manufacturing equipment had failed 10 years ago, success has been achieved in practical applications within the past several years.

Freund has also established its own unique continuous production system and created commercial applications of this technology which will become a driver of growth in the future. The ability to continuously production of drug formulations will allow for 1) equipment to be reduced in size in response to individual needs of customers, 2) increases in efficiency by reducing the manufacturing time and 3) improvements in design quality.

GEA developed a continuous production machine and it has begun being adopted by pharmaceutical manufacturers in Europe from 2015 to 2016. The guidelines for continuous production are being solidified as modular and full line equipment applications are being tried. It has already received approval from the United States Food and Drug Administration and is expected to receive approval in Japan shortly. Freund and Powerex Corp. are both promoting development.

The merits of continuous production include 1) flexibility in the control of production volumes, 2) the ability to use the same equipment after research and development is conducted for actual manufacturing, and 3) offers reductions in capital investments and other resources. At the same time, some of the main concerns surrounding the introduction of continuous production equipment include the quality and cost of products manufactured, the ability to respond to various regulations and others.

Currently, there are applications where certain products are better suited for continuous production and batch production in striking a balance between drug unit pricing and production volumes. Because both options can provide a set volume through continuous production, the ability to develop new products on an anticipatory basis is a key.

The most difficult aspect of continuous production is the mixing process for drugs and excipients. In order to mix both successfully, both need to be of similar quality depending upon the drugs being manufactured and consequently a high level of knowhow is required. Inability to achieve high quality levels in the initial stages of manufacturing can lead to defective products being manufactured in the continuous production process.

Freund will form alliances with other companies to conduct joint development of continuous production systems for tablets. The newly developed systems will not use batch processing, but instead use granulating, drying, tableting, coating and printing processes on a continuous basis. All of these processes will be created in cooperation with other companies involved with tableting. This

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continuous production system will duplicate the integrated manufacturing structures of chemical plants for drug formulation processes functions.

Freund developed the granulating equipment Granuformer to replace conventional batch production and realize continuous production for granules, and launched sales in 2014. Raw powder materials are mixed with binders in two axis extruders to be turned into granules in a dome type vertical granulating machine. Uniform granules with minimal variation in granule size distribution can be manufactured using a newly developed spiral drying mechanism for continuous production and recovery in a cyclone mechanism after hot air drying is completed. And while GEA manufactures continuous manufacturing equipment, Freund's equipment is more advanced and leads the continuous production machinery industry.

Global Deployment of the Pharmaceutical Excipients Business

With regard to excipients, the decision to deploy this business globally has also been made and efforts to begin marketing excipients have already led to an increase in exports. Beginning with non-parallel, new excipients in niche realms are being leveraged to cultivate overseas markets.

In addition to the organizational restructuring performed in March 2017 for the machinery, cosmetics and management divisions, Japanese and overseas marketing divisions have also been newly established. Repeated marketing visits to the same clients for both machinery and cosmetic products are commonly made. Therefore a decision has been made to integrate the marketing efforts, which had been conducted separately.

In addition, the Japanese and overseas marketing divisions have been placed on the same floor so that coordinated marketing for both Japan and overseas markets can be conducted. The ability to coordinate marketing functions for both Japan and overseas markets is becoming increasingly important due to the recent aggressive moves by the Japanese generic drug manufacturers to enter overseas markets. Moreover, collaboration on marketing with Freund Vector and Freund Turbo has been strengthened more recently.

Pharmaceutical Excipients and New Product Development

Sales of new pharmaceutical excipient products were launched in October 2015. Freund has succeeded in developing a version of the Nonpareil 105 series with even finer granule size. Traditional granule sizes have ranged between 355 to 500 μm and 180 to 300 μm , but a new size of between 106 to 212 μm has been developed. Consequently, the rough texture of orally disintegrating tablets has been reduced a step further, and capsule sizes can now be reduced. At the same time, enteric and controlled release, and precise drug design can now be performed. This technology leads

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the industry and is expected to contribute to earnings.

Promote Internal Development of New Products in the Chemical and Food Business

Freund is marketing pharmaceutical excipients developed in-house to generic drug manufacturers, and they should become a stable source of earnings due to sustained demand if they are used by generic drug manufacturers.

The Company has promoted efforts to internalize the manufacture of food quality preserving agents along with the merger of Freund Kasei Corporation and the move of the in-house plant to Hamamatsu.

At the same time, consigned manufacture of supplements has lost the momentum it had seen two years earlier. This slowing is attributed to the arrival of an adjustment period for Freund's dietary supplements. Freund's granulating and coating technologies can be leveraged in the production of newer supplements. The effectiveness of supplements depends upon how high in quality and uniformity they can be manufactured, and how they are absorbed. The profitability of excipients and quality preserving agents manufactured in-house is higher than supplements manufactured on a consigned basis and they contribute to overall profits.

Freund currently manufactures over 10 different supplements. One of the strengths of the Company is its drug formulation technologies and applications of special coating technologies to protect important agents of these supplements from dissolving in the stomach to allow them to remain intact until they can reach the intestines. This superior sustained release control technology is a strength of Freund.

Freund manufactures on a consigned basis enclosed capsules that can deliver bifidobacteria safely to the intestine. Bifidobacteria in general is susceptible to degradation within the stomach and small intestine and most die in the stomach. Freund's capsule technology allows the bifidobacteria to reach the large intestines where they are designed to aid the healthy digestion process. Manufacturing is done on a consignment basis and contributions from this technology are expected to boost future earnings.

Lithium Battery Manufacturing Equipment Development, Market Cultivation: Expected to Grow to Become a Large Market

Freund's machinery is used in the manufacturing process for cathode and negative electrode materials for lithium ion batteries because of its strong reputation amongst clients. Various coating equipment for surface modification are available including Turbo Screener used for of raw materials introduction, Roller Compactor for granulating, and V Turbo for pulverizing.

In addition to Freund Turbo equipment, Freund equipment (roller compactor, coating equipment) is

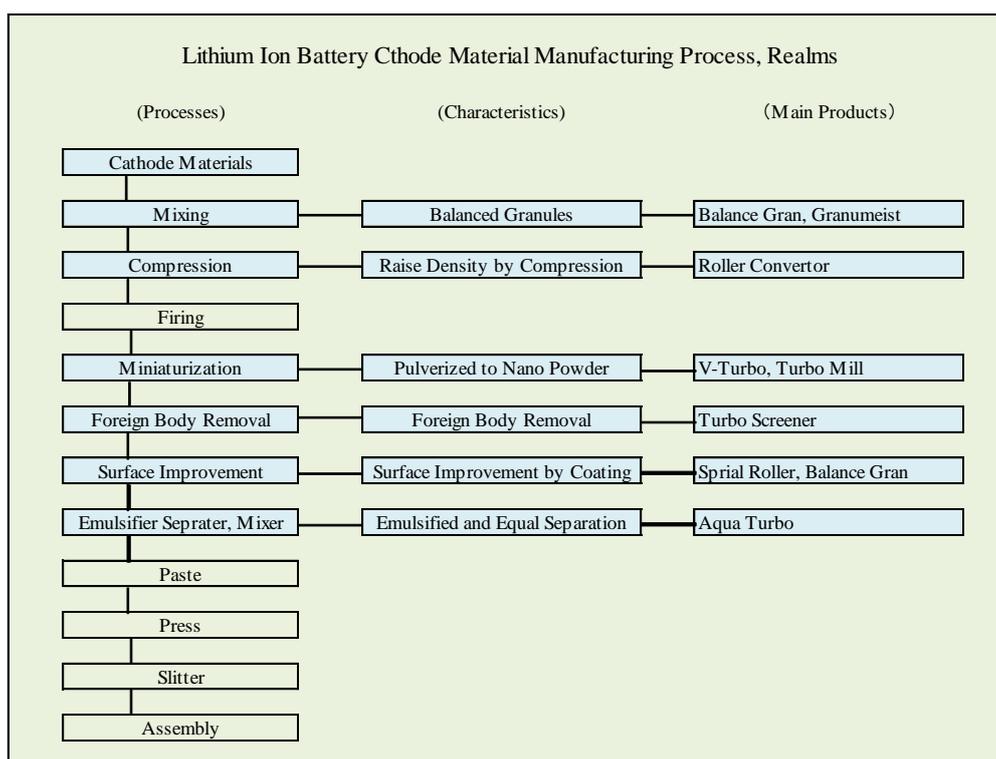
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also used to create high performance electrodes.

Lithium batteries are expected to become established as an independent industry, and machinery for the manufacture of electrodes sold to Korea and China are expanding. Consequently, Freund Turbo's business is expanding.

Lithium ion battery applications that call for increased performance of particle coating of electrodes and miniaturization on the rise. These trends are expected to contribute to growth in demand for Freund's coating technologies. Lithium ion batteries are beginning to utilize industrial coating applications and Freund is developing specialized equipment for these applications.

V Turbo new industrial use products utilize drug formulation equipment technology applications, but efforts to develop new products that are improved to better match lithium battery applications. Product development is being conducted through a collaboration between Freund and Freund Turbo, with Turbo assuming responsibility for marketing. Because of strong demand in China and Korea, efforts will be made to further strengthen marketing capabilities.



Highly Competitive Cathode, Negative Electrode Material Use Equipment: Leveraging Pharmaceutical Technologies

The main part manufacturing equipment for secondary batteries that use primarily lithium ion

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batteries is starting up on a full scale basis. Freund is producing manufacturing equipment for cathode and negative electrode materials.

Mixed cathode and negative electrode material are combined (Equipment names: Balance Gran, Granumeist), compacted (Roller compactor), miniaturized (V Turbo), removed of foreign bodies (Turbo Cleaner), surface modified (Balance Gran, Spira-Flow), and emulsifying separated, mixed (Aqua Turbo). They are thereby turned into a paste form which is then pressed, slitted and assembled.

In the pulverizing process, they are made into even greater miniaturized nano-powders. By doing so, the capacity of batteries can be increased. Furthermore, the surfaces can be improved further by using smaller particles than those used in pharmaceutical products in the coating process. After the combining process, pressure is used to increase the density using compressed powder adjustment technology. Surface area can be increased by miniaturizing powders to expand capacity. Nickel, cobalt, and manganese spheres of 17 nanometers are used in coating processes. This is smaller than particles used in pharmaceutical products, and allows for improved conductivity.

Commercialization of new manufacturing process equipment is being conducted continuously with the new product Aqua Turbo being launched into the market in November. Over the coming ten years, the market for cathode and negative electrode materials is expected to grow by between five to ten times. Factors behind this rapid growth include accelerated growth in electric vehicles, and the implementation of revolutionary technologies for self driving automobiles.

Demand for applications from China, Korea and Taiwan is rapidly growing as battery manufacturers are aggressively pursuing high performance battery applications. Freund has established distributors in Beijing and Suzhou, China, and in Korea, and Taiwan, and has already booked orders for several units and sales in each region. Furthermore, the Company has received daily requests for testing to be conducted at the Hamamatsu facility. Marketing for this series of products have begun with secondary batteries and related powders being displayed at exhibitions. Freund expects to participate in an exhibition in China in May 2018.

While sales have begun to ramp up with orders for individual products within the lithium ion battery related equipment business, Freund is expected to soon start a strategy of order taking in line with its manufacturing process plant.

While Freund is a late participant to the market for these materials, its miniaturization technologies developed in the realm of pharmaceutical products is a strength that can be used to cultivate clients in this new business realm.

The ability of Freund's coating technologies to improve conductivity will become even more important in next generation battery applications. Freund's dominant position in this technology is

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likely to become a strong differentiating factor.

In the realm of pharmaceutical products, roller compactors boast of a market share of about 90%. This precision technology is also expected to have applications within the battery materials realm.

There are only three manufacturers of equipment for lithium ion battery electrodes for electric vehicles, including Freund and another company within Japan, and another company in Germany. The main clients are in companies in China, Korea and Taiwan, with which Japanese companies are collaborating with for next generation electric vehicle applications. Product systems that leverage Freund's technological strengths are expected to act to elevate the Company to a position of superiority relative to competitors.

Akira Kiko Acquisition

In order to strengthen mixing equipment, Freund Turbo has acquired Akira Kiko Co., Ltd. Akira Kiko owns patents for high speed stirring granulating equipment (Balance Gran) and is conducting ongoing development of new equipment. Akira Kiko, located in Kobe, Japan, is expected to contribute to growth of the Freund as a Group company. The acquisition price is said to be relatively small given the small amount of sales of Akira Kiko of JPY80 million.

Akira Kiko is a start-up company launched 10 years ago by President Iwata. The main product of this company is Balance Gran which uses unique technologies. Clients have placed orders for several units of this equipment and Freund has sought to use this equipment as well.

The inclusion of Akira Kiko to the Freund Group is expected to accelerate its growth by bolstering its weak management foundation. The some five to six employees working for President Iwata in Akira Kiko are expected to join Freund Turbo.

The acquisition price of Akira Kiko was small given that it was operating at a loss. Despite the losses, the positive affects expected to be derived from synergies with the Freund Group are large.

Cultivate Fine Chemical Machinery Market – Leverage Freund Turbo's Strengths

Freund Turbo is promoting aggressive marketing activities within Japan and in overseas markets. V Turbo pulverizing equipment is favorably received in the market for applications in the food and battery applications.

Freund Turbo also replaced its top management team in March 2014, with Iwao Fusejima becoming Chairman and Shuichi Watanabe, who used to work at a trading firm selling Freund Turbo products, being appointed as President. An office was established in Shinagawa in June 2014 as part of its efforts to strengthen its marketing structure and integrate its manufacturing and sales functions.

President Souichi Watanabe has led efforts to strengthen the marketing function, and achieve results

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from new product development. Pulverizing equipment has matched new needs in the market for toner and chemical products and are growing. Freund Turbo's ultrasonic screen type turbo cleaner is also expected to see strong demand in pharmaceutical product applications. This machinery uses a mechanism to eliminate foreign matter at ultrasonic speeds and was developed for pharmaceutical product applications. This product is also expected to be marketed by Freund Vector as well in the future.

Freund Turbo also boasts of strengths in fine chemical products commonly used as materials in cosmetics, toner, and lithium ion battery related applications. Granulating machinery process powders in sorting equipment to form solid materials, then processes them in mixing and pulverizing equipment to turn them into micron sized granules, and finally run them through dry mill equipment to be turned into ink. This process turns micron sized powders into nano sized granules. Freund Vector of the United States has begun selling Freund Turbo's Turbo Screener (Sorting equipment).

The over 300 tests of pharmaceutical products conducted at the Hamamatsu Technology Development Research Center per year, and testing of industrial use batteries (Machinery used to create materials used in automobile use lithium ion batteries) is also rapidly growing.

Plans to Launch A Service Business

Machinery maintenance service is one of the new businesses currently being considered for launch in the future. Nearly 10% to 15% of machinery business sales are repair parts and services. While Freund has not actively pursued the maintenance and service business, Vector of the United States has promoted efforts to conduct the service business. Within the next year, Freund expects to establish the foundations of a maintenance service business within Japan.

Cultivate the Global and Asian Markets

In North America, new developments are appearing with regards to both pharmaceutical and food related products. While demand in South America had stagnated in the past several years, a recovery is being seen in parts of Brazil. Freund will endeavor to raise its overseas sales ratio to 30%. With regards to the overseas manufacturing structure, Freund is considering the creation of a manufacturing structure within Asia as part of its current Medium Term Business Plan and with a view to the promising market of India.

A laboratory was opened in Milan, Italy to cultivate the European market. Similarly Freund deems that there is now a need for a similar laboratory in Asia to cultivate local markets. Furthermore, responses are being developed to answer the growing need for multiple function equipment in the Indian market.

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The superior uniformity quality of the Granulex (Centrifugal rolling granulation and coating equipment) with both granulating and coating functions that eliminate the need for a separate granule sizing process is believed to match the needs of the India market. In overseas markets, Freund has switched its distributing agents in both India and Korea, and is strengthening its collaboration with Freund Vector to cultivate business in the Asian markets. Moreover, measures to improve the coating equipment High Coater Original for emerging markets in Asia are being promoted.

With regards to cultivation of the India market, marketing for both equipment made in Japan by Freund and the United States by Freund Vector are being conducted, and orders have been received for manufacturing equipment made by Freund Vector. These orders reflect the characteristic of Freund Vector machinery being designed with global standards in mind.

In cultivating global markets, the anticipated strong growth in generic drug usage around the world must be considered. With regards to developing markets, demand for Freund's high end drug formulation equipment is expected to grow. There are some 2,000 pharmaceutical related companies within Japan, 5,000 in China (200 are publicly traded) and 20,000 in India (Only 100 are recognized by the United States Food and Drug Administration). Therefore, demand for Freund equipment is expected to rise along with growth in the construction of clean and highly precise manufacturing facilities in these markets.

The main markets in Asia are Korea, China, India and Taiwan, but other markets including Turkey and Indonesia are also becoming attractive. And while marketing for these markets is conducted from Japan, both equipment made in Japan by Freund Corporation and in the United States by Freund Vector are being sold, depending upon the needs of the customers in those markets.

Particular efforts to sell excipients will be made in Korea, China and India. Marketing will be conducted for unique products in cooperation with companies with strengths in chemicals.

Freund Vector Business Expansion

With regard to the laboratory of Freund Vector, the existing aging equipment is expected to be replaced with state-of-art equipment so that customers coming to the facility can test the highly improved efficiency of the newer equipment. Consequently, capital investments are expected to increase.

In addition, Vector is hiring engineers for business development that explore opportunities in new business realms. They have already been able to identify potential business candidates and are considering their commercialization.

Vector of the United States completed construction of facilities to house a new manufacturing line in January 2015. The assembly space is 1.6 times the size of existing facilities. Furthermore, the

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construction of this new facility is timed perfectly.

This new facility was originally planned as a response to capture growing demand from South America and Europe as Freund Vector exports products to Central and South Americas. This increase in demand from overseas is the result of transfer of manufacturing facilities by United States pharmaceutical companies to overseas and it is expected to contribute to a decline in sales within North America and a rise in sales within Central and South Americas. The sales agent in Brazil maintains test equipment and provides them to customers on a rental basis as part of its marketing strategy. However, the use of sales agents in Central and South America leads to reductions in profit margins.

A key issue for Freund Vector is its marketing capability. While it maintains both manufacturing and sales facilities at its headquarters in Cedar Rapids, Iowa, a one hour plane ride from Chicago, Illinois, it needs to strengthen its marketing capabilities to be able to service the numerous pharmaceutical product manufacturer facilities located in the eastern portion of the United States.

Pharmaceutical Product Manufacturing Recovery in North America

There appears to be a trend for manufacturing to be brought back in-house within the United States and North America overall. United States pharmaceutical manufacturers had shifted production overseas, with products being imported back to the United States. But in order to raise the quality of pharmaceutical products, pharmaceutical companies are bringing production back to the United States to be manufactured in-house. Furthermore, pharmaceutical product manufacturers in India and China are also opening up manufacturing facilities in the United States. Consequently, Freund Vector is seeing increases in business opportunities.

As part of its sales services, Freund also provides rental of equipment, which is a service unique to Freund within the industry. This service allows customers to use their smaller machinery on loan for between two to three months. Customers can conduct actual production using this machinery, which leads to purchases by 20% to 30% of the customers to which the machines have been loaned. In addition, sale of spare and repair parts for equipment has become another income stream for Freund. The lifespan of equipment is long at between 10 to 20 years, but during this period parts need to be replaced. Consequently, parts sales account for between 10% and 15% of total sales and profitability on parts is high.

Leveraging Strength of Collaboration with Japan

According to Freund Vector, 1) the competitive capability of products can be raised by leveraging the development capabilities of Freund within Japan, 2) there is ample room to reduce costs through reviews of design, 3) COMPU5 can be leveraged in applications within Japan, and 4) both the volume

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and quality of human resources need to be improved for expansion of overseas business.

The importance of Freund Vector in the global strategy of the entire Freund Corporation Group is growing, and integration of the Group's overall management function is also necessary. President Iwao Fusejima, who was an exchange student studying in Cedar Rapids and is also the Chief Executive Officer of Freund Vector, will demonstrate his leadership qualities in the management of both companies.

4. Near Term Earnings: Orders Declines Expected to Cause Profits to Fall Next Term

Extremely Favorable Conditions in Fiscal Year February 2017

Sales and operating, current and net profits rose by 11.2%, 51.6%, 50.4% and 10.7% to JPLY21.164, JPY2.041, JPY2.097 and JPY1.064 billion respectively during fiscal year February 2017. Also, operating profit margin and return on equity ratio of 9.6% and 9.0% respectively were achieved.

The relatively low growth in net profit is attributed to the payment of JPY250 million in retirement benefits for directors arising from the retirement of the founder as managing director, and the affect of this payment is expected to disappear from fiscal year February 2018.

With regard to the machinery business, strong capital investments of the generic drug manufacturers and subsequent record high levels of orders were recorded. Machinery business division orders rose by a strong 24.8% year-on-year. Industrial related sales rose by a large margin of 55.2% year-on-year. This strong growth is attributed to a large project for a food related application in the United States, and the start of some lithium ion battery related application work in Korea. Consequently, confidence of the Freund management is growing as applications for products outside of the pharmaceutical product realm in the food and battery market are growing.

Machinery Business New Orders, Order Backlog Trends

	(JPY mn. %)									
	FY2/13		FY2/14		FY2/15		FY2/16		FY2/17	
Machinery										
New Orders	9,280	(-8.4)	10,067	(+8.6)	12,407	(+23.2)	13,112	(+5.7)	16,358	(+24.8)
Sales	9,914	(+3.5)	11,004	(+11.0)	10,941	(-0.6)	13,037	(+19.2)	14,914	(+14.4)
Order Backlog	5,271	(-9.3)	4,991	(-5.2)	6,682	(+33.9)	7,086	(+6.0)	8,561	(+20.8)

(Note) Figures in parenthesis are percent year-on-year change

Sales of Freund Vector in North America are trending favorably, and earnings steadily expanded. However, in yen terms sales and profits declined by 9.6% due to the influence of the strengthening of the yen from JPY121.1 to JPY109.5. In local currency terms, profit actually rose by about 10%. Freund Turbo was able to grow sales, but higher costs including labor and development expenses

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caused profits to decline.

Excipient sales within the chemical and food business trended favorably. Fierce competition caused sales and profits of food quality preserving agents to decline. Sales of dietary supplements grew, but profits trended sideways due to lower profitability of products sold. Recent growth in highly profitable pharmaceutical excipients allowed profits of chemical products to grow by a large margin.

Sales by Geographic Region

	(JPY mn, %)							
	FY2/15	(Share)	FY2/16	(Share)	(YY)	FY2/17	(Share)	(YY)
Japan	13,056	74.9	13,547	71.2	(+3.8)	15,601	73.7	(+15.2)
Overseas	4,367	25.1	5,480	28.8	(+25.5)	5,563	26.3	(+1.5)
North America	1,599	9.2	2,190	11.5	(+37.0)	3,331	15.7	(+52.1)
Europe	450	2.6	937	4.9	(+108.2)	830	2.6	(-11.4)
Central South Americas	1,071	6.1	1,325	7.0	(+23.7)	553	3.9	(-58.3)
Asia, Others	1,246	7.2	1,027	5.4	(-17.7)	847	4.0	(-17.5)
Total	17,424	100.0	19,027	100.0	(+9.2)	21,164	100.0	(+11.2)

(Note) YY represents year-on-year growth rates

While the value of exports of the chemical and food business is still small, they grew by 37.3% year-on-year. Exports to India, Korea and Taiwan are growing and Freund maintains high expectations for future exports.

During fiscal year February 2017, factors including 1) the disappearance of development expenses (JPY0.3 billion) for TABREX that occurred in the previous fiscal year and 2) the disappearance of losses of Pharmatec (JPY0.15 billion) due to sale of the company had a positive influence upon earnings, and contributed to both the machinery and chemical and foods businesses.

Earnings by Business Segment

	(JPY mn, %)					
	Machinery	YY	Chemical, Food	YY	Adjustment	Total
2012.2						
Sales	9,582	(+18.4)	5,653	(+9.5)	-1	15,236
Operating Profit	907	(+46.3)	470	(+20.9)	-312	1,065
% margin	9.5		8.3			7.0
2013.2						
Sales	9,914	(+3.4)	6,482	(+14.7)	—	16,396
Operating Profit	1,172	(+29.2)	565	(+20.2)	-267	1,470
% margin	11.8		8.7			9.0
2014.2						
Sales	11,004	(+8.6)	6,611	(+2.0)	—	17,616
Operating Profit	1,242	(+6.0)	379	(-32.9)	-335	1,286
% margin	11.3		5.7			7.3
2015.2						
Sales	10,941	(-0.6)	6,482	(-2.0)	—	17,424
Operating Profit	1,108	(-10.8)	474	(+24.9)	-432	1,150
% margin	10.1		7.3			6.6
2016.2						
Sales	13,037	(+19.2)	5,990	(-7.6)	—	19,027
Operating Profit	1,189	(+7.3)	519	(+9.6)	-362	1,346
% margin	9.1		8.7			7.1
2017.2						
Sales	14,914	(+14.4)	6,249	(+4.3)	—	21,164
Operating Profit	1,750	(+47.1)	748	(+44.0)	-456	2,041
% margin	11.7		12.0			9.6

(Note) % margin represents ratio of operating profit to sales

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Change in Accounting Periods of Subsidiaries

During fiscal year February 2017, both Freund Vector and Freund Turbo changed their accounting period end from December to February, causing both companies to see an irregular accounting period of 14 months. While business activities are slow during the months of January and February, this change in accounting periods is estimated to have added some JPY0.7 billion in sales and several tens of millions of yen to profits. During the coming term, this change is expected to contribute to loss of a similar level of sales and profits.

Strong Balance Sheet, Adequate Free Cash Flow

With regard to the balance sheet, capital adequacy ratio declined slightly from 67.0% at the end of the previous term to 63.8% at the end of the current term. At the same time, cash position rose from JPY4.042 to JPY6.982 billion over the same period. Growth in orders and the change in subsidiary accounting periods contributed to a rise in prepayments from JPY1.288 to JPY1.831 billion.

The net cash inflow from operating activities rose by a large margin to JPY3.605 billion. And despite a net cash outflow from investing activities of JPY351 million, free cash flow turned from a net outflow in the previous term to a large net inflow in the current term. Freund is expected to use its cash flow for research and investment, overseas capital investments, capital collaboration within and outside of Japan, and for M&A activities.

Balance Sheet

(JPY mn, %)

	FY2/12	FY2/13	FY2/14	FY2/15	FY2/16	FY2/17
Current Assets	10,554	11,084	11,331	12,782	13,053	14,938
Cash equivalents	3,035	3,617	4,600	4,870	4,042	6,982
Receivables	4,954	4,764	4,409	5,272	5,694	4,403
Inventories	251	210	202	296	330	404
Uncompleted products	1,219	1,497	937	931	1,511	1,712
Raw materials	403	394	535	543	590	649
Noncurrent Assets	3,787	3,886	4,219	4,495	4,153	4,162
Tangible assets	2,861	2,910	3,052	3,403	3,135	3,234
Investments, others	898	946	988	944	835	872
Total Assets	14,342	14,971	15,550	17,277	17,206	19,101
Current Liabilities	5,204	5,015	4,402	5,427	5,315	6,592
Payables	2,810	2,478	2,068	2,786	2,580	3,058
Prepayments	1,223	1,279	926	1,242	1,288	1,831
Noncurrent Liabilities	647	640	754	669	361	323
Net Assets	8,489	9,315	10,392	11,180	11,529	12,185
Capital adequacy ratio	58.3	61.4	65.8	63.6	67.0	63.8

(Note) Freund had no interest bearing liabilities as it maintains no loans payable

Unfinished products on the balance sheet grew due to the increase in orders and include orders to be filled during the coming term. Customers are required to make a prepayment worth one third of the value of their order for products at the time of their order. The majority of products are booked

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as sales at the time of their delivery. Sales for longer term projects of over two years are booked on a percentage of completion basis, but account for a small amount of Freund's overall sales.

Freund maintains a healthy balance sheet with zero debt. Furthermore, prepayments match the levels of inventories. Because Freund is a research and development based company, large capital investments are a requirement of its business cycle. Working capital can be paid for using internal funds and there is no need for external funding. And because Freund is able to secure adequate amounts of free cash flow, its ability to pay dividends is on the rise.

Cash Flow Trends

(JPY mn)

	FY2/14	FY2/15	FY2/16	FY2/17	FY2/18 Est.
Operating Cash Flow	1,227	822	290	3,605	860
Net profit after tax	574	895	642	1,655	1,400
Depreciation	303	308	321	338	360
Receivables	453	-781	-430	1,243	-400
Inventories	552	12	-620	-382	-500
Payables	-113	345	-170	409	200
Prepayments	-447	252	45	571	-200
Profit on sale of subsidiary			217		
Investing Cash Flow	-423	-240	-432	-351	-600
Tangible assets	-264	-453	-304	-436	-600
Free Cash Flow	804	582	-142	3,253	260
Financing Cash Flow	-226	-284	-331	-277	-400
Dividends	-172	-215	-258	-215	-350
Cash and Equivalents at Term End	4,107	4,548	4,042	6,982	6,842

Orders Slow in First Half of Fiscal Year February 2018

During the first half of fiscal year February 2018, sales and operating, current and net profit rose by 11.7%, 56.4%, 54.0%, and 139.7% year-on-year to JPY9.789, JPY1.074, JPY1.091 and JPY0.734 billion respectively.

2Q Earnings by Business Segment

(JPY mn, %)

	Machinery	YY	Chemical, Food	YY	Adjustments	Total	YY
2Q FY2/17							
Sales	5,697		3,065			8,762	
Operating Profit	567		357		-237	687	
% Margin	10.0		11.6			7.8	
2Q FY2/18							
Sales	7,171	(+25.9)	2,617	(-14.6)		9,789	(+11.7)
Operating Profit	868	(+53.1)	420	(+17.9)	-215	1,074	(+56.4)
% Margin	12.1		16.1			11.0	

Freund is currently processing the bountiful orders booked for machinery for generic drug applications. And while the Company has received spot machinery orders from Europe, shipments have already been frontloaded into the first half of the current term and their high levels of profitability have boosted profits. The chemical and food business is benefitting from steady growth in highly profitable pharmaceutical product excipients.

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Machinery Business Quarterly Order Trends

(JPY mn)

	FY2/17				FY2/18	
	1Q	2Q	3Q	4Q	1Q	2Q
Machinery Business						
New Orders	3,689	4,716	3,836	4,115	3,624	2,360
Japan	2,569	2,892	3,032	2,089	1,649	1,711
Overseas	1,119	1,824	804	2,025	1,974	648
Sales	2,413	3,284	4,305	4,911	3,198	3,973
Order Backlog	8,318	9,765	9,289	8,561	9,045	7,465

At the same time, a sudden slowing in capital investments is resulting from the abating of the generic drug boom. Consequently, Freund has also entered a phase where orders have begun to decline by a large margin. The machinery business saw orders fall by a large margin of 38.5% year-on-year to JPY3.661 billion during the current first half from JPY5.462 and JPY5.122 billion in the first and second halves of the previous fiscal year.

Other concerns include how large the impending drug pricing revision scheduled to be implemented from April 2018 will be, and its impact upon the pharmaceutical industry. Freund appears to have already begun to see the influence of the industry's moves to restrain capital investments as the booking of orders for its new TABREX machines are behind schedule.

While orders for new food products have fallen by a large margin, this had been expected due to anticipated declines in consigned manufacture of supplements and has had little effect upon profits.

At the same time, new positive developments have also arisen. The first is the appearance of orders from overseas markets for machinery that produces materials used in lithium ion batteries within the machinery business, which has traditionally provided its products primarily to pharmaceutical product applications. Another is the start of sales, albeit slow, of pharmaceutical excipients in overseas markets. As formulation equipment and excipients represent the wheels of an automobile, stable growth in excipient sales appear to be promising.

While the operating loss is expanding along with growth in the sales of Vector, this trend is attributed to the strengthening of the overall business including hiring of local staff to firmly capture future business potential. At the same time, Turbo is able to secure growth in both sales and profits, with an acceleration in lithium ion battery application sales in China and Korea also being recorded.

Regional Sales

(JPY mn, %)

	2Q FY2/17	Share	2Q FY2/18	Share	YY
Japan	7,208	82.3	7,109	72.6	-1.4
North America	925	10.6	647	6.6	-30.0
South, Central Americas	179	2.0	472	4.8	163.6
Europe	244	2.8	1,020	10.4	317.2
Asia	205	2.3	539	5.5	163.1
Total	8,762	100.0	9,789	100.0	11.7

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The large growth in gross profits is attributed to the sales of machinery to Europe. However, these sales are expected to be one-off sales and are not expected to be sustained. With regard to regional sales, the decline in sales within Japan is attributed to disappearance of large deliveries of products to the food industry recorded during the previous term. Furthermore, sales to the pharmaceutical industry within North America are trended weakly. With regard to Central and South America, sales in Brazil, which had trended weakly, are beginning to recover. In Europe, spot sales of Spherex (Liquid tablet use) are on the rise. Also, high regard for Freund's unique technologies in the market have allowed for high levels of profitability. In the Asia region, exports of granulating equipment to India and China are growing. Amidst the strengthening regulatory trend, there are pockets within the industry where demand for Freund equipment is increasing, and they are promising as the profitability on these equipment is strong.

Earnings Estimates by Business Segment

	2014.2	2015.2	2016.2	2017.2	2018.2 (Est.)	2019.2 (Est.)	2022.2 (Est.)
	(JPY mn, %)						
Machinery	11,004	10,941	13,037	14,914	15,500	14,100	14,500
Freund Corp.	7,081	6,887	7,784	9,446	10,100	8,100	8,000
Freund Vector	3,892	3,905	4,686	4,727	4,500	4,800	5,000
Freund Turbo	782	999	1,205	1,641	1,900	2,200	2,500
Operating Profit	1,242	1,108	1,189	1,750	1,750	1,350	1,450
Operating Margin (%)	11.3	10.1	9.1	11.7	11.3	9.6	10.0
Chemical and Food	6,611	6,482	5,990	6,249	5,500	5,900	6,100
Pharmaceutical Excipients	1,971	2,135	2,132	2,357	2,650	2,850	3,000
Food Quality Preserving Agents	1,916	1,952	2,004	1,951	2,150	2,200	2,200
Dietary Supplements	2,723	2,394	1,853	1,941	800	850	900
Operating Profit	379	474	519	748	850	950	1,000
Operating Margin (%)	5.7	7.3	8.7	12.0	15.5	16.1	16.4
Adjustments (Company wide admin expense)	-335	-432	-362	-456	-500	-500	-500
Sales	17,616	17,424	19,027	21,164	21,000	20,000	20,600
Operating Profit	1,286	1,150	1,346	2,041	2,100	1,800	1,900
Operating Margin (%)	7.3	6.6	7.1	9.6	10.0	9.0	9.2
Overseas Sales	4,382	4,368	5,480	5,563	5,800	6,300	6,900
Overseas Sales Ratio (%)	24.9	25.1	28.8	26.3	27.6	31.5	33.5

(Note) Based upon Freund Business Plan data, Analyst estimates

Overcoming the End of the Generic Drug Boom: Shift from Generic Drug to Electric Vehicle Applications

Freund's earnings estimates for fiscal year February 2018 call for sales to decline by 0.8% year-on-

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year to JPY21.000 billion, and operating, current and net profits to rise by 2.9%, 0.1% and 31.5% year-on-year to JPY2.100, JPY2.100, and JPY1.400 billion respectively. The Company bases these estimates on an exchange rate assumption of JPY100 per United States dollar.

With regard to sales, chemical and food business is expected to see a JPY1.0 billion decline due to loss of consigned production of supplements as clients take production back internally. Also, a sales loss amounting to about JPY0.7 billion is expected to be caused by the change in accounting periods by Vector and Turbo and subsequent decline in the accounting period from a 14 month irregular year in the previous term to a normal 12 month year in the current term. Neither of these factors is expected to have any significant impact upon profits.

The Japanese pharmaceutical industry has entered a period where large adjustments in its capital investment plans are being made. Depending upon the details of the drug pricing revisions expected to take place in April 2018 there may be some recovery in capital investments in the latter half of the coming fiscal year, but the generic drug boom is expected to come to an end.

Orders for TABREX equipment have been delayed until the second half, and restraint in capital investments by pharmaceutical companies may have an influence upon orders yet to be booked. However, existing customers are expected to continue to use Freund equipment because of its ability to satisfy their need for clear printing on tablets to make them easier to be administered to patients. Furthermore, the Company is expected to continue to market equipment with tablet printing capabilities within Japan and begin marketing them in overseas markets as well. Orders for 10 TABREX equipment are expected to be booked during the current term.

While the order environment for Vector is slightly weaker than the previous term, it is expected to see similar levels of orders as the past term. While Vector of the United States saw a loss during the first half, this reflects efforts to increase its spending upon human resources through hiring of new employees including business development related staff for expansion of business in the future. In addition, staff numbers at the Milano facility have also been increased for the expansion of the product range from pharmaceuticals to food products, and from equipment to excipients. Sales of Turbo are trending favorably, and are expected reached a new record high of JPY2.0 billion at its current rate of growth.

With regard to the second half, Freund is expected to achieve its earnings estimates as it continues to process its order backlogs. This trend is reflected in the increase in work in progress on the balance sheet as of end August. Consequently, estimates for sales are expected to be achieved during the second half.

Orders usually require between six to eight months to be manufactured and delivered. Therefore, the bulk of the orders booked during the first half are expected to be delivered by the end of the current

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term, and orders booked during the second half to be delivered in the coming term. At the current pace of a 30% decline in orders during the second half, earnings of the machinery business in the coming term are expected to drop by a large margin.

Based upon the target of raising the usage rates of generic drugs to 80%, heated competition between the various generic drug manufacturers has continued. However, 1) the potential for overcapacity has arisen, 2) the need for authorized generics drugs is strong, and 3) fears arising from the impending implementation of drug price revisions from April 2018 have contributed to the sudden slowing in capital investments. Consequently, the generic drug boom which had been expected to continue for another year appears to have come to an end. The current issue is how far orders will decline.

It appears that orders could fall by 30% to 50% from the peak. Before the boom period when orders reached JPY8.0 billion, orders within Japan trended around the JPY6.0 billion level. Therefore, orders may be expected to fall to a level between JPY4.0 to JPY6.0 billion (Reflecting declines of JPY4.0 to JPY2.0 from the peak respectively). This margin of decline suggests that operating profit could also decline by JPY0.7 to JPY1.4 billion.

Consequently, Freund will implement measures to help offset this order decline including efforts to 1) expand sales by developing new product applications for TABREX (Add of JPY1.0 billion), 2) increase exports of formulation equipment to Asia (Add of JPY0.5 billion) and 3) raise exports of industrial machinery for lithium battery applications (Add of JPY0.5 billion).

While various uncertainties still exist, operating profit may be expected to decline by about 14% or JPY0.3 billion year-on-year during fiscal year February 2019.

The negative year-on-year comparisons resulting from the termination of the generic drug boom is expected to end in fiscal year February 2020, and profits may be expected to recover to a growth phase based upon Freund's efforts to cultivate new markets.

With regard to TABREX, Freund booked orders for two units and no sales during the first half, and expects to book orders for ten units and sales of between five to six units during the full year. And because of difficulties encountered in pre-delivery testing and post-delivery adjustments, a rapid expansion in TABREX units booked and sold appears difficult to achieve at this point in time. After these issues are resolved, the number of units booked as orders may expand to 20 units per year.

Success in efforts to expand sales of pharmaceutical excipients to India and the United States are beginning to be seen. Furthermore, the establishment of sales distributors in overseas markets is expected to boost sales even further.

Sales of lithium ion battery related equipment may expand more than expected. Despite the existence of competitors including Hosokawa Micron Group (Stock Code: 6277) of Japan and Netzch of Germany, Freund's powder processing equipment boasts of a superior competitive

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positioning.

Turbo's marketing strength is expected to result in large orders but a remaining issue is its ability to mass produce this equipment. Current annual sales are around JPY2.0 billion, so its ability to fill additional orders of between JPY0.5 to JPY1.0 billion is in question. Therefore, development of the ability to respond to the strong market needs for this equipment must be watched closely.

5. Company Evaluation: Endeavoring to Overcome the End of the Generic Drug Boom

Medium Term Growth Potential

Freund's goal of achieving sales and operating profit targets of JPY30.0 and JPY3.0 billion respectively in five years appear to be reasonable. However, the outlook for a decline in machinery orders in the wake of a decline in the boom in generic drugs in Japan calls for the need to carefully consider a strategy of to offset potential weakness.

The main issues for Freund are the same as before and include 1) new product development and 2) overseas market cultivation.

However, the expansion in machinery equipment orders is expected to be accompanied by a similar increase in pharmaceutical excipient sales. But because excipients are consumable products, their sales are expected to continue despite weakening in machinery orders. Furthermore, their contribution to profits is expected to increase along with growth in their sales.

A key issue for the Company is how far it can grow its presence in markets in Asia including India by the time the peak in generic drug related demand is seen. Therefore, the ability to come up with adequate new products responses will be a key factor in the raising of its overseas sales ratio, which will continue to be a key performance indicator.

Freund expects to cultivate market opportunities by leveraging its cooperation with Freund Vector. Over the medium to long term, Freund will be responsible for cultivating business opportunities in Asia, and Freund Vector will be responsible for Central and South Americas, the Middle East, and other emerging markets, and for the global deployment of the pharmaceutical excipient business. At the same time, Freund Turbo will continue to focus upon lithium ion batteries and other high value added applications

Based upon its strong product development capability, efforts will be made to aggressively cultivate opportunities in global markets and measures will be conducted to strengthen its overseas functions. At the same time, Freund will increase its efforts to cultivate both Japanese and foreign human resources, hire mid-career professionals, make anticipatory investments.

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The goal of achieving 10% operating profit margin now appears within reach. Freund boasts of a high capital adequacy ratio, but higher levels of operating profitability need to be achieved in order to raise return on equity a step further. At the same time, efforts will be made to raise the ratio of overseas sales, increase profitability of overseas businesses, leverage proprietary technologies to raise value addition of products, and reviews pricing of products.

In order to raise its position to become a top player in the global market, Freund needs to achieve further successes in cultivating opportunities in overseas markets over the long term. And because of the sustained strengthening of their capabilities, we rate the corporate value of Freund as “A”.

(Definition of corporate value is described in the cover of this report)

A View to Freund’s Move to the First Section of the Tokyo Stock Exchange

Freund was selected as the “Securities Analyst Choice of Companies with Superior Disclosure” during the current term. Amongst the emerging market listed companies selected were Freund Corporation, Seria Co. Ltd., and En-Japan Inc. These companies were selected for their 1) detailed communications with investors, 2) availability of published integrated reports, 3) explanations of internal controls, and 4) highly detailed fact sheets.

Freund has paid a dividend of JPY20 per share, including a special JPY5 dividend to commemorate the 20th anniversary of its listing in fiscal year February 2017. The Company is expected to maintain a dividend payment of JPY20 per share in the coming term, and maintains a dividend payout ratio target of 30%.

In order to move its shares to the First Section of the Tokyo Stock Exchange, Freund needs to have a minimum number of 2,200 shareholders. As of end February 2017, the number of shareholders stood at 6,570. Furthermore, the two for one stock split conducted at the end of February 2016 increased liquidity. Consequently, Freund can now move to the First Section as its market capitalization also exceeds the JPY25.0 billion minimum requirement. We anticipate Freund to make this move sooner or later.

While the portion of shares held by institutional investors is expected to rise, the maintenance of a strong individual investor base is also important. Because of the large number of shareholders holding the minimum lot of 100 shares, the shareholder benefit program (A JPY1,000 prepaid QOL Card given to shareholders with minimum trading lot) is also another attractive feature for shareholders in addition to the increase in dividends. The shareholder benefit program specifies that prepaid cards worth JPY1,000 will be given to shareholders holding the minimum of 100 shares for over one year, and JPY2,000 to those holding the minimum of 100 shares for over three years. This JPY1,000 prepaid card is equal to 0.6% in dividend yield terms. In other words, the actual dividend

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yield to shareholders holding 100 shares for over three years would be equivalent to 2.6%.

Freund is expected to focus its efforts upon achieving the goals defined in its Medium Term Business Plan, and President Iwao Fusejima is expected to adopt an aggressive role as the leader of Freund. At the current share price as of October 27, 2017, the price to book ratio (PBR) and price to earnings ratio (PER) stood at 2.04 and 18.3 times respectively, and return on equity and dividend yield were 11.2% and 1.3% respectively.

In the near term, a close watch should be kept on the timing of a bottoming in orders and the speed by which new businesses are ramped up. Based on the outlook for earnings to grow over the medium term and the potential for improvement in return on equity to over 10%, Freund may garner positive attention of the market again.

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