

Medical Data Vision Co., Ltd.

Leader in the collecting and utilization of medical big data: promoting collection and use of DPC data and EMR data via CADA-BOX

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Business

Collects and provides medical data to Japan's medical and healthcare sectors

Business model: Medical Data Vision (MDV) has two segments. In the Data Network Service segment, it provides management support systems to medical institutions, which gives it access to the medical data from those institutions. It also gathers health information (such as symptoms) of patients, with their consent. In the Data Use and Application Service segment, MDV receives permission from medical institutions to provide the data it has collected as secondary data to pharmaceutical companies, research institutions, food companies, and insurance companies, in addition to individual users.

DPC analysis benchmark system EVE holds a leading market share at 45%:

Most of the medical data the company amasses is Diagnosis Procedure Combination (DPC) data. DPC is a comprehensive evaluation system used in Japan to calculate the reimbursement of medical fees for acute inpatient medical care. The system classifies patients into diagnostic groups based on ailment, whether surgery is required, etc. MDV's EVE is a DPC analysis benchmark system for hospitals. The system analyzes DPC data, allowing hospitals to compare their medical care, and contributes to improving both medical care and management quality. 45% of all DPC hospitals use EVE (top market share).

Collecting both DPC data and EMR data: MDV's database, centering on DPC hospitals, covers 17.9mn individuals (as of February 28, 2017) and contains data on drug prescriptions, disease severity, etc, at DPC hospitals. In addition, in October 2016, MDV introduced CADA-BOX, a service that links the Karteko online service (allowing patients to view and manage a portion of their own medical information) and CADA Pay service (allowing deferred payment of medical fees) with existing electronic medical record (EMR) systems.

Earnings

Profits lag behind revenue growth on increased personnel costs in FY12/17; recoup investments in earnest from FY12/18

Growth potential: FY12/15 and FY12/16 were investment periods, with target annual sales growth of 30% and RPM of around 10%. By further expanding its data infrastructure and application through FY12/16, MDV aims to begin recovering its investments in FY12/17, with full-fledged recoupment starting in FY12/18. For FY12/17, it forecasts sales of JPY3.6bn (+36.8% YoY) and operating profit of JPY542mn (+25.9%). It expects to hire about 40 employees, primarily salespeople.

Medium-term strategy

Grow Data Use and Application Service by collecting real-time data and improving data quality and volume

Increase use of CADA-BOX: MDV plans to install CADA-BOX at 344 secondary care hospitals by end 2019, allowing it to collect more diverse medical data in real time and with individual consent.

Jump-start new businesses, including through M&A: MDV has high hopes for its new businesses and plans to begin manufacturing and selling OTC drugs and health and beauty care products through subsidiaries in summer 2017. The company is also considering M&A.

Expand Data Use and Application Service: By collecting more diverse data in real time, MDV plans to expand the target utilization of its data beyond pharmaceutical companies and research institutions, to the food, beauty care, and insurance industries, individual patients, and online ads.

Strengths and weaknesses

Strengths

Existing relationships with DPC hospitals:

45% of DPC hospitals use EVE. Trust-based relationships (regarding data collection) can be leveraged effectively for the next stage of growth

Large accumulated database: Holds medical data on 17.9mn people, or about 1 of every 8 Japanese people

Knowledge of medical data utilization:

Proprietary staff training program covering both medical care and data utilization

Weaknesses

DPC data not collected in real time: Three to four months can elapse between data collection and utilization if it comes on magnetic media and requires data cleansing

Lack of relationships with non-DPC hospitals and clinics: Currently, MDV has strong relationships with DPC hospitals (1,667 as of December 31, 2016). The total number of medical institutions is 178,946, so there is a much larger number of non-DPC hospitals and clinics

More business partnerships with EMR

system vendors required: Development focus shifted from AceVision to CADA-BOX in FY12/16

Profit growth drivers

To date: DPC-related data networks and utilization

Medium-term: DPC-related and CADA-BOX (EMR) data networks and utilization

Index	
Market capitalization	JPY38.4 bn
Stock price (2017/4/14)	JPY3,840
Issued shares (End-FY12/16)	10,003,600 shares
Foreign stockholding ratio	5.30 %
BPS (FY12/16)	JPY280.89
PBR (FY12/16)	13.67 x
PER (FY12/17 Est.)	117.5 x
Dividend (FY12/17 Est.)	-
Dividend yield (FY12/17 Est.)	- %
ROE (FY12/17 Est.)	11.6 %
Net debt/equity ratio (FY12/16)	-69.7 %

*Adjusted for stock splits. Issued shares include treasury stock

Source: Shared Research based on company data

Trends and results													
		Sales (JPYmn)	YoY	Operating profit (JPYmn)	YoY	Recurring profit (JPYmn)	YoY	Net income (JPYmn)	YoY	EPS (JPY)	BPS (JPY)	ROA	ROE
FY12/09	Parent	841	na	na	na	91	na	70	na	22.44	151.63	na	16.3%
FY12/10	Parent	1,063	26.4%	na	na	165	82.0%	144	105.4%	41.03	208.70	21.7%	23.3%
FY12/11	Parent	971	-8.7%	na	na	34	-79.4%	43	-70.5%	11.76	220.45	3.7%	5.5%
FY12/12	Parent	1,167	20.2%	61	na	63	83.3%	92	115.8%	12.68	122.91	6.3%	10.9%
FY12/13	Parent	1,530	31.1%	210	241.6%	211	236.4%	205	123.2%	28.31	151.21	17.8%	20.7%
FY12/14	Parent	1,951	27.5%	261	24.2%	249	18.1%	135	-33.9%	18.03	246.31	12.5%	8.0%
FY12/15	Parent	2,414	23.7%	282	8.4%	280	12.7%	164	21.1%	17.66	263.75	10.0%	6.9%
FY12/16	Cons.	2,632	9.1%	431	7.1%	416	48.4%	178	6.6%	18.68	280.89	13.7%	6.7%
FY12/17	Est. Cons.	3,600	36.8%	542	25.9%	540	29.9%	311	74.9%	32.68	-	-	

*Amounts below JPY1mn are rounded (these are rounded down in figures announced by the company); per share data is after adjustment for stock split; FY12/16 YoY data is a simple comparison with parent-only results.

Business

Leader in collecting medical data; utilizing electronic medical records and DPC data

Company overview

MDV was established in August 2003. It provides domestic medical and health care markets with massive amounts of data accumulated daily. It has medical data on some 17.9mn people—about one of every eight Japanese people (as of February 2017)—and is driving the utilization of big data in the medical sphere. The company name, Medical Data Vision, comes from the idea of “realizing medical care based on extensive proven data.”

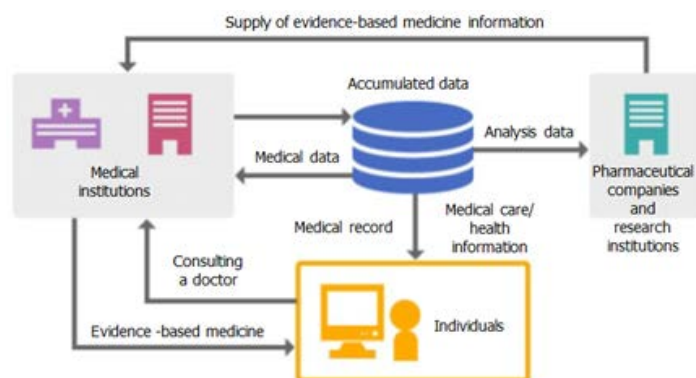
MDV provides management support systems to medical institutions, which enables it to collect medical data from those institutions. Its DPC* (Diagnosis Procedure Combination) benchmark analysis system, EVE, is the market leader in Japan. The system is used by 45% of DPC hospitals (as of December 31, 2016). The medical data MDV has accumulated on 17.9mn people (as of February 28, 2017)—with permission for secondary use—is used by numerous domestic and overseas pharmaceutical companies and research institutions for marketing and research on adverse effects. The company is also making inroads into connecting to core systems to collect patient medical records and vital signs (such as pulse and heart rate, respiratory rate, and blood pressure). It aims to build systems for collecting and utilizing medical data from various sources (such as electronic medical records). In FY12/16, sales totaled JPY2.6bn and operating profit JPY430mn. As of December 31, 2016, employees numbered 169 (around 25% in development and 50% sales).

Leader in collecting and utilizing medical data

- Has medical data on 17.9mn people, or about 1 of every 8 Japanese people
- EVE, its DPC* benchmark analysis system, has top market share (45% as of December 31, 2016)
- Name comes from the idea of “realizing medical care based on extensive proven data”

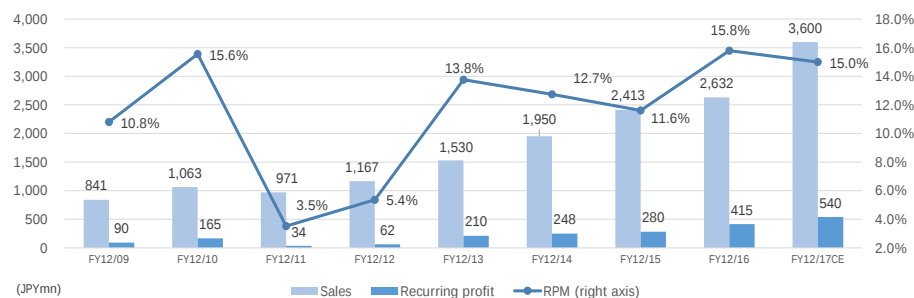
* Diagnosis Procedure Combination (DPC): A comprehensive evaluation system used in Japan for the reimbursement of medical fees for acute inpatient medical care, described in more detail below

MDV's ideal set-up



Source: Shared Research based on company data

Sales, recurring profit, and RPM



Source: Shared Research based on company data (figures below JPY1mn rounded down)

Business model

MDV has two segments. In the Data Network Service segment, the company provides management support systems to medical institutions, which enables it to accumulate medical information. In the Data Use and Application Service segment, MDV provides medical data to pharmaceutical companies and research institutions. It receives permission from medical institutions to use collected data as secondary data.

In the past, pharmaceutical companies used drug manufacturers' and wholesalers' shipment data. Yet this data was not enough to understand patient (i.e., end-user) drug usage in hospitals (key information for pharmaceutical companies' marketing activities). In contrast, DPC data that MDV collects allows for clear insight into end-user drug usage, so numerous domestic and overseas pharmaceutical companies and research institutions use MDV's medical data and data analysis.

MDV also aims to expand the use of CADA-BOX, its digital health solution for hospitals, which will help it collect data in addition to the DPC data obtained each month from hospitals (in line with secondary data use agreements). It plans to raise the quality and quantity of its Data Bank (a database of DPC and EMR data) by obtaining increasingly diverse medical data in real time. With this additional data, MDV aims to provide analysis data to various industries rather than just pharmaceutical companies and research institutions.

Business model: Provide management support systems to medical care institutions (receives lump-sum payments from packaged software sales and steady revenue from maintenance)

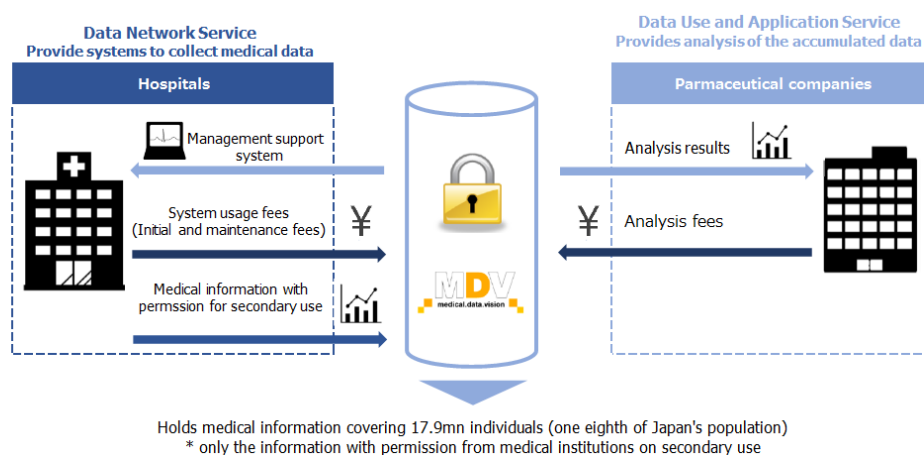
⇒ gather data from medical care institutions from which it has obtained permission for secondary use

⇒ generate earnings by providing data to pharmaceutical companies and others

► Obtain data on patient drug use at hospitals

► Aiming to expand the scope of data utilization by raising data quality and quantity, such as through collecting more diverse data in real time

MDV's business model



Source: Shared Research based on company data

Sales by segment

MDV has two segments: the Data Network Service business (54.6% of sales in FY12/16) and the Data Use and Application Service business (45.4% of sales). In Data Network Service, the company is involved in the planning, development, production, sales, and maintenance of management support systems for medical institutions, through which it collects medical and health care information. In Data Use and Application Service, MDV

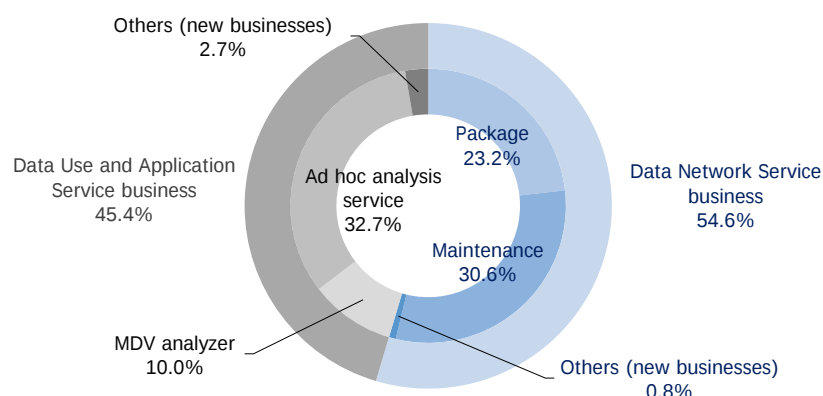
Two segments

► Data Network Service business: 55% of FY12/16 sales

► Data Use and Application Service business: 45% of sales

obtains permission from hospitals to provide the medical data obtained in Data Network Service to others—mainly pharmaceutical companies and research institutions—for secondary use.

Sales by segment, and by product or service (FY12/16)



Source: Shared Research based on company data

Sales by segment, and by product or service									
	FY12/09	FY12/10	FY12/11	FY12/12	FY12/13	FY12/14	FY12/15	FY12/16	FY12/17 Est.
(JPYmn)	Parent	Parent	Parent	Parent	Parent	Parent	Parent	Cons.	Cons.
Sales (to external customers)	841	1,063	971	1,167	1,530	1,951	2,414	2,632	3,600
YoY	na	26.4%	-8.7%	20.2%	31.1%	27.5%	23.7%	9.1%	36.8%
Data Network Service	na	na	na	na	1,053	1,213	1,449	1,438	1,994
YoY	na	na	na	na	na	15.2%	19.5%	-0.8%	38.6%
% of sales	na	na	na	na	68.8%	62.2%	60.0%	54.6%	55.4%
Package	na	na	na	na	452	557	730	611	741
YoY	na	na	na	na	na	23.2%	31.1%	-16.3%	21.3%
% of sales	na	na	na	na	29.5%	28.6%	30.2%	23.2%	20.6%
Maintenance	na	na	na	na	600	656	719	805	871
YoY	na	na	na	na	na	9.3%	9.6%	12.0%	8.2%
% of sales	na	na	na	na	39.2%	33.6%	29.8%	30.6%	24.2%
Other	na	na	na	na	-	-	-	21	380
YoY	na	na	na	na	na	na	na	na	1709.5%
% of sales	na	na	na	na	na	na	na	0.8%	10.6%
Data Use and Application Service	na	na	na	na	476	737	963	1,194	1,605
YoY	na	na	na	na	na	54.8%	30.8%	23.9%	34.5%
% of sales	na	na	na	na	31.1%	37.8%	39.9%	45.4%	44.6%
MDV analyzer	na	na	na	na	174	215	240	263	276
YoY	na	na	na	na	na	23.6%	11.6%	9.6%	4.9%
% of sales	na	na	na	na	11.4%	11.0%	10.0%	10.0%	7.7%
Ad Hoc Analysis	na	na	na	na	302	521	686	860	1,075
YoY	na	na	na	na	na	72.5%	31.7%	25.4%	25.0%
% of sales	na	na	na	na	19.7%	26.7%	28.4%	32.7%	29.9%
Other	na	na	na	na	-	-	36	69	254
YoY	na	na	na	na	na	na	na	91.7%	268.1%
% of sales	na	na	na	na	0.0%	0.0%	1.5%	2.7%	7.1%

Note: Amounts below JPY1 mn are rounded.

Source: Shared Research based on company data

Data Network Service segment

In Data Network Service, the company mainly provides hospitals with analysis systems to support management, such as EVE and Medical Code. Revenue comes from packaged software (23.2% of FY12/16 sales), maintenance (30.6%), and other business (0.8%). The

Data Network Service segment

Principal offerings: EVE, a DPC analysis benchmark system, and Medical Code, a management support system for hospitals

company receives lump-sum payments from packaged software sales, and steady revenue from maintenance. Principal products are EVE, a DPC analysis benchmark system (with a leading market share of 45% as of December 31, 2016), and Medical Code, a management support system for hospitals (installed at 224 hospitals as of December 31, 2016). Through providing these analysis systems to support management, MDV obtains medical information.

Data Use and Application Service segment

In Data Use and Application Service, MDV provides pharmaceutical companies and research institutions in Japan and overseas with data and analysis on drug prescriptions. It gets this data from the medical information obtained under agreements with medical institutions. Sales in this segment come from the MDV analyzer (10.0% of FY12/16 sales), Ad Hoc Analysis Service (32.7%), and other business (2.7%). In FY12/15, the company began providing services in the OTC/H&BC* categories. In FY12/16, it extended its offerings into the insurance sector.

Data Use and Application Service segment

Under secondary data use, the company amasses data from medical institutions, which it provides to pharmaceutical companies and others in Data Use and Application Service (MDV analyzer, Ad Hoc Analysis Service), which has a high growth rate

* OTC (over-the-counter) drugs: Drugs sold at pharmacies and drugstores that do not require a physician's prescription.

H&BC (health and beauty care): Includes OTC drugs, as well as quasi-drugs, medical devices, functional foods, cosmetics, and hair care and body care products.

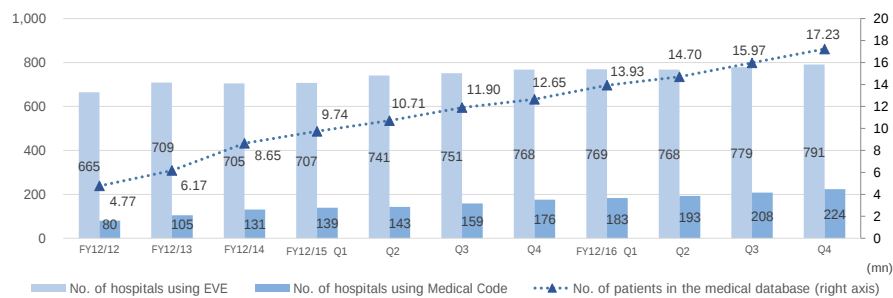
Main products and services

Overview of MDV's products and services

By segment and target user	Overview	Functions and features	Price; installations
Data Network Service			
For hospitals			
EVE	DPC analysis benchmarking system	Analyzes disparities in fee-for-services and DPC claims, number of patients, days in hospital, as well as medical resources and other indicators by disease and case type. Enables comparison with other hospitals to identify own strengths/weaknesses, facilitating efforts to draft medical care and management policies (benchmarking).	Implementation cost of JPY4mn (including server), maintenance costs of JPY50,000 per month. Introduced at 791 hospitals as of December 31, 2016, accounting for roughly 45% of DPC hospitals
EVE-ASP	Detailed DPC analysis benchmarking system	If hospital name is made public, allows browsing of medical content at other hospitals that have made their names public.	JPY20,000 per month
Medical Code	Management support system for hospitals	Uses admission and outpatient EF files in DPC format, as well as digital medical records and other standardized formats. Allows sharing of information within the hospital, fosters increased awareness and action, and ultimately leads to management improvements. Allows costs to be calculated by patient or by day and analysis of percentage of generics used.	Implementation cost of JPY8.1mn, monthly maintenance cost of JPY100,000. Introduced at 224 hospitals as of December 31, 2016
CADA-BOX	Health-related digital solution for hospitals (Karteko and CADA Pay service merged into a single product for use with existing electronic medical record systems)	Integration of CADA Pay (service providing post-paying options for medical bills where patients can freely choose the terms and methods of payment) and Karteko (web-based service allowing patients to store and browse certain sections of their own medical information) among other functions. Product works with existing medical record systems. *See section below on Data Use and Application Service for individuals	Implementation cost of JPY20mn, monthly maintenance cost of JPY250,000. CADA-BOX linked to electronic medical record system of CSI (MDV's business alliance partner) to be introduced at three hospitals, including Daido Hospital (Nagoya City) where system operation began February 1, 2016. Targets use at 15 hospitals by end of FY12/17 and at one hospital per each 344 secondary medical service regions in Japan (regions determined by the Ministry of Health, Labour and Welfare under the Medical Service Law) by end of FY12/19
Data Use and Application Service			
For companies (pharmaceutical companies, research institutions, companies in the OTC/H&BC sector)			
MDV analyzer	Web analysis tool enabling analysis of prescription drug dosages by day at acute care medical institutions	Analyzes the number of patients using specific drugs, concomitant drugs, concomitant illnesses, dosage volumes and days, and dosage and illness patterns	Generates annual fees of JPY20mn
Ad hoc analysis service	Meets specific needs of pharmaceutical companies that are not part of MDV analyzer's analysis menu	Provide detailed analysis and reports tailored to specific needs, as well as data sets	Averages JPY4mn per time (sometimes more than JPY10mn)
OTC- and H&BC-related services	Provides various types of analysis data, mainly to companies in the OTC and H&BC categories, to help them understand markets and facilitate the creation of targeting and positioning strategies	Use and application of medical database on 13.6mn people (started in February 2015)	
For individuals			
Karteko	Web tool that enables physicians to share some medical information with patients via medical record modules; allows patients to store, manage, and browse information; and facilitates communication between physicians and patients	Allows the management and browsing of information on medical institution conducting diagnosis, illness leading to diagnosis, name of injury and illness, test results, prescription drugs, treatments/surgeries, messages from physicians, and personal memos	
CADA card / CADA Pay	ID card with a common patient ID function that allows a patient's medical information to be consolidated. Has added function of CADA Pay where patients are given post-paying options to freely choose terms and methods of payment. Patients can go home immediately after medical appointment without having to wait and pay, and can also choose terms of payment that suit their financial conditions	Patients can print out their medical information and medical bill details using terminals placed in hospitals. Registering the CADA ID also enables patients to browse certain medical information on their PCs and smartphones by accessing Karteko.	

Source: Shared Research based on company data

MDV customers, number of hospitals and patients providing medical data



Source: Shared Research based on company data

EVE (DPC analysis benchmark system): Top share, used at 45% of DPC hospitals

EVE is currently the leading product in Data Network Service. EVE provides analysis of DPC data, allowing a hospital to compare its medical care with other hospitals.

EVE provides hospitals access to a variety of clinical testing metrics. It allows hospitals to determine earnings disparities in fee-for-service invoicing and DPC invoicing by disease and case, the number of hospital days, number of cases, revenue factors, and the incidence of infectious and concomitant diseases. Using EVE, hospitals can compare their performance with other hospitals to identify strengths and areas to improve, raising the quality of medical care and management. As of December 31, 2016, EVE held the top share of the market and was used at 45% of DPC hospitals nationwide.

Management support system Medical Code installed at 224 hospitals (as of December 31, 2016)

The management support system for hospitals Medical Code is one of MDV’s leading products in Data Network Service. This system expands the scope of analysis beyond DPC data to include outpatient, electronic receipt (statements of medical expenses), and financial data. The system unveils potential management issues for a hospital as a whole.

Medical Code helps with the following challenges:

- **Cost management** (by patient, by day, or by category of medical staff operating under physician’s instructions, such as nurses, pharmacists, and dieticians)
- **Drug prescription** (improvement by analyzing the ratio of generics use and the status of medical fee reimbursement calculations)
- **Quantifying potential improvements** (by comparing with other hospitals and simulations)

CADA-BOX: Digital health solution for hospitals; launched in October 2016

Details follow.

MDV analyzer: Online tool to analyze drug dosage daily at acute care medical institutions

This online tool allows pharmaceutical companies (MDV’s customers) analyze dosage information on a daily basis, using the medical information MDV has obtained under licenses from medical institutions. Customers can analyze patient count by drug, concomitant drugs, concomitant illnesses, dosage volume and days, as well as dosage and illness patterns, among other factors*. The medical data obtained through Data Network Service serves as a pillar for Data Use and Application Service. MDV analyzer accesses substantially more data volume than similar services offered by other companies, but MDV’s technological capabilities and experience allow information to be processed quickly.

*Anti-cancer agent A might be prescribed for multiple types of cancer such as colon cancer, lung cancer, and breast cancer. In the past, pharmaceutical companies only had access to information about the drug's overall sales. MDV analyzer provides a simple way to determine the amount of money spent on each type of cancer. Because it also allows analysis of dosage and prescription period for each type of cancer, pharmaceutical companies can analyze constituent sales by drug, and use this dosage information when creating sales and marketing strategies.

Customized ad hoc analysis service

Under its ad hoc analysis service, MDV offers two products: customized reports* tailored to pharmaceutical companies' specific needs (needs not met in the standard analysis of MDV analyzer), and data sets** that pharmaceutical company managers can analyze themselves.

*Reports: To enable pharmaceutical companies to analyze trends in their own and competitors' drugs to determine new usage, ongoing use, switching, or discontinuation, as well as the number of patients in each category. Also, to determine how long the dosage continues, what drug switches are being made, and why.

** Data sets: MDV provides data sets that pharmaceutical companies can input into their statistical analysis systems. (In many cases, this service is used in relation to research papers by university lecturers.)

CADA-BOX: Medium-term growth driver; collecting medical info from EMRs

The following details pertain to CADA-BOX, which MDV views as its biggest growth driver for the medium term.

- ✔ CADA-BOX, a digital health solution for hospitals, was launched in October 2016.
- ✔ Patients may view and manage a portion of their own medical information online and use a service that allows them to set their own payment conditions for the deferred payment of medical fees.
- ✔ MDV can obtain patient consent for the collection of some medical information from electronic medical records (EMRs).
- ✔ MDV can increase real-time data sourced from EMRs, instead of relying on batch-processed DPC data.
- ✔ MDV can increase the diversity of data compared to DPC data, which is from acute patients.
- ✔ MDV plans to install CADA-BOX at 344 secondary care hospitals nationwide by the end of 2019.

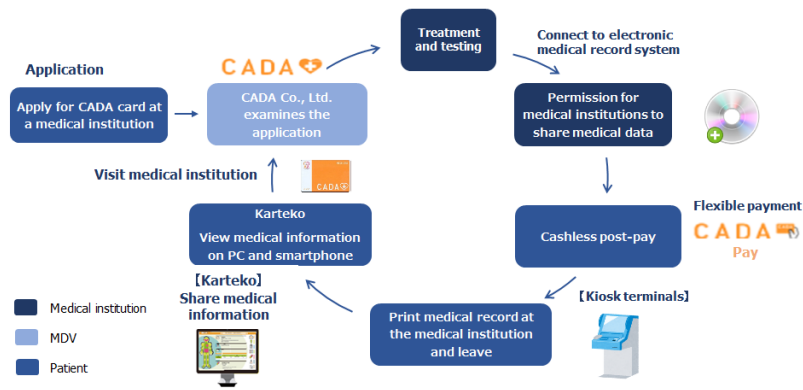
CADA-BOX

Launched in October 2016, CADA-BOX is a service that links the Karteko online service (allowing patients to view and manage a portion of their own medical information) and CADA Pay service (allowing patients to set their own payment conditions for the deferred payment of medical fees) with existing EMR systems. CADA-BOX allows MDV to collect medical data from patient EMRs after receiving consent for data use directly from individual patients. As of December 31, 2016, the company had received orders from three hospitals. By 2019, it hopes to install CADA-BOX at 344 secondary care hospitals.

Data collected via CADA-BOX with individual patient consent is more diverse than DPC data and is accumulated in real time

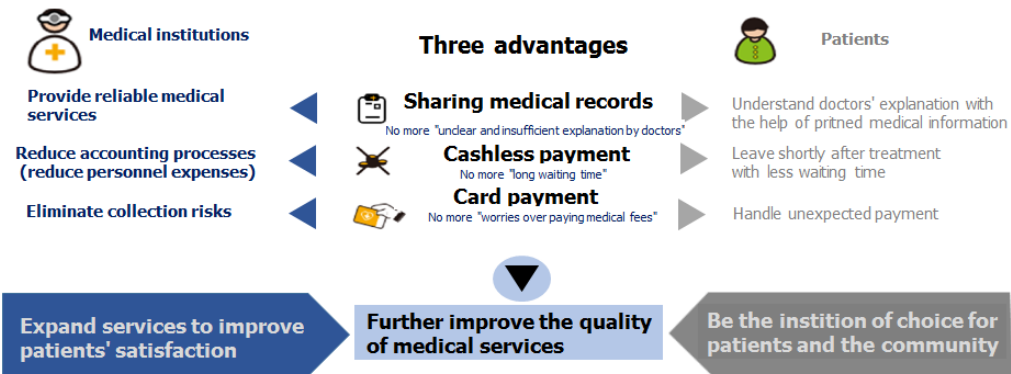
CADA-BOX: Service that links the Karteko online service (allowing patients to view and manage a portion of their own medical information) and CADA Pay service (allowing patients to set their own payment conditions for the deferred payment of medical fees) with existing EMR systems

CADA-BOX schematic



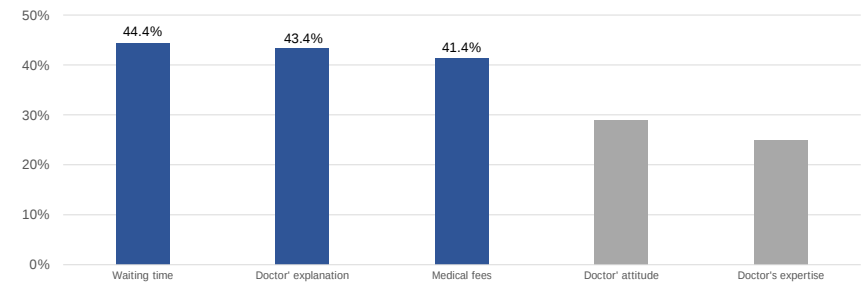
Source: Shared Research based on company data

Special characteristics of CADA-BOX: Resolving patient dissatisfaction toward medical care



Source: Shared Research based on company data

Patient dissatisfaction toward medical care



Source: Shared Research based on company data*

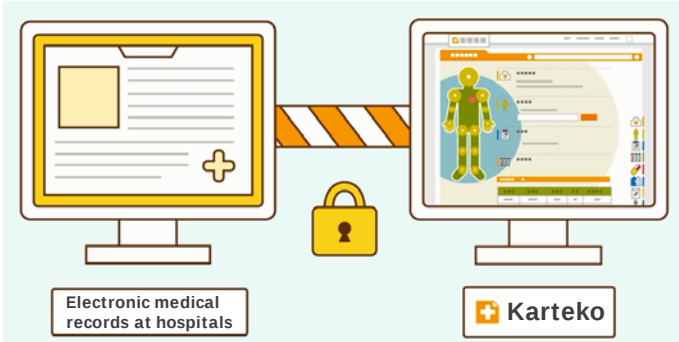
*Company data prepared using the Fifth Survey of Physicians' Attitudes on Medical Care (Japan Medical Association Research Institute) for reference

Karteko

Karteko is a website that allows online management and browsing of a patient's entire medical history. Physicians can add a patient's medical information onto an electronic medical record via a medical record module. Karteko facilitates communication with physicians.

Karteko: An online service for browsing stored data

Karteko concept



Source: Shared Research based on company data

CADA

CADA is a patient ID card that allows each patient’s medical information to be consolidated. Patients who have consented to the secondary use of their medical data register their CADA ID number and other information, and certain medical data can then be stored and browsed using Karteko. CADA can serve as a trigger for patients to provide consent for the storage of a portion of their medical data.

CADA Pay

CADA Pay is a deferred payment service* offered by subsidiary CADA Co., Ltd., allowing patients to pay what they can when they can against their medical bills. This eliminates the need for patients to have ready cash when they undergo treatment. After treatment, they can return home without waiting for accounting and later set payment conditions that suit their financial circumstances. Medical institutions enjoy the merits of a reduction in personnel costs (thanks to a lightened accounting burden) and resolution of outstanding accounts.

CADA: A patient ID card that can serve as a trigger for patients to provide consent for the storage of a portion of their medical data

CADA Pay: Service for the deferred payment of medical fees, allowing patients to pay what they can when they can

*Features

- No guarantor or deposit is needed at the time of hospitalization
- No cash required, even for outpatient care
- Reduced risk of illicit use, since the service is limited to medical fees
- Applications even by elderly patients and patients with irregular income are accepted
- Family medical expenses can be lumped together for account withdrawal
- Reduced burden of sudden expenses on the family budget
- High degree of freedom in terms of payment method

*Subsidiary CADA Co. holds claims associated with the service, which means it has a risk burden rather than simply serving as a proxy for collections.

Medical big data market

DPC currently the main source of big data

Medical data comes from multiple sources, including Diagnosis Procedure Combination (DPC)* data, receipt data***, and electronic medical records. Of these, DPC data is currently the main source of MDV’s medical data. DPC data provides detailed records of a patient’s hospital admittance and treatment.

DPC is a system for the comprehensive evaluation of medical fee reimbursements for acute inpatient medical care. The system categorizes patients according to Japan-specific diagnosis groups, such as by disease, whether surgery is necessary, etc. The system sets medical fees accordingly for each hospital day (although fee-for-service rates apply for certain types of medical care, including surgery and rehabilitation.) Hospitals in the DPC system are required to submit specific forms (DPC data) to the Ministry of Health, Labour and Welfare to obtain medical fee reimbursements. The DPC system has resulted in a wealth of medical information being submitted in standardized formats, enabling various types of analysis. MDV was established in 2003, the same year the DPC system was introduced, and has grown as the system expands.

DPC: Detailed records of patient admittance and treatment; allows for deeper data analysis than the national database of detailed medical fee statements

- ▶ Clinical information on patients in a consistent format nationwide + electronic data set of medical acts
- ▶ Uses comprehensive payment system at time of admission (introduced in 2003 by the Ministry of Health, Labour and Welfare)

*Under this comprehensive evaluation system, patients admitted for acute medical care (from the point when a patient's condition is unstable to the point it becomes relatively stable) are divided into diagnosis groups **, which determine per-day reimbursement. This system differs from the conventional fee-for-services system, in which calculations were based on points assigned to each medical act. Medical fees are calculated through a combination of the comprehensive evaluation system (basic fees for hospitalization, testing, drug administration, and diagnostic imaging), under which a number of points are set by the Ministry of Health, Labour and Welfare at a fixed rate only for the condition requiring the most medical resources during the period when a patient is in the hospital, and the conventional fee-for-services evaluation system (surgery, anesthesia, gastroscopy, rehabilitation).

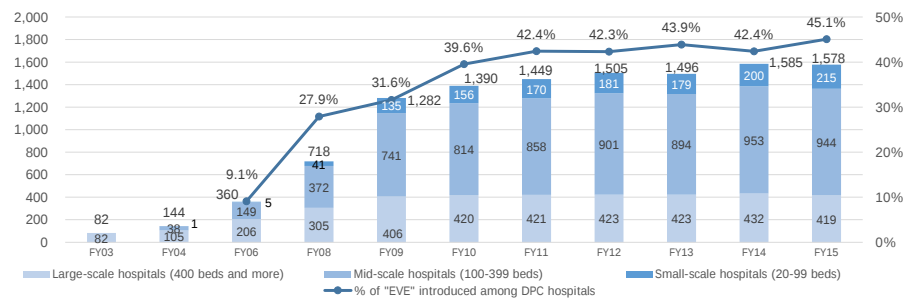
** Diagnosis groups: Category information is contained as part of a 14-digit code that includes the name of the disease requiring the most medical resources, medical acts, and the name of secondary injuries or illnesses.

*** Receipt form: general term referring to a medical fee reimbursement claim form. Hospitals and clinics submit these forms to public authorities to obtain payments for the portion of medical fees covered by insurance.

Big data tends to be unstructured (not in a format that can be read and understood using languages such as SQL). In comparison, DPC and other medical data are typically structured, which simplifies the processing and analysis of the collected data. Utilization of data for purposes such as benchmarking (comparison with best practices) is enhancing the quality of medical care in Japan.

DPC data in particular facilitates deep analysis because it is based on diagnosis group categories (and given the data structures and diagnosis group category definitions). DPC data obtained under license for secondary use adds value for pharmaceutical companies. Compared with the detailed medical fee statements in the national database (NDB) of medical data—a system introduced in April 1999 under which the Ministry of Health and Welfare (currently the Ministry of Health, Labour and Welfare) began requiring some medical institutions to submit information electronically)—DPC was not introduced until FY2003. Since then, the adoption of DPC has been rapid. In FY2016, DPC hospitals across Japan numbered 1,667 (22% of all hospitals in Japan, and 55% of hospital beds). Of these DPC hospitals, 45% have introduced EVE, MDV's flagship DPC analysis benchmark system (as of December 31, 2016).

DPC hospitals and percentage using EVE (right axis)



Sources: Shared Research based on Ministry of Health, Labour and Welfare and company data

DPC data vs data from detailed medical fee statements

The essential feature of DPC is its use of diagnosis group categories. This data includes the name of injury or disease, reason for admittance, comorbidities at time of admittance, and diseases contracted post-admittance. From DPC data, practitioners can understand a patient's clinical information, medical acts can be seen in chronological order, and medical processes visualized. This facilitates deeper data analysis than possible with detailed medical fee statements, which only categorize the principal disease. DPC data also include patients' addresses and postal codes (not present in detailed medical fee statements), which is expected to contribute to the development of medical care by area. (See side bar

Objectives

- Increase transparency of medical care: Increase the quality of medical care by disclosing data

⇒ Benchmarking

- Boost efficiency of medical care: Standardize medical care by making it more comprehensive

⇒ Shorten hospital stays

- Optimize medical fees

Benefits

- For hospitals: Increase revenues through more effective medical care
- For patients: More effective treatment through evidence-based medicine (EBM)

File structure

- Format I : Simplified discharge summary (summary of patient condition when admitted, main surgeries undergone, days in hospital, and patient condition when discharged)
- E file (detailed medical information: information on the calculation of points for services = how a fee-for-services hospital would make claims)
- F file (detailed information on acts: E file details = records all information, also including fees for volume of medicines administered during procedures)

DPC: allows data to be analyzed as diagnosis group categories

- Publicly available: DPC data (1) is public, detailed medical fee statement data (2) is private
- Per record: (1) is by admission, (2) by month
- Number of annual records (2012): (1) around 12mn, (2) around 9.6bn medical records
- Target medical institutions: (1) 1,578; (2) 7,528 (targets general hospitals)

on right for other differences.)

Electronic receipts use a master code for electronic processing based on formats set by the Ministry of Health, Labour and Welfare. This data can be transmitted as text in common CSV (comma separated values) format—either online or in electronic media—between medical institutions, examining authorities, and society-managed health insurance operators.

Electronic medical records also promising medical big data

Electronic medical records (EMRs) constitute a core system for medical care. They combine records of a patient’s chief complaint, physician’s comments, and treatment and dosage, plus functions to process reimbursement claims. These records are in real time and highly comprehensive, and serve as a communication tool for physicians and patients. Still, the social structures are not completely in place to enable chronologically storing and browsing an individual patient’s entire medical history. In light of these circumstances, MDV launched the pioneering CADA-BOX in October 2016.

The spread of electronic medical records and ordering systems are leading to progress in data record sharing within a medical institution. The next stage of sharing data records (electronic health records, or EHRs) among different medical institutions has already begun. Japan is nearing the third stage, when data records will be managed by individuals (personal health records, or PHRs). Spurred on by the US, which has no universal healthcare system, the spread of EHRs and PHRs may accelerate in Japan as well. We believe that MDV is introducing CADA-BOX (including Karteko and CADA Pay) in line with this trend. By collecting data from core systems in real time—including EMRs and vital information not previously obtained—MDV aims to promote the utilization of medical data.

EMRs an effective tool for communication between physicians and patients; lack of social structures a challenge

► Stage 1: Proliferation of EMRs and ordering systems

► Stage 2: Sharing of data records among different medical institutions (EHRs)

► Stage 3: Individual patients manage their records (PHR)

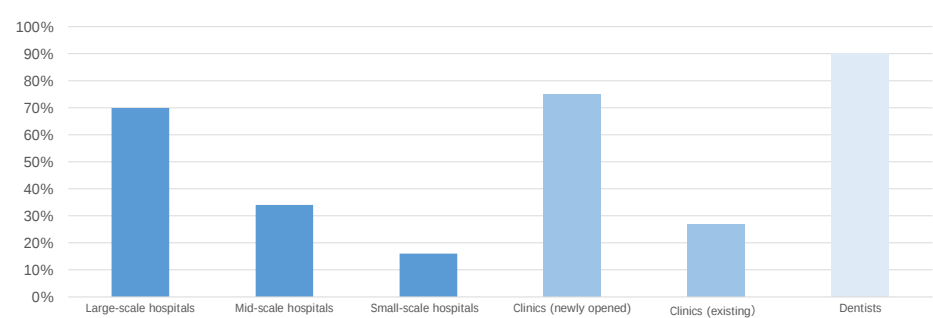
Japanese government pushing the spread of EMRs

Over the five years to FY2020, the Japanese government’s “Japan Revitalization Strategy, 2015 Revision” (June 30, 2015, Cabinet decision) calls for focus on promoting ITC in medical care, spreading regional medical information networks (by FY2018), and spreading electronic medical records (EMRs). As one of its central tenets for regional medical care, the government aims to have 90% of large hospitals (400 beds or more) use EMRs. According to Seed Planning’s 2014 Survey of EMR Market Trends, in 2013 around 70% of large hospitals had adopted EMRs.

(Source: <https://www.seedplanning.co.jp/press/2014/2014082001.html>)

Japanese government promoting the spread of EMRs

Electronic medical record adoption rate (2013)



Note: The rate of adoption at newly opened clinics is given at 70–80%, so an average value of 75% is indicated.

Source: Shared Research based on data from Seed Planning, Inc. (<https://www.seedplanning.co.jp/press/2014/2014082001.html>)

According to the 2014 study, in 2013 the domestic EMR market for was JPY126.7bn. According to a similar study conducted in 2016, the market had expanded to JPY216.1bn in 2015. Furthermore, Seed Planning forecast in the 2016 study that the market would continue to grow, reaching JPY259.4bn by 2018.

(Source: <https://www.seedplanning.co.jp/press/2016/2016032401.html>)

According to studies and forecasts by Seed Planning, the domestic market for electronic medical records will expand from JPY126.7bn in 2013 to JPY259.4bn in 2018.

► The market environment for MDV’s CADA-BOX is positive in the medium term.

According to the 2016 study, unit cost is likely to decline due to replacements, smaller cases, and a shift to cloud-based services, but the number of installations is likely to grow steadily. The Japanese government's "Japan Revitalization Strategy, 2015 Revision" offers as an objective having 90% of large hospitals (400 beds or more) using EMRs by 2020, so the EMR market, focused mainly on large hospitals, can be expected to grow. The market environment for MDV's CADA-BOX is therefore likely to be positive in the medium term.

Market expansion

The medical big data market is poised to be worth some JPY800bn by 2025, according to an estimate by MDV. (Note: MDV's estimate references "Transforming to Medical IT Seamless and Cloud and Future Prospect of Medical Big Data Business; No.2 Medical Big Data Business Edition" from Fuji Keizai Co., Ltd.) This is 100x the scale of the 2016 medical data analysis market of JPY8bn (MDV estimate back calculated using its own sales and market share). Of the JPY800bn projected for 2025, MDV expects to involve itself in the following five business domains.

Medical big data market is poised to be worth some JPY800bn by 2025 (MDV estimate)

- ▶ Medical big data analysis
- ▶ Support for development of pharmaceuticals, including clinical trials
- ▶ Support for diagnosis and treatment
- ▶ Support for promotions of medical care
- ▶ Medical information management systems

Competitors

- DPC analysis benchmark system: Nissay Information Technology Co., Ltd. (an IT subsidiary of the Nissay group) and Girasol. Note: MDV has top market share at 45%

Comparison with companies offering EMR systems

Company	FY	Sales (JPY mn)	OP (JPY mn)	OPM	ROA	ROE	Equity ratio	Main businesses (% of revenue)
3902 Medical Data Vision (Reference)	FY12/16	2,632	430	16.3%	13.7%	6.7%	88.0%	Data Network Service (55%), Data Use and Application Service (45%)
4694 BML	FY03/16	109,024	8,429	7.7%	9.2%	8.9%	62.5%	Clinical Testing business (95%), Medical Informatics (4%), other (1%)
4320 CE Holdings	FY09/16	8,125	170	2.1%	4.3%	3.0%	73.7%	Parent company of CSI, MDV's business partner and a major provider of EMR systems; EMR System business (99%), other (1%)
	Average	39,927	3,010	8.7%	9.1%	6.2%	74.7%	

Source: Shared Research based on data from the various companies

Earnings

For FY12/17, MDV forecasts profit growth lower than sales growth due to personnel increase, but operating profit +25.9% YoY

FY12/16 earnings: Sales of JPY2.6bn (+9.1% YoY in simple comparison with FY12/15 parent-only results) and operating profit of JPY430mn (+7.1%). Sales in the Data Network Service business were JPY1.4bn (-0.8%). Sales in the Data Use and Application Service business were JPY1.2bn (+23.9%). (Note: In figures announced by the company, figures under JPY1mn are rounded down.)

- Cumulative installations of the EVE DPC analysis benchmark system (December 31, 2016): 791 hospitals (+3.0% YoY; about 45% of all DPC hospitals nationwide)
- Cumulative installations of Medical Code management support system for hospitals: 224 hospitals (+27.3% YoY)
- Patient medical data: 17.2mn patients (+36.2% YoY), 17.9mn as of February 28, 2017
- Companies using medical data analysis tool MDV analyzer: 13 (+2 companies YoY)
- In August 2016, CE Holdings Co., Ltd. (TSE1: 4320) entered a partnership with CSI Co., Ltd. (which develops and sells EMR systems; CSI had installed EMR systems at 740 locations as of end September 2016), aiming to promote cooperation with CADA-BOX.

FY12/16 results:

- ▶ Sales: JPY2.6bn (+9.1% YoY in simple comparison with FY12/15 parent-only results)
- ▶ Operating profit: JPY430mn (+7.1%)
- ▶ Burden from investment increased

In FY12/15, MDV established CADA Co., Ltd. as a wholly owned subsidiary. As this subsidiary's importance increased, it was entered into consolidation from Q2 FY12/16, and MDV has announced consolidated results since that quarter.

Difference between company forecasts and actual results

- FY12/16 sales were about JPY400mn below the forecast of JPY3.0bn. Midway through the year, the company changed strategies, shifting from selling the high unit price, low profit AceVision (service that included the company's CADA ID cards containing EMRs and the Karteko online service) to manufacturing and selling CADA-BOX (service that links Karteko and the CADA Pay service with existing EMR systems).
- Operating profit and recurring profit both exceeded the company forecasts of JPY303mn and JPY300mn respectively by about JPY100mn. This was thanks to the strategic shift from AceVision to CADA-BOX, since the latter involves high margin products and services, sales of which were robust.
- Net income attributable to parent company shareholders, despite the relatively high recurring profit, was fairly close to the company forecast of JPY174mn. This was because of a software impairment loss (mainly for AceVision) of JPY92mn and a JPY29mn valuation loss on investment securities.

Quarterly performance

Cumulative (JPY mn)	FY12 / 15				FY12 / 16			
	Q1 Par.	Q2 Par.	Q3 Par.	Q4 Par.	Q1 Par.	Q2 Cons.	Q3 Cons.	Q4 Cons.
Sales	478	954	1,687	2,414	519	1,037	1,732	2,632
YoY	23.8%	22.2%	30.7%	23.7%	8.6%	8.6%	2.7%	9.1%
Data Network Service	297	591	1,066	1,449	317	620	999	1,438
Package	125	244	537	730	121	225	400	611
Maintenance	171	346	529	719	195	394	597	805
Others	-	-	-	-	-	-	-	21
Data Use and Application Service	180	362	620	963	201	415	733	1,194
MDV analyzer	60	123	186	240	60	125	193	263
Ad hoc analysis service	114	222	408	686	131	266	504	860
Others	6	17	24	36	9	24	35	69
<YoY>								
Data Network Service	8.8%	6.5%	25.0%	19.5%	6.9%	4.9%	-6.3%	-0.7%
Package	9.6%	4.7%	46.7%	31.1%	-2.9%	-7.8%	-25.5%	-16.3%
Maintenance	7.5%	7.8%	8.8%	9.6%	13.9%	13.7%	12.9%	12.0%
Others	na	na	na	na				
Data Use and Application Service	62.2%	60.9%	42.2%	30.8%	11.5%	14.8%	18.2%	24.0%
MDV analyzer	25.0%	21.8%	16.3%	11.6%	0.9%	1.5%	3.8%	9.6%
Ad hoc analysis service	81.0%	79.0%	47.8%	31.7%	15.0%	19.8%	23.5%	25.4%
Others	na	na	na	na	1	0	0	1
CoGS	93	202	383	516	94	198	313	458
YoY	23.4%	21.2%	52.2%	34.2%	1.5%	-2.0%	-18.3%	-11.3%
CoGS ratio	19.4%	21.2%	22.7%	21.4%	18.1%	19.1%	18.0%	17.4%
Gross profit	385	752	1,304	1,897	425	838	1,420	2,174
YoY	23.9%	22.5%	25.5%	21.2%	10.3%	11.5%	8.8%	14.6%
GPM	80.6%	78.8%	77.3%	78.6%	81.9%	80.9%	82.0%	82.6%
SG&A expenses	364	781	1,204	1,615	413	846	1,296	1,743
YoY	28.0%	30.1%	26.9%	23.7%	13.7%	8.3%	7.6%	8.0%
SG&A-to-sales ratio	76.1%	81.8%	71.4%	66.9%	79.6%	81.6%	74.8%	66.2%
Personnel expenses	209	452	695	927	241	507	760	1,015
Other expenses	153	327	508	687	171	337	535	727
YoY	28.0%	30.1%	26.9%	23.7%	13.7%	8.3%	7.6%	8.0%
Personnel expenses	22.9%	26.3%	23.2%	20.5%	15.3%	12.2%	9.4%	9.5%
Other expenses	35.4%	35.7%	32.3%	28.4%	11.8%	3.1%	5.3%	5.8%
Operating profit	22	-29	100	282	12	-7	124	431
YoY	-19.5%	nm	11.3%	8.4%	-45.6%	nm	23.4%	52.6%
OPM	4.5%	-3.0%	5.9%	11.7%	2.3%	-0.7%	7.1%	16.4%
Non-operating income (expenses)	-1	-1	-2	-2	-1	-1	-2	-15
Recurring profit	21	-30	99	280	11	-8	122	416
YoY	-21.6%	nm	11.6%	12.7%	-46.6%	nm	24.0%	48.4%
RPM	4.4%	-3.2%	5.8%	11.6%	2.2%	-0.8%	7.1%	15.8%
Extraordinary gains (losses)	-1	-1	-1	-18	-	0	0	-122
Losses on retirement of fixed assets	-1	-1	-1	-1	0	0	0	-30
Impairment losses	0	0	0	-17	0	0	0	-92
Taxes	10	-7	41	98	6	1	46	116
Net income attributable to parent company shareholders	11	-24	57	164	5	-10	76	178
YoY	-9.1%	nm	36.0%	21.1%	-50.6%	nm	33.1%	8.7%
Net margin	2.3%	-2.5%	3.4%	6.8%	1.0%	-1.0%	4.4%	6.8%

Source: Shared Research based on company data

Note: When viewing the company's sales by quarter, there tends to be an increase in the latter half of the year. This is because many of the foreign-financed pharmaceutical manufacturers that utilize MDV's data have a financial year ending in December, causing increased data utilization demand in the latter half of the year.

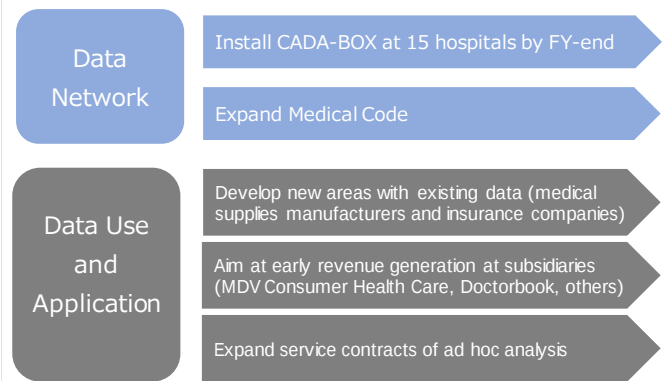
Difference between forecasts and actual results for FY12/16

In the Data Network Service business, the company planned installation of CADA-BOX at five hospitals, but only installed it at three. Hospital eye, a cloud-based data analysis system provided to non-DPC hospitals did not produce sales as anticipated because it required system improvements during FY12/16. At the same time, in terms of data utilization, the establishment of MDV Consumer Healthcare Co., Ltd. (details follow) was moved back to February 2017. This was because, although initially the company planned to provide marketing support using medical data in its possession, it worked on expanding business domains to include OTC drugs and H&BC products. This change of plan required more time than was originally allotted.

Company forecasts for FY12/17: The company forecasts sales of JPY3.6bn (+36.8% YoY), operating profit of JPY542mn (+25.9%), and recurring profit of JPY540mn (+29.9%). If these targets are achieved, FY12/17 will be the sixth straight year with increased sales and recurring profit. By segment MDV expects sales in Data Network Service to rise 38.6% YoY to JPY2.0bn (55.4% of total sales), and in Data Use and Application Service by 34.5% to JPY1.6bn (44.6% of total sales). The profit growth rate is lower than the sales growth rate due to anticipated personnel expenses. The company plans to hire about 40 people, mostly for sales-related positions. This is twice the number hired in FY12/16.

- FY12/17 company forecasts
- ▶ Sales: JPY3.6bn (+36.8% YoY)
 - ▶ Operating profit: JPY542mn (+25.9%)
 - ▶ Hire about 40 people (2x the FY12/16 hiring figure), mostly for sales-related positions

Specific objectives for FY12/17



Source: Shared Research based on company data

CADA-BOX and data utilization in the area of clinical trials

MDV aims to install CADA-BOX at 15 hospitals by end FY12/17. The company is currently gathering data regarding the potential effects of installation at those hospitals. On February 1, 2017, Daido Hospital (Nagoya: 404 beds) became the first facility in Japan to utilize CADA-BOX. In addition, as a new data utilization domain, MDV has begun preparation to enter the area of clinical trials. The company believes CADA-BOX can be used in screening for trial participants, since the service could be used to determine quickly which hospital has patients suiting the conditions of the trial. The Karteko online service of CADA-BOX can then be used to notify patients of the details of the trial and ascertain whether or not they would consent to participation.

Jump-start subsidiaries

MDV Consumer Healthcare Co., Ltd.

The company established MDV Consumer Healthcare Co., Ltd. (subsidiary) on February 1, 2017. The subsidiary's main business is the manufacture and sale* of OTC drugs and H&BC (health and beauty care) products. The company determines consumer needs using its massive medical database, and the subsidiary manufactures OTC drugs and H&BC products in line with those needs.

*Actual sales are to start around summer of 2017, primarily via drugstores.

Doctorbook

Doctorbook was made a subsidiary in January 2017. It currently has about 10,000 member dentists (about 10% of the dentists in Japan), but MDV aims to create a network of doctors that includes clinicians.

Medium-term strategy

Collect EMRs, not just DPC data; begin recouping investment in earnest from FY12/18

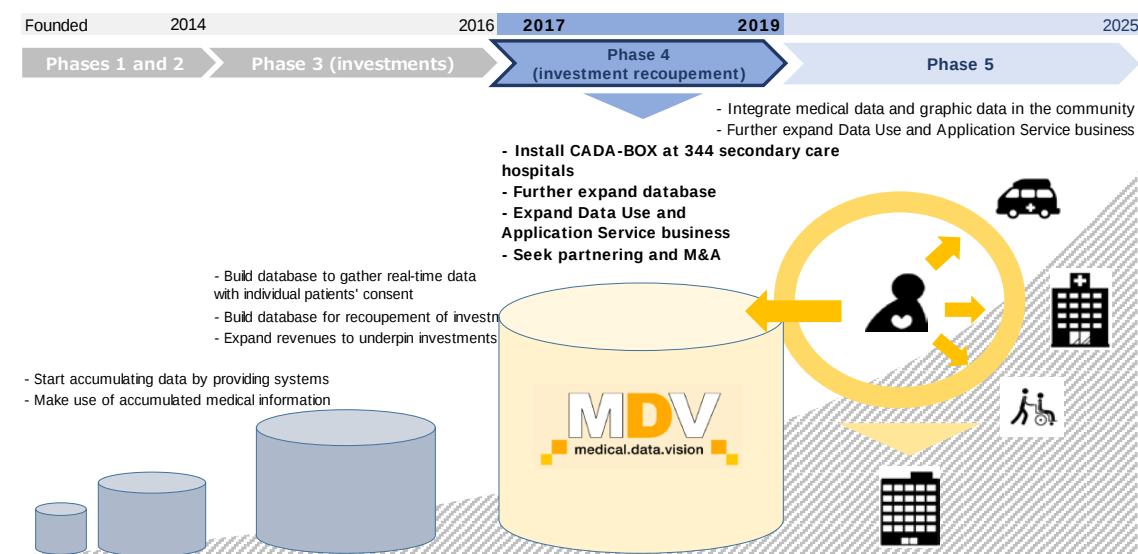
Second growth driver to expand Data Use and Application Service

DPC data is the current driver of MDV's data collection. But rather than relying solely on DPC data, the company is planning to collect data from EMRs with individual consent using CADA-BOX. If DPC data is the company's first driver, we see CADA-BOX as the second driver, launching the company toward the next growth stage.

Shared Research considers individual patient data obtained via CADA-BOX with individual consent to be medical data of even more value than DPC data, offering more continuity, volume, and detail, as well as enabling real-time data collection. We think that the projected arrival of EHRs (data records shared among different medical institutions) and PHRs (data records managed by individuals) will substantially boost the importance of individuals' medical data collected by MDV's CADA-BOX.

The company says it is currently in its investment recoupment phase (Phase 4: FY12/17—FY12/19). By further expanding its data infrastructure and leveraging its Data Use and Application Service, it expects to begin recouping its investments in FY12/17 (the first year of the recoupment phase) and continue in earnest from FY12/18. In Phase 5 (FY12/20 onward), the company aims to expand the utilization of the EMR data it collects via CADA-BOX (creating links with community-based healthcare as well).

Medium-term growth strategy



Source: Company data

Phase 4 (FY12/17—FY12/19): Begin investment recoupment from mid FY12/17; recoupment in earnest from FY12/18)

- ▶ Install CADA-BOX at 344 secondary care hospitals by end FY12/19 (15 hospitals at end FY12/17)
- ▶ Further expand data infrastructure
- ▶ Expand Data Use and Application Service
- ▶ Cooperate with other companies (M&A)

Medium-term strategy: In addition to its existing medical database covering 17.9mn people, after obtaining individual consent, the company plans to accumulate more diverse real-time medical information from EMRs using CADA-BOX. This will help it recoup investments in earnest with expansion of the Data Use and Application Service business

Phase 4 targets

- ▶ Install CADA-BOX at 344 secondary care hospitals
- ▶ Further expand data infrastructure
- ▶ Expand Data Use and Application Service
- ▶ Cooperate with other companies (M&A)

Changes in external factors and business opportunities for the company

National government policies/strategies	Environmental changes	Impact on the company
System of individual identity numbers - Planning to introduce system identifying medical records, medical reimbursement details, and other medical information by number	- Enhanced environment for managing medical information - Promoting the use and application of medical data	- Increased orders for CADA-BOX - More orders for services targeting pharmaceutical companies
"Japan Revitalization Strategy," 2015 revision (June 20, 2015 Cabinet decision) - Support generation of healthcare - Promote ITC in medical and nursing fields	- Energized healthcare markets - Promote use and application of medical data	- Increased orders for CADA-BOX - More orders for services targeting pharmaceutical companies - New business potential
"Policies for Economic and Fiscal Management Reform" (June 30, 2015 Cabinet decision) - Increase target for generics penetration to 80% by volume (by FY2020)	- Promote use and application of medical data - Need for hospital management reviews	- Increased orders for EVE and Medical Code - More orders for services targeting pharmaceutical companies - Increased orders for CADA-BOX
Introduction of medical care function reporting system - Require hospitals and small clinics to report policies on planned medical care by ward	- Need for hospital management reviews	- Increased orders for EVE and Medical Code - Increased orders for CADA-BOX

Source: Shared Research based on company data

MDV believes that if it can collect real-time data at 344 hospitals as a result of Phase 4, this will open up new business opportunities. During Phase 5 (2020–2025), it plans to link regional medical data. The bulk of the data MDV is currently accumulating pertains to acute care hospitals, but in the area of secondary care, the company plans to collect regional medical data from chronic care hospitals and clinics.

(Reference) Phases 1 and 2 (establishment through FY12/14)

- Create networks with medical institutions by providing systems
- Accumulate data from DPC hospitals
- Commence utilization of accumulated data

(Reference) Phase 3 (from FY12/15 to mid FY12/17)

- Gather medical data with individual consent via a digital health solution
- Create systems that allow individuals to view and manage some medical information
- Leverage data accumulated to date and expand business domains

Note: MDV envisions a society in which consumers have access to their own medical and health care information throughout the course of their lives and can make their own choices in medical and health care markets based on this information.

Strengths and weaknesses

Strengths

- **Existing relationships with DPC hospitals:** Since its establishment in 2003, MDV has engaged in steady sales efforts, setting up management support systems and benchmarking software it has developed one hospital at a time. (As of December 31, 2016, EVE, its DPC analysis benchmark system, is installed at more than 45% of all DPC hospitals and Medical Code, its management support system for hospitals, is installed at 224 hospitals.) In addition to providing thorough maintenance services, the company has gained trust by conducting seminars and study groups (attended by 1,200 medical personnel each year) and establishing a call center. Gaining trust in this manner has served the company well in the long-term process of obtaining licensing agreements with hospitals for the secondary use of data. These trust-based relationships should prove useful for the company’s next growth phase.
- **Large accumulated database:** MDV has amassed a medical database that covers about one of every eight Japanese people (17.9mn people). In general, data tends to grow more useful as its parameters increase. No other private company possesses medical data of this scale.
- **Knowledge of medical data utilization:** The company is a pioneer in the field of

Strengths

- ▶ Existing relationships with DPC hospitals
- ▶ Large accumulated database
- ▶ Knowledge of medical data utilization

Weaknesses

- ▶ DPC data not collected in real time
- ▶ Lack of relationships with non-DPC hospitals and clinics
- ▶ More business partnerships with EMR system vendors required

medical data utilization, which it entered in 2008. Since then, it has developed knowledge on how those in the medical care industry can apply its collected data and cultivated analysts with expertise both in medical care and data utilization and cleansing (improving data quality). In these ways, MDV has accumulated advanced knowledge on the utilization of medical data. As it is difficult to find staff possessing knowledge in both medical care and data, the company has concentrated on cultivating personnel through a proprietary training program. We believe that this advanced knowledge and the utilization of its medical data represent high barriers to entry.

Weaknesses

- DPC data not collected in real time:** DPC hospitals submit DPC data on magnetic media to the Ministry of Health, Labour and Welfare, so MDV also collects this data directly from those hospitals on magnetic media. Once the tapes have been received, data cleansing requires significant time, so three to four months can elapse between data collection and utilization. However, by linking the company's CADA-BOX to existing EMR systems from other companies (in September 2016, MDV entered a business partnership with CSI), the company is working toward real-time collection of data. By 2019, it plans to have installed CADA-BOX at 344 secondary care hospitals. Shared Research therefore believes this weakness will be resolved in the medium to long term.
- Lack of relationships with non-DPC hospitals and clinics:** Of 178,946 medical institutions in Japan (8,440 hospitals, 101,571 clinics, and 68,935 dental offices), there are just 1,667 DPC hospitals, whereas the numbers of non-DPC hospitals (about 6,700) and clinics (101,570) are vastly bigger. The company's DPC analysis benchmark system EVE is used by 45% of the DPC hospitals (as of end FY12/16: based on Ministry of Health, Labour and Welfare and company data). The company plans to have Hospital eye, its cloud-based data analysis system provided to non-DPC hospitals, in use at 50 hospitals during FY12/17 (according to MDV, it already has advance orders from more than 50 hospitals). However, compared to the total number of non-DPC hospitals, this is a mere drop in the bucket.
- More business partnerships with EMR system vendors required:** In FY12/16, MDV shifted its focus from AceVision, which included an EMR system developed in-house, to CADA-BOX. Instead of using its own EMR system, the company entered a business partnership (in September 2016) with CSI Co., Ltd., a major player in the field of EMR systems, in order to coordinate CADA-BOX with CSI's EMR systems. Shared Research believes this was a beneficial decision in terms of making it possible for MDV to collect EMR data quickly. However, since it is not using an in-house EMR system as its data source, some of the earnings it could have obtained will go to CSI instead.

Income statement

Income statement						
	FY12/12	FY12/13	FY12/14	FY12/15	FY12/16	FY12/17 Est.
(JPYmn)	Parent	Parent	Parent	Parent	Cons.	Cons.
Sales	1,167	1,530	1,951	2,414	2,632	3,600
YoY	20.2%	31.1%	27.5%	23.7%	9.1%	36.8%
CoGS	264	288	385	516	458	na
YoY	na	9.0%	33.5%	34.2%	-11.3%	na
CoGS ratio	22.7%	18.8%	19.7%	21.4%	17.4%	na
Gross profit	903	1,242	1,566	1,897	2,174	na
YoY	na	37.6%	26.1%	21.2%	14.6%	na
GPM	77.3%	81.2%	80.3%	78.6%	82.6%	na
SG&A expenses	842	1,032	1,305	1,615	1,743	na
YoY	na	22.7%	26.4%	23.7%	8.0%	na
SG&A-to-sales ratio	72.1%	67.5%	66.9%	66.9%	66.2%	na
Operating profit	61	210	261	282	431	542
YoY	na	241.6%	24.2%	8.4%	52.6%	25.9%
OPM	5.3%	13.7%	13.4%	11.7%	16.4%	15.1%
Recurring profit	63	211	249	280	416	540
YoY		236.4%	18.1%	12.7%	48.4%	29.9%
RPM	5.4%	13.8%	12.7%	11.6%	15.8%	15.0%
Net income	92	205	135	164	178	311
YoY	115.8%	123.2%	-33.9%	21.1%	8.7%	74.9%
Net margin	7.9%	13.4%	6.9%	6.8%	6.8%	8.6%
Depreciation and amortization of goodwill	60	55	72	75	94	
EBITDA	121	265	333	358	525	

Note: Amounts below JPY1 mn rounded off

Source: Shared Research based on company data

SG&A expenses breakdown (JPYmn)					
	FY12/12	FY12/13	FY12/14	FY12/15	FY12/16
(JPYmn)	Parent	Parent	Parent	Parent	Cons.
SG&A expenses	842	1,032	1,305	1,615	1,743
Salaries and allowances	348	406	527	648	na
Depreciation	24	23	40	40	na
Research and development expenses	4	8	21	6	na
Other	465	596	718	921	na
<% of sales>					
SG&A	72.1%	67.5%	66.9%	66.9%	66.2%
Salaries and allowances	29.8%	26.5%	27.0%	26.8%	na
Depreciation	2.1%	1.5%	2.0%	1.7%	na
Research and development expenses	0.4%	0.5%	1.1%	0.3%	na
Other	39.8%	38.9%	36.8%	38.1%	na

Note: Amounts below JPY1 mn rounded.

Source: Shared Research based on company data

- GPM is high, at around 83%.
- The company entered an investment recoupment phase in FY12/17. A significant increase in hiring of sales-related personnel for the Data Network Service and Data Use and Application Service businesses (about 40 employees) resulted in cost increases.

Cost of goods sold breakdown					
(JPYmn)	FY12/12	FY12/13	FY12/14	FY12/15	FY12/16
I Materials cost	28	45	82	149	na
II Labor cost	109	114	119	143	na
III Other costs	127	134	200	236	na
(License fee)	(27)	(36)	(37)	(47)	na
(Depreciation)	(35)	(32)	(32)	(35)	na
(Outsourcing expenses)	0	(9)	(52)	(47)	na
(Other)	(65)	(57)	(79)	(106)	na
Subtotal	264	293	401	528	na
Transfer to other accounts	-	5	16	12	na
Cost of goods sold	264	288	385	516	na
I Materials cost	10.8%	15.4%	20.5%	28.3%	na
II Labor cost	41.1%	38.9%	29.5%	27.2%	na
III Other costs	48.2%	45.7%	50.0%	44.6%	na
Subtotal	100.0%	100.0%	100.0%	100.0%	na

Note: Amounts below JPY1 mn rounded.

Source: Shared Research based on company data

Balance sheet

Balance sheet					
(JPYmn)	FY12/12	FY12/13	FY12/14	FY12/15	FY12/16
	Parent	Parent	Parent	Parent	Cons.
Cash and deposits	547	779	1,799	1,752	1,959
Accounts receivable	245	291	433	597	770
Inventories	8	8	15	9	10
Prepaid expenses	6	10	16	24	na
Deferred tax assets	32	49	7	8	9
Other	5	2	4	26	49
Total current assets	843	1,140	2,275	2,416	2,797
Tangible fixed assets	67	76	119	97	106
Buildings and accompanying facilities	36	28	52	38	29
Tools, furniture, and fixtures	31	48	68	59	77
Intangible assets	41	31	146	195	127
Software	41	31	40	111	127
Software in progress	-	0	107	84	-
Other fixed assets	87	86	111	206	161
Total fixed assets	195	194	377	497	394
Total assets	1,038	1,334	2,659	2,919	3,194
Accounts payable	15	32	53	64	40
Accounts payable-other	30	73	117	130	na
Accrued expenses	19	8	7	3	na
Accrued income taxes	6	26	62	78	81
Accrued consumption taxes	15	19	38	43	na
Deposits received	7	9	11	14	na
Unearned revenue	39	55	68	71	na
Other	1	1	5	5	243
Total current liabilities	131	222	362	408	364
Deferred tax liabilities	3	3	3	-	-
Asset retirement obligations	14	14	18	18	19
Other	-	-	4	3	2
Total fixed liabilities	17	17	26	21	20
Total liabilities	149	239	387	429	384
Shareholder's equity	890	1,095	2,272	2,490	2,810
Capital stock	351	351	884	911	981
Capital surplus	960	960	1,468	1,495	1,566
Retained earnings	-421	-216	-80	84	263
(Treasury stock)	-	-	-	-0	0
Total net assets	890	1,095	2,272	2,490	2,810
Net cash	547	779	1,799	1,752	1,959
Working Capital	238	268	395	543	741

Note: Amounts below JPY1 mn rounded off

Source: Shared Research based on company data

- ✔ Liquid assets (cash and deposits, accounts receivable) account for some 80% of assets (not an equipment-based industry).
- ✔ Net cash is JPY2.0bn (as of end FY12/16).

Net asset ratio is 88%.

Per-share data (in yen, after adjusting for stock splits)

Per share data (JPY; adjusted for stock splits)					
	FY12/12	FY12/13	FY12/14	FY12/15	FY12/16
	Parent	Parent	Parent	Parent	Cons.
Shares issued (year end)	7,239,600	7,239,600	9,223,600	9,439,600	10,003,600
EPS (earnings per share)	12.68	28.31	18.03	17.66	18.68
EPS (fully diluted)	-	-	16.33	16.75	16.75
DPS (cash dividends per share)	-	-	-	-	-
BPS (book value per share)	122.91	151.21	246.31	263.75	280.89

Source: Shared Research based on company data

Cash flow statement

Statement of cash flows					
	FY12/12	FY12/13	FY12/14	FY12/15	FY12/16
(JPYmn)	Parent	Parent	Parent	Parent	Cons.
Cash flows form operating activities	44	286	206	118	196
Cash flows form investing activities	-56	-154	-108	-218	-144
Cash flows from financing activities	0	0	1,022	52	139

Note: Amounts below JPY1 mn rounded off

Source: Shared Research based on company data

Cash flow status is favorable. Cash outflows from investing activities are largely countered by cash inflows from operating activities. The company is not paying dividends.

Financial ratios

Financial ratios					
	FY12/12	FY12/13	FY12/14	FY12/15	FY12/16
	Parent	Parent	Parent	Parent	Cons.
ROA	6.3%	17.8%	12.5%	10.0%	13.7%
ROE	10.9%	20.7%	8.0%	6.9%	6.7%
Inventory turnover	na	35.3	33.3	42.9	47.4
Fixed assets turnover	na	21.4	20.0	22.3	26.0
Current ratio	642.1%	513.1%	629.0%	592.7%	769.0%
Equity ratio	85.7%	82.1%	85.4%	85.3%	88.0%

Source: Shared Research based on company data

- Profitability and efficiency ratios are high
- Robust balance sheet: The current ratio and net asset ratio are sufficiently high and net cash holdings are high (JPY2.0bn at end FY12/16)

Policy on shareholder returns

MDV considers the return of profits to shareholders an important aspect of its business management. However, as it is currently in a growth phase, it is prioritizing aggressive business development and accumulating retained earnings. The company has not paid dividends since its establishment.

Shareholders

This company's principal shareholders are companies in the medical care industry.

Entity	Shares	% of issued shares
Fujifilm Corporation	2,823,200	28.2%
MEDIPAL HOLDINGS CORPORATION	2,103,200	21.0%
Japan Trustee Services Bank, Ltd. (trust account)	658,300	6.6%
Mitsubishi Corporation	320,000	3.2%
Hiroyuki Iwasaki	273,600	2.7%
Takahiro Yamaguchi	240,008	2.4%
CMIC HOLDINGS Co., Ltd.	240,000	2.4%
The Master Trust Bank of Japan, Ltd. (trust account)	226,900	2.3%
SBI Securities Co., Ltd.	162,000	1.6%
Shigeru Tanaoka	135,200	1.4%
Total shares issued	10,003,600	100.0%

Source: Shared Research based on company data

Corporate governance

Organization type, capital structure etc.	
Controlling shareholder	None
Parent company code	N/A
Director relationships	
Number of directors under Articles of Association	10
Directors' terms under Articles of Association	2 years
Number of external (independent) directors	2
Auditor relationships	
Number of auditors under Articles of Association	5
Number of external (independent) auditors	2
Other	
Number of independent officers (aggregate of external directors/auditors)	4
Participation in electronic voting platform	None
Other initiatives to enhance voting rights of investors	None
Provision of convocation notice in English	None
Disclosure of directors' compensation	None
Disclosure of executive officers' compensation	N/A
Policy on determining amount of compensation and calculation methodology	In place
Takeover defenses	None

Source: Shared Research based on company data

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