

# 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 and insurance companies.

### EVE leading market share at 45%, expanding demand for Medical Code:

By utilizing DPC (Diagnosis Procedure Combination) data, EVE allows hospitals to compare and analyze details and status of their medical care. DPC is a government-driven comprehensive evaluation system that calculates medical fees for inpatients partially based on fixed rates per diem. Eve is installed at 45% of all DPC hospitals, which are hospitals that have adopted the DPC system. DPC data refers to data DPC hospitals provide to the Ministry of Health, Labour and Welfare regularly, and EVE utilizes these data to allow hospitals to conduct a comparative analysis of their medical care and management status versus their peers. Medical Code is a system that analyzes hospitals' management status (e.g. profits/costs breakdown per department). It was installed at 265 hospitals as of end-FY12/17. It is in high demand owing to harsh circumstances surrounding medical institutions today. As it displays greater growth potential compared to EVE (already over 45% share), MDV intends to focus on promoting Medical Code. MDV holds medical data on 22.5mn people, or about one out of every six Japanese people (as of March 31, 2018), the largest among private companies. Analyzing these data can elucidate drug prescription, disease severity, etc., at DPC hospitals.

**CADA-BOX creates a diverse, real-time database:** Although MDV already has an extensive clinical database, it launched CADA-BOX in October 2016 to collect more diverse, real-time data. CADA-BOX is a service for hospitals 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

### FY12/18 OP up 40.5% YoY; absorbed spending to expand workforce, bolster services

**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, MDV aimed to begin recovering its investments in FY12/17, with full-fledged recoupment starting in FY12/18. For FY12/18, it forecasts sales of JPY4.7bn (+45.7% YoY) and OP of JPY799mn (+40.5%). It expects to hire about 40 employees, primarily salespeople.

## Medium-term strategy

### Grow Data Use and Application Service on 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 around 2020, allowing it to collect more diverse medical data in real time and with individual consent. With the data collected, it aims to grow Data Use and Application Service explosively. MDV estimates that the size of the market is around JPY800.0bn. It has announced plans to integrate data obtained from not only hospitals, but also clinics, pharmacies, and nursing care facilities.

**Proprietary efforts to expand Data Use and Application Service:** MDV made Cosmex Co., Ltd., a clinical trial company, its subsidiary in June 2017 to start a clinical trial business. By utilizing its medical big data, MDV aims to realize fast and efficient clinical trials without relying on manpower. It also plans to utilize its own database at subsidiaries Doctorbook and MDV Consumer Healthcare.

## 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 22.5mn people, or about one of every six 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 due to data cleansing

**Lack of relationships with non-DPC hospitals and clinics:** Currently, MDV has strong relationships with DPC hospitals (total of 1,664 as of December 31, 2017). The total number of medical institutions is 179,171, so there is a much larger number of non-DPC hospitals and clinics. However, in terms of the number of hospital beds, DPC hospitals make up more than half

## Profit growth drivers

**To date:** DPC-related data networks and utilization

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

Indices	
Market capitalization	JPY71.2 bn
Stock price (2018/4/18)	JPY3,560
Issued shares (End-FY12/17)	20,007,200 shares
Foreign stockholding ratio	4.14 %
BPS (FY12/17)	JPY158.17
PBR (FY12/17)	22.51 x
PER (FY12/18 Est.)	144.8 x
Dividend (FY12/18 Est.)	-
Dividend yield (FY12/18 Est.)	- %
ROE (FY12/18 Est.)	15.5 %
Net debt/equity ratio (FY12/17)	-56.8 %

\* Issued shares include treasury stock. With April 30, 2018 as the record date (April 27 in effect), the company has resolved to perform a two-for-one stock split for each share of common stock owned by shareholders recorded in the final shareholder registry as of the record date. The effective date for this stock split will be May 1, 2018 (announced on March 27, 2018).

		Earnings											
		Sales	YoY	Operating profit	YoY	Recurring profit	YoY	Net income	YoY	EPS	BPS	ROA	ROE
		(JPYmn)		(JPYmn)		(JPYmn)		(JPYmn)		(JPY)	(JPY)	(RP-based)	
FY12/09	Parent	841	na	na	na	91	na	70	na	5.61	37.91	na	16.3%
FY12/10	Parent	1,063	26.4%	na	na	165	82.0%	144	105.4%	10.26	52.17	21.7%	23.3%
FY12/11	Parent	971	-8.7%	na	na	34	-79.4%	43	-70.5%	2.94	55.11	3.7%	5.5%
FY12/12	Parent	1,167	20.2%	61	na	63	83.3%	92	115.8%	6.34	61.46	6.3%	10.9%
FY12/13	Parent	1,530	31.1%	210	241.6%	211	236.4%	205	123.2%	14.16	75.61	17.8%	20.7%
FY12/14	Parent	1,951	27.5%	261	24.2%	249	18.1%	135	-33.9%	9.02	123.16	12.5%	8.0%
FY12/15	Parent	2,414	23.7%	282	8.4%	280	12.7%	164	21.1%	8.83	131.88	10.0%	6.9%
FY12/16	Cons.	2,632	9.1%	431	7.1%	416	48.4%	178	6.6%	9.34	140.45	13.7%	6.7%
FY12/17	Cons.	3,226	22.5%	569	32.1%	565	36.0%	355	99.0%	17.72	158.17	16.3%	11.9%
FY12/18	Est. Cons.	4,700	45.7%	799	40.5%	800	41.6%	491	38.7%	24.58	-	-	-

\*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

In addition to DPC data, MDV collects electronic medical records (EMR) via CADA-BOX; started a clinical trial business

### 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 22.5mn people—about one of every six Japanese people (as of March 31, 2018)—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.”

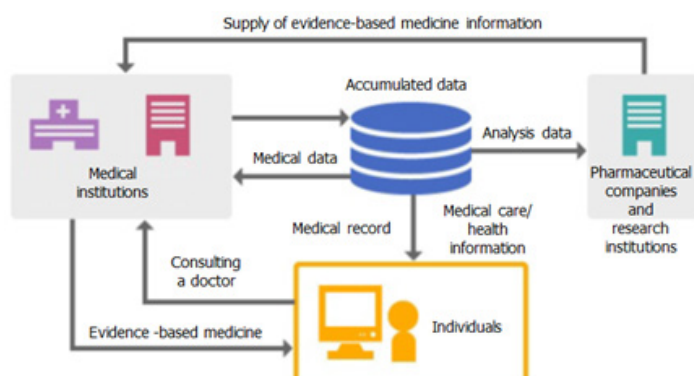
MDV provides management support systems to medical institutions, which enables it to collect medical data from those institutions. Its DPC\* (Diagnosis Procedure Combination) benchmark analysis system, EVE, is the market leader in Japan. The system is used by 45% of DPC hospitals (as of December 31, 2017). The medical data MDV has accumulated on 22.5mn people (as of March 31, 2018)—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 FY12/17, sales totaled JPY3.2bn and operating profit JPY569mn. As of end-FY12/17, employees numbered 212 (consolidated basis; around 25% in development and 50% sales).

#### Leader in collecting and utilizing medical data

- ▶ Has medical data on 22.5mn people, or about one of every six Japanese people
- ▶ EVE, its DPC\* benchmark analysis system, has top market share (45% as of December 31, 2017)
- ▶ Realizing medical care based on extensive proven data

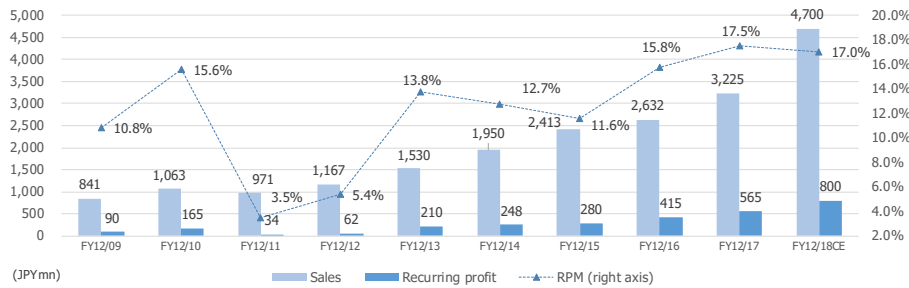
\* Diagnosis Procedure Combination (DPC): A comprehensive evaluation system used in Japan for the reimbursement of medical fees for acute inpatient medical care, described in more detail below

#### 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)

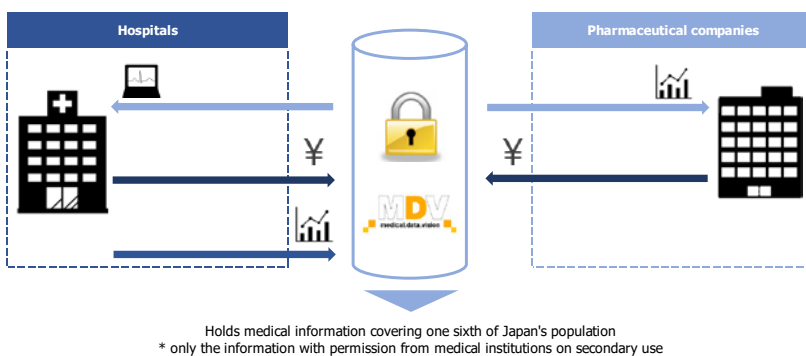
**Business model**

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.

**MDV's business model**



Source: Shared Research based on company data

**Sales by segment**

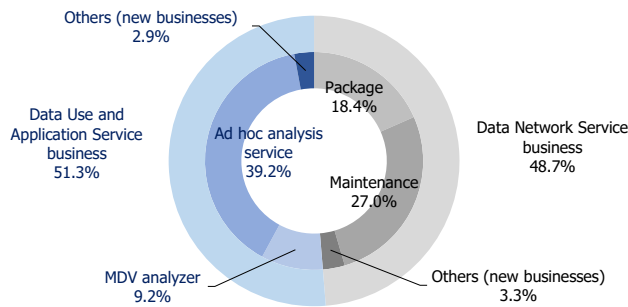
MDV has two segments: the Data Network Service business (48.7% of sales in FY12/17) and the Data Use and Application Service business (51.3% of sales). In Data Network Service, the company is involved in the planning, development, production, sales, and maintenance of management support systems for medical institutions, through which it collects medical and health care information. In Data Use and Application Service, MDV obtains permission from hospitals to provide the medical data obtained in Data Network Service to others—mainly pharmaceutical companies and research institutions—for

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

Two segments  
 ► Data Network Service business: 49% of FY12/17 sales  
 ► Data Use and Application Service business: 51% of sales

secondary use.

### Sales by segment, and by product or service (FY12/17)



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	FY12/18 Est.
(JPYmn)	Parent	Parent	Parent	Parent	Parent	Parent	Parent	Cons.	Cons.	Cons.
Sales (to external customers)	841	1,063	971	1,167	1,530	1,951	2,414	2,632	3,226	4,700
YoY	na	26.4%	-8.7%	20.2%	31.1%	27.5%	23.7%	9.1%	22.5%	45.7%
<b>Data Network Service</b>	<b>na</b>	<b>na</b>	<b>na</b>	<b>na</b>	<b>1,053</b>	<b>1,213</b>	<b>1,449</b>	<b>1,438</b>	<b>1,571</b>	<b>na</b>
YoY	na	na	na	na	na	15.2%	19.5%	-0.8%	9.2%	
% of sales	na	na	na	na	68.8%	62.2%	60.0%	54.6%	48.7%	
Package	na	na	na	na	452	557	730	611	593	
YoY	na	na	na	na	na	23.2%	31.1%	-16.3%	-2.9%	
% of sales	na	na	na	na	29.5%	28.6%	30.2%	23.2%	18.4%	
Maintenance	na	na	na	na	600	656	719	805	872	
YoY	na	na	na	na	na	9.3%	9.6%	12.0%	8.3%	
% of sales	na	na	na	na	39.2%	33.6%	29.8%	30.6%	27.0%	
Other	na	na	na	na	-	-	-	21	105	
YoY	na	na	na	na	na	na	na	na	488.8%	
% of sales	na	na	na	na	na	na	na	0.8%	3.3%	
<b>Data Use and Application Service</b>	<b>na</b>	<b>na</b>	<b>na</b>	<b>na</b>	<b>476</b>	<b>737</b>	<b>963</b>	<b>1,194</b>	<b>1,654</b>	<b>na</b>
YoY	na	na	na	na	na	54.8%	30.8%	23.9%	38.5%	
% of sales	na	na	na	na	31.1%	37.8%	39.9%	45.4%	51.3%	
MDV analyzer	na	na	na	na	174	215	240	263	296	
YoY	na	na	na	na	na	23.6%	11.6%	9.6%	12.5%	
% of sales	na	na	na	na	11.4%	11.0%	10.0%	10.0%	9.2%	
Ad hoc analysis	na	na	na	na	302	521	686	858	1,263	
YoY	na	na	na	na	na	72.5%	31.7%	25.1%	47.2%	
% of sales	na	na	na	na	19.7%	26.7%	28.4%	32.6%	39.2%	
Other	na	na	na	na	-	-	36	71	94	
YoY	na	na	na	na	na	na	na	97.2%	32.4%	
% of sales	na	na	na	na	0.0%	0.0%	1.5%	2.7%	2.9%	

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 (18.4% of FY12/17 sales), maintenance (27.0%), and other business (3.3%). The 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, 2017), and Medical Code, a management support system for hospitals (installed at 265 hospitals as of December 31, 2017). Revenue in other business includes sales from subsidiaries and sales of CADA-BOX (explained in detail below). 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

### Data Network Service segment

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

### 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

institutions. Sales in this segment come from the MDV analyzer (9.2% of FY12/17 sales), Ad Hoc Analysis Service (39.2%), and other business (2.9%). 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.

\* 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.

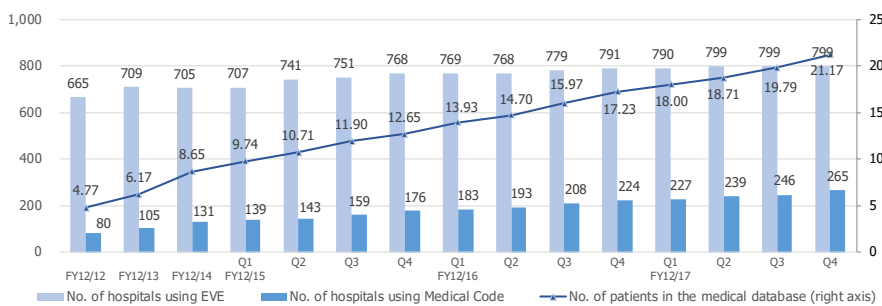
## Main products and services

### Overview of MDV's products and services

By segment and target user	Overview	Functions and features	Price; installations
<b>Data Network Service</b>			
<i>For hospitals</i>			
<b>EVE</b>	DPC analysis benchmarking system	Analyzes disparities in fee-for-services and DPC claims; also analyzes various indicators (such as number of patients, days in hospital, medical resources) 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 fee of JPY4mn (including server), monthly maintenance fee of JPY50,000. Introduced at 799 hospitals as of December 31, 2017, accounting for roughly 45% of DPC hospitals
<b>Medical Code</b>	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 265 hospitals as of December 31, 2017
<b>CADA-BOX</b>	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 JPY500,000. 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. Five hospitals have decided to introduce the system (end-FY12/17). Targets use 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 around 2020
<b>Data Use and Application Service</b>			
<i>For companies (pharmaceutical companies, research institutions, companies in the OTC/H&amp;BC sector)</i>			
<b>MDV analyzer</b>	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
<b>Ad hoc analysis service</b>	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)
<b>OTC- and H&amp;BC-related services</b>	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 22.5mn people (March 2018)	
<i>For individuals</i>			
<b>Karteko</b>	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	
<b>CADA card / CADA Pay</b>	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, 2017, EVE held the top share of the market and was used at 45% of DPC hospitals nationwide. With such a high market share, it aims for organic growth.

#### **Management support system Medical Code installed at 265 hospitals (as of December 31, 2017)**

The management support system for hospitals Medical Code is one of MDV's leading products in Data Network Service. Medical code faces high demand owing to the severe circumstances medical institutions face today. As it displays greater growth potential compared to EVE, which already has a top market share of 45%, MDV intends to focus on marketing Medical Code to respond to growing demand. 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**

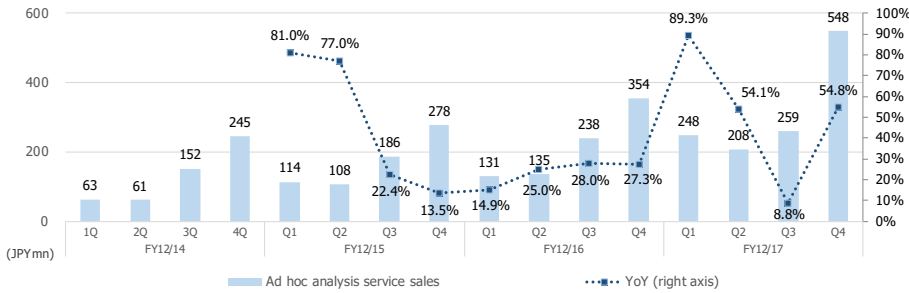
Under the Ad Hoc Analysis Service, MDV provides more specific and pinpoint analysis in response to diverse customer needs. It is driving the growth of Data Use and Application Service (annual sales growth of 43% in the four years leading to FY12/17). Under the Ad Hoc Analysis Service, MDV offers two 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. For example, reports analyzing factors involved in the increase or lagging growth in the number of patients can be used as guides for understanding changes in patient numbers and devising future promotion policies. Also, they can help categorize patient dropouts based on reasons for dropping out, e.g., those who switched to using other drugs, those who stopped using drugs because of complications.

\*\* 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.)

**Sales of Ad Hoc Analysis Service**



Source: Shared Research based on company data

**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 provides solutions to the top causes of patient dissatisfaction with medical care, namely waiting time, doctor's explanation, and medical fees (the Fifth Survey of Physicians' Attitudes on Medical Care conducted in August 2014 by Japan Medical Association Research Institute).

- 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 around 2020.

**CADA-BOX**

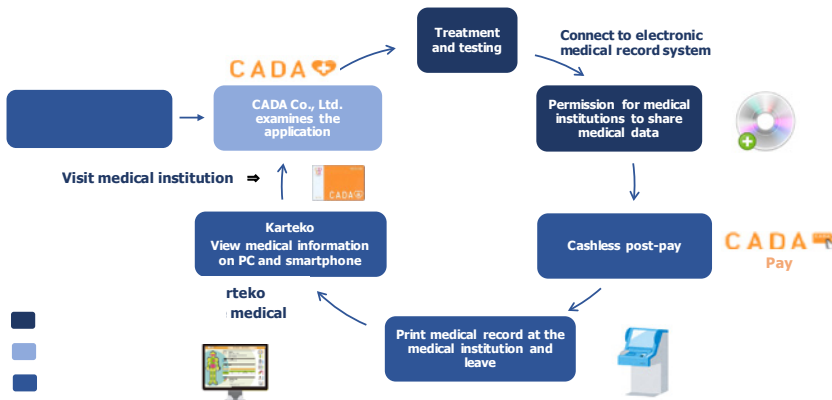
Launched in October 2016, CADA-BOX is a service that links the Karteko online service (allowing patients to view and manage a portion of their own medical information) and CADA Pay service (allowing patients to set their own payment conditions for the deferred payment of medical fees) with existing EMR 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, 2017, CADA-BOX was installed at five hospitals (in operation in three, and in preparation in two)\*. The company aims to install CADA-BOX at 24 new hospitals in FY12/18 and at 344 secondary care hospitals nationwide by around 2020.

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 is in operation in Daido Hospital and Daido Clinic (Nagoya), Keiju Medical Center (Ishikawa Prefecture), and Hito Medical Center (Ehime Prefecture); it is under preparation in Sagara Hospital (Kagoshima Prefecture) and Yuai Memorial Hospital (Ibaraki Prefecture).

**CADA-BOX schematic**



Source: Shared Research based on company data

**Karteko**

Karteko is a website that allows physicians to share a portion of a patient’s medical history with the patient via medical record modules with his/her consent. The patient can then manage and browse the shared medical history for a lifetime. Karteko includes information on the hospitals visited, areas of injuries and names of disorders, test results, prescribed drugs, and treatment and surgery. However, patients may not browse information which physicians have decided not to share upon careful consideration.

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: 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**

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 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.

\*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.

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 FY2017, DPC hospitals across Japan numbered 1,664 (28% of all hospitals in Japan, and 54% of all hospital beds). Of

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)

### 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

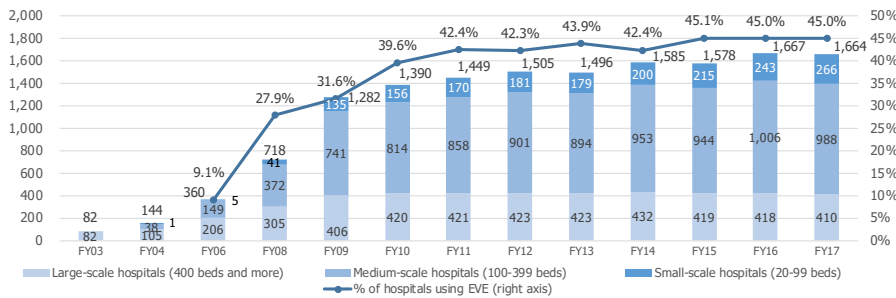
- ▶ For hospitals: Increase revenues through more effective medical care
- ▶ For patients: More effective treatment through evidence-based medicine (EBM)

### 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)

these DPC hospitals, 45% have adopted EVE, MDV’s flagship DPC analysis benchmark system (as of December 31, 2017).

**DPC hospitals and percentage using EVE (right axis)**



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

**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.

**The government’s Japan Revitalization Strategy (revised in 2015)**

Over the five years leading up to FY2020, the government’s Japan Revitalization Strategy, revised in 2015 (June 30, 2015, Cabinet decision), called for focus on promoting information and communication technologies (ICT) in medical care, spreading regional medical information networks (by FY2018), and promoting the spread of electronic medical records (EMRs).

**Promoting ICT in medical care**

In its endeavor to promote ICT in medical care, the Japanese government pointed out three challenges: insufficient spread of EMRs and lack of data compatibility in effect, inability for patients to manage their own medical records, and insufficient progress in consolidating and utilizing medical database. Shared Research believes that CADA-BOX can resolve these challenges.

**Japanese government pushing for the spread of EMRs**

As one of its central tenets of regional medical care, the government aims to have 90% of large hospitals (400 beds or more) use EMRs.

According to Seed Planning’s 2017 Survey of EMR Market Trends, the size of domestic EMR market in 2016 was JPY233.4bn (CAGR of 22.6% from JPY126.7bn in 2013 reported in 2014 issue). EMRs have been adopted in 76.4% of large hospitals with more than 400 beds, 43.7% of mid-size hospitals with 100–399 beds, and 38.9% of all medical institutions. According to the survey, because data submission is required for reimbursement of hospitalization fees in community-based integrated care facilities, small

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)

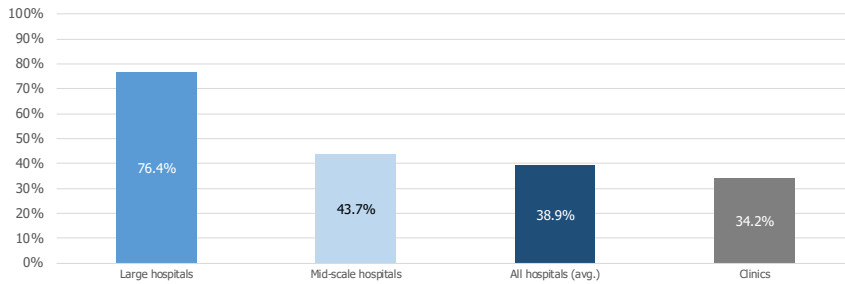
According to studies and forecasts by Seed Planning, the domestic market for electronic medical records will expand from JPY126.7bn in 2013 to JPY278.0bn in 2020.

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

hospitals are showing strong desires to adopt EMRs. Taking such factors into account, the survey expects the market to reach JPY278.0bn in 2020.

(Source: <http://www.seedplanning.co.jp/press/2017/2017080301.html>)

#### Electronic medical record adoption rate (2016)



Source: Shared Research based on data from Seed Planning, Inc. (<http://www.seedplanning.co.jp/press/2017/2017080301.html>)

All baby-boomer generation will be aged 75 or above and the proportion of Japanese population aged 65 or above is expected to reach approximately 30% in 2025. In preparation for this period, Japanese government is promoting a plan to designate mid-sized and small hospitals as the core of regional medical care responsible for providing chronic and recovery phase medical treatment (as part of an initiative to promote community-based integrated care system). A transition to complete community-based medical care in which local hospitals, clinics, and nursing care facilities collaborate with each other in caring for a single patient will take place. 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 JPY800.0bn projected for 2025, MDV expects to involve itself in the following five business domains.

- ▶ 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 and comparable companies

- ✔ 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%
- ✔ Analysis and utilization of information on detailed medical fee statements: Japan Medical Data Center (delisted by management buyout in 2011)
- ✔ Provision of medical care-related services using internet: M3, Inc (TSE1: 2413)

Medical big data market is poised to be worth some JPY800.0bn by 2025 (MDV estimate)

## Comparison with companies offering EMR systems

Company	FY	Sales (JPYmn)	OP (JPYmn)	OPM	ROA	ROE	Equity ratio	Main businesses (% of revenue)
3902 Medical Data Vision	FY12/17	3,226	569	17.6%	16.3%	11.9%	84.3%	Data Network Service (49%), Data Use and Application Service (51%)
(Reference)								
4694 BML	FY03/17	111,243	9,329	8.4%	9.5%	9.2%	64.5%	Clinical Testing business (95%), Medical Informatics (3%), other (1%)
2413 M3	FY03/17	78,143	25,050	32.1%	29.5%	26.2%	70.2%	Medical Platform (39%), Evidence Solution (28%), other (33%)
4320 CE Holdings	FY09/17	7,764	163	2.1%	3.8%	2.8%	57.6%	Parent company of CSI, MDV's business partner and a major provider of EMR systems; EMR System business (99%), other (1%)
Average		50,094	8,778	15.0%	14.8%	12.5%	69.2%	

Source: Shared Research based on data from the various companies

## Earnings

## FY12/18 OP up 40.5% YoY; absorbed spending to expand workforce, bolster services

**FY12/17 earnings:** Sales of JPY3.2bn (+22.5% YoY) and operating profit of JPY569mn (+32.1%). Sales in the Data Network Service business were JPY1.6bn (+9.2%). Sales in the Data Use and Application Service business were JPY1.7bn (+38.5%) (figures under JPY1mn are rounded). Sales in Ad Hoc Analysis Service grew substantially by 47.2% YoY. However, in new businesses, although preparation to leverage synergy is almost complete, sales missed the targets. Following the acquisitions of Doctorbook (January 2017) and Cosmex (June 2017), the company recorded goodwill amortization of JPY32mn.

- █ Cumulative installations of the EVE DPC analysis benchmark system (December 31, 2017): 799 hospitals (+1.0% YoY; about 45% of all DPC hospitals nationwide)
- █ Cumulative installations of Medical Code management support system for hospitals: 265 hospitals (+18.3% YoY)
- █ Patient medical data: 21.2mn patients (+22.9% YoY), 22.5mn as of March 31, 2018
- █ CADA-BOX was installed at five hospitals (in operation in three, in preparation in two)

FY12/17 results:

- ▶ Sales: JPY3.2bn (+22.5% YoY)
- ▶ Operating profit: JPY569mn (+32.1%)

## Quarterly performance (cumulative)

Cumulative (JPY mn)	FY12/16				FY12/17				FY12/17	
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	% of FY	FY Est.
	Par.	Cons.	Cons.	Cons.	Cons.	Cons.	Cons.	Cons.		Cons.
Sales	519	1,037	1,732	2,632	645	1,334	2,109	3,226	89.6%	3,600
YoY	8.6%	8.6%	2.7%	9.1%	24.3%	28.6%	21.8%	22.5%		36.8%
Data Network Service	317	620	999	1,438	309	700	1,108	1,571	78.8%	1,994
Package	121	225	400	611	91	259	405	593	80.0%	741
Maintenance	195	394	597	805	212	428	648	872	100.1%	871
Others	-	-	-	21	6	13	54	105	27.6%	380
Data Use and Application Service	201	415	733	1,194	335	632	1,000	1,654	103.1%	1,605
MDV analyzer	60	125	193	263	75	150	221	296	107.2%	276
Ad hoc analysis service	131	266	504	858	248	456	715	1,263	117.5%	1,075
Others	9	24	35	71	11	26	66	94	37.0%	254
<YoY>										
Data Network Service	6.9%	4.9%	-6.3%	-0.7%	-2.4%	12.9%	11.0%	9.2%		
Package	-2.9%	-7.8%	-25.5%	-16.3%	-25.0%	15.0%	1.3%	-2.9%		
Maintenance	13.9%	13.7%	12.9%	12.0%	8.6%	8.5%	8.5%	8.3%		
Others	na	na	na	na	nm	nm	nm	488.8%		
Data Use and Application Service	11.5%	14.8%	18.2%	24.0%	66.2%	52.2%	36.5%	38.5%		
MDV analyzer	0.9%	1.5%	3.8%	9.6%	23.2%	19.9%	14.8%	12.5%		
Ad hoc analysis service	15.0%	19.8%	23.5%	25.1%	89.5%	71.7%	41.3%	47.2%		
Others	50.0%	46.4%	45.8%	97.2%	20.8%	5.7%	86.4%	32.4%		
Cost of sales	94	198	313	458	119	249	446	620		
YoY	1.5%	-2.0%	-18.3%	-11.3%	27.0%	25.5%	42.8%	35.3%		
Cost ratio	18.1%	19.1%	18.0%	17.4%	18.5%	18.7%	21.2%	19.2%		
Gross profit	425	838	1,420	2,174	526	1,085	1,663	2,606		
YoY	10.3%	11.5%	8.8%	14.6%	23.7%	29.4%	17.1%	19.9%		
GPM	81.9%	80.9%	82.0%	82.6%	81.5%	81.3%	78.8%	80.8%		
SG&A expenses	413	846	1,296	1,743	462	940	1,491	2,037		
YoY	13.7%	8.3%	7.6%	8.0%	11.7%	11.2%	15.1%	16.8%		
SG&A-to-sales ratio	79.6%	81.6%	74.8%	66.2%	71.6%	70.5%	70.7%	63.1%		
Personnel expenses	241	507	760	1,015	275	552	841	1,146		
Other expenses	171	337	535	727	186	387	650	890		
YoY	13.7%	8.3%	7.6%	8.0%	11.7%	11.2%	15.1%	16.8%		
Personnel expenses	15.3%	12.2%	9.4%	9.5%	14.1%	8.9%	10.7%	12.9%		
Other expenses	11.8%	3.1%	5.3%	5.8%	8.8%	14.8%	21.5%	22.4%		
Operating profit	12	-7	124	431	64	144	172	569	105.0%	542
YoY	-45.6%	nm	23.4%	52.6%	441.6%	nm	38.6%	32.1%		25.9%
OPM	2.3%	-0.7%	7.1%	16.4%	9.9%	10.8%	8.1%	17.6%		15.1%
Non-operating income (expenses)	-1	-1	-2	-15	-1	-1	-3	-4		-
Recurring profit	11	-8	122	416	63	143	169	565	104.7%	540
YoY	-46.6%	nm	24.0%	48.4%	460.6%	nm	37.9%	36.0%		29.9%
RPM	2.2%	-0.8%	7.1%	15.8%	9.8%	10.7%	8.0%	17.5%		15.0%
Extraordinary gains (losses)	-	0	0	-122	-	-17	-18	-18		-
Income taxes	6	1	46	116	17	41	75	193		-
Net income attributable to parent company shareholders	5	-10	76	178	46	85	76	355	114.0%	311
YoY	-50.6%	nm	33.1%	8.7%	758.2%	nm	-0.2%	99.0%		74.9%
Net margin	1.0%	-1.0%	4.4%	6.8%	7.2%	6.4%	3.6%	11.0%		8.6%

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.

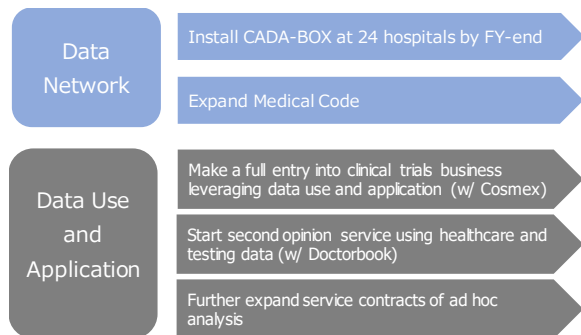
**Difference between forecasts and actual results for FY12/17**

Sales undershot the company forecasts by 10.4%. However, profits performed well with operating profit exceeding the target by 5.0%, recurring profit by 4.7%, and net income attributable to parent company shareholders by 14.0%. Results regarding the spread of CADA-BOX (installed at five hospitals versus 15 targeted) and sales at subsidiaries fell short of the company’s initial targets. The company slightly revised the marketing strategy of its core service, CADA-BOX. Originally, it planned to obtain data on increased patient volume driven by CADA-BOX installation in 2017 and use it as evidence in marketing activities. However, because it took time for hospital employees to understand how the hospital would operate after installing CADA-BOX, there was less time to collect data for evidence. On the other hand, having presidents and directors of hospitals already using CADA-BOX explain how they have reached their decision to adopt CADA-BOX helped other hospitals speed up their decision-making process leading to installation. Hence, the company revised its strategy to one that seeks to obtain evidence of increased patient volume in the long term, while focusing on strengthening referral marketing and marketing using movies featuring presidents or directors of hospitals that have already adopted CADA-BOX.

**Company forecasts for FY12/18:** The company forecasts higher sales and higher recurring profit for the seventh consecutive year with target sales of JPY4.7bn (+45.7% YoY), operating profit of JPY799mn (+40.5%), recurring profit of JPY800mn (+41.6%), and net income attributable to parent company shareholders of JPY491mn (+38.7%) (forecasts by segments are not announced). Continuing from FY12/17, the company expects Ad Hoc Analysis Service to drive the growth and aims to improve sales in its subsidiaries. It expects goodwill of JPY53mn to be amortized. The company plans to hire about 40 people, mostly for sales-related positions. In addition, the company plans to make investments in security and strengthening services including CADA-BOX.

- FY12/18 company forecasts
- ▶ Sales: JPY4.7bn (+45.7% YoY)
  - ▶ Operating profit: JPY799mn (+40.5%)
  - ▶ Hire about 40 people, mostly for sales-related positions, and make investments to strengthen services including CADA-BOX

**Specific objectives for FY12/18**



Source: Shared Research based on company data

**Install CADA-BOX at a greater number of hospitals**

MDV aims to install CADA-BOX at 24 hospitals in FY12/18 (29 by end-FY12/18 including five in FY12/17). According to the company, 19 hospitals are just a step away from signing the contract as of the beginning of FY12/18. Marketing activities utilizing movies featuring presidents and directors of hospitals already using CADA-BOX are proving successful.

**Improve sales at subsidiaries**

**Cosmex**

Cosmex will start recruiting clinical trial subjects from April 2018 using the company’s data on more than 20.0mn people. It is looking to utilize data it accumulates via CADA-BOX (refer to medium-term strategy).

**Doctorbook**

Doctorbook was made a subsidiary in January 2017. It currently has a network of about

10,000 dentists (about 10 percent of total dentists in Japan), and in addition to it, intends to create a network of physicians including clinicians. It expanded the network to include physicians in addition to dentists and began distributing images of more than 70 clinicians who are to become Key Opinion Leaders (KOL). Doctorbook is responding to the demand for videos of surgeries performed by KOLs, and as a result, an increasing number of physicians are signing up for membership. By utilizing the network of member physicians and the company’s database, Doctorbook will launch a service in which members provide a second opinion to patients on the website.

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 and sells them primarily via drugstores.

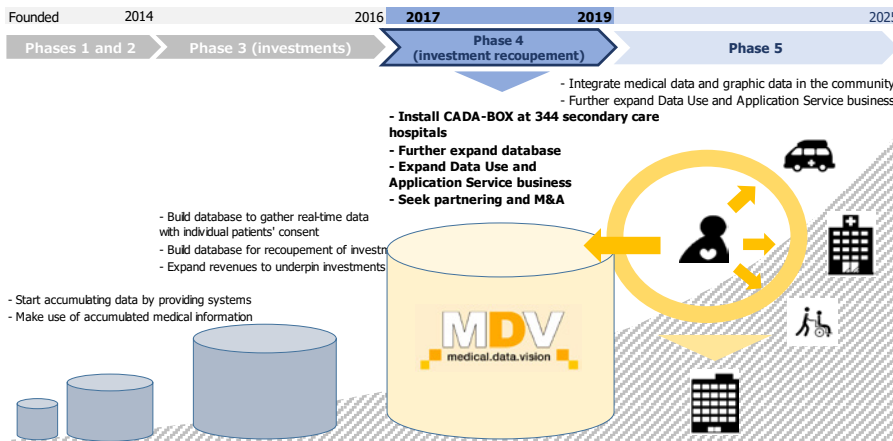
## Medium-term strategy

**Collect data including EMRs via CADA-BOX in addition to DPC data; start a clinical trial business**

### Expand CADA-BOX

The company reports that it is currently in its investment recoupment phase (Phase 4: FY12/17—FY12/19). It aims to install CADA-BOX at 344 secondary care hospitals nationwide by around 2020. In addition to the clinical database of 22.5mn people already accumulated (as of March 31, 2018), the company intends to collect diverse and real-time medical data from EMRs with individual consent using CADA-BOX. 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.

### 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 around 2020 (29 hospitals by end-FY12/18)
- ✔ Further expand data infrastructure
- ✔ Expand Data Use and Application Service
- ✔ Cooperate with other companies (M&A)

#### 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)

\*The company aims for a society in which individuals can track their own medical and health information over their lifetime, and based on such information, can choose medical and health care for themselves.

## Changes in external factors and business opportunities for the company

National government policies/strategies	Environmental changes	Impact on the company
<b>System of individual identity numbers</b> - 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
<b>"Japan Revitalization Strategy," 2015 revision (June 20, 2015 Cabinet decision)</b> - 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
<b>"Policies for Economic and Fiscal Management Reform" (June 30, 2015 Cabinet decision)</b> - 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
<b>Introduction of medical care function reporting system</b> - 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 combine regional medical data collected up until patients reach chronic care hospitals and clinics. By establish data link among medical care facilities, MDV intends to offer services such as the provision of second opinions from acute care hospitals.

## Starting a clinical trial business

### Making Cosmex Co., Ltd. a subsidiary

The company entered the clinical trial industry by acquiring all shares in Cosmex Co., Ltd. (Cosmex)\* on June 7, 2017, making it a subsidiary. It plans to utilize medical big data Cosmex has accumulated.

\*Cosmex, since its establishment in 2000, has been operating a site management organization (SMO) business. Its specialty is in dermatology, psychiatry, and neurology, and it is known for conducting multi-case clinical trials at a small number of institutions.

The main function of the clinical trial support business is to provide selection services for matching hospitals and patients to clinical trial protocols formulated by pharmaceutical companies. Currently, the use of human wave tactics to identify suitable subjects (patients) is common\*. However, MDV and Cosmex have applied the concept of PRO (Patients Researched Organization) and plan to use medical big data—the data already accumulated by MDV over the years and the data the company intends to accumulate going forward—in selecting test subjects. This will make it possible to shorten the time required to conduct clinical trials and reduce costs, while still ensuring safety. The aim is to facilitate innovation in the clinical trial industry.

\*MDV will use medical big data—the data it has already accumulated over the years and the data it intends to accumulate going forward—in recruiting test subjects. Big data will make it possible to conduct advance selection of test subjects and to quickly and efficiently identify those hospitals with the largest number of patients suiting the prepared protocol. This will make it possible to significantly reduce the amount of time and money required. It will also be relatively easy to run simulations on additions to a protocol.

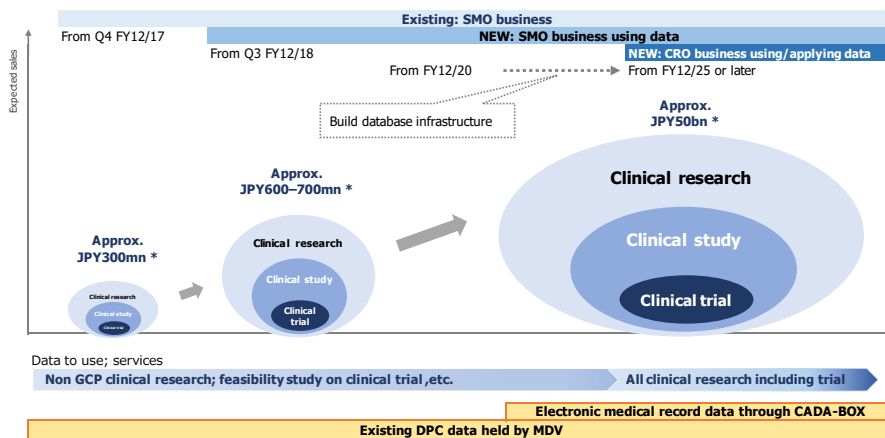
### Sales estimates

MDV has proposed a timeline for the growth of its clinical trial business. Specifically, it anticipates growth in the following three stages. In Phase 1, the company began preparing for the use and application of DPC data in Q4 FY12/17. The company estimates cumulative sales for the period Q4 FY12/17 to Q3 FY12/18 at approximately JPY300mn, coming from the existing SMO business at Cosmex and new SMO clients to be captured by MDV's own EVE sales unit. For Phase 2, starting in Q3 FY12/18, the company will add an SMO business using its DPC data. It estimates revenues of approximately JPY600mn–700mn from

conducting clinical studies (excluding trials) and feasibility studies on clinical trials. MDV will use the period from FY12/20 to FY12/24 to establish databases and infrastructure allowing data use and application for the contract research organization (CRO) business. In Phase 3, from FY12/25 onward, the company will launch the CRO business using, with patient consent, active electronic medical record data via its CADA-BOX service. It forecasts sales of about JPY50bn gained by conducting all clinical studies including clinical trials.

Through the use and application of big data, MDV expects to significantly reduce costs, including personnel expenses, and save time, permitting it to secure adequate profits even as it lowers the cost per trial. The company also believes the cost reductions will make it possible for it to take on clinical trials that have typically been delayed or neglected, including ones that companies providing clinical trial support have avoided on the grounds of low profitability. MDV believes it can promote an industry environment in which clinical trials can be conducted more smoothly than is presently the case.

**Clinical trial business sales estimates and timeline**



Source: Shared Research based on company data

**Market scale**

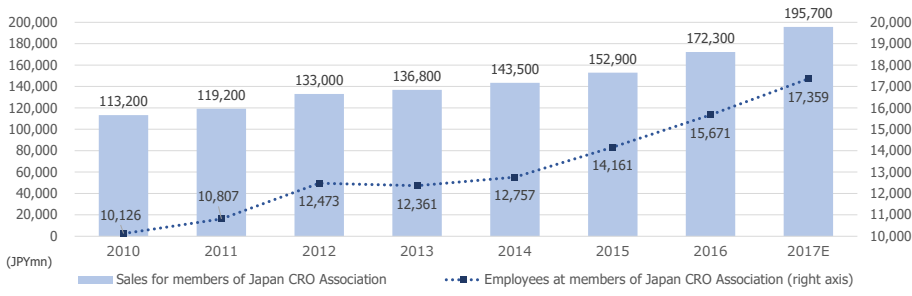
Based on total sales of companies in the CRO business and of those in the SMO business, the scale of the clinical trial market can be estimated at about JPY240bn. Even as the SMO market contracts, the CRO market is experiencing robust expansion.

In 2016, combined sales of the members of the Japan CRO Association were JPY172.3bn (+12.0% YoY), and the forecast for 2017 is JPY195.7bn (+13.6%). In 2016, the members of the Japan CRO Association had 15,671 employees (+10.7% YoY), and the projection for 2017 is 17,359 employees (+10.8%). These figures show that the CRO market is continuing to expand.

On the other hand, in 2016, combined sales of the members of the Japan Association of Site Management Organizations were JPY35.2bn (+7.4% YoY), and the number of association members fell to 35 companies (down three companies YoY). Although the SMO market had been contracting since 2013, it expanded in 2016.

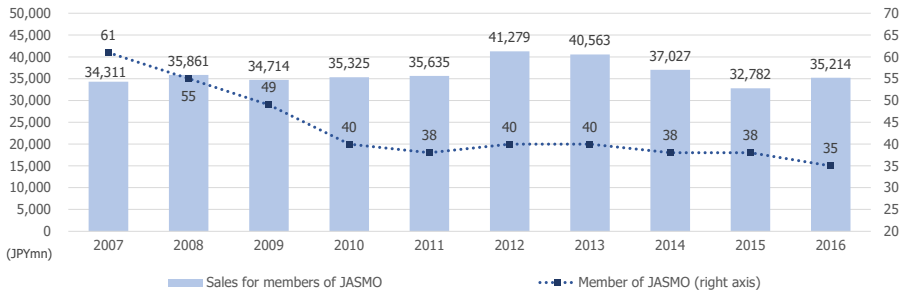


**CRO market: total sales**



Source: Shared Research based on Japan CRO Association data

**SMO market: total sales**



Source: Shared Research based on Japan Association of Site Management Organizations data

## 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, 2017, 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 265 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 six Japanese people (22.5mn people) as of March 31, 2018. 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 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 around 2020, it plans to install 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 179,171 medical institutions in Japan (8,404 hospitals, 101,903 clinics, and 68,864 dental offices), there are just 1,664 DPC hospitals, whereas the numbers of non-DPC hospitals (about 6,700) and clinics (101,903) are vastly bigger. The company's DPC analysis benchmark system EVE is used by 45% of the DPC hospitals (as of December 31, 2017, based on Ministry of Health, Labour and Welfare and company data). The company installed Hospital eye, its cloud-based data analysis system provided to non-DPC hospitals, at about 50 hospitals in FY12/17. However, compared to the total number of non-DPC hospitals, this is a mere drop in the bucket.

#### 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

- 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										
	FY12/09	FY12/10	FY12/11	FY12/12	FY12/13	FY12/14	FY12/15	FY12/16	FY12/17	FY12/18 Est.
(JPYmn)	Parent	Parent	Parent	Parent	Parent	Parent	Parent	Cons.	Cons.	Cons.
Sales	841	1,063	971	1,167	1,530	1,951	2,414	2,632	3,226	4,700
YoY	-	26.4%	-8.7%	20.2%	31.1%	27.5%	23.7%	9.1%	22.5%	45.7%
Cost of sales	na	na	na	264	288	385	516	458	620	-
YoY	-	-	-	-	9.0%	33.5%	34.2%	-11.3%	35.3%	-
Cost ratio	-	-	-	22.7%	18.8%	19.7%	21.4%	17.4%	19.2%	-
Gross profit	na	na	na	903	1,242	1,566	1,897	2,174	2,606	-
YoY	-	-	-	-	37.6%	26.1%	21.2%	14.6%	19.9%	-
GPM	-	-	-	77.3%	81.2%	80.3%	78.6%	82.6%	80.8%	-
SG&A expenses	na	na	na	842	1,032	1,305	1,615	1,743	2,037	-
YoY	-	-	-	-	22.7%	26.4%	23.7%	8.0%	16.8%	-
SG&A-to-sales ratio	-	-	-	72.1%	67.5%	66.9%	66.9%	66.2%	63.1%	-
Operating profit	na	na	na	61	210	261	282	431	569	799
YoY	-	-	-	-	241.6%	24.2%	8.4%	52.6%	32.1%	40.5%
OPM	-	-	-	5.3%	13.7%	13.4%	11.7%	16.4%	17.6%	17.0%
Recurring profit	91	165	34	63	211	249	280	416	565	800
YoY	-	82.0%	-79.4%	83.3%	236.4%	18.1%	12.7%	48.4%	36.0%	41.6%
RPM	10.8%	15.6%	3.5%	5.4%	13.8%	12.7%	11.6%	15.8%	17.5%	17.0%
Net income	70	144	43	92	205	135	164	178	355	491
YoY	-	105.4%	-70.5%	115.8%	123.2%	-33.9%	21.1%	8.7%	99.0%	38.7%
Net margin	8.3%	13.6%	4.4%	7.9%	13.4%	6.9%	6.8%	6.8%	11.0%	10.4%
Depreciation and amortization of goodwill	na	na	na	60	55	72	75	94	131	-
EBITDA	-	-	-	121	265	333	358	525	700	-

Note: Amounts below JPY1 mn rounded off

Source: Shared Research based on company data

SG&A expenses breakdown						
	FY12/12	FY12/13	FY12/14	FY12/15	FY12/16	FY12/17
(JPYmn)	Parent	Parent	Parent	Parent	Cons.	Cons.
SG&A expenses	842	1,032	1,305	1,615	1,743	2,037
Salaries and allowances	348	406	527	648	710	771
Depreciation	24	23	40	40	na	na
R&D expenses	4	8	21	6	16	6
Other	465	596	718	921	1,017	1,259
<% of sales>						
SG&A expenses	72.1%	67.5%	66.9%	66.9%	66.2%	63.1%
Salaries and allowances	29.8%	26.5%	27.0%	26.8%	27.0%	23.9%
Depreciation	2.1%	1.5%	2.0%	1.7%	na	na
R&D expenses	0.4%	0.5%	1.1%	0.3%	0.6%	0.2%
Other	39.8%	38.9%	36.8%	38.1%	38.6%	39.0%

Note: Amounts below JPY1 mn rounded.

Source: Shared Research based on company data

- GPM is high, at around 81%.**
- The company entered an investment recoupment phase in FY12/17.** Increases in promotion and advertising costs, rent due to expansion of Tokyo headquarters, and labor cost resulting from significant sales-related personnel expansion in the Data Network Service and Data Use and Application Service businesses (about 40 employees) were all covered by the increase in sales. OPM rose 1.2pp YoY to 17.6%.

Cost of goods sold breakdown (parent)						
(JPYmn)	FY12/12	FY12/13	FY12/14	FY12/15	FY12/16	FY12/17
	Parent	Parent	Parent	Parent	Parent	Parent
I Material costs	28	45	82	149	57	59
II Labor costs	109	114	119	143	155	190
III Other costs	127	134	200	236	247	296
(License fee)	(27)	(36)	(37)	(47)	(25)	na
(Depreciation)	(35)	(32)	(32)	(35)	(46)	(43)
(Outsourcing expenses)	0	(9)	(52)	(47)	(51)	(67)
(Other)	(65)	(57)	(79)	(106)	(125)	(185)
Subtotal	264	293	401	528	460	545
Transfer to other accounts	-	5	16	12	2	0
Cost of goods sold	264	288	385	516	458	545
I Material costs	10.8%	15.4%	20.5%	28.3%	12.5%	10.9%
II Labor costs	41.1%	38.9%	29.5%	27.2%	33.8%	34.9%
III Other costs	48.2%	45.7%	50.0%	44.6%	53.7%	54.3%
Subtotal	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Note: Figures rounded to nearest JPYmn.

Source: Shared Research based on company data

## Balance sheet

Balance sheet						
(JPYmn)	FY12/12	FY12/13	FY12/14	FY12/15	FY12/16	FY12/17
	Parent	Parent	Parent	Parent	Cons.	Cons.
Cash and deposits	547	779	1,799	1,752	1,959	1,798
Accounts receivable	245	291	433	597	770	794
Inventories	8	8	15	9	10	156
Prepaid expenses	6	10	16	24	-	-
Deferred tax assets	32	49	7	8	9	30
Other	5	2	4	26	49	87
Total current assets	843	1,140	2,275	2,416	2,797	2,864
Tangible fixed assets	67	76	119	97	106	173
Buildings and accompanying facilities	36	28	52	38	29	67
Tools, furniture, and fixtures	31	48	68	59	77	106
Intangible assets	41	31	146	195	127	476
Software	41	31	40	111	127	92
Software in progress	-	-	107	84	-	-
Goodwill	-	-	-	-	-	367
Other	-	-	-	-	-	17
Other fixed assets	87	86	111	206	161	239
Long-term prepaid expenses	2	1	1	18	-	-
Other	85	85	110	188	161	239
Total fixed assets	195	194	377	497	394	888
Deferred assets	0	-	8	5	2	-
Total assets	1,038	1,334	2,659	2,919	3,194	3,752
Accounts payable	15	32	53	64	40	40
Accounts payable–other	30	73	117	130	-	-
Accrued expenses	19	8	7	3	-	-
Accrued income taxes	6	26	62	78	81	189
Accrued consumption taxes	15	19	38	43	-	-
Deposits received	7	9	11	14	-	-
Unearned revenue	39	55	68	71	-	-
Other	1	1	5	5	243	322
Total current liabilities	131	222	362	408	364	551
Deferred tax liabilities	3	3	3	-	-	-
Asset retirement obligations	14	14	18	18	19	33
Other	-	-	4	3	2	4
Total fixed liabilities	17	17	26	21	20	37
Total liabilities	149	239	387	429	384	588
Shareholder's equity	890	1,095	2,272	2,490	2,810	3,164
Capital stock	351	351	884	911	981	981
Capital surplus	960	960	1,468	1,495	1,566	1,566
Retained earnings	-421	-216	-80	84	263	618
(Treasury stock)	-	-	-	0	0	0
Total net assets	890	1,095	2,272	2,490	2,810	3,164
Net cash	547	779	1,799	1,752	1,959	1,798
Working Capital	238	268	395	543	741	910

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 JPY1.8bn (as of end-FY12/17).
- ✔ Net asset ratio is 84%.

## Per-share data (JPY, after adjusting for stock splits)

Per share data (JPY; adjusted for stock splits)									
	FY12/09	FY12/10	FY12/11	FY12/12	FY12/13	FY12/14	FY12/15	FY12/16	FY12/17
	Non-cons.	Non-cons.	Non-cons.	Parent	Parent	Parent	Parent	Cons.	Cons.
Shares issued (year end)	12,799,200	14,479,200	14,479,200	14,479,200	14,479,200	18,447,200	18,879,200	20,007,200	20,007,200
EPS	5.61	10.26	2.94	6.34	14.16	9.02	8.83	9.34	17.72
EPS (fully diluted)	-	-	-	-	-	8.17	8.38	8.95	-
Dividend per share	-	-	-	-	-	-	-	-	-
Book value per share	37.91	52.17	55.11	61.46	75.61	123.16	131.88	140.45	158.17

Source: Shared Research based on company data

## Cash flow statement

Statement of cash flows						
	FY12/12	FY12/13	FY12/14	FY12/15	FY12/16	FY12/17
(JPYmn)	Parent	Parent	Parent	Parent	Cons.	Cons.
Cash flows form operating activities	44	286	206	118	196	486
Cash flows form investing activities	-56	-154	-108	-218	-144	-740
Cash flows from financing activities	-	-	1,022	52	139	-8

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. An expenditure of JPY429mn from acquisition of subsidiary shares accompanying a change in the scope of consolidation and a payment of JPY100mn into time deposits caused cash outflows from investing activities to exceed cash inflows from operating activities in FY12/17. The company has not paid dividends.

## Financial ratios

Financial ratios						
	FY12/12	FY12/13	FY12/14	FY12/15	FY12/16	FY12/17
	Parent	Parent	Parent	Parent	Cons.	Cons.
ROA (RP-based)	6.3%	17.8%	12.5%	10.0%	13.7%	16.3%
ROE	10.9%	20.7%	8.0%	6.9%	6.7%	11.9%
Inventory turnover	na	35.3	33.3	42.9	47.4	7.5
Fixed assets turnover	na	21.4	20.0	22.3	26.0	23.1
Current ratio	642.1%	513.1%	629.0%	592.7%	769.0%	520.0%
Equity ratio	85.7%	82.1%	85.4%	85.3%	88.0%	84.3%

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 (JPY1.8bn at end-FY12/17)

## 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	As of end-December 2017	
	Shares held	Shareholding ratio
Fujifilm Corporation	5,646,400	28.2%
Japan Trustee Services Bank, Ltd. (Trust account)	1,965,600	9.8%
MEDIPAL HOLDINGS CORPORATION	1,606,300	8.0%
Takahiro Suzuki	785,000	3.9%
Mitsubishi Corporation	640,000	3.2%
The Master Trust Bank of Japan, Ltd. (Trust account)	609,100	3.0%
Hiroyuki Iwasaki	547,200	2.7%
Takahiro Yamaguchi	524,616	2.6%
CMIC HOLDINGS Co., Ltd.	480,000	2.4%
Japan Trustee Services Bank, Ltd. (Trust account 9)	402,600	2.0%
Total shares issued	20,007,200	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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