

**360°
Imaging
Services**

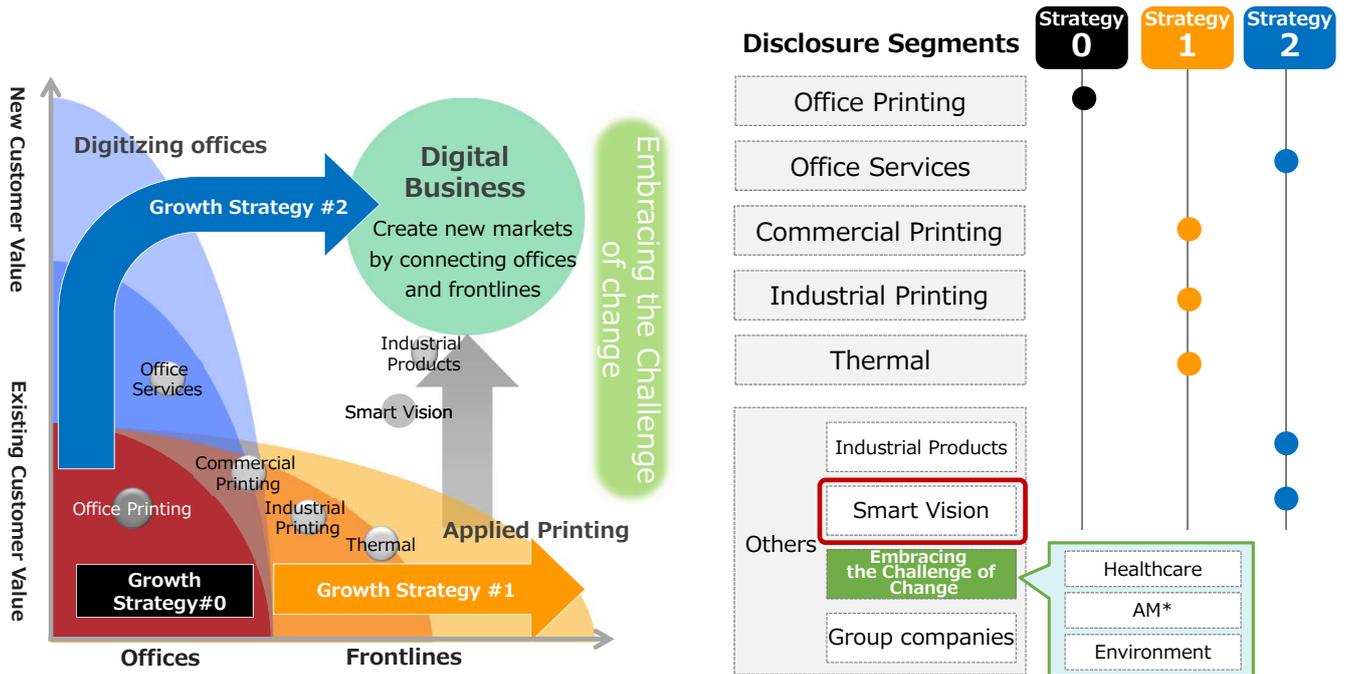
April 11, 2019

Wataru Otani

**General Manager of
Smart Vision Business Group**

Ricoh Company, Ltd.

- I'm Wataru Otani. I look after the Smart Vision Business Group.
- Today, I will discuss new 360-degree image-based data services.

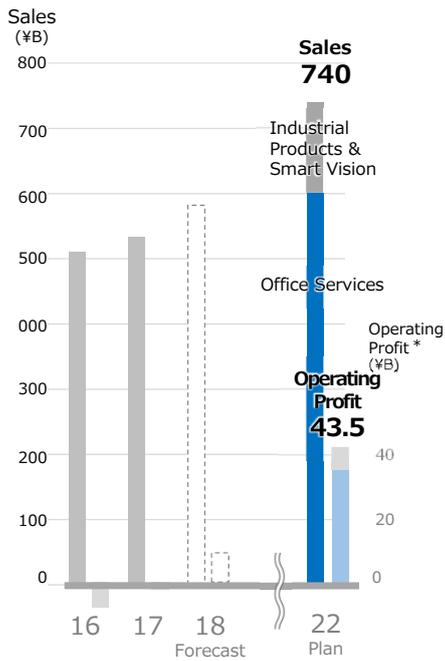


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*AM: Additive Manufacturing

- The Smart Vision business is part of Growth Strategy #2.



Growth Strategy #2 toward FY2022
Expand Office Services business earnings and create new businesses

Office Services:

Reinforce our structure and invest extensively to expand operations and create a business model that produces stable earnings

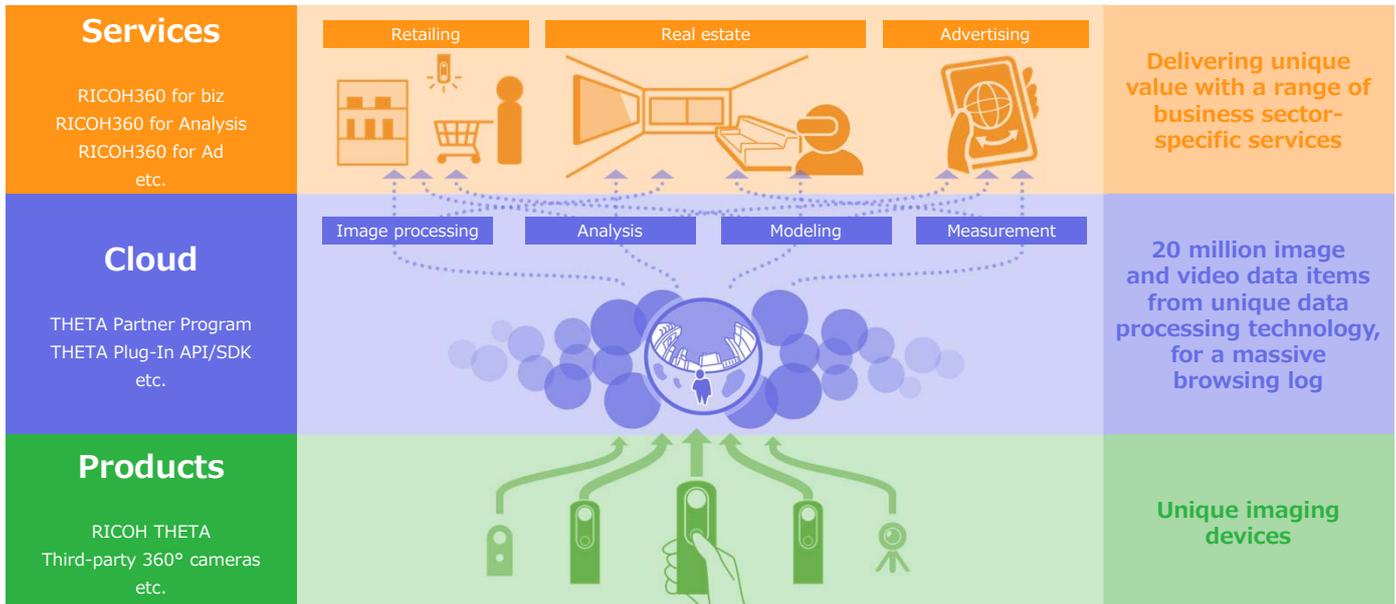
Digitizing frontlines : RICOH360 data service

Industrial Products:

Combine optical technologies that Ricoh has amassed over the years with Internet of Things, artificial intelligence, and other advanced technologies and visualize information through information conversion from data recognition processes to enhance the productivity of societies

- Today, I will discuss our 360-degree image-based data services business as an example of frontline digitization in our drive toward fiscal 2022.

Service platform employing largely 360° images and video data



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- I will begin by overviewing the data services business.
- The underpinning for this business is currently Ricoh's 360° THETA camera. This was a world first among consumer cameras. We are creating new value and services by accumulating 360° image data from this camera platform, processing images and analyzing and employing the amassed data.

Real estate

- 360° virtual room tours
- Adding CG parts for facility and other services



Advertising

- Online banner ads employing THETA 360° images
- Web ads optimized by AI learning



Stores

- Behavioral analysis services using THETA in stores, offices, and other locations
- Cloud services harnessing AI recognition technology



Customer growth

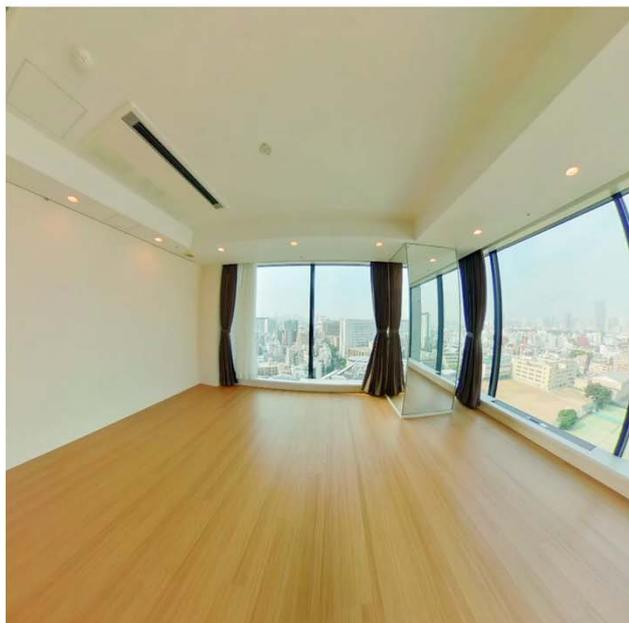


Customer business sectors

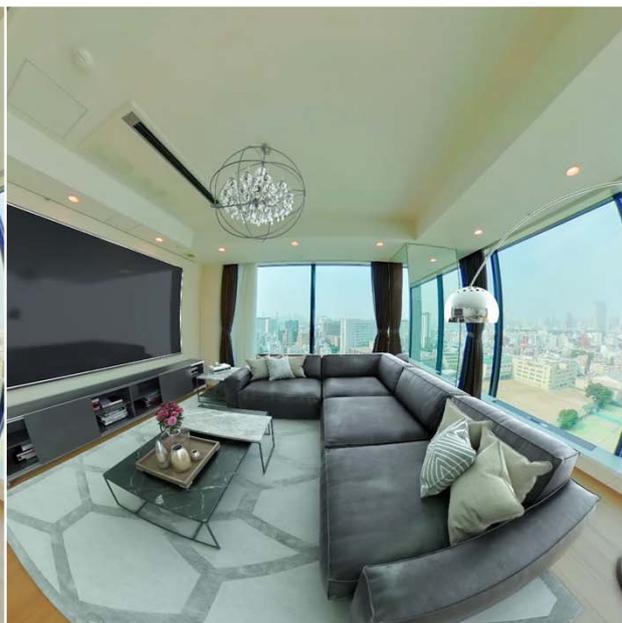


- I will present several areas in which we are offering 360° imaging services, in the order we brought them out.
- The first is real estate, an easily understood example of added value in which you can present 360° images of interiors or building locations.
- The next service is advertising. We have been very well received here because a rotating a 360° still image has the same advertising impact as a data-heavy video.
- The third service is for stores, and this is an area we plan to develop considerably. The many prospective needs in this space include being able to quickly assess situations from a wide range of perspectives or change viewing points or camera locations according to the season or time. This service entails installing THETA cameras for behavioral analysis.
- Following around three years of trials, the number of customers for our services began rising significantly from fall 2018. Initially, 90% of customers were from the real estate industry, but various other sectors and businesses began adopting our service recently.
- The use of 360° workflows is taking hold.

Image hosting service



VR staging (with computer-generated images) service



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- I will present a service example.
- On the left, an image hosting service presents a 360° view of a room. End users can themselves rotate the image to see a part of the room that interests them.
- The image on the right shows an example of our virtual reality staging service, which we launched in February this year. This is exactly the same room as shown on the left, and includes computer-generated images of furniture.
- The graphics look very much like the real thing, and this staging service has become wildly popular because it is so easy to switch layouts from Japanese-style ones, for example, to Scandinavian ones. We look forward to this service being used for presenting virtual layouts in office design processes.

Category	Needs of prospective customers	Ricoh's strengths	Market scale
Marketing and sales support Real estate Tourism Used cars Architecture	<ul style="list-style-type: none"> See things before going to real location Focusing specific area View furniture and facilities layouts Assess impacts of design changes 	<ul style="list-style-type: none"> 360° camera pioneer with the THETA Systems linked with cameras Image processing technology applications More than 20 million properties and items data 	Japan: ¥7 trillion Overseas: ¥34 trillion Online advertising market scale
Advertising	<ul style="list-style-type: none"> Boost click rates Attract interested people effectively Create simple contents 	And... <ul style="list-style-type: none"> Using deep learning and AI to analyze user perspectives and optimize presentation Data sets of user browsing histories 	Digital marketing market
Stores Facilities management Inspections	<ul style="list-style-type: none"> Easily install and move location Analyze customer movements Check and record on-site conditions 	And... <ul style="list-style-type: none"> Face and object recognition technology applications 	Worldwide: ¥63.9 billion Digital marketing market

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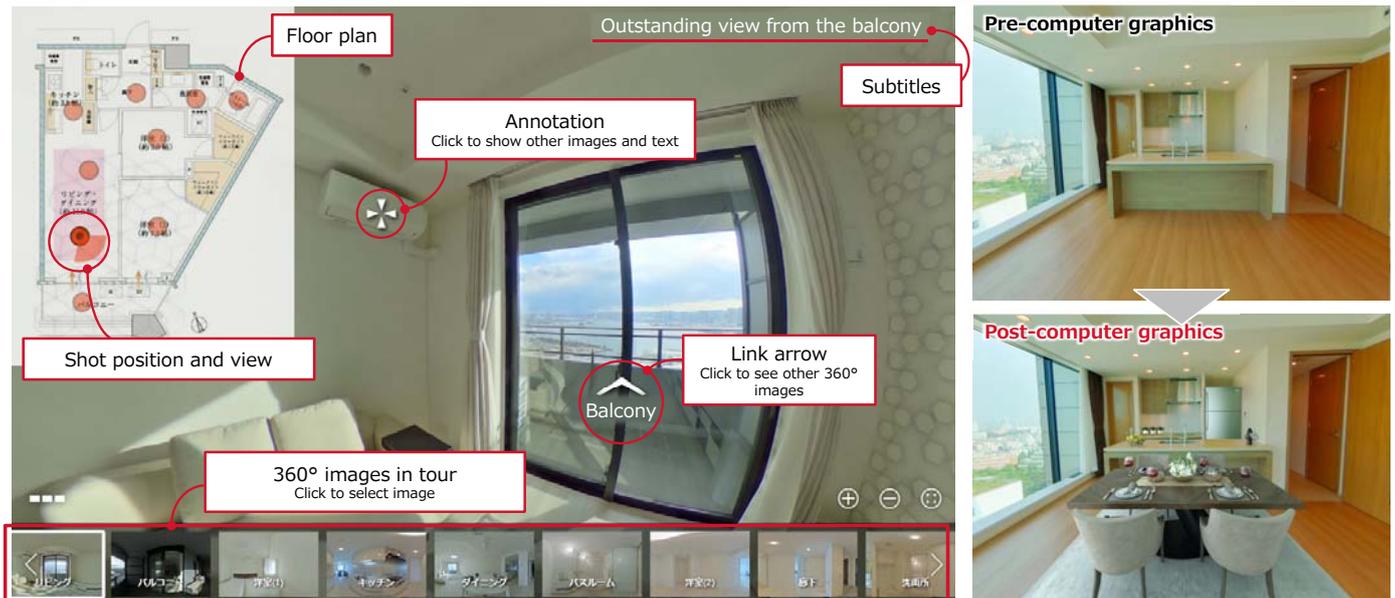
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- I will now explain the business climate for our 360° image data services.
- The categories in which we aim to deliver value are marketing and sales support, advertising, and stores, facilities management, and inspections.
- On the marketing and sales support front, as explained earlier we can accommodate needs for complete views, previewing particular areas, installing computer-generated images of furniture and facilities and presenting designs.
- Ricoh's strength is that it began supplying its pioneering THETA cameras, which are based upon a new concept, linking these devices to systems.
- Another important point to note is that Ricoh accumulated the image processing technologies that I presented before over many years.
- It is also worth noting that we have amassed more than 20 million data sets. It is said that you need 1 million data sets for analysis with artificial intelligence. We will use our massive data sets to focus on ways in which we can produce value.
- In advertising, customers are interested most in increasing click rates for their web ads. They also need ways to create content more easily. We are seeing more cases of users producing their own content. Just taking one 360° still photo enables them to create content automatically. Video content is popular because it is so easy to create with our platform.
- Another capability in advertising is using deep learning and artificial intelligence to analyze what users are looking at. This data is not simply what you would get from 360° rotations, and is about analyzing what users look at most and the order in which they view things. Our data set also includes user browsing histories, and this is another strength that we can leverage.
- Finally, it is easy to install and relocate THETA cameras in stores and facilities and quickly analyze the data. This is a good sales point. We are deploying face and object recognition technologies that we have developed.

Key business strategy	Make RICOH 360 portal a cross-industry platform by 2022
Main measures	
Technologies	<ul style="list-style-type: none">● Acquire AI data sets and other advanced technologies● Build a menu structure that enables customers to choose services and gives them easy access to updates and new services
Development	<ul style="list-style-type: none">● Build and run a Web platform that enables service APIs and new technology deployments● Bolster external collaboration to improve services menu● Develop hardware for THETA and other edge device processing
Production	<ul style="list-style-type: none">● Link and standardize Web platforms with Ricoh Smart Integration● Hybrid approach combining edge device production in-house and original design manufacturer collaboration
Sales and service	<ul style="list-style-type: none">● Make it possible to integrate estimate, sales, contract management, invoicing, and revenue designs in the one platform● Enhance service menu and provide service and price packages matching customer plans

- I will now discuss our business strategies and key initiatives.
- Our key business strategy is to make the RICOH 360 portal a cross-industry platform by 2022.
- We aim to enable customers to select what they want from the portal menu.
- While there is some overlap from my business climate discussion on the previous page, I will highlight some important points.
- On the technology side, our measures include acquiring data sets and other advanced technologies.
- In development, the main focus is on increasing the service menu, so we will go beyond simply building applications independently and bolster external collaborations.
- In production, we will standardize with RICOH Smart Integration, discussed in the Office Services Business presentation.
- Finally, there is sales and service. The key about Software as a Service data businesses is to complete all workflow processing without human involvement, so it is vital to integrate everything so all processes can be completed on the platform.
- One other point to note is that customers choose services, making it essential to provide service and price packages that they can select from.



- Enabling browsing as if moving around in by presenting omnidirectional images in one screen and linking them with the floor plan

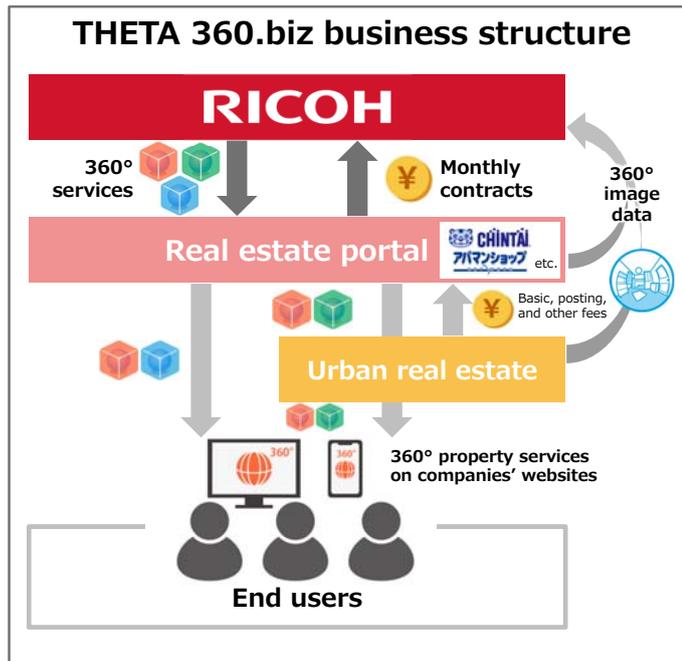
- Embedding top-quality computer graphics by leveraging Ricoh's optical and image processing technologies

*1 : One of RICOH360 menus

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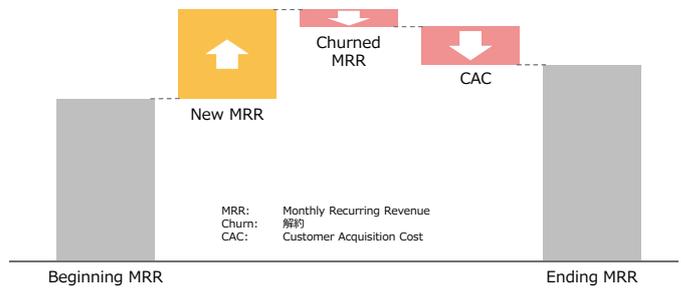
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- On this page we present our THETA 360.biz service as an example of what we are doing.
- This is the first service that we rolled out, for the real estate space. As shown earlier, things started out with simply rotating 360°. But in response to customer needs, we recently made it possible and easy to create content linked with floor plans. The point here is that the service simplifies the creation of tours and explanations from floor plans.

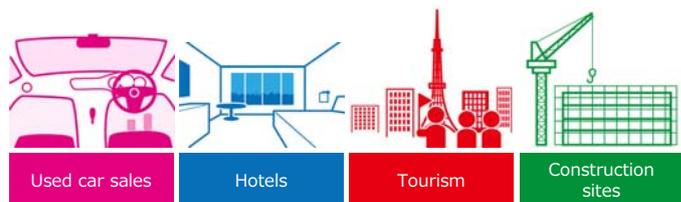


Earnings structure

Model of increasing returns from securing and retaining customers



Applications



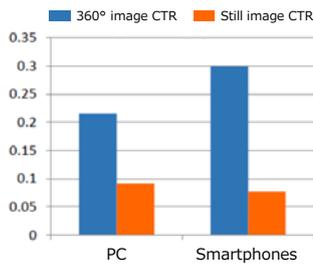
- I will now explain the THETA 360.biz business structure.
- We provide our 360° service to real estate portals that pay us fees based on monthly contracts. The crucial element of any data business is the ability to collect data. Under our framework, data on product images that customers capture is automatically accumulated in our portal. Users are currently accumulating hundreds of thousands of data sets every month in the portal under this setup.
- It is said that there are three key considerations with Software as a Service business models that function without human intervention.
- The first is the ability to secure new customers. The second is to minimize churn rates. The third is to identify the costs as far as possible of securing new customers.
- Fundamentally, the fixed costs of services web platforms are basically unchanging. What is important is having a basic structure for increasing customer numbers, particularly in initial stages, and reducing churn rates.
- Applications beyond real estate include such areas as used car sales, hotels, tourism, and construction sites.

Advertising

- Distribute and display 360° banner ads that move using Ricoh's AI learning



Still images and click-through rate (CTR) comparisons



360° banner CTRs are far higher than those of still image ones

PC: 2.4-fold

Smartphone: 3.9-fold

*Our records

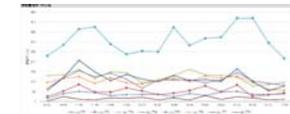
In-store behavioral analysis

- Behavioral analysis service that uses deep learning-based image recognition technology to measure the numbers of people in stores, at event venues, offices, and other locations



People numbers

Showing changes in numbers of people by area and time



Heat map view

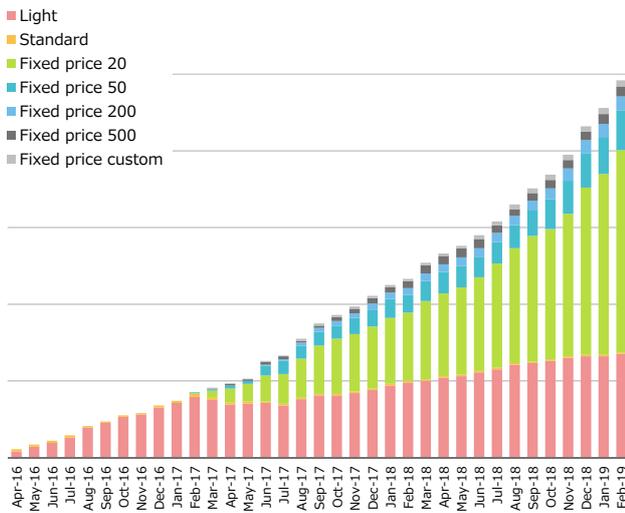
Showing popular areas (hot spots) and unpopular ones (cool spots)



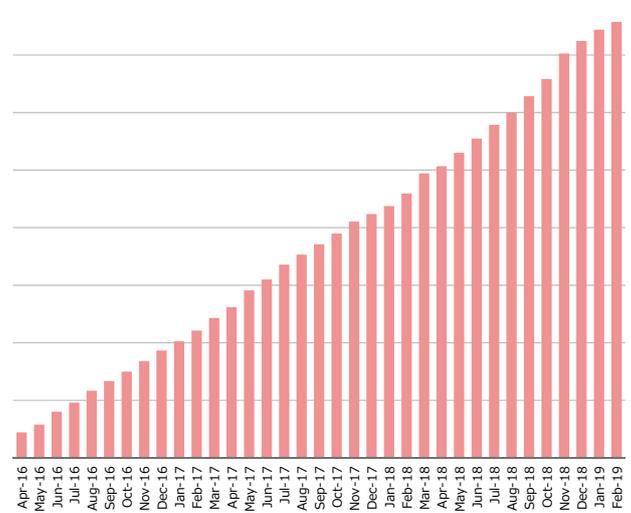
- I will now present advertising and shop services.
- While the advertising uses stills, the main attraction for customers is that images can be moved around. Such images have demonstrably higher click through rates than conventional stills.
- As I explained earlier, it is very easy to create content with still images, so they have been extremely well received.
- For in-store behavioral analysis, we are beginning to develop services that replace fixed cameras and cater to the need for simple camera installation and analysis for showrooms, events, and other locations.



Number of paid subscriptions



Number of free subscriptions

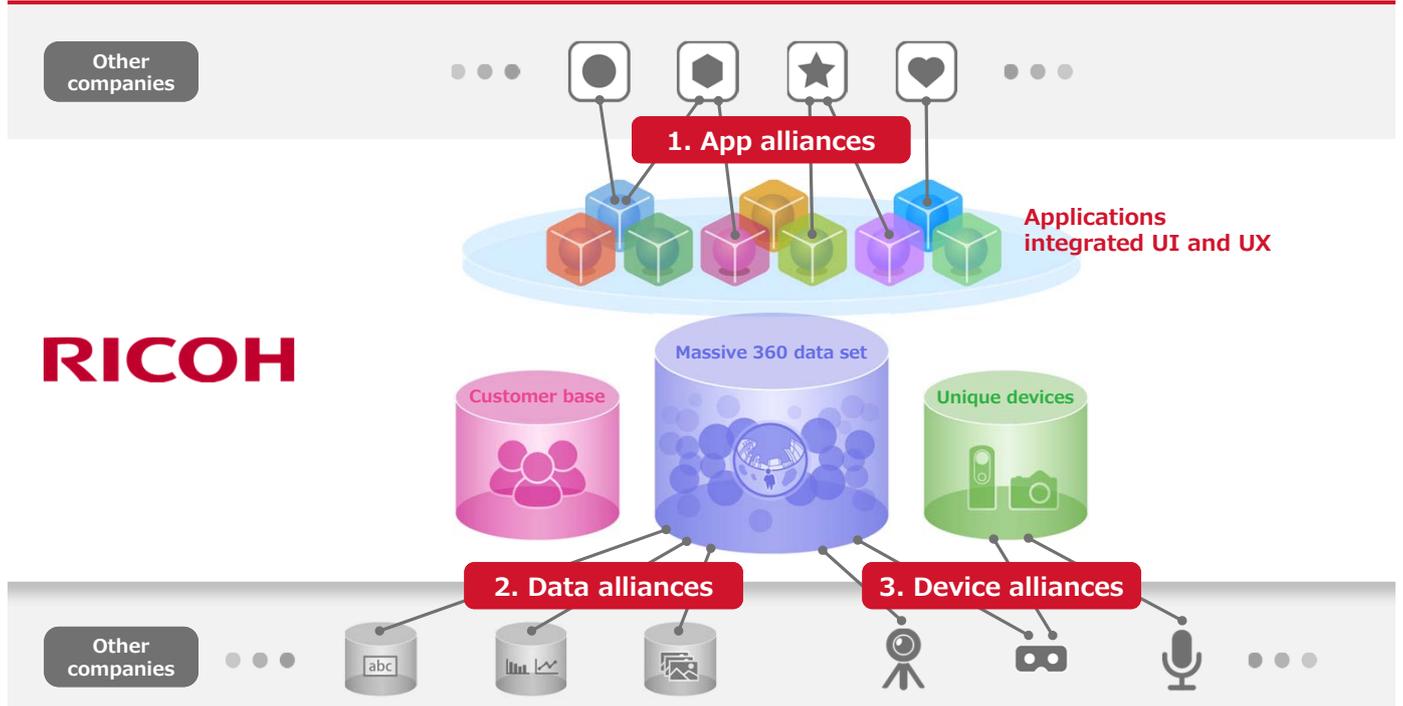


Note: Data as of February 19, 2019
April 11, 2019

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- Here, you see the number of corporate subscribers.
- The number of paid subscriptions began rising from around fall 2018.
- We offer free trial plans that customers can convert into paid ones. Free subscriptions are increasing in the hundreds per month.
- We have taken steps to increase the rates of conversion from free to paid plans. These rates are increasing, and 360° imaging is gaining traction in workflows.

Alliances with External Partners



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- Now, I will discuss our alliances with external partners.
- First, we are broadening our offerings through alliances. We already have partnerships with three companies in services that we already provide. It will be important to further expand our offerings.
- Second, while we already have our own large data sets, we are also building data alliances with other companies whose sets differ from ours.
- Third, it is important for alliances with external partners to add value by augmenting 360° image data through voice links with other devices.



ABOUT

すべてを撮ったそのあとはRICOH360

RICOH THETAによる360°全天球画像／映像は、その場所その瞬間すべてをとることができるので、多くを伝えたり、あとからたくさんの情報を引き出すことができます。

RICOH360は、これまで蓄積した膨大な360°全天球画像／映像データとログデータ、そして独自のデータ処理技術によって、360°ならではの価値を提供します。



(Screenshots from the Japanese Ricoh 360 website, which presents a range of business applications domestically for the RICOH THETA camera.)

- All of the services that I presented today are available on our Japanese RICOH 360 website. Customers can choose and use services from it.
- We are constantly updating the website with new data and functions, so customers can visit the website if looking to create workflows with 360° images. We look forward to seeing the potential of this website develop as a data service.
- Thank you very much for your time today.

RICOH
imagine. change.

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- a. General economic conditions and business trend
- b. Exchange rates and their fluctuations
- c. Rapid technological innovation
- d. Uncertainty as to Ricoh's ability to continue to design, develop, produce and market products and services that achieve market acceptance in hot competitive market

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FY2018 = Fiscal year ended March 31, 2019, etc.**