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Managing Document Scanner Development at PFU



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Abstract

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A document scanner is a device to convert paper documents into digital format. In corporate activities, the digitization of paper documents is an effective way for quick information search, reduction of storage space and transportation cost, and business continuity in case of disaster. Today, more and more people are utilizing document scanners in business worldwide.

In addition, the number of individual users who digitize their own books has been increasing as mobile devices (e.g. tablets) become popular.

PFU Ltd. has been engaging in the development of scanners for more than 30 years. In order to satisfy the ever changing user and business needs, we are constantly improving the core technology of scanner - paper feeding and control system.

As a result, we hold the top market share in the document scanner market in the world. In other words, "ScanSnap" is now the most popular scanner for personal use worldwide.

This paper describes our development concept, market creation and our efforts to upgrade the functions of the scanner which has led to establishing the core competence of the business.

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Outline

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 - Technology Innovation: creation of new market and price destruction
 - Incorporate development and sales into our business strategy
- 3. Lessons Learned**
- 4. Summary**
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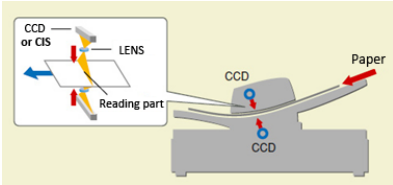
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Definition of Document Scanner

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■ Document scanner is a device that digitizes a large amount of papers.
Below is a common structure for scanning paper efficiently:

- ✓ ADF(Auto Document Feeder) mechanism which separates and feeds papers automatically
- ✓ CCD Units attached to the upper and lower part so that both sides of the paper can be scanned in one go



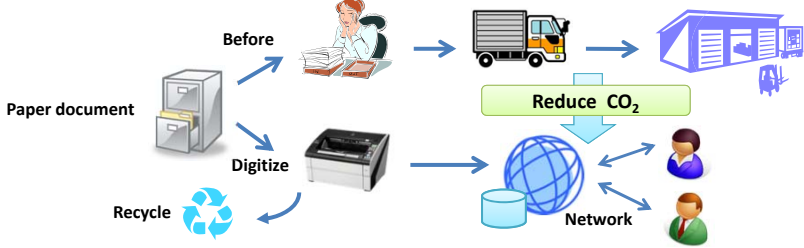
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Role of Document Scanner (1/2)



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- **Increase business efficiency**
 - ✓ Exchange and share information speedily through network
 - ✓ Cut down searching time and able to use the data easily
- **Low-cost/ Low-carbon Society**
 - ✓ Reduce document storage space and transportation cost
 - ✓ Recycle the discarded papers



With the development of IT, the needs to digitize paper document are increasing
 ⇒ The document scanner integrates paper information into digital information.

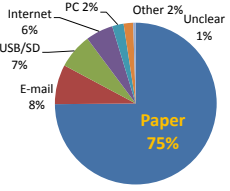
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Role of Document Scanner (2/2)



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- **Security of Information**
 - ✓ **Compliance: limit access to secret information & control the information**



Source	Percentage
Paper	75%
E-mail	8%
USB/SD	7%
Internet	6%
Other	2%
PC	2%
Unclear	1%

75% of information leakage is by way of paper documents [1]

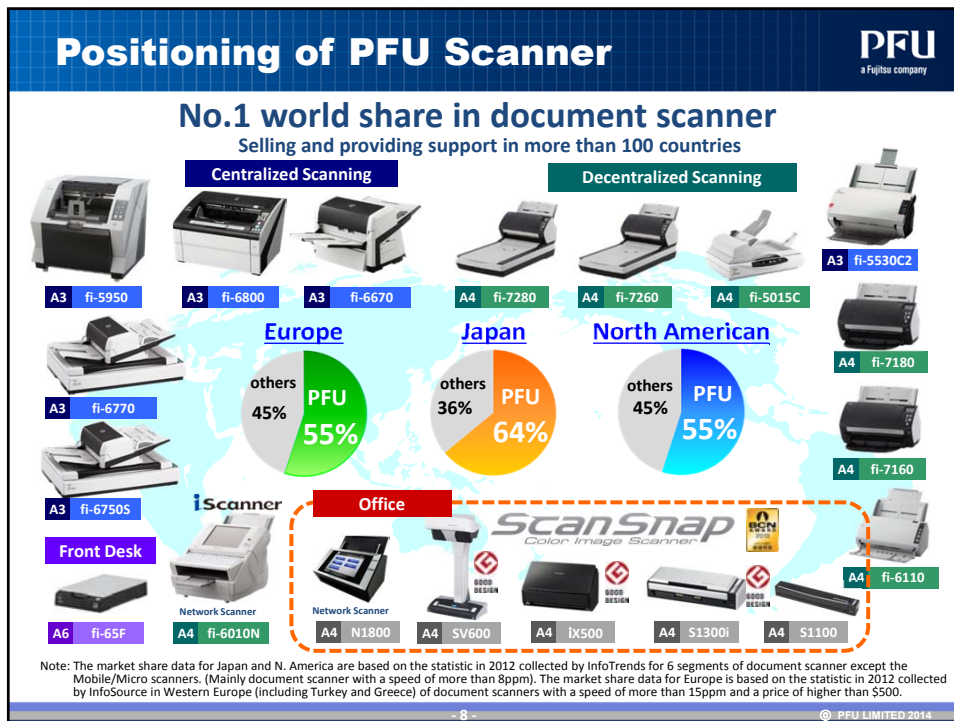
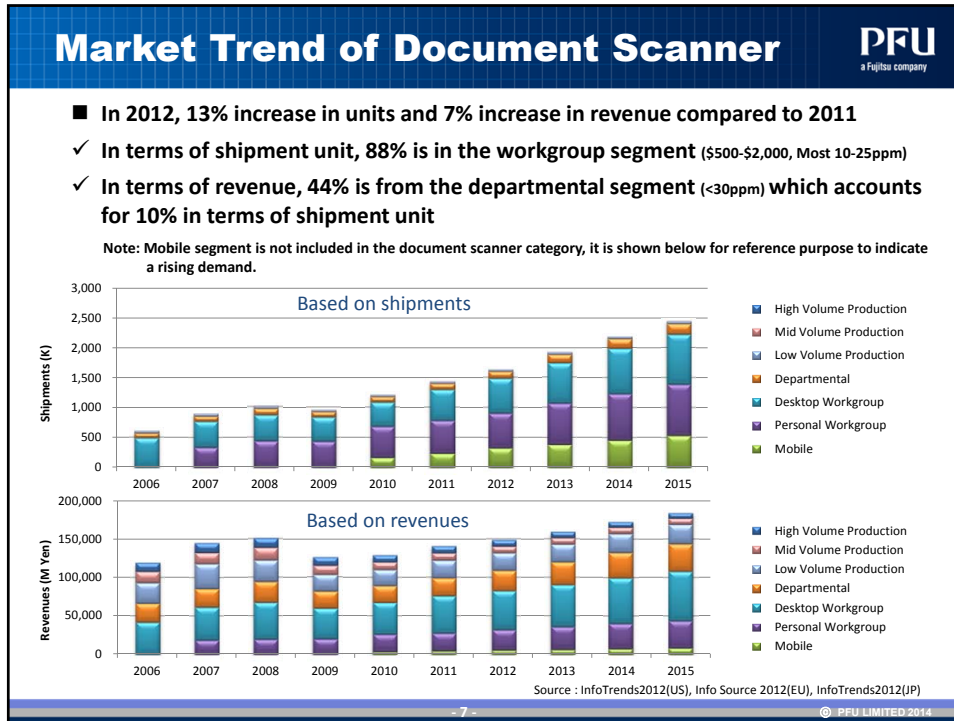
 - An increasing needs of using document scanner as a tool to digitize paper documents for information management of internal control (SOX Act) and ECM
 - ✓ **Business Continuity: immediate business recovery after disaster or pandemic**

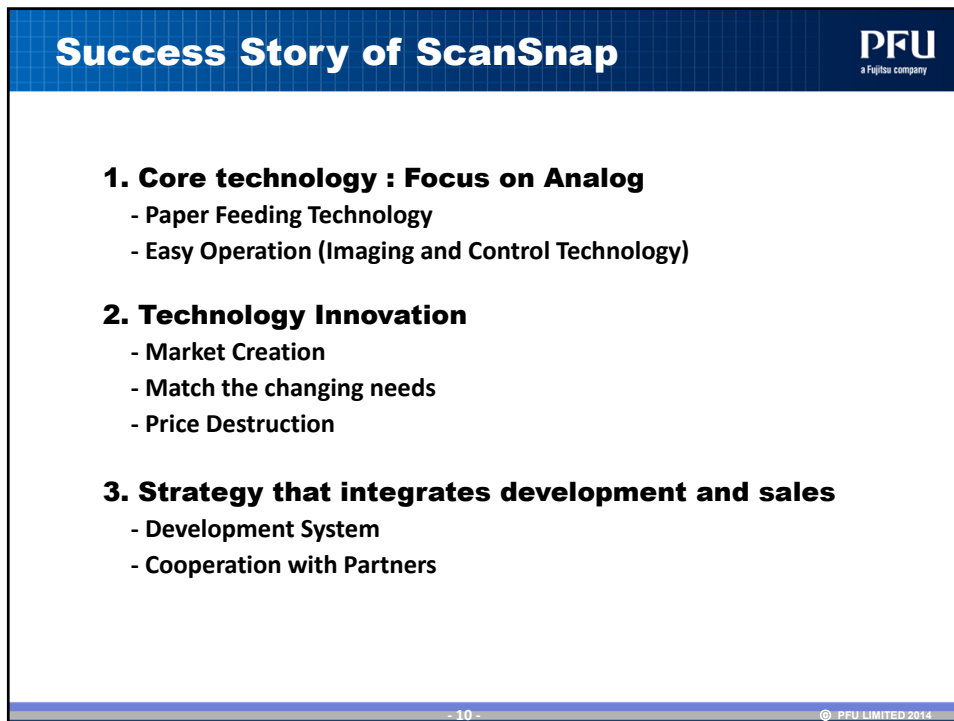
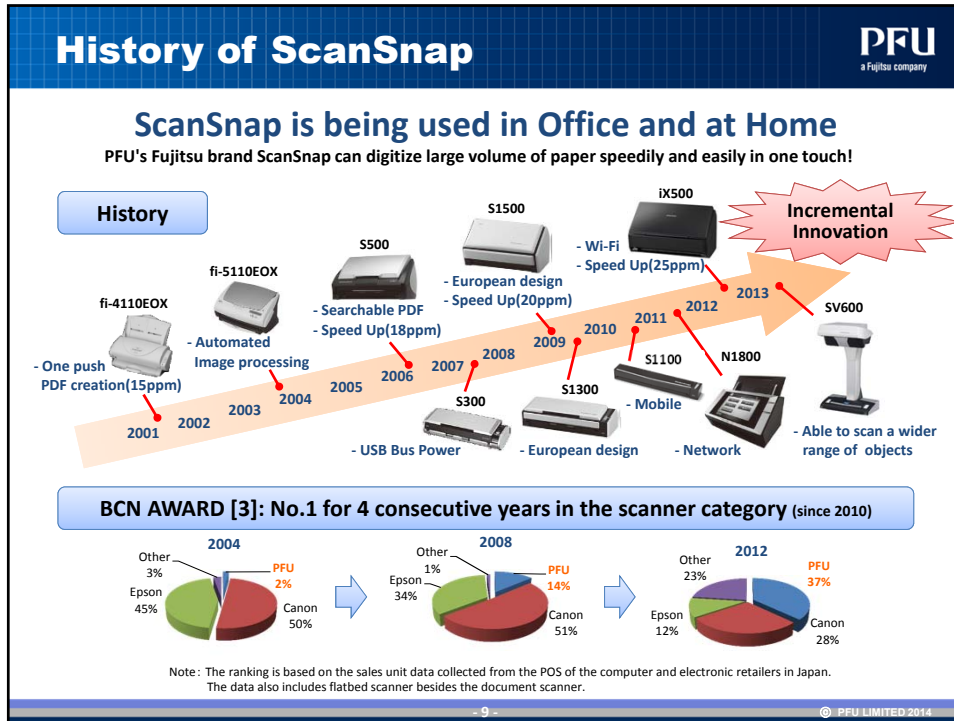


The Great East Japan Earthquake (3.11.2011)

 - Plenty of family registers and medical records were washed away by tsunami
 - 96% administrative documents are still stored in paper format [2]

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Core Technology : Focus on Analog

Ishikawa Spirit : Pride in Craftsmanship x Hospitality



Gold leaf
Copyright © Ishikawa Prefecture Tourism League

Lacquer

Fine detail & persistent



Ishikawa



Ryokan
Japanese Hot Spring Hotel

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Think from customer's standpoint

We focus on technology development specialized in Analog.

Paper feeding

Easy operation

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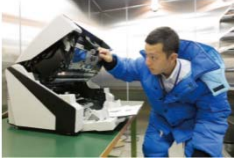
Paper Feeding Technology

■ **Treat paper as alive - Repeat Evaluation and Improvement**

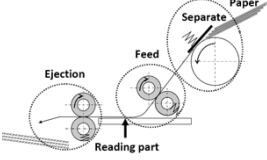
- ✓ A wide variety of paper (thickness, composition, storage condition etc.) exists in the world.
- ✓ Paper condition is changed by temperature or humidity.
- ✓ Characteristics of the rubber for sheet separation affect paper feeding.

We visit the customer's site if problem occurs to understand the situation as these on-site experiences cannot be simulated in the laboratory. Such know-how buildup strengthens our core technology.

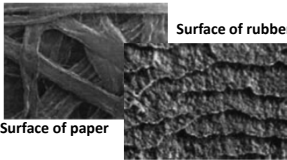
Scanner must handles used paper in contrast to printer which only handles new paper.



Environmental testing
- Testing in a wide range of temperature and humidity condition.



Improve paper feed structure
- Constant trial and error to minimize the incidence of jam or multi feed.



Analysis of the physical properties
- We measure the friction properties and surface condition to seek the best material and structure.


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Easy Operation (Imaging and Control technology)

Concept of ScanSnap : Easy and Comfortable digitization

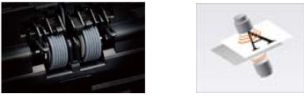
- **Easy: No Perplexing Operation. (One push PDF creation)**
 - Using our original UI, user can simply digitize paper documents in one touch.
 - Automated image processing to eliminate post scanning task.
 - ✓ Cropping, skew correction, orientation correction, blank page removal, automatic color detection, etc.
 - ✓ Create single PDF file with multiple pages. (First in the industry to bundle Adobe Acrobat)
- **Comfortable: Speedy Reliable Operation (25ppm)**
 - Using the highly reliable control technology cultivated from the experience of business grade scanners - fi Series.
 - ✓ Straight path, brake roller separation, ultrasonic multi-feed detection etc.

Automated Image Processing



Paper detection Skew correction Cropping

Control Technologies



Brake rollers for separation Ultrasonic multi-feed detection

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Market Creation

- **Creation of personal needs in office**
 - Want to sort out piled paper documents
 - Want to digitize and view documents any time
 - **Create needs in office; scanner is the tool to increase personal efficiency.**

Combination of paper and digital


- **Market creation in consumer market**
 - Early adopters extend to home use from office use
 - Expand the usage scenario driven by the diffusion of computer and tablet
 - **Create personal scanner market; ScanSnap is known for its simplicity and reliability**


- **SV600: Extend the choices of scanned objects**
 - Objects which are difficult to scan in the past can now be scanned in high quality without touching the objects.



Book



Calligraphy



Chess board



Origami/Artwork



(Note) Ambassador program: Post usage scenario and tips via SNS by ScanSnap fan (leader in a particular field) [4]

Experience convenience beyond imagination

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Match the changing needs

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- **Digitizing books become a social phenomenon in personal use**
 - Unbind self owned books into separate sheets of paper.
 - Digitize using ScanSnap rapidly, then read the PDF file on the tablet.

Magazines and comic books → Cut → Scan → PDF → Tablet

- **Linkage with Cloud**
 - View anytime & anywhere
 - Increased connection speed of network and devices (Operating environment of handling image has improved)

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Price Destruction

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- **Price freeze even with improved performance**
 - Duplex scanning is our standard feature when simplex scanning is the market standard.
 - Resolution: our scanner supports scanning at 600dpi in the era that 300dpi is the norm.
 - Same high speed scanning in color or B/W.
 - **These are all standard features now, but we are always ahead of the competition and differentiate ourselves by “freezing” our price.**
- **Small sized A4 scanner**

The development of compact A4 model may lead to the decrease of medium size scanner market. However, we offer compact A4 scanner because we predict that decentralized capture market will grow.

 - **The position of "document scanner" is established because it synchronized with the timing of the decentralized operation of computer.**
- **ScanSnap(Strategy: lower the price further)**

Strategic products to expand the users in the consumer and office market.

 - **Use it as the trigger to expand our user base of document scanner.**

Drive the market with our own strategy.

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Development System

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■ Efforts of Trinity (Development/Sales/Customer)

- **Market Info**
 - ✓ Global Marketing Meeting (Twice per year): Reflect the voices from the market to development. Engineers and sales gather together to share the product road map and concept to be reflected in product development.
 - ✓ Partner program: Listen to the voices of the customers through sales and promotion support.
- **Research**
 - ✓ Engineers visit the customers to understand the on-site needs/problems for improving future products.

Product development that considers the needs and market info

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Cooperation with Partners

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- Our sales network covers 185 countries and regions.
- Enhanced marketing and sales through local partners.
- Over 4,000 companies are selling our products.
- This overwhelming collaboration with partners supports the expand and growth of the market.

Annual partner meetings

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Lessons Learned (1/2) **PFU**
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Build Sustainable Competitive Advantage

- **Analyze own strength**
 - Compete in the field which we are good at.
 - Environment and Culture give engineer to have uniqueness
 - ✓ Ishikawa has great craftsmanship based on traditional handicrafts for a long time.
 - ✓ We adhere to Analog technology and attain differentiation from the other company, e.g. Paper feeding and Ease-of-use.
- **Many a little makes a mickle**
 - Many small improvements make new value to customer.
 - Building Core technology needs a long-term strategy.
 - ✓ Building Analog technology requires a long term and arduousness.
 - ✓ It's important to make technologies as organization's asset not a person.

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Lessons Learned (2/2) **PFU**
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Evolution and Innovation

- **Hint of Evolution is hidden at on-site use**
 - Listen to Customer, Partner and Sales.
- **Innovation brings an unexpected surprise**
 - Convenience beyond user's imagination creates a new market.
- **New technology drives the market**
 - Not only following competitors, but the development which predict the trend of the future is important.
 - ✓ e.g., decentralized processing, create new personal scanner market, price destruction

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Summary


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■ Our strength


- We are committed to **Monozukuri** (making things).
- Our **Analog core technologies**, such as paper feed and easy operation, are constantly upgraded and are difficult for competitors to imitate.
- **Innovation** : Build up from existing technologies to create better products.

■ Human resources development

- **Skill** is inherited from skill holders through product development and study sessions.
- **Challenge spirit** : We encourage individual motivation and creativity to lead to a new innovation.
- ✓ **Rising-V** : A system that is not confined by the rules of the organization to support creation of new technology.
- ✓ **PFU Future Class** : Cultivate leaders centered by the people who completed "Ishikawa MOT School" offered by JAIST.



Rising-V



PFU Future Class

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