Helping to create and leverage knowledge

Fuji Xerox’s R&D sites in Japan and overseas remain in close collaboration to proactively undertake R&D activities aimed at providing customers with high-value-added services.

R&D efforts

Pursuing the latent potential of documents, Fuji Xerox is working on research and development aimed at promoting better communication, boosting intellectual creativity, and exploring new ways of working.

Documents as the core for leading businesses

The Xerox 914, an office-use plain paper copy machine, was commercialized in 1959 based on the Xerography technology invented by U.S. patent attorney Chester Carlson in 1938; it offered an innovative means of communicating and sharing information. In the 1970s, the Graphical User Interface and Ethernet were developed at Xerox Corporation’s Palo Alto Research Center (PARC); and in 1973, Alan Kay, a computer scientist and fellow at PARC, developed the first personal computer called Alto. These innovations ushered in a new age in which documents are created on computers and circulated via networks.

Fuji Xerox has persistently been involved in technological developments relevant to documents. Copy machines have undergone a remarkable evolution that has led to higher document quality and enhanced operational productivity. In the 1990s, Fuji Xerox established closer collaboration between scanner/printer functions and PCs by linking them via a network. We also actively addressed the digitization of documents, and developed the software DocuWorks, which enables users to manage both digital documents created using various applications and scanned paper documents in a unified manner.

Responding to changes in the environment that surround office documents—including the recent implementation of the e-Document Law, the Personal Information Protection Law and the Financial Instruments and Exchange Law (Japanese SOX Act)—Fuji Xerox is actively working on information security technology. Furthermore, we are leveraging the “Apeos” service environment to help resolve customers’ managerial issues. Apeos enables linkage between paper documents and data stored in mission-critical systems so that information assets can be utilized at will, both inside and outside of an enterprise. Furthermore, Fuji Xerox is focusing on environmental technology to help reduce environmental impact, while providing the high-level quality that customers demand.

With Xerography as our core, Fuji Xerox’s technologies continually evolve, covering a wide spectrum of business areas.

Broadening the scope of technology that originated in Xerography

Chester Carlson

Xerox 914
Moving one step ahead to make the future a reality

With the evolution of IT, changes in the business environment—such as globalization and more frequent inter-company collaboration—are significantly transforming the way people work. Fuji Xerox is creating an environment that enables communication that transcends time, space and organizational boundaries, thus allowing us to bring together scattered knowledge, and propose new ways of working suitable for the 21st century.

Making global communication and collaboration possible

In line with the globalization of our customers’ businesses, opportunities are growing for them to work in collaboration with distant offices and plants. Under such circumstances, however, there is an increase in the cost of and time spent on business trips, as well as the difficulty of accurately conveying detailed information via telephone or video conferencing.

Fuji Xerox aims to improve office productivity, and at the same time build an environment where people can display the full potential of their creativity. We developed “LightCollabo,” which allows communication and collaboration so that even people in faraway locations can feel as if the object discussed were actually right in front of them. This system captures an image of an object to be viewed on a PC screen at the other end of a network. A person at the PC can then enter instructions that are displayed directly on the object itself. We are verifying the effects of this new technology, which allows more accurate and extensive sharing of information, by installing it in our development and production sites, making gradual improvements, and we aim to provide the technology eventually to our customers.

Fuji Xerox is constantly advancing research and development to deliver innovative value, with the focus on staying one step ahead of future trends.

Centralizing R&D sites to provide products worldwide from the customer’s perspective

To bolster our R&D functions, Fuji Xerox will establish a new, urban R&D center in Minato Mirai 21, Yokohama by the spring of 2010, where we will integrate our existing R&D facilities. We will strengthen the ties among the newly integrated functions so that they go beyond individual fields, with the aim of shortening product development lead times, cutting R&D costs, and responding rapidly to market needs.

The new center allows Fuji Xerox to undertake high-quality co-creation with customers, and is based on the concept of thoroughly creating new value from the customers’ perspective, establishing a structure to actively implement and improve the value offered to customers, while also recognizing issues at their worksites in a timely manner. Furthermore, we aim to promptly provide exceptionally high quality products and services to our customers worldwide through ties with the Ebina Center, which has recently become an R&D center for manufacturing as part of our restructuring of development and production.
Fuji Xerox’s technological domains

This section introduces Fuji Xerox’s four technological domains that lead to the creation of products and services to help customers build an environment where they can effectively create and leverage knowledge.

Digital imaging technology

Fuji Xerox’s digital imaging technology, which has focused on the digitization and colorization of copy machines, is now being enhanced in terms of color, image quality and resolution, with the capability of handling an enormous amount of information. In addition to a new low-cost controller architecture that combines the functions of printing, faxing, copying and scanning, we have developed advanced technologies to communicate information that include exposure technology adopting such systems as the ROS laser (VCSEL), which achieves high speed and high image quality, and the DELCIS technology-based LED print head, which reduces the amount of energy and space required while enhancing image quality. Fuji Xerox’s digital imaging technology continues to evolve further so that we can provide services that enable users to easily create and leverage information on the network while maintaining and improving the quality of information delivered.

Ubiquitous (service and system) technology

Dr. Mark Weiser, a scientist at the Palo Alto Research Center (PARC) of Xerox Corporation, advocated the concept of ubiquitous computing in 1988. It is a strictly anthropocentric concept that envisages a user-friendly environment where users are not conscious of the existence of computers, allowing them to better concentrate on their work. To realize a world of ubiquitous computing, Fuji Xerox is developing services and systems aimed at promoting close communication, knowledge sharing and collaboration, making the best of the knowledge we have gained through our “document” businesses.

DELCIS

An LED exposure control technology that employs Fuji Xerox’s proprietary SLED\(^1\) chips. High image quality of 1,200 x 2,400dpi has been achieved through highly precise light compensation, where a single high performance ASIC conducts centralized control of all of the SLED chips.

1. Trademark pending
2. Self-scanning Light Emitting Device

ArcSuite, Web-compatible document management and utilization software

Enables users and groups to share information, promoting smooth communication and collaboration, through simple Web-based operations.
Fuji Xerox’s technological domains

Fuji Xerox and our affiliates have established the Ecology & Safety Vision aimed at realizing a sustainable society. To bring this vision to fruition, we are working to reduce environmental impact by combining hardware with software. Furthermore, with the entire product lifecycle in mind, we are promoting the development of technologies for reusing parts and modules and recycling materials, while also reducing specific hazardous substances. Fuji Xerox aims to completely eliminate the amount of lead contained in shafts used for the paper feed and other components of copy machines and printers. By collaborating with the manufacturers of materials and processors in Japan and overseas, we have developed lead-free alloys that do not hinder processing, and will keep employing the industry-first lead-free shafts for all copy machines and printers.

Environmental technology

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Fundamental technology (materials, devices, images and optics)

With the spread of the broadband communication environment, the need has arisen for ways to easily, comfortably and efficiently handle a large volume of documents. To meet our customers’ high demands and provide functions that even exceed their expectations, Fuji Xerox is promoting research and development, focusing on materials and devices that constitute a platform for future products. Examples include the Vertical-Cavity Surface-Emitting Laser (VCSEL), optical transmission and recording technology as well as E-paper that is expected to serve as the next-generation display medium.

Moreover, Fuji Xerox is actively pursuing manufacturing technology to ensure high quality, high reliability and safety, environmental measurement technology, simulation technology, image processing technology and security technology to comprehensively protect paper and electronic information.

Vertical Cavity Surface-Emitting Laser (VCSEL)

VCSEL is a surface-emitting laser device that Fuji Xerox developed independently to achieve both high resolution and high productivity in print output. It enables high-speed and high-resolution image printing using 32 beams.

Free-belt nip fusing technology

The free-belt nip fusing technology, which gained an excellent reputation for achieving compactness and energy conservation, is applied to many Fuji Xerox products and is continuing to evolve. In recent years, high-speed printing has been realized, in addition to improvements in the life span of products and better energy-saving performance. This high-speed free-belt nip fusing technology enables warm-up time to be reduced by approximately one-fourth compared to conventional models.
Placing the “customer first” is at the core of Fuji Xerox’s quality assurance activities. To satisfy the needs of customers through our products and provide new value, Fuji Xerox is tackling initiatives to bolster the quality of our products and services in an integrated manner.

Fundamental approach to quality assurance

Under our Basic Policy on Quality Assurance, and to promptly and globally offer products that satisfy customers and obtain their trust, Fuji Xerox is conducting quality assurance activities that incorporate international standards, advanced technologies and other elements, throughout the entire product lifecycle, covering product planning, design, development, production, sales/maintenance, recovery and reuse.

Aiming to provide value that exceeds customers’ expectations

Quality

Aiming to improve total quality over the entire product lifecycle

To deliver high-quality products and services to customers, Fuji Xerox adopts a method of “phase management” in which we perform reliable quality assurance from the customers’ perspective by setting conditions that must be met for each phase of product delivery.

Meanwhile, in our quality management activities aimed at boosting the quality of business functions, Fuji Xerox implements a Quality Settlement review each fiscal year to ascertain customer satisfaction, and incorporates the results in our quality assurance policy and quality goals for the following fiscal year.

By continuing these activities, we strive to boost the company’s overall quality assurance level.

Delivery of safe, secure and environmentally friendly products to customers

Based on our Ecology & Safety Vision, Fuji Xerox is striving for environmental conservation and safety assurance in all our business activities.

Fuji Xerox is actively working on environmental conservation initiatives by developing and introducing the latest technologies, as well as strengthening our environmental management. Examples include developing energy-saving products that contribute to reducing the environmental impact at customers’ offices, making an all-out effort for product recycling, and reducing hazardous substances starting from parts procurement.

Fuji Xerox is also ensuring safety in all stages of our planning, design, production and maintenance to provide products that customers can feel safe using. We have established an “escalation system” for taking swift action in the case where a serious accident or quality problem occurs, thus striving to prevent such occurrences as well as maintaining and increasing public trust in our company.

• Fuji Xerox’s Basic Policy on Quality Assurance

In our timely provision of products with the quality that satisfies customers and gains their trust, Fuji Xerox and our affiliates are focusing on achieving outstanding quality levels in the market, so that we can evolve while contributing to the development of society.

• Fuji Xerox Ecology & Safety Vision

Fuji Xerox will introduce and develop into all aspects of our business world-class environmentally conscious activities that emphasize respect for the environment. Fuji Xerox and all of our affiliates will strive to offer our customers products, services and related information that are safe and kind to the environment, and thereby contribute to the environmental conservation efforts of individuals and society.
Aiming to provide high-value-added products

This section introduces some of our initiatives for enhancing quality so as to provide customers with value that meets or exceeds their expectations.

Initiatives to prevent breakdowns over the long-term

To allow customers to use our products with peace of mind, Fuji Xerox is working on “long-life design” to prevent any product breakdowns over the long-term. Understanding that many malfunctions are attributed to wear, we are making an all-out effort to achieve improvements by reviewing designs—starting from the selection of materials—to substantially reduce malfunctions attributable to wear on the marking unit, paper feed unit and other components that constitute the core elements of copy machines, thus extending the life of each unit. Fuji Xerox will continue to develop new technologies to reduce the number of times maintenance services are required and to allow customers to use our products with peace of mind over the long-term.

Realizing high image quality and reducing environmental impact

Fuji Xerox’s emulsion aggregation toner (EA toner), compared to ground toner, reduces CO₂ emissions during the production process by 35% and the amount of toner used by 37% as the result of a smaller diameter of toner particles and higher transfer efficiency. The company has developed EA-Eco Toner that further reduces energy consumption.

Toner fusing is the most power-intensive process in copy/multifunction devices, accounting for 50–80% of the total power consumed. By adopting a new material and structure that thoroughly aim at reducing the impact on the environment, the fusing temperature of EA-Eco Toner is at least 20°C lower than that required for EA toner. This makes it possible to reduce power consumption during fusing by up to 40%, which cuts consumption when used by customers by 15 to 20%. Furthermore, as the small, uniformly-sized toner particle contains wax, it does not need oil when fused. This enables it to be transferred evenly and thinly, creating a lustrous image quality in line with the glossiness of the paper. In this way, EA-Eco Toner combines CO₂ emissions reductions with high-quality image printing.
Rapidly responding to market needs on two fronts: R&D and manufacturing

To strengthen R&D and manufacturing in Japan, the plant building at the Ebina Center in Kanagawa Prefecture is being revamped to become the “Production Technology Plant.” The new plant is implementing measures, in collaboration with the R&D center at Minato Mirai 21 in Yokohama (scheduled to be operational in April 2010), to further accelerate and enhance Fuji Xerox’s technology and product development capabilities to promptly provide customers with even more attractive products.

Production Technology Plant

The Production Technology Plant at the Ebina Center comprises the Production Technology Center, where new technologies and production technologies are developed, the Mass Production Pilot Line, where mass production is verified, and the Functional Parts Center, which aims for cost improvements and other achievements via new parts and materials technologies. By 2011, all of Fuji Xerox’s manufacturing technologies will be integrated into the plant. We will further enhance our global competitiveness, in terms of quality, cost, and products, through the establishment of a system that completely integrates every process, from research and technology development to product development, as well as from production preparation to mass-production verification.

The Production Technology Center is currently working to accelerate the process of product commercialization by means of an integrated digital system that directly links design—which uses 3D CAD and other computer programs—to the creation of prototype parts. Production functions and manufacture are subject to a final check and verification on the Mass Production Pilot Line prior to their mass production at each site to ensure smooth start-up of production. Meanwhile, at the Functional Parts Center, we aim for major improvements in cost efficiency and quality improvements, as well as a reduction in lead times, based on the acquisition of new technologies.
Evaluation system to supply safe products worldwide

FXICC Test Laboratory (Fuji Xerox International Certification Center), located at the Ebina Center in Kanagawa, our hub of manufacturing technologies, fairly, promptly and accurately assesses all safety areas (electrical and mechanical safety, laser safety, EMC*1, radio transmission, noise as well as chemical emissions*2) required for electrical and electronic equipment that include digital multifunction devices and printers. The FXICC Test Laboratory has advanced facilities and systems that incorporate European and international standards, even before they are introduced to Japan, making it possible to perform safety-related assessments that respond to global product supplies.

*1 EMC: electromagnetic compatibility
*2 Chemical emissions: volatile organic compounds emitted by devices

FXICC Test Laboratory

As the office environment becomes increasingly digitized, manufacturers around the globe are being urged to closely consider the electromagnetic environment to prevent electromagnetic waves emitted by office equipment from causing malfunctions in other devices or exerting a harmful impact on human health.

In response to this requirement, Fuji Xerox equipped the Ebina Center with EMC test facilities that perform at the world’s highest levels and comply with European and international standards. These facilities include a new building that houses a fully anechoic room and a 10m radio wave semi-anechoic chamber (which is one of the largest in Japan). We have acquired the international certification ISO/IEC 17025 from the Belgian Ministry of Economic Affairs in five areas for the test laboratory, including noise, electrical and mechanical safety, laser and chemical emissions testing. The facilities make it possible for us to implement all safety evaluation tests for information processing devices at a single location. Furthermore, thanks in part to this international certification of the test laboratory, we have also acquired test certification from the German eco-label Blue Angel, and we are striving to evaluate products in a timely and accurate manner.

As a manufacturer that supplies products globally, Fuji Xerox will continue our efforts to further enhance product quality and safety.

Fully anechoic room for radio frequency

Chemical emissions chamber

Chemical emissions analysis

The electromechanical safety test room where electrical and mechanical safety evaluation tests are performed
Fuji Xerox adopted a new corporate logo on April 1, 2008.

Along with this change, we have recommitted ourselves to placing the customer first as well as pledged to work closely with our customers to solve their increasingly diverse and complex issues related to business and management.

Fuji Xerox proclaims that we will continually excel in terms of the quality of our products and services as well as enhance all of our activities related to customers to support their businesses globally.