Fujitsu Laboratories' R&D Strategy Briefing

April 3, 2013

Tatsuo Tomita
President
Fujitsu Laboratories Ltd.

Complex issues that impact our lives
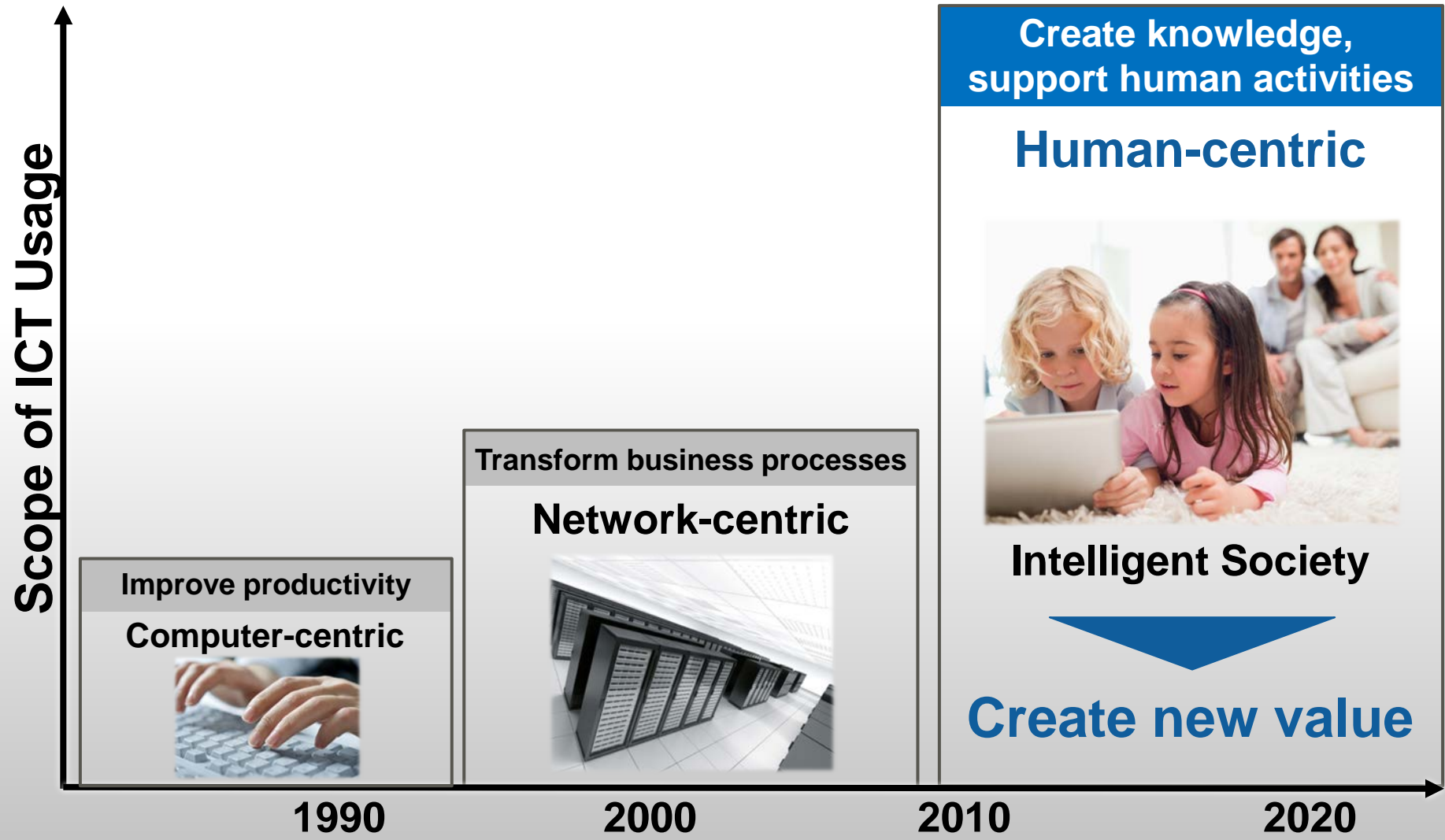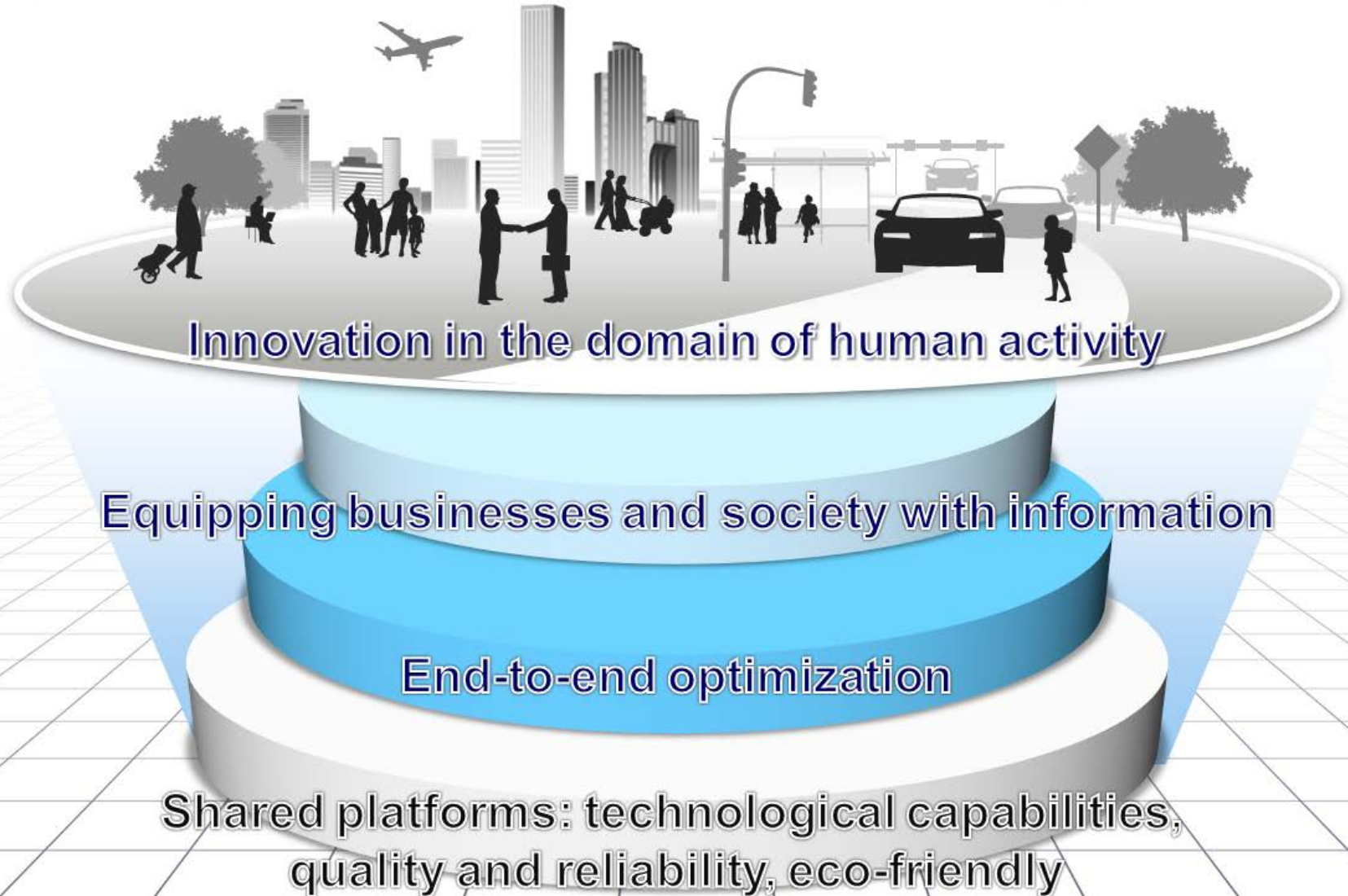
Intricately intertwined issues

Security & Safety

Daily Lives   Health

Lifestyles

Business
Management

Transportation

Pollution

Food
Supply

Society

Population

Energy

Global Warming

Economy

Governmental:
Domestic & Global

Paradigm Shift in ICT

- **Shift from "Technology-centric" to "Human-centric":
Support of activities that are more people-focused**

Scope of ICT Usage
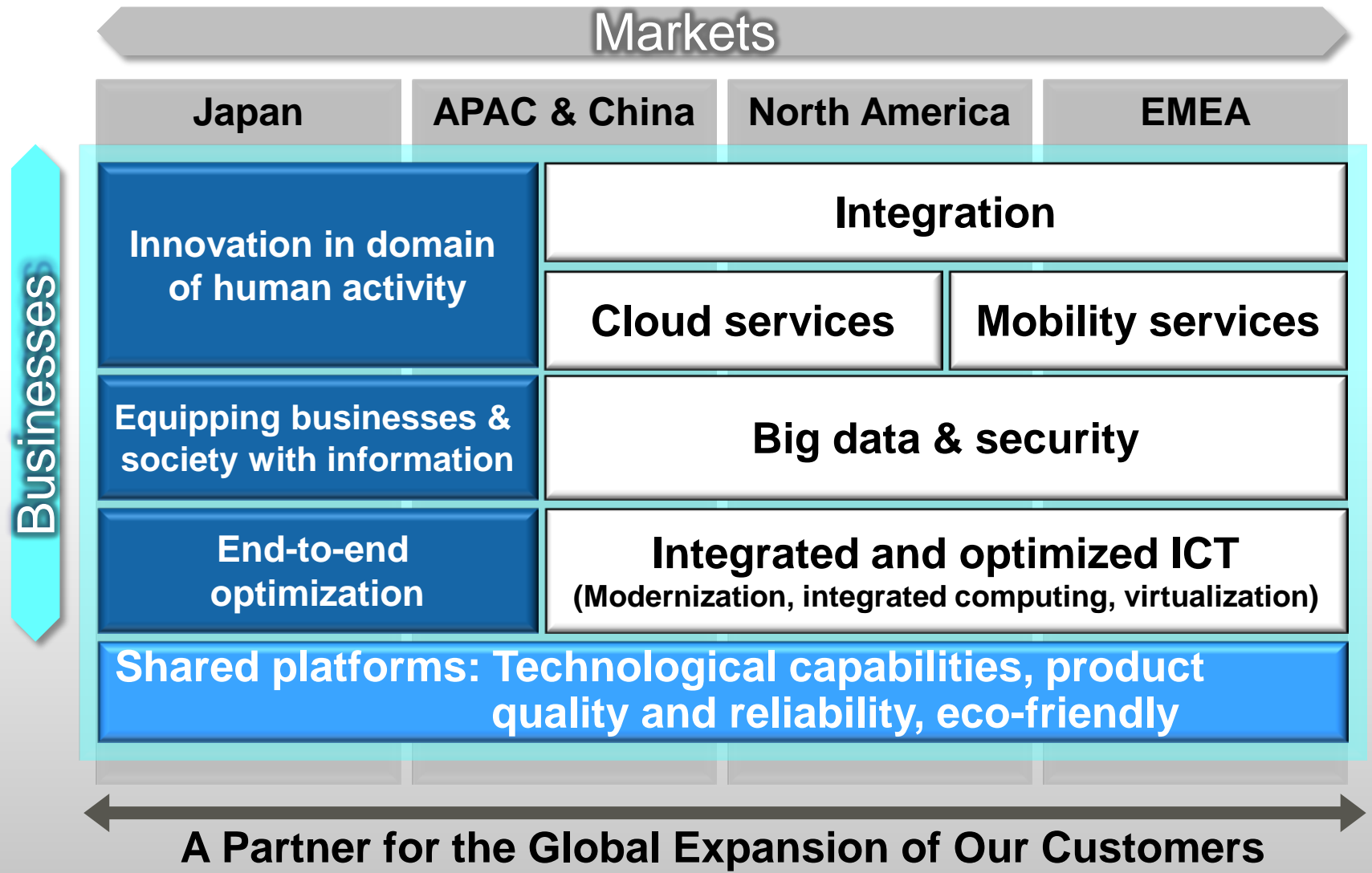
Create knowledge, support human activities

Human-centric

Intelligent Society

Create new value

Transform business processes

Network-centric

Improve productivity

Computer-centric

1990   2000   2010   2020

Fujitsu's Vision

Bringing about a "Human Centric Intelligent Society"

Innovation in the domain of human activity

Equipping businesses and society with information

End-to-end optimization

Shared platforms: technological capabilities, quality and reliability, eco-friendly

Technologies & Services for Achieving Fujitsu's Vision

FUJITSU

■ **Strengthen business offerings, deliver uniform services globally**

Markets

	Japan	APAC & China	North America	EMEA
Businesses	**Innovation in domain of human activity**	Integration		
		Cloud services	Mobility services	
	Equipping businesses & society with information	Big data & security		
	End-to-end optimization	Integrated and optimized ICT (Modernization, integrated computing, virtualization)		
	Shared platforms: Technological capabilities, product quality and reliability, eco-friendly			

A Partner for the Global Expansion of Our Customers

Fujitsu Laboratories: Mission

- **Support the Fujitsu Group's growth by leveraging leading-edge technologies**

2023

2018

2013

Innovation in the domain of human activity

Equipping businesses & society with information

End-to-end optimization

Shared platforms

Contribute to growth of existing businesses

Continuous innovation for new businesses

Breakthrough innovation toward cultivating new markets and businesses

Generate innovation through leading-edge technologies

Innovation in Domain of Human Activity

FUJITSU
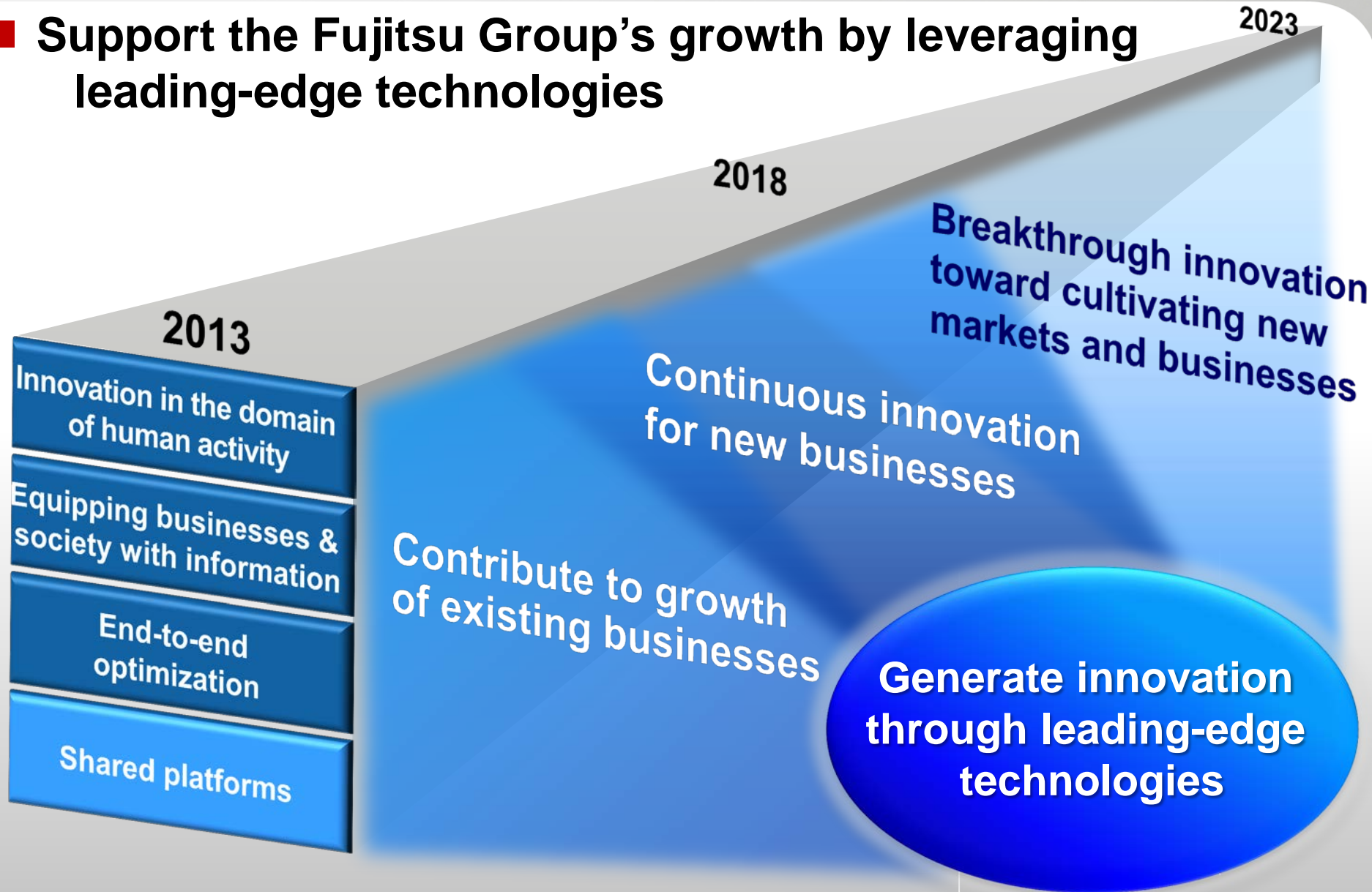
■ **Empowering people and society by integrating real and digital worlds**

2013   **2023**

Support individuals' abilities through use of devices

Discover value by sharing information about objects

Generate new value by sharing information about people, objects, and society

Support abilities of individuals by engaging multiple senses and enabling natural operations
Support human activity & daily life via interfaces that appeal to the 5 senses

Enhancement of users' abilities through interaction with user environment
Offer customized services based on user location & activity

Networks for sharing information about objects
Variety of real-world sensor data can be shared across digital world

Networks connecting society with people & objects
Interconnection of sensors spread throughout society with people and objects, to deliver fully optimized services

Human Interaction Technology
Ultra-Realistic Audio & Video
Intent- Recognition-Based Dialogue System

Multi-Sense Interfaces

Contextual Computing
Wearable Assistance-Technology

Enhanced Abilities

People   Objects

Sensors

Smart Communication Platform
Autonomous Sensor Networks

Total Connectivity

6

Equipping business & society with information

■ From individual to cross-industry & society-wide solutions

2013 — **2023**

Utilize data for vertical industries & work tasks	Utilize cross-industry data	Utilize society-wide data

Knowledge Integration from Massive/High-Frequency/Diverse Data
Build systematic knowledge from massive data of varying reliability & size to help address problems

Customized Information Provision
Offer customized, valuable data & support decision-making based on surroundings, environmental impact & future projections

SaaS and Cloud Security Platforms
Developing specialized security gates and performing real-time data protection to guard personal and enterprise data

Predictive Security Platform
Build infrastructure-wide cyber security platform to prevent & respond to attacks, predictive measures also taken

Unstructured-Data Forecasting
Automated Analytics Process

Leveraging Massive Data

Biometric Authentication System for Social Platforms
Predictive Security Platform

Security Platforms

Comprehensive Full-Scale Simulation of Cities
Social Collaboration Platform
Metrics for Smart Community Infrastructures

Leverage Society-Wide Data

End-to-End Optimization

■ **Deliver ICT platforms that rapidly adapt to ever-changing businesses & society**

2013   **2023**

Total ICT management for customer businesses

Support, services and fully optimized ICT infrastructure that meet the needs of a changing society

Optimize the infrastructure that supports enterprise ICT

Added Value through Application LCM
Support business growth through total management services ranging from application deployment and operation to maintenance and revision

Formulating Growth Strategies Using a Data Collection and Analysis Platform
Support sustainable growth via a platform for analysis and reuse of accumulated customer data

Wide-Distribution Deployment of Apps and Data & Effective Usage of Network/Server Resources
Dynamically respond to business fluctuations by providing server resources that meet user needs, and through network-wide distributed processing

Global Collaboration of Server Resources Employing Proactive Networks
Use optimal-quality network services adapting to change to enable optimized operation of global-scale computer resources

Overall Services and Support
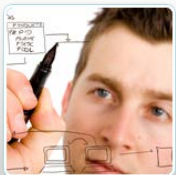
Planning Deployment

Operations Maintenance

Modifications

Overall Infrastructure

Servers & storage

Networks

Clients

Fabric Computing

Datacenters Leveraging On-site Natural Energy Generation

Comprehensive System-Verification

Automated Application-Operation

Application LCM Platform

User-Centric Data Delivery

Optimization of support and services, infrastructure optimization and efficient deployment

Shared Platforms

- **Advanced technologies for achieving a Human Centric Intelligent Society**

2013 ── 2023

Core technologies for advanced ICT

- Performance
- Quality
- Eco-friendly

Manufacturing Simulations
Transforming manufacturing through synergistic effects of front line-integrated modeling simulations and HPC

Intelligent Software Development
Contribute to development efficiencies and enhanced security for product-oriented software

Materials, Devices & Packaging
Employ non-silicon materials and device technologies, along with packaging technologies that leverage them, to contribute to high-speed processing, high-speed communications, and effective energy leveraging

Model-Based Calibration
Distributed Cooperative-Model Predictive Control

Manufacturing Simulations

Universal Program Verification
Enhancement of Embedded Software Quality
(Automated Testing, Security Enhancement)
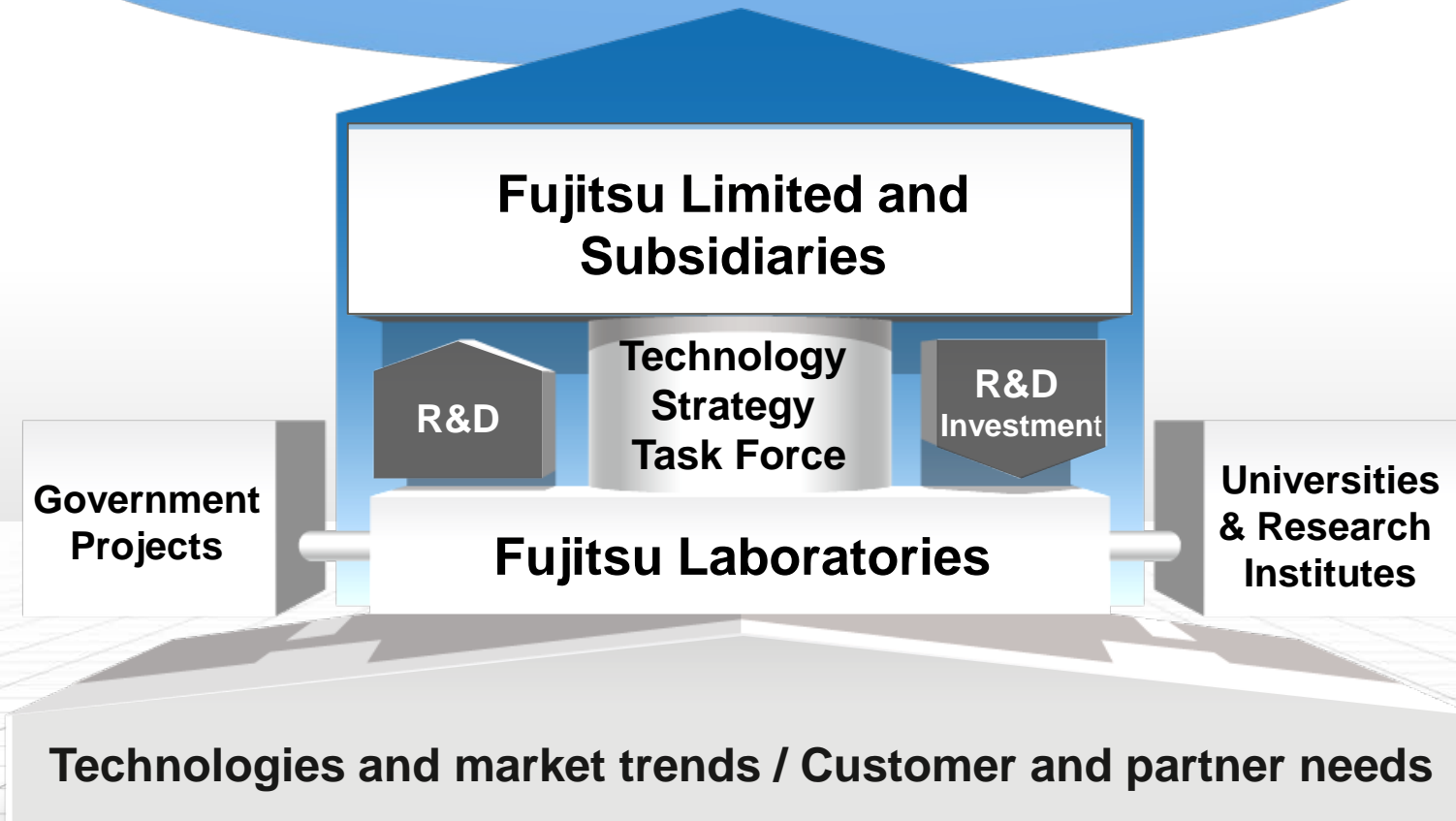
Software Development & Manufacturing

CNT

GaN HEMT

High-Speed Processing
High-Capacity Communication
Efficient Energy Usage

Redistribution Layer

Mold Compound

Device-Device Integration
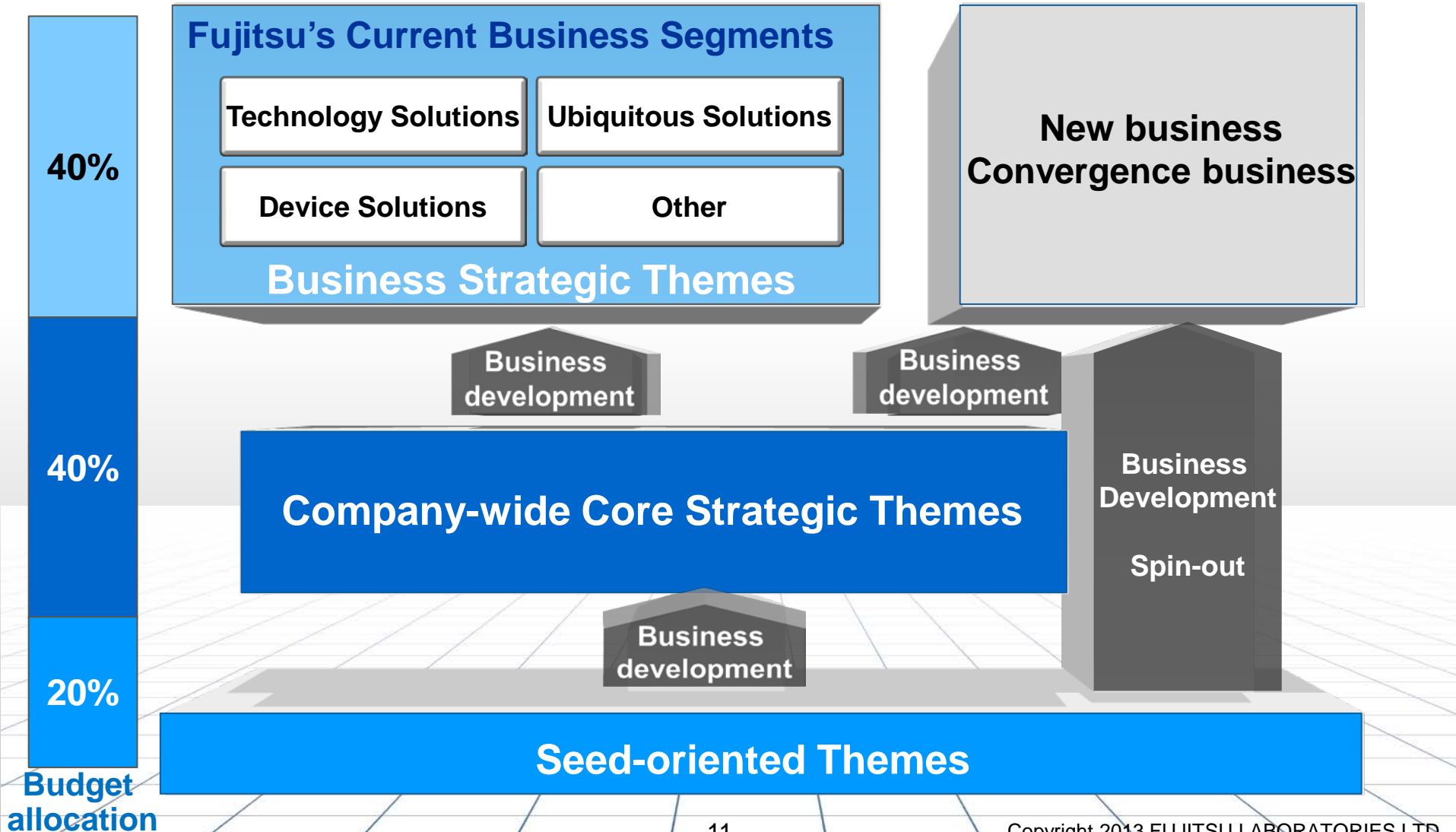Device A
Device B
Device C
Device D
Device E

Materials, Devices & Packaging

Fujitsu Groups: R&D Scheme

Creating new value and developing new markets
Contributing to core businesses

Fujitsu Limited and Subsidiaries

R&D

Technology Strategy Task Force

R&D Investment

Government Projects

Universities & Research Institutes

Fujitsu Laboratories

Technologies and market trends / Customer and partner needs

Strategic R&D Themes

FUJITSU

- **Clarify positioning of R&D themes, eyeing future of Fujitsu Group**
- **Consistency of R&D themes with business; R&D resources: strategic allocation**

40%

40%

20%

Budget allocation

Fujitsu's Current Business Segments

| Technology Solutions | Ubiquitous Solutions |
| Device Solutions | Other |

Business Strategic Themes

New business Convergence business

Business development

Business development

Company-wide Core Strategic Themes

Business Development

Spin-out

Business development

Seed-oriented Themes

Transformation of R&D Themes

Previous Business-Strategic Themes

Business-Strategic Themes

Previous Core Strategic Themes

- Human Centric Computing
- Intelligent Society
- Cloud Fusion
- Green Datacenters
- Manufacturing Innovation
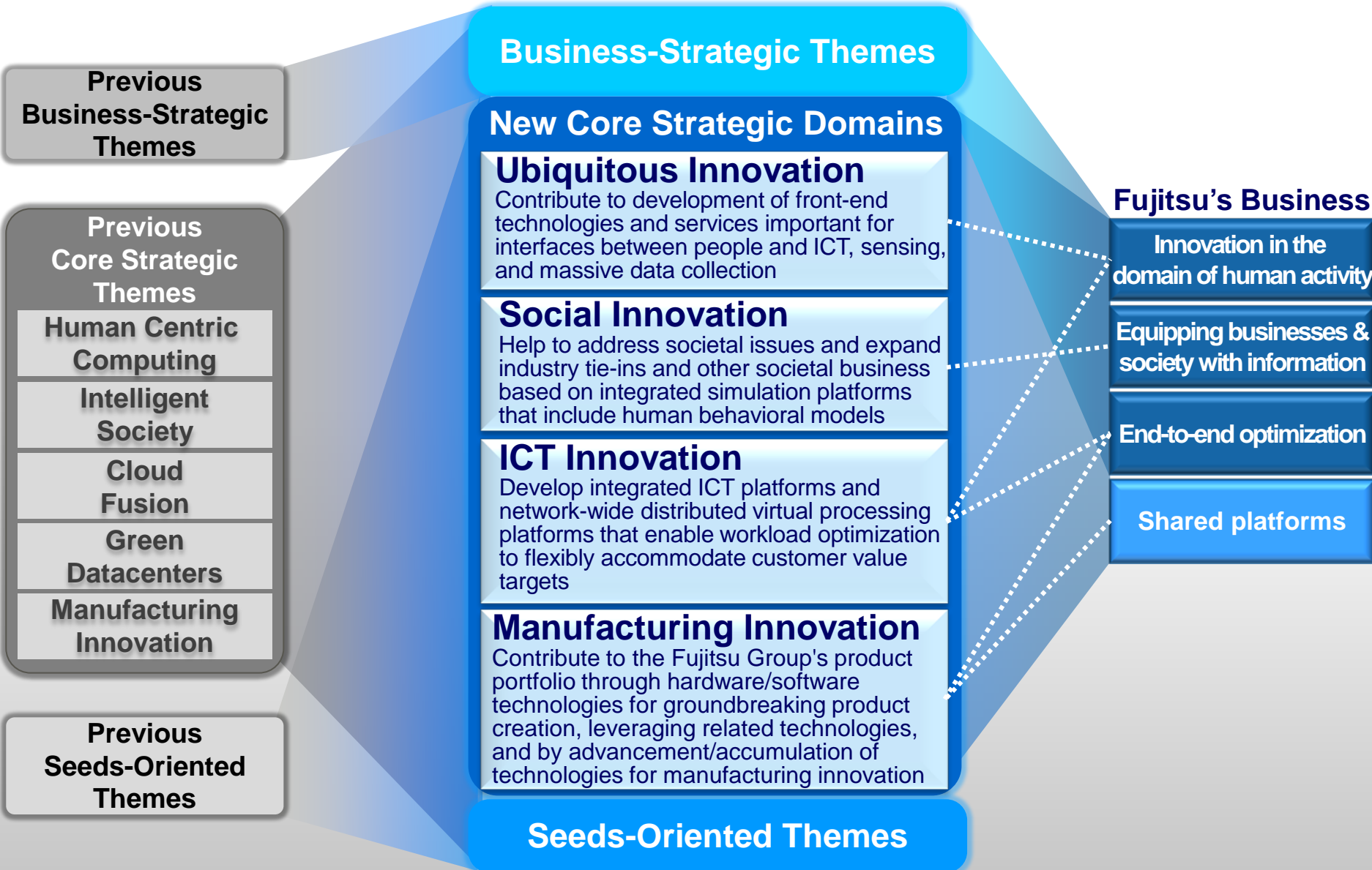
New Core Strategic Domains

Ubiquitous Innovation
Contribute to development of front-end technologies and services important for interfaces between people and ICT, sensing, and massive data collection

Social Innovation
Help to address societal issues and expand industry tie-ins and other societal business based on integrated simulation platforms that include human behavioral models

ICT Innovation
Develop integrated ICT platforms and network-wide distributed virtual processing platforms that enable workload optimization to flexibly accommodate customer value targets

Manufacturing Innovation
Contribute to the Fujitsu Group's product portfolio through hardware/software technologies for groundbreaking product creation, leveraging related technologies, and by advancement/accumulation of technologies for manufacturing innovation

Fujitsu's Business

Innovation in the domain of human activity

Equipping businesses & society with information

End-to-end optimization

Shared platforms

Previous Seeds-Oriented Themes

Seeds-Oriented Themes

Strengthening Strategic Initiatives for Breakthrough Innovations

FUJITSU

■ **Build cross-organizational ties throughout the Fujitsu Group, formulate strategic initiatives, and strengthen management of early-stage R&D starts**

■ **Enhance support for global business development at global laboratories of Fujitsu Laboratories Group**

Life Innovation R&D Advancement Office

Striving toward realization of a society that is prosperous and fulfilling for its inhabitants, proposes research direction pertaining to life innovation.

ATO* Advancement Office

*ATO: Academic Technology Outlook

Gathers academic data held by internal research units worldwide, conducts studies to supplement lacking information, and leverages such information to disseminate a bird's-eye view of R&D trends and guidance.

Mobility R&D Advancement Office

Advises R&D direction for mobility, an increasingly important area for ICT. Organically links technologies spread across different research units and enhances technology acumen and research.
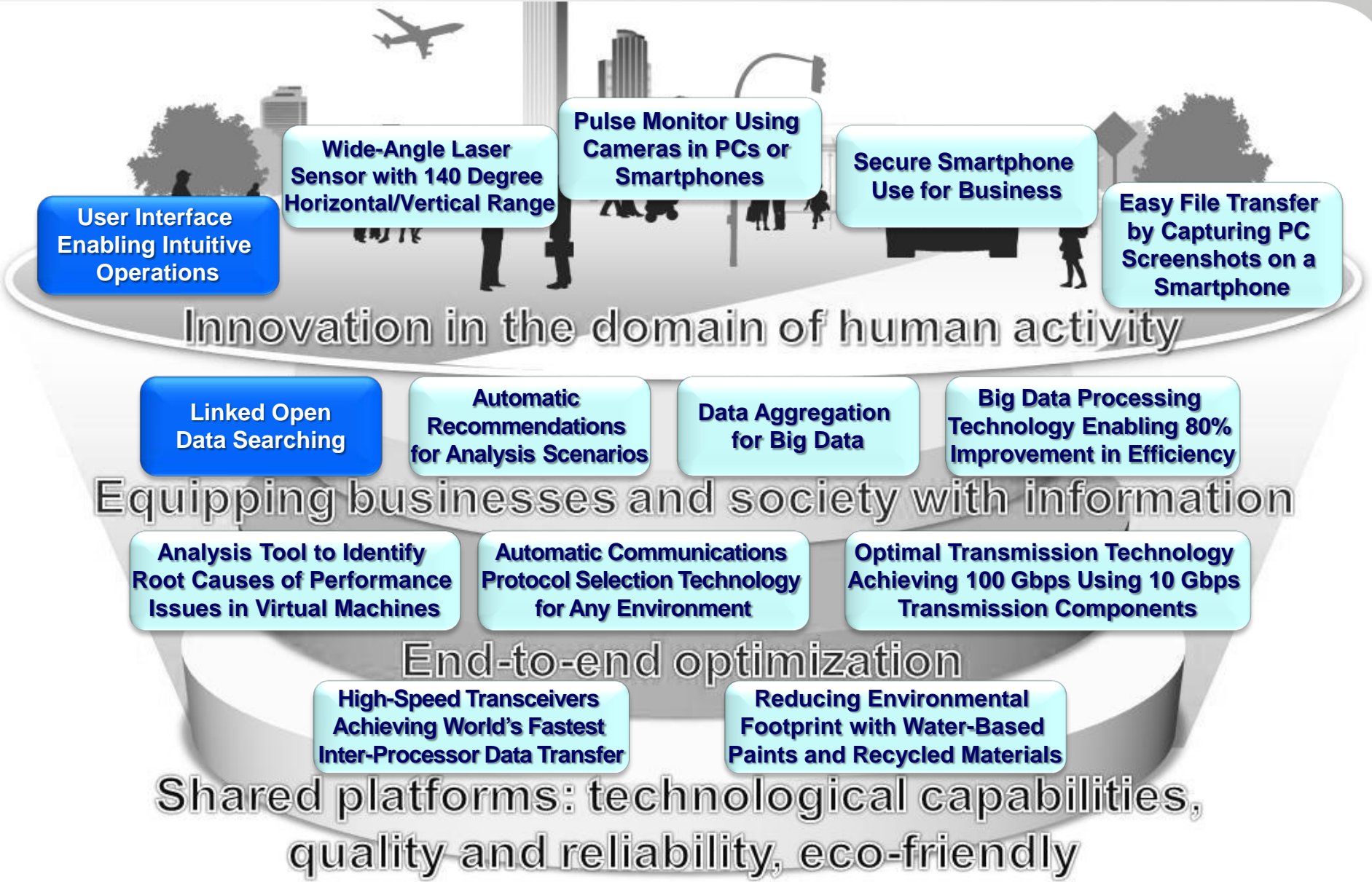
Open Innovation Advancement Office

In addition to ongoing support to build research partnerships comprised of internal research units with external research entities, organically links such initiatives to create new value for Fujitsu Laboratories as a whole, and accelerates preparations for related technological development.
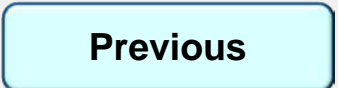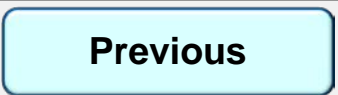
Established designated organizations for 2 segmented fields to propose R&D direction for new markets/businesses and initiate such development.

Established designated organizations to enable greater attunement of technology data and trends, and for enhancing innovation for key-focus technology fields

Major Achievements in FY2012 April 2012 – March 2013 FUJITSU

User Interface Enabling Intuitive Operations

Wide-Angle Laser Sensor with 140 Degree Horizontal/Vertical Range

Pulse Monitor Using Cameras in PCs or Smartphones

Secure Smartphone Use for Business

Easy File Transfer by Capturing PC Screenshots on a Smartphone

Innovation in the domain of human activity

Linked Open Data Searching

Automatic Recommendations for Analysis Scenarios

Data Aggregation for Big Data

Big Data Processing Technology Enabling 80% Improvement in Efficiency

Equipping businesses and society with information

Analysis Tool to Identify Root Causes of Performance Issues in Virtual Machines

Automatic Communications Protocol Selection Technology for Any Environment

Optimal Transmission Technology Achieving 100 Gbps Using 10 Gbps Transmission Components

End-to-end optimization

High-Speed Transceivers Achieving World's Fastest Inter-Processor Data Transfer

Reducing Environmental Footprint with Water-Based Paints and Recycled Materials

Shared platforms: technological capabilities, quality and reliability, eco-friendly

List of Major Achievements in FY2012 (1)

FUJITSU

R&D Area	R&D Theme	Press Releases
Innovation in the domain of human activity	**Fujitsu Develops Next-Generation User Interface for Intuitive Touch-Based Operations** *Enables innovative handling of data by directly touching actual objects*	**NEW**
	Fujitsu Develops World's First Super-Wide-Angle 3D Laser Radar with a Horizontal and Vertical Range of 140 Degrees	Previous
	Fujitsu Develops Real-Time Pulse Monitor Using Facial Imaging	Previous
	Fujitsu Develops Platform Technology for Secure Application Execution on Smartphones for Business Use	Previous
	Fujitsu Develops Easy Way to Transfer Files with Video of PC Screens Shot by Mobile Devices	Previous
Equipping business & society with information	**Fujitsu and DERI Revolutionize Access to Open Data by Jointly Developing Technology for Linked Open Data** *Promoting open data usage with world's first freely available storage and query platform that utilizes Linked Open Data*	**NEW**
	Fujitsu Develops Industry's First Technology that Automatically Offers Analysis Scenarios for Big Data	Previous
	Fujitsu Develops World's First Stream Aggregation Technology to Rapidly Process Both Historical Data and Incoming Data	Previous
	Fujitsu Develops Industry's First Integrated Development Platform for Big Data	Previous

List of Major Achievements in FY2012 (2)

FUJITSU

R&D Area	R&D Theme	Press Releases
End-to-end optimization	**Fujitsu Develops World's First Performance Analysis Tool that Identifies Root Causes of Performance Issues in Virtual Environments**	Previous
	Fujitsu Develops World's First Automatic Protocol Selection Technology for Any Environment	Previous
	Fujitsu Develops First Optical Transmission Technology to Achieve 100 Gbps Using 10 Gbps Transmission Components	Previous
Shared platforms	**Fujitsu Achieves World's Fastest Transceivers of 32 Gbps for Inter-Processor Data Communications**	Previous
	Fujitsu Pioneers Industry's First Use of Water-Based Paint for Plastic Chassis ICT Equipment	Previous

Generating Innovation through Leading-Edge Technologies

Striving to achieve sustainable growth for society

Seeking to bring about a prosperous society where people can live in security

Cautionary Statement

These presentation materials and other information on our meeting may contain forward-looking statements that are based on management's current views and assumptions and involve known and unknown risks and uncertainties that could cause actual results, performance or events to differ materially from those expressed or implied in such statements. Words such as "anticipates," "believes," "expects," "estimates," "intends," "plans," "projects," and similar expressions which indicate future events and trends identify forward-looking statements. Actual results may differ materially from those projected or implied in the forward-looking statements due to, without limitation, the following factors:

•general economic and market conditions in the major geographic markets for Fujitsu's services and products, which are the United States, EU, Japan and elsewhere in Asia, particularly as such conditions may effect customer spending;
•rapid technological change, fluctuations in customer demand and intensifying price competition in the IT, telecommunications, and microelectronics markets in which Fujitsu competes;
•Fujitsu's ability to dispose of non-core businesses and related assets through strategic alliances and sales on commercially reasonable terms, and the effect of realization of losses which may result from such transactions;
•uncertainty as to Fujitsu's access to, or protection for, certain intellectual property rights;
•uncertainty as to the performance of Fujitsu's strategic business partners;
•declines in the market prices of Japanese and foreign equity securities held by Fujitsu which could cause Fujitsu to recognize significant losses in the value of its holdings and require Fujitsu to make significant additional contributions to its pension funds in order to make up shortfalls in minimum reserve requirements resulting from such declines;
•poor operating results, inability to access financing on commercially reasonable terms, insolvency or bankruptcy of Fujitsu's customers, any of which factors could adversely affect or preclude these customers' ability to timely pay accounts receivables owed to Fujitsu; and
•fluctuations in rates of exchange for the yen and other currencies in which Fujitsu makes significant sales or in which Fujitsu's assets and liabilities are denominated, particularly between the yen and the British pound and U.S. dollar, respectively.