Japan Technology Initiative – An Open Innovation at GE

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GE Global Research - Japan

October 13, 2009

imagination at work

Innovation in the high jump (early yrs)

Scissors

Record

The first recorded high jump event took place in Scotland in the 19th century with heights of up to (**1.68 m**) contested. Early jumpers used either an elaborate straight-on approach or a *scissors* technique

Western Roll

Record

M.F. Horine developed an even more efficient technique in 1912, the 'Western roll. His technique predominated through the Berlin Olympics of 1936, in which the event was won by Cornelius Johnson at **2.03 m** (6' 8")

Innovation in the high jump (later yrs)

Straddle

Record

Straddle jumpers took off as in the Western roll, but rotated their (belly-down) torso around the bar, obtaining the most economical clearance to date. A Soviet jumper took the record up to **2.28 m** (7' 5¾"), and won the Olympic gold medal in 1964

Fosbury Flop

Record

Dick Fosbury invented a new style in 1968. Javier Sotomayor, the current record holder took the record up to **2.45m**/Aug 2007

"The only source of profit, the only reason to invest in companies in the future, is their ability to **innovate** and their ability to **differentiate**."

Jeff Immelt
CEO
General Electric

Innovation

Merriam-Webster Dictionary

In· no· va· tion (noun)

1: the introduction of something new

2: a new idea, method, or device

Thesaurus

Something (as a device) created for the first time through the use of the imagination.

Commercialization of a technology as a product that generates profit

GE Innovation

GE Company
Four segments aligned for growth

Infrastructure - Technology

Infrastructure - Energy

GE Capital

NBC Universal

NBC BEIJING 2008

hulu

Global Research: market-focused R&D

First US industrial lab

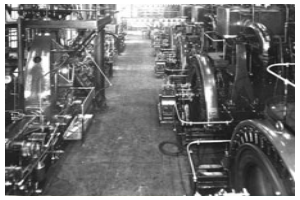
Began 1900 in Schenectady, NY

Founding principle … improve businesses through technology

One of the world's most diverse industrial labs

Cornerstone of GE's commitment to technology

A History of GE Innovation



Steam Turbine (1890's)

Monitor Top refrigerator (1927)

LEXAN® Polycarbonate (1953)

Light Speed VCT (2004)

Medical X-ray (19

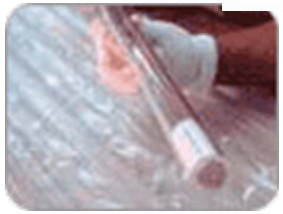
Jet Engine (1942)

G gine (1995)

Hybrid Loco (2007)

Electric fan (1902)

Glareless glass



Optical fiber (1920)

Digital X-ray (1999)

1900 1910 1920 1930 1940 1950 1960 1970 1980 1990 2000 2010

imagination at work

GE Global Research Organized for R&D Effectiveness

SVP, Global Research

Advanced Technology Programs – VP (6)	Global Technology Organizations (10)	Business Program Offices (10)
Nanotechnology	Energy & Propulsion	GE Aviation
Sustainable Energy	Ceramics & Metallurgy	GE Healthcare
⋮	⋮	⋮
Discretionary funds	Clear missions minimizes overlap	Biz & discretionary funds
High risk / high payoff biz focused research	Stewards of technical competencies	Voice of Customer
Charting new territory for biz strategic moves	Attract, retain, develop talent	Biz R&D portfolio & effective execution
		Leverage synergy across company

"Virtual Labs" focused on mid & long term, high impact technology developments

Accelerating Innovation Cycle

Internal R&D Effort –

Develop World-class technical talent

Advanced Technology projects

Awareness of the cutting edge technology

Metrics for external collaboration

External Innovation Effort –

Divesting unused patents

Licensing with technical assistance program

Open Innovation Examples

Open Innovation at GE – Needs Pull Examples

INSPIRATION and PERSPIRATION (I&P)

EB-PVD Research Coater

Permanent magnet MRI

Connecting with the world's technology

Governments

State of Bavaria

Customers

BNSF RAILWAY

EADS

Chevron

WAL★MART

UNION PACIFIC

bp

BOEING

Universities

Berkeley

清華大學 Tsinghua University

TOKYO TECH 国立大学法人 東京工業大学

MIT

Georgia Institute of Technology

भारतीय प्रौद्योगिकी संस्थान Indian Institute of Technology

Other Partners

LOCKHEED MARTIN

Lilly

GM

ExxonMobil

SEI

SUMITOMO ELECTRIC

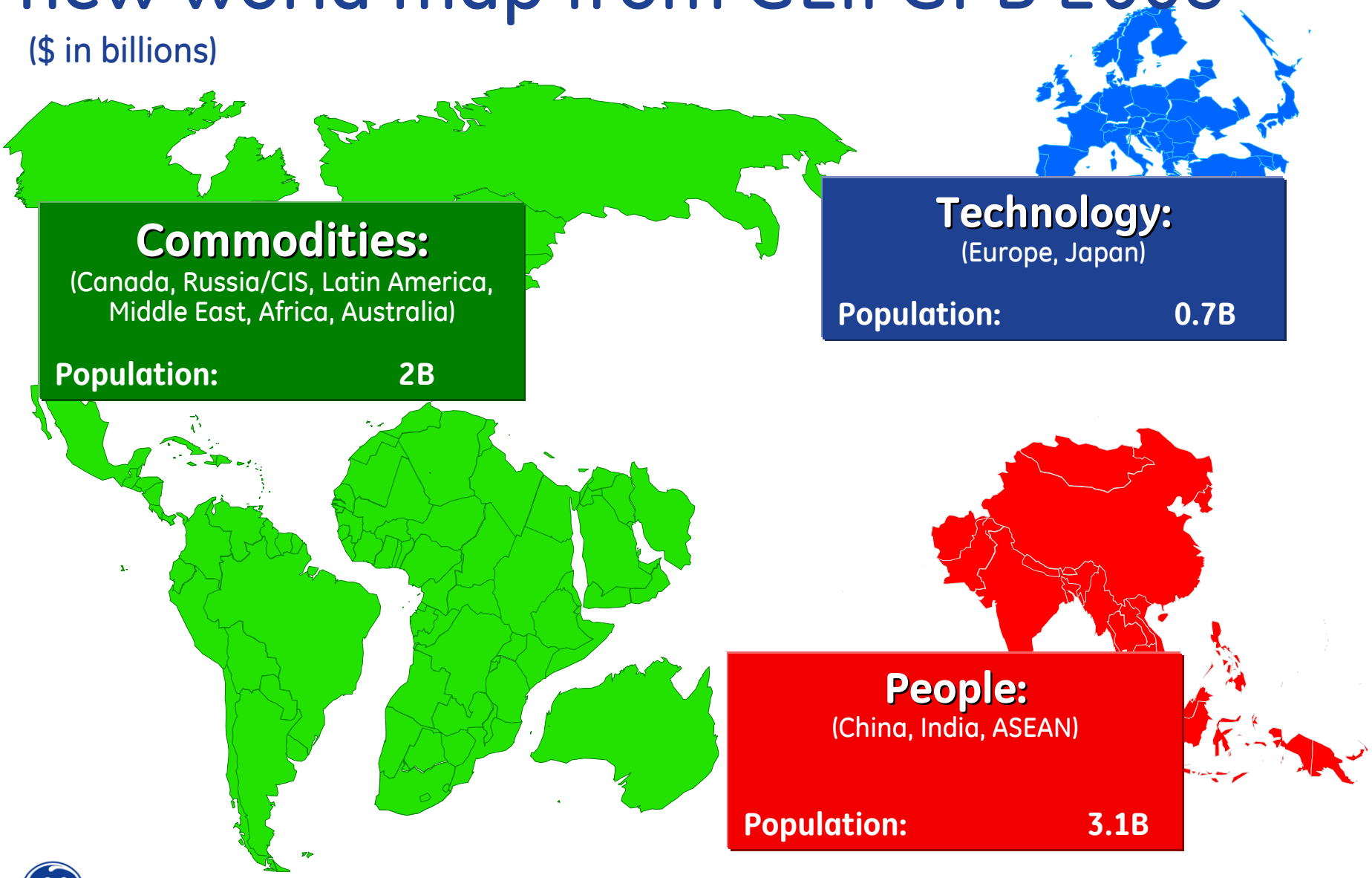
KONICA MINOLTA

MEMORIAL SLOAN-KETTERING CANCER CENTER

Why Japan?

new world map from GEII GPB 2008

($ in billions)



Commodities:
(Canada, Russia/CIS, Latin America, Middle East, Africa, Australia)

Population: 2B

Technology:
(Europe, Japan)

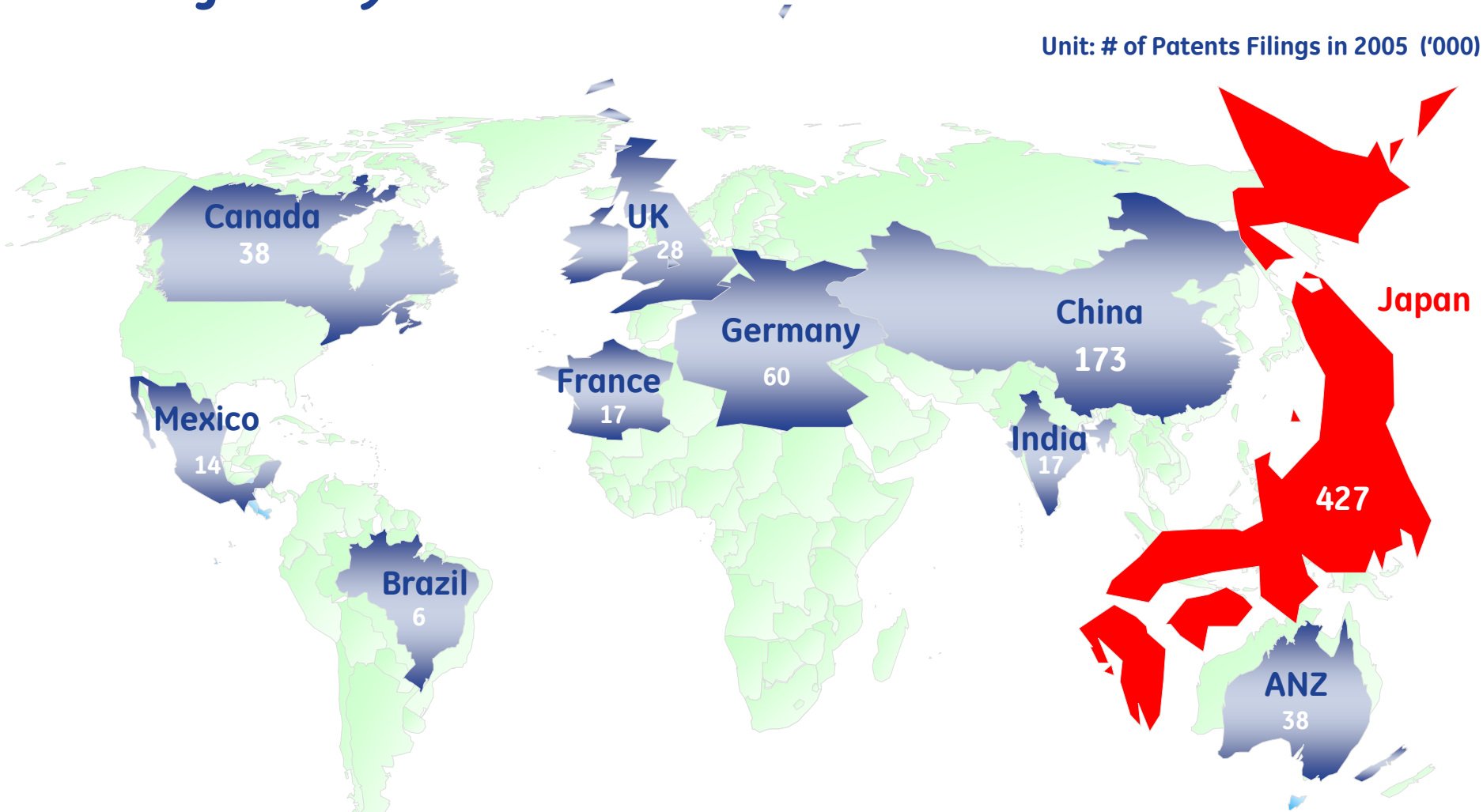
Population: 0.7B

People:
(China, India, ASEAN)

Population: 3.1B

GE Major by Patents

Unit: # of Patents Filings in 2005 ('000)



Data Source: WIPO

Note*India&France 2004/Canada 2003/Italy 2000

Japan = Technology Leader !!

A History of Japanese Innovation

Astro Boy

SONY Walkman (1979)

High Draft
Spinning Machine (1932)

Planet

uper Mario (1985)

Serotherapy (1894)

Ferrite Magnet (1932)

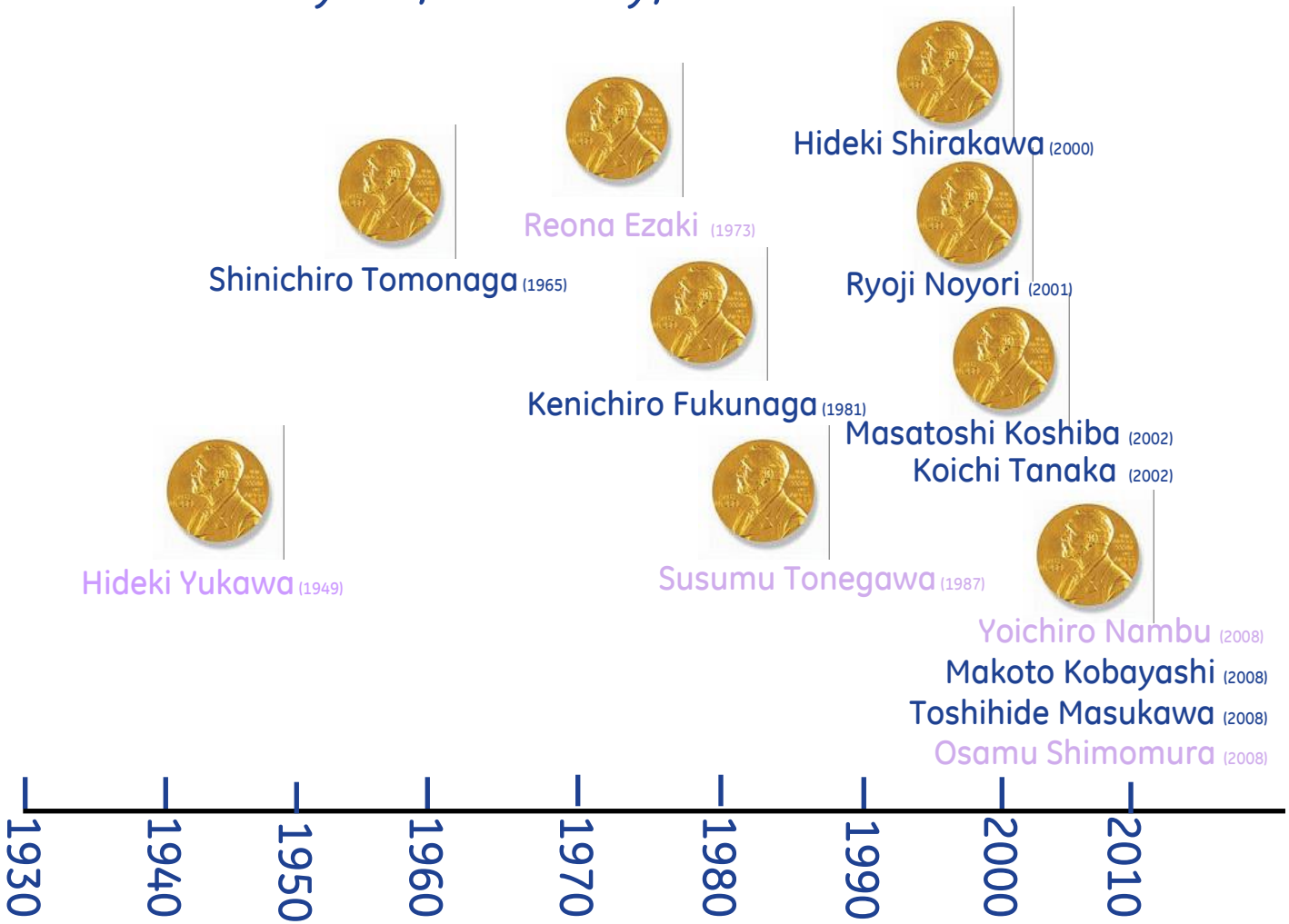
Retort Food Pkg (1968)

Neomax Magnet (1983)

1900 1910 1920 1930 1940 1950 1960 1970 1980 1990 2000 2010

Japanese Nobel Laureates

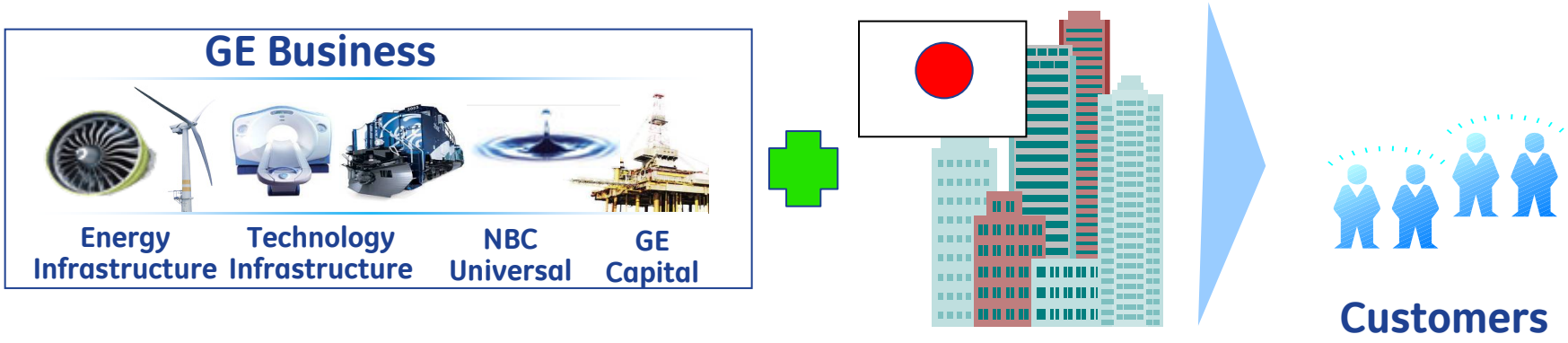
13 Novel Prizes in Physics, Chemistry, Medicine



Japan Technology Initiative

Japan Technology Initiative (JTI)

GE cross-business collaboration to serve customers better by forming partnerships with Japanese organizations



- ✓Win-win collaborations and partnerships
- ✓Innovation & growth thru technology
- ✓Bringing outside ideas - “OPEN INNOVATION”

JTI mission and approach

Mission: Leverage Japanese technology for GE growth

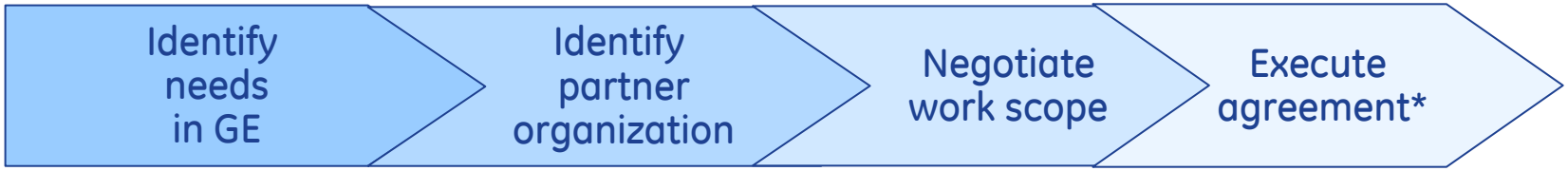
What	Main Players	How
Japanese investment in basic research, science	National Labs, Universities	Establish collaborations, JDs with National Labs, Universities
Accelerate commercialization together	Large companies	Promote open innovation, Establish collaborations
Incorporate their products In GE products	Large and small commercial entities	Establish joint developments, sourcing agreement

Quick Hit

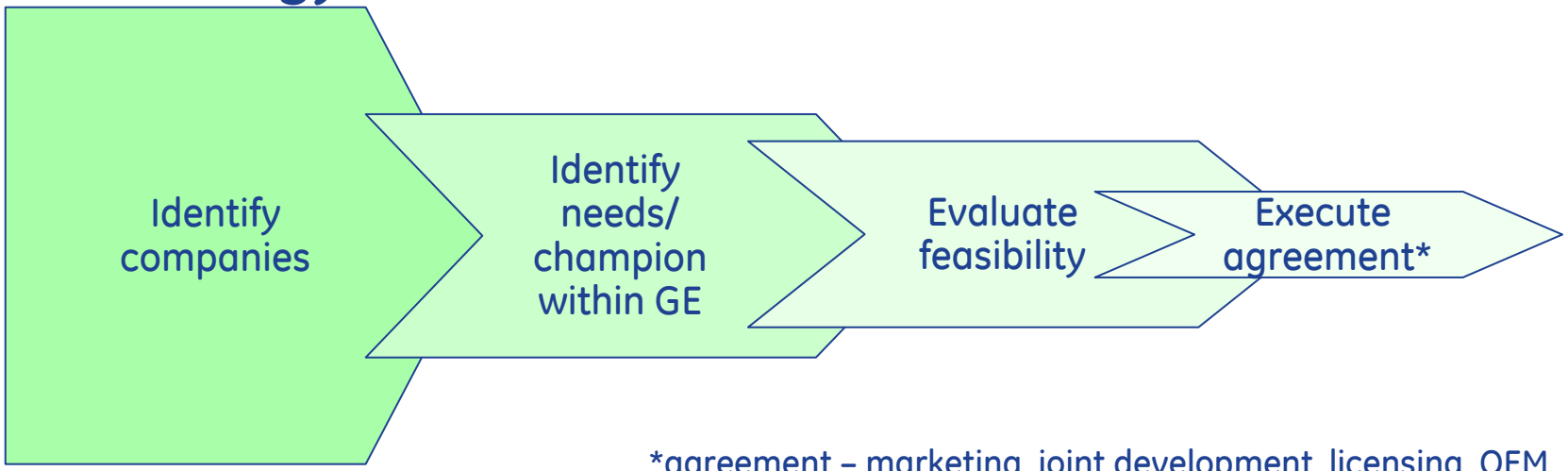
Project based collaborations and technology acquisitions

Open innovation approach

Needs Pull



Technology Push



*agreement – marketing, joint development, licensing, OEM, …

"Needs pull" yields higher return

Open Innovation at GE – Technology Push Examples

GE Japan Technology Forum

- October 2007
- May 2009

- ✓*Introduce unique technologies and products which may provide solutions to the needs and interests of GE.*
- ✓*Identify new business opportunities for top line growth*

GE and Fujikura Cooperate on Cooling Technology for Electronics Products

- Two companies sign agreement for GE to provide technology transfer and license for GE's Dual Cool Jet technology to Fujikura

Cooperation will drive more energy efficient, quieter cooling solutions for a variety of consumer electronics and other industrial product applications -

Tokyo, Japan – October 13, 2009 –GE (headquartered in Fairfield, Connecticut) and Fujikura Ltd. (headquartered in Tokyo, Japan) have signed a technology transfer and license agreement for GE's Dual Cool Jet thermal cooling technology. As part of the agreement, GE researchers will work with Fujikura, providing valuable expertise and assistance to support the technology development for new cooling products.

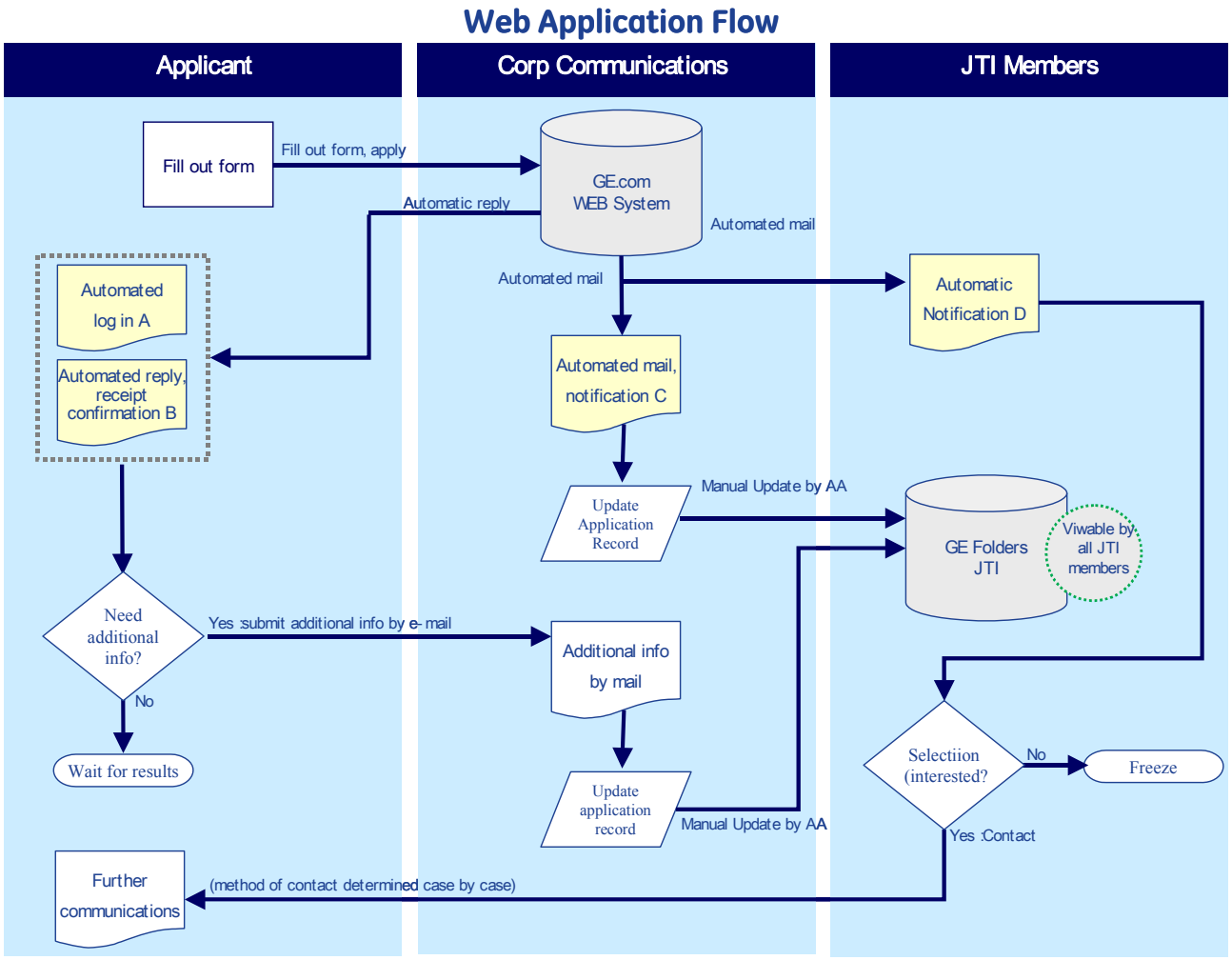
GE's Dual Cool Jet (DCJ) technology developed by researchers at GE's Global Research (headquartered in Niskayuna, NY) features a piezo-based cooling engine and has a wide range of applications for electronic products such as personal computers, laptops, and netbooks. As the demand for better functionality and miniaturization in electronics continues to grow, GE's compact yet powerful DCJ technology will enable removal of heat from local hotspots and recessed places. The ability to cool parts more efficiently will help raise the overall energy efficiency and enhance the functionality of electronics products.

The agreement with Fujikura, which specializes in the development of cooling applications for the consumer electronics market and industrial equipment, provides an excellent opportunity to further develop the Dual Cool Jet technology and produce higher-value cooling solutions.

In front of Thomas Edison's Desk at GE Global Research, October 9, 2009

From the left GE Technology Ventures Vice President William Konrick, Fujikura President & CEO Kazuhiko Ohashi, GE Global Research Japan Representative Juliana Shei

Open Innovation at GE – Technology Push Examples



ecomagination℠

1. Doubling our research investment
2. Introducing more ecomagination products
3. Reducing greenhouse gas emissions
4. Make customers true partners
5. Keeping the public informed

healthymagination

Increase Access

Reduce Costs

Improve Quality

Invest $3 billion in R&Dto launch at least 100 innovations that lower cost, increase access and improve quality by 15%.

ecomagination in Japan

Energy

Gas Turbines
TEPCO

Nuclear
Hitachi partnership

Wind

- **Japan Wind Development / Clean Energy Factory**

ecomagination in Japan

Aviation

JAL – 35x787 w/GEnx + 24x777 w/GE90

ANA – 17x777 w/GE90

Nippon Cargo – 14x747w/GEnx

IHI – partner for GEnx and GE90

ANA ALL NIPPON AIRWAYS CO.,LTD.

Explore the Engineering Edge

IHI

imagination at work

Partnership with Japanese Government

株式会社 産業革新機構

平成20年度対日直接投資に関する
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Success Begins with Innovation INVEST JAPAN

Bringing Innovative Solutions to Life

As the global economy recovers from the downturn of the past year, investors from all nations are increasingly looking to Japan. Combining stable growth with continual technological advancement, Japan is providing a wealth of new opportunities for investment and partnership. We spoke with Ferdinando Beccalli-Falco, President and CEO of GE International, to hear his thoughts on the growing collaboration between GE and Japan. This relationship dates back over a century, to when Thomas Edison sourced the filaments for his first light bulbs from Japanese bamboo forests. Today of course, Japan is far more than a supplier of raw materials, and alliances play a major role in many of GE's businesses from healthcare and environmental technology, to aviation and finance.

What makes Japan a unique investment opportunity for the future?

More than any other factor, innovation drives the global economy to produce sustainable growth and long-range profitability. And when investors from around the world look for the cutting edge innovations that will shape the future, they turn to Japan, "Japan is a 'hive of innovation,'" says Mr. Beccalli-Falco. "It has highly advanced technologies in the areas of environment, such as energy efficiency, and is at the forefront in developing new technologies in healthcare. There is a strong collaborative culture, which has created networks of innovation across the private and public sectors and encourages the incubation of small and medium enterprises clearly focused on delivering new technology solutions to the market." Firms in Japan are continually pushing the boundaries of technology, from automotive to communications to bioscience. In 2006 alone, over 200,000 patents were issued to Japanese researchers, nearly 60% more than the US, and more than the other six G8 nations combined. "I believe innovation and intellectual property will be two of the key drivers that will enable companies like GE and entire economies to grow and succeed as we emerge from this period of global economic reset and renewal. Japan offers this in abundance," Mr. Beccalli-Falco adds.

What factors have most attracted GE to seek out partnerships with firms in Japan?

"One of the exciting things for us is how the technologies developed and produced in Japan are now being exported and applied elsewhere across the world." Regardless of size technology and manufacturing firms across Japan place great emphasis on research and development. "Japan currently undertakes approximately 20% of the world's R&D and has a long established culture of promoting innovation, intellectual property and R&D in the educational, industrial and private sectors."

As a percentage of GDP, Japan spends over 35% more on R&D than the US, and more than 2.5 times that of China". This commitment to innovation, involving the cooperative efforts of businesses, universities and government research facilities has consistently placed Japan ahead of the curve on technological breakthroughs that have launched new product and services for the world market.

This has meshed perfectly with GE's 'healthymagination' initiative, aimed at providing access to superior healthcare for communities around the world. "Since the launch of "healthymagination" we have been accelerating our activity to seek new collaborative opportunities with Japanese companies have developed superb healthcare technologies and precision devices, and are also used to meeting the demanding needs and expectations set by their customers."

How is GE working together with Japan to take advantage of the 'Green Revolution'?

Environmental concerns are foremost in the minds of consumers and businesses alike, and Japan has taken the lead in the growing wave of 'green thinking', developing cleaner manufacturing processes, alternative energy sources, more efficient devices and improved recycling techniques. The results of this commitment to creating a cleaner, more sustainable world have been far more than just theoretical: Japan currently produces less CO_2 per dollar of GDP than any other industrialized nation, and firms throughout the country continue to invest heavily in minimizing their environmental footprint. These efforts have also created new opportunities across the board, with Japanese firms receiving four times as many environment-related patents than either the United States or the EU over the last decade. "A significant focus of our activity in Japan is on developing, creating and manufacturing 'ecomagination'** products and technology solutions with local and global applications. GE is collaborating with a number of companies and institutions in Japan in developing next-generation 'ecomagination' technologies, including OLED lighting and clean energy generation. We believe that our cooperation with existing and potential partners will greatly contribute to accelerate the development of innovative solutions for a more sustainable society." Mr. Beccalli-Falco said.

Where is Japan going from here?

In July 2009, the Japanese government announced the formation of the Innovation Network Corporation of Japan (INCJ), a public-private joint venture creating a $10 billion stimulus for small and medium-sized firms in developing and maturing industries, including energy, healthcare and the environment. This funding will enable them to take the bold steps that will lead to the next-generation of cutting edge ideas that will provide a strong competitive advantage. Also funding this venture is a growing coalition of private firms, including GE, that have chosen to support the initiative. Mr. Beccalli-Falco concludes "Private-public partnerships are critical for the rapid development and commercialization of technology that is something that is central to what we do as a company. As a founding member, we believe that the INCJ will greatly support the development of new and existing industries focusing on finding innovative solutions for some of the most challenging issues of our time in the fields of energy, the environment and healthcare."

METI Ministry of Economy, Trade and Industry　JETRO Japan External Trade Organization

For more information, visit: www.jetro.go.jp/en/invest/

What are Japanese good at

What are Japanese good at?

Some examples

Reverse engineer and make things better

GM ruled the auto world

1960 Chevy Impala 1960 Toyota Corona

Toyota became #1 auto maker

2008 Chevy Malibu 2008 Toyota Camry

Make things smaller (and often better)

GE Signa Excite

WORLDWIDE PARTNER

GE Signa HDe

30% less siting space
63% less installation time
41% less energy
25% lower lifecycle cost
Easier operation

What are Japanese good at?

Some examples

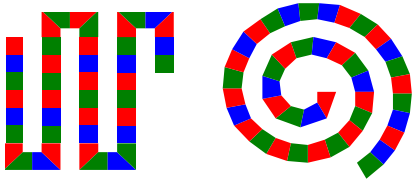
Making things precise

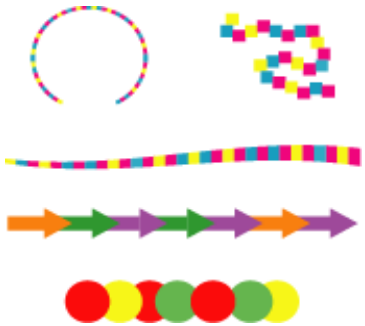
Hokkai M.I.C. Cylinders with 2 micron clearance

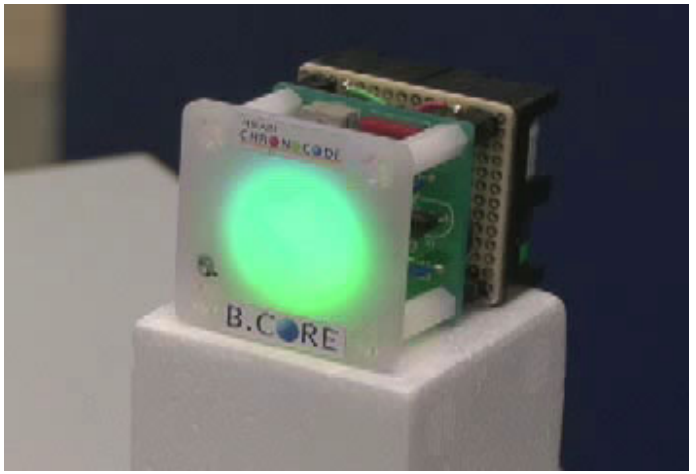
What are Japanese good at?

Some examples

Early Adopter







imagination at work


imagination at work