

April 21, 2015
MEMS Engineer Forum 2015

Paradigm Shift in Industrial Structure amid IoT

IoTにおける産業構造のパラダイムシフト

Development Bank of Japan Inc.
Mai Ota
Planning & Research Division
Kansai Branch

For Discussion Purposes Only

Author Introduction

Profile as of December 2, 2014

Development Bank of Japan Inc.

Established:	October 1, 2008 Former Japan Development Bank: 1951, Former Hokkaido-Tohoku Development Finance Public Corporation: 1956
Total assets:	¥16,247.9 billion (as of March 31, 2014)
Loans:	¥13,963.0 billion (as of March 31, 2014)
Credit ratings:	A1 (Moody's Investors Service, Inc.), A+ (Standard & Poor's Corp.), AA (Rating and Investment Information, Inc.), AAA (Japan Credit Rating Agency, Ltd.)
Number of employees:	1,189 (as of March 31, 2014)
Offices:	Head Office; 10 branch offices; 8 representative offices; 1 overseas representative office; 3 overseas subsidiaries

Corporate Philosophy



The Core Competencies at the Center of DBJ-Specific Financial Expertise

Intention

DBJ's fundamental stance is based on sharing with its clients a long-term perspective, neutrality, public-mindedness and reliability.

Intellectual Assets

Intellectual assets is a catch-all that refers to the abilities—to think ahead, make discerning judgments and introduce new financial technologies—that we have built through our experience in applying our industry, analytic and R&D expertise.

Networks

DBJ enjoys trust-based networks with clients, as well as partners among regional governments and financial institutions.

レポート紹介



2014年5月
株式会社日本政策投資銀行
関西支店

「センサ×ビッグデータ」ビジネスの可能性

—スマートフォンのビジネスモデルから学ぶ、センサの将来—

<要旨>

1. M2M(Machine to Machine)、IoT(Internet of Things)、そしてビッグデータ。これらは次世代ネットワークビジネスの構成要素として最近大きな注目を集めている。本稿で取り上げる「センサネットワーク」もまた、今後ビジネスとして大きな成長が見込まれる要素だ。センサネットワークとは、社会のあらゆる機器や、社会インフラ(建物、道路、鉄道等)や人(スマートフォン、ウェアラブル端末等)に付随したセンサをネットワークで繋ぎ、そこから膨大なデータを収集し、分析し、ソリューションを提供する仕組みである。橋梁の老朽状態のモニタリングや、高齢者の見守り等といった「社会課題対応」や、「新たなビジネスの創出」において、センサネットワークの活用が期待されている。
2. 本稿では、今後このセンサネットワークを、ビジネスとして確立していくにあたって、センサネットワークビジネスの生み出す付加価値を日本が獲得するために、意識すべき「プラットフォーム構築」について論じる。プラットフォーム構築によりビジネスの大きな転換を遂げたスマートフォンビジネスの事例を参考としていきたい。
3. センサネットワークビジネスは、使用するセンサ端末の低消費電力化・低コスト化等の技術的な課題も有しているが、最大の課題は、『センサで集めたデータを活用し、ソリューションを提供する方法(=アプリケーション)の開発』である。センサで収集される膨大なデータを活かす分野は、インフラ、エネルギー、農業、交通、ヘルスケア、スポーツ等、非常に幅広い。単独の企業が自らデータを収集して、自社のビジネスに活かすには、規模もアプリケーションのアイデアも限界があるだろう。
4. アプリケーションが重要な役割を果たしているという点で参考になるスマートフォンビジネスは、グーグル社のAndroidOSやアップルのiOS等のオープンOSの登場により、アプリケーション開発に誰でも参加できるようになり、ビジネスモデルが激変した。アプリケーション開発のプラットフォームが構築されたことで、世界中のアイデアから多くのアプリケーションが生まれ、スマートフォンの生み出す付加価値が大きく向上したのである。
5. センサネットワークビジネスにおいても、これから多様なアプリケーションが生まれることでビジネスが拡大すると考えられる。そこで必要なものは、センサが収集する膨大な「データ」とアプリケーションの「アイデア」だ。「アイデア」を持つ人が誰でも「データ」を利用できる仕組みを作ることにより、スマートフォンビジネスと同じく、アプリケーション開発のプラットフォームを構築することがこのビジネスのカギとなるだろう。日本企業は、電気・一般機械産業の発展の中で、センサネットワークの要素技術ノウハウを獲得し、多くのアプリケーションのアイデアを有している。今後、関連産業が英知を結集するとともに、必要に応じて連携を深め、センサネットワークビジネスのプラットフォームを構築する動きが出てくることを期待したい。

(お問い合わせ先) 株式会社日本政策投資銀行 関西支店 企画調査課 大田麻衣
TEL : 06-4706-6455、E-mail : ksinfo@dbj.jp

Background to the report

- In July 2013, DBJ conducted a study of the sensor industry in light of the increasing number of leading sensor manufacturers operating in the Kansai region.
- The Sensor Research Group, launched by Dr. Kazuhiro Mishina of the Kobe University Graduate School of Business Administration, approached the revival of Japanese industry from a new perspective: that of the sensor. The group interviewed representatives of public agencies and manufacturers and visited exhibits and lectures in order to document the challenges of the sensor network industry and its outlook for the future. It presented its proposals in a report issued on May 12, 2014.
- The report has sparked a widespread, ongoing discussion on how Japan might best structure a market for remote sensing data distribution.

Article in *Nikkei Technology Online*



The Front Lines of the Remote Sensing Data Business

<http://techon.nikkeibp.co.jp/article/COLUMN/20141010/381840/>

* Free registration is required to read the article in full.

Essence of the series

Sensors are found in smartphones, cars, buildings, and innumerable other places in our society.

The masses of data they produce – “big data” – promise huge new opportunities for business.

Once collected from sensors via the Internet, big data can be used not only for its original intention but for various other purposes by third parties. The business potential, both for goods and services, is nothing less than enormous.

Many challenges must be resolved before this vision can become a reality. They include establishing a distribution market that will enable anyone to access big data, and ensuring the security of remote sensing data.

In this column, DBJ's Mai Ota explains what Japanese companies must focus on in order to succeed in businesses using remote sensing data. Her points are accompanied with keen market analysis, abundant case studies, and interviews with experts in the field.

Analysis of the Near Future

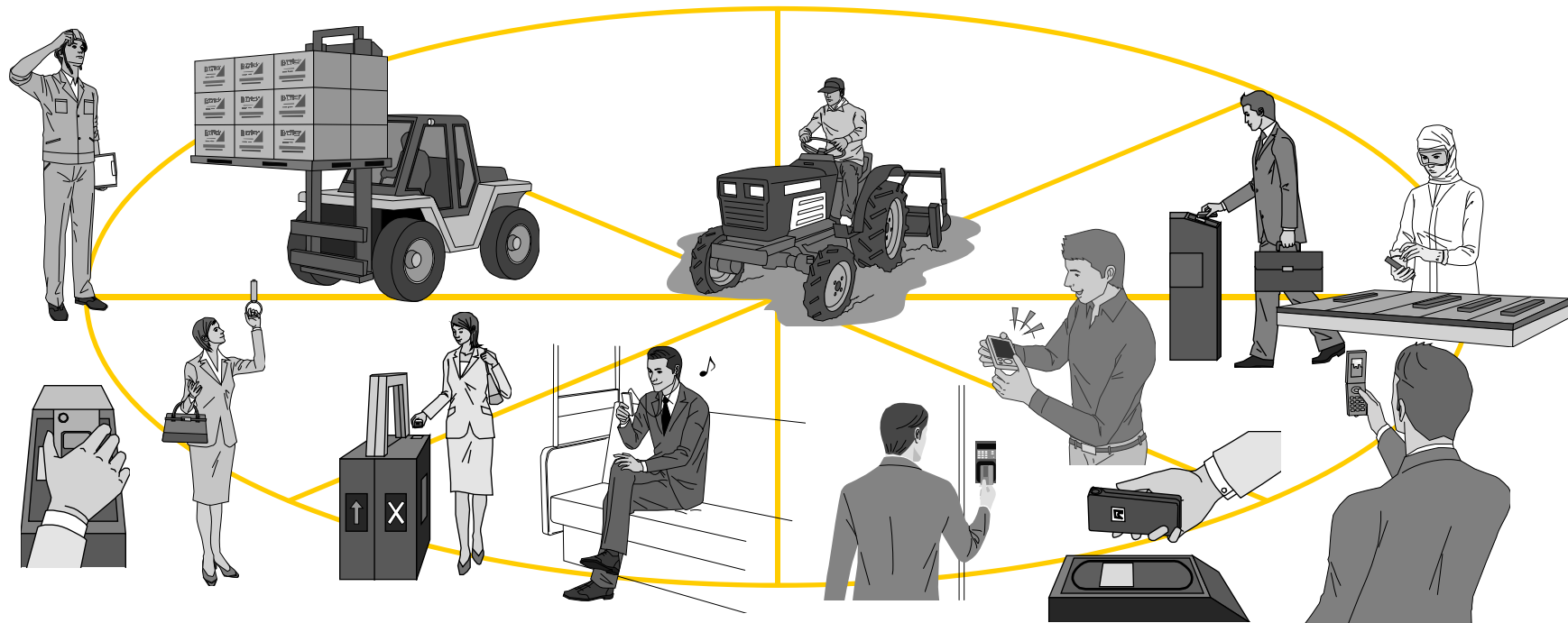
**Sensors: Who Will Want Them, and for What
Purposes?**

Early Perceptions

With the advent of IoT – the “Internet of Things” – more and more of the world is coming online. Immense amounts of data are being picked up by sensors and traveling over the Internet .

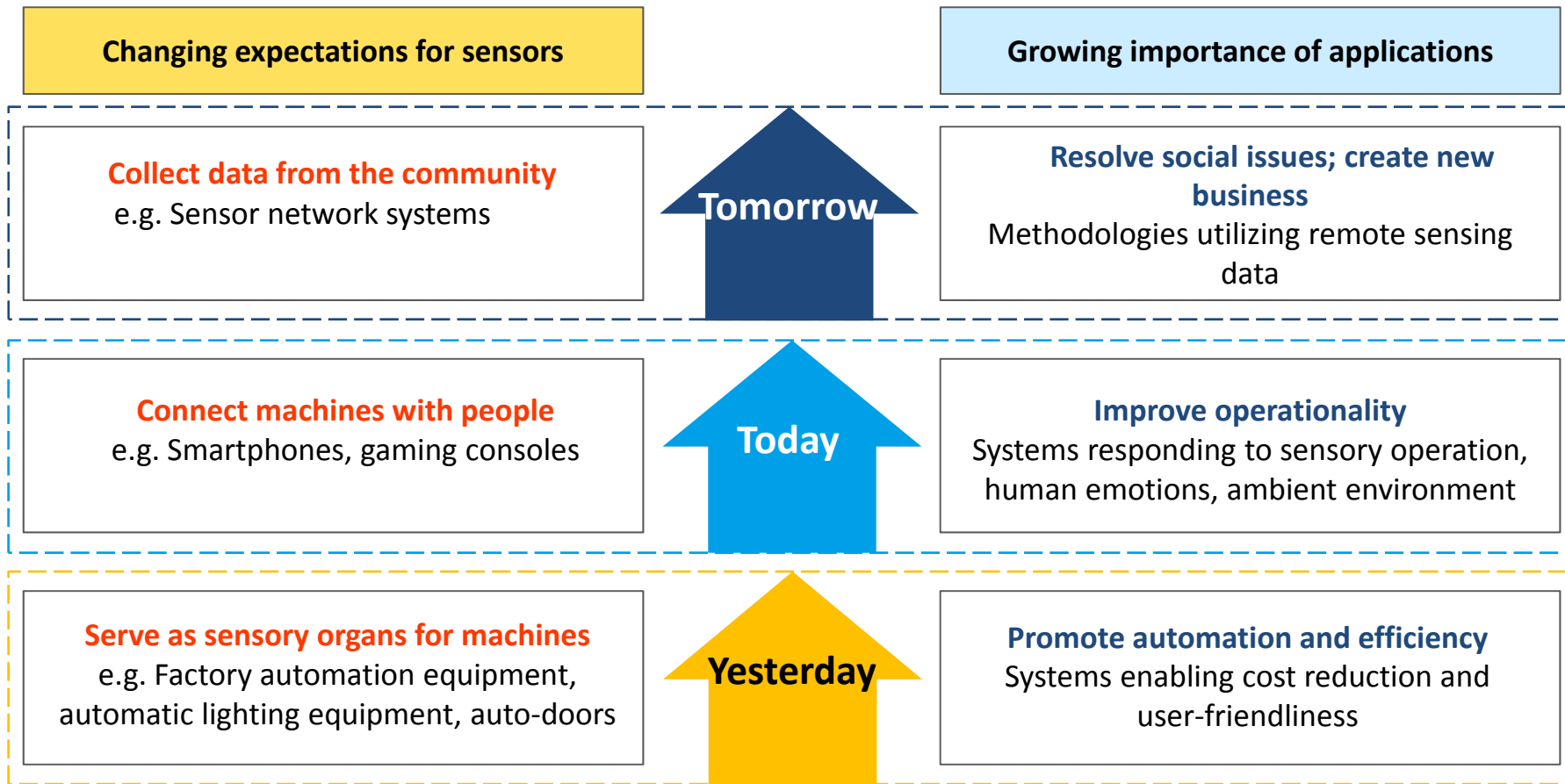
Useful, connected machinery is not the only area of IoT offering promise to business. The true business opportunities will lie in the field of remote sensing data.

How shall we approach remote sensing data to make the most of its immense potential?



Prepared by DBJ from interviews.

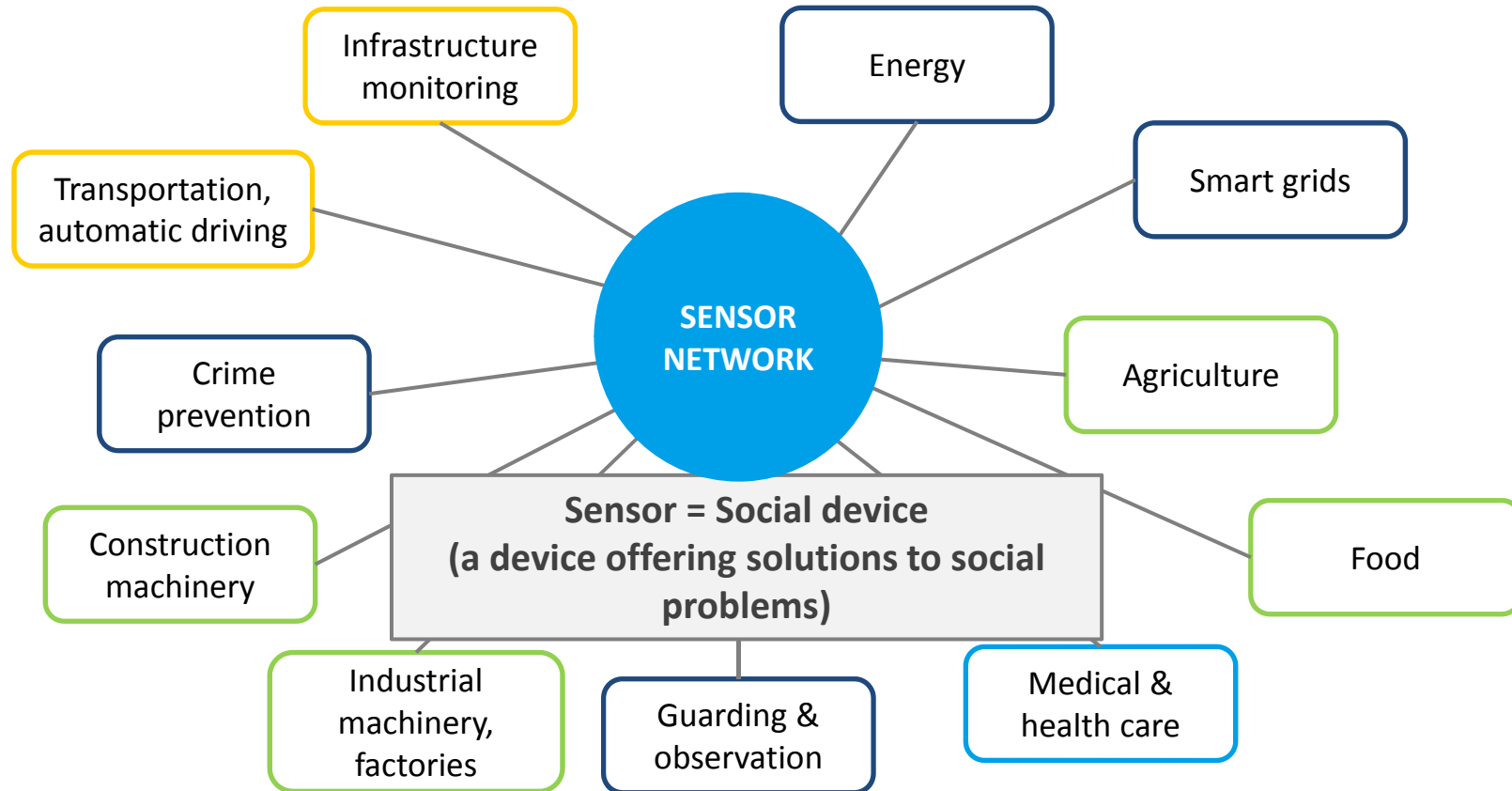
The Importance of Applications as Sensors Take On New Roles



Prepared by DBJ from interviews.

- ◆ The development of applications – means of applying the data collected by sensors to the solution of problems – is of great importance to users employing sensors for such new purposes as addressing social issues or creating new business.
- ◆ To make the best use of sensor networks, we must have applications capable of linking sensor technology to problem-solving.

New Sources of Demand: The Sensor Network



Prepared by DBJ based on public documents.

- ◆ A sensor network is a system which links the sensors attached to instruments, social infrastructure (such as buildings, roads, and railroads), and people (via smartphones, wearable terminals, and other devices); collects and analyzes enormous amounts of data; and applies the results to the solution of social issues.
- ◆ Sensor networks are promising means of resolving Japan's social challenges – including a shrinking working population, rising health care costs, and population aging – and creating new opportunities for business.

Absence of a Killer App: A Challenge for the Sensor Network

The system lacks a killer app (an application capable of driving growth).

Expectations are growing that with the use of sensors, almost any social problem can be solved. But the question remains: how should remote sensing data be collected, and how should it be applied to a problem's solution? The market will not move forward without crucial products and services for these purposes.

Firms are wary of entering an unpredictable market.

We can't predict how far the sensor network will grow, or whether consumers will be willing to use the data it makes available. Companies are cautious about entering a market with such an unforeseeable future.

Sensor manufacturers are taking a passive attitude.

Sensor manufacturers have been working hard to meet the demands of their customers. They have the technology to do this, but find it difficult to create new applications of their own.

Installing a sensor is an unrecoverable cost.

Sensors themselves are available at low cost. But installing and maintaining them can be expensive. There are only a limited number of fields in which businesses which can reliably recover the cost of installation.

Japan has the technology, but it lacks a business model.

An Essential Analysis of the Future

The Sensor Ushers in a Paradigm Shift

A Paradigm Shift in Application Development

Companies need to look outside their own business sphere and **seek out diverse ideas wherever they exist.**

Companies adhering to the concept of “**our** company, in **our** field, using **our** technology,” cannot turn out interesting ideas, nor can they launch the sort of killer app that depends on diverse technologies and ideas collected from a broad range of sources.



Remote sensing data and ideas are essential to the development of applications.

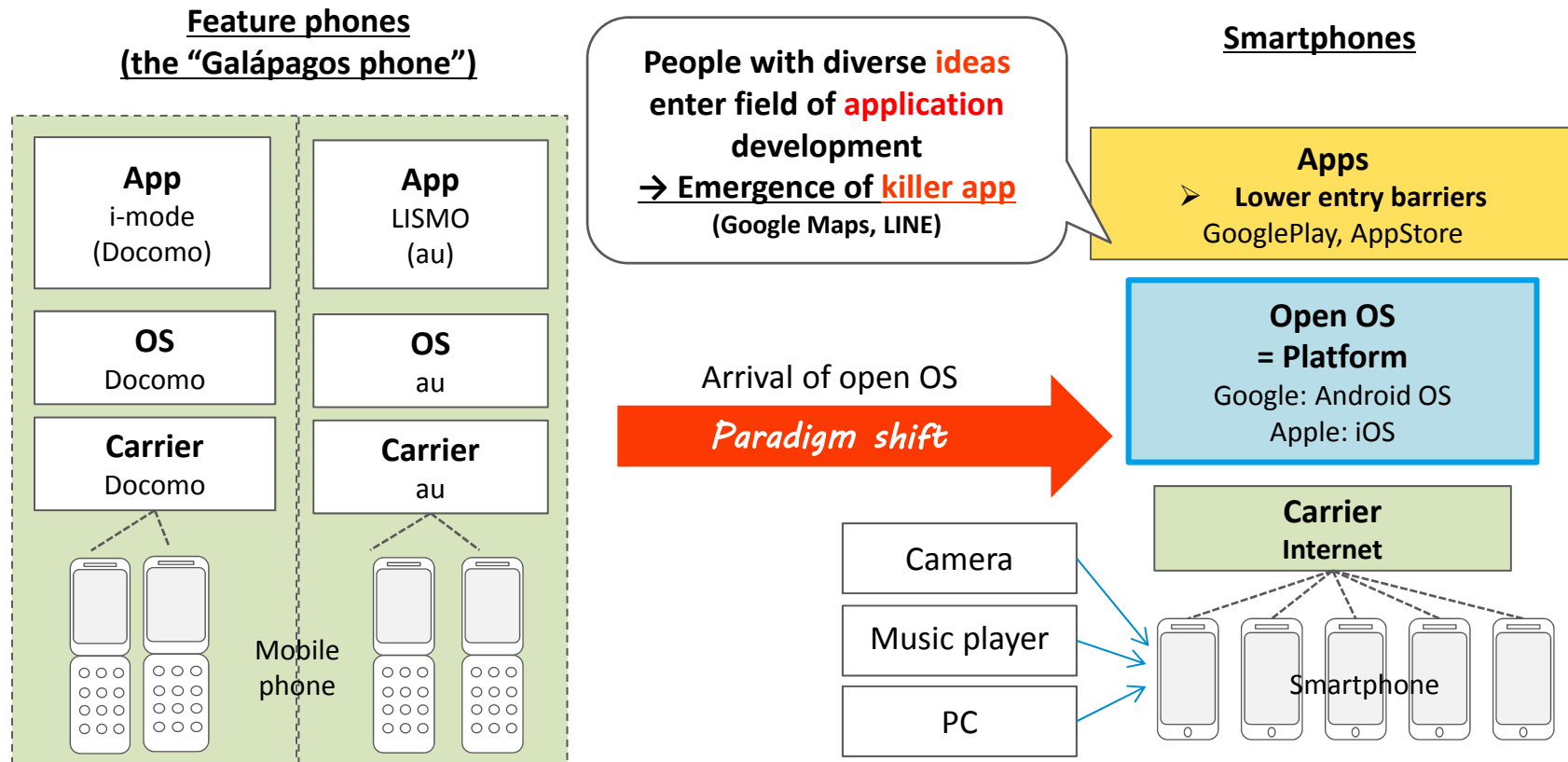
Big companies have data but lack ideas for their application. Venture firms have ideas but can't collect enough data.

No “meeting place” exists for data and ideas from diverse sources and of various types.



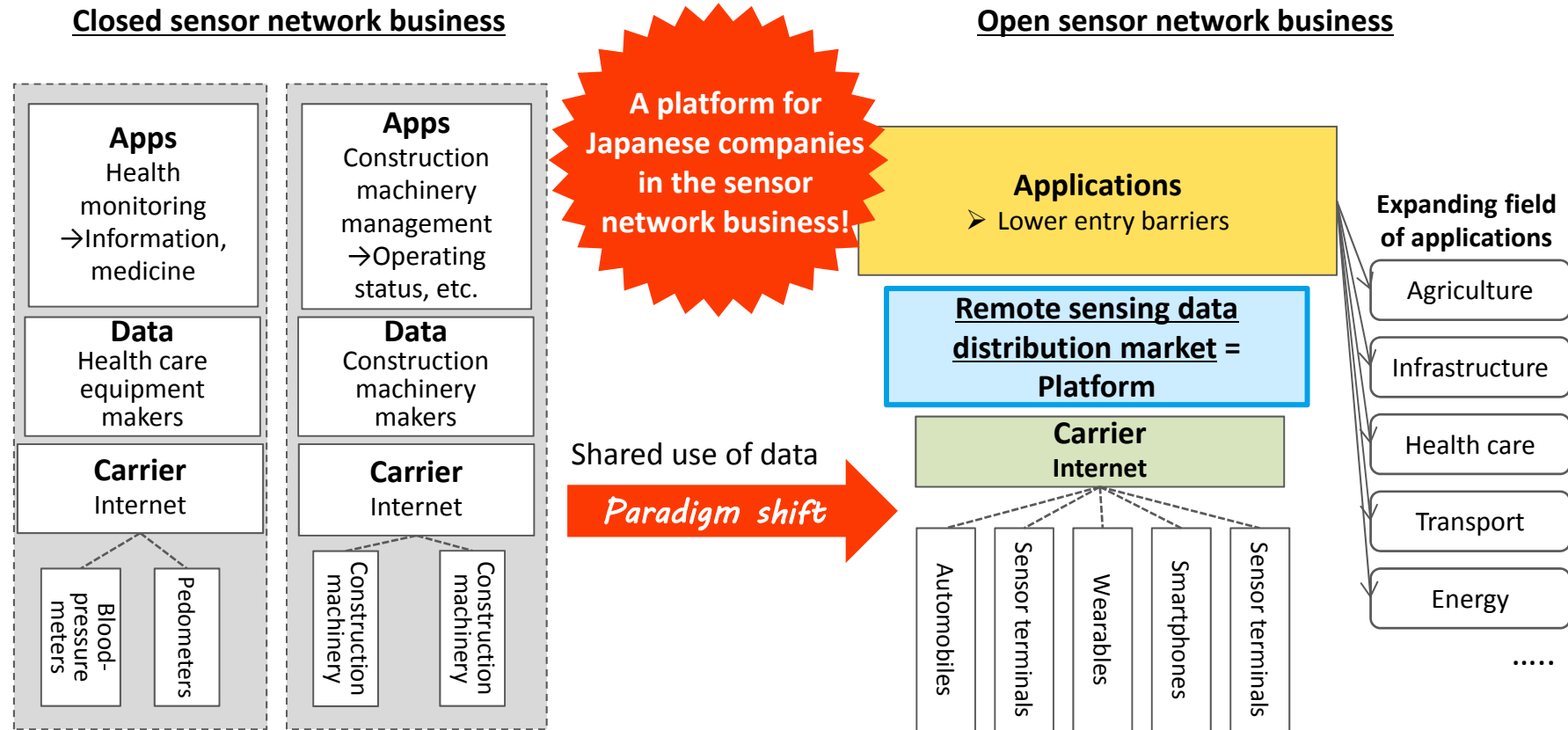
A place where **remote sensing data can link with **ideas**:
the foundation for IoT business development.**

A Look at the Success of the Smartphone Business



- ◆ Feature phones were a closed business, with carriers such as Docomo, au, and Softbank handling transmission, operating software, and all applications.
- ◆ The advent of smartphones brought the open OS offered by Google and Apple. Applications were unveiled, and app development becoming a business in which anyone could take part. Ideas for smartphone applications emerged around the world, and the many apps that resulted have contributed to the huge growth of the smartphone business.

A Paradigm Shift in the Sensor Network

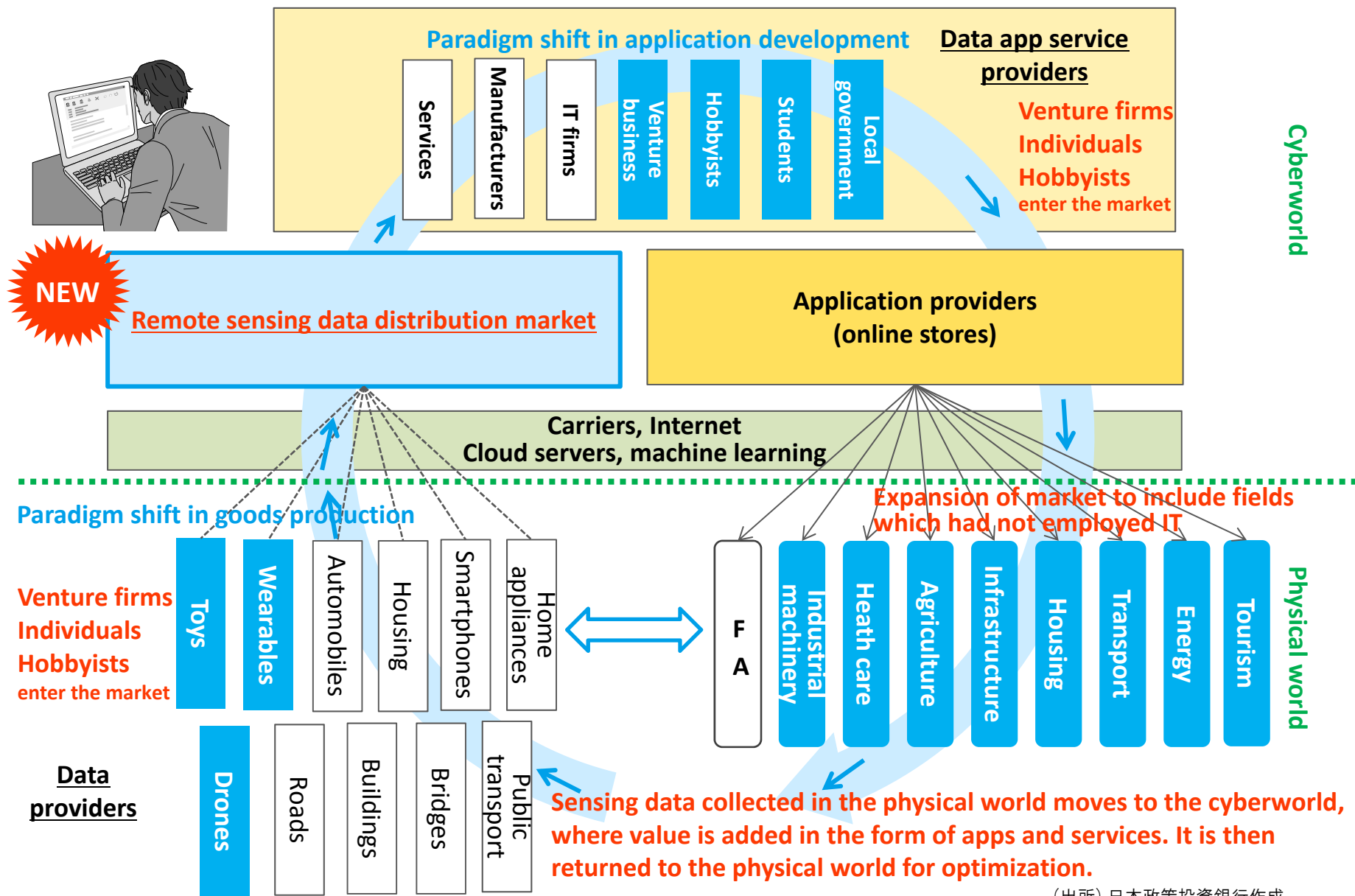


- ◆ For diverse applications to emerge in the sensor network business, we will need the immense amount of data that the sensors accumulate, and ideas for how that data can be utilized to produce solutions.
- ◆ Our aim should be to create a system in which data is collected by firms and other organizations, processed for the proper disposal of personal information, and combined and used jointly with data collected for other purposes, rather than being kept within each individual entity. With such a platform, numerous firms will take part in the development of applications and the range of sensor network applications will expand.

The Future of IoT Business

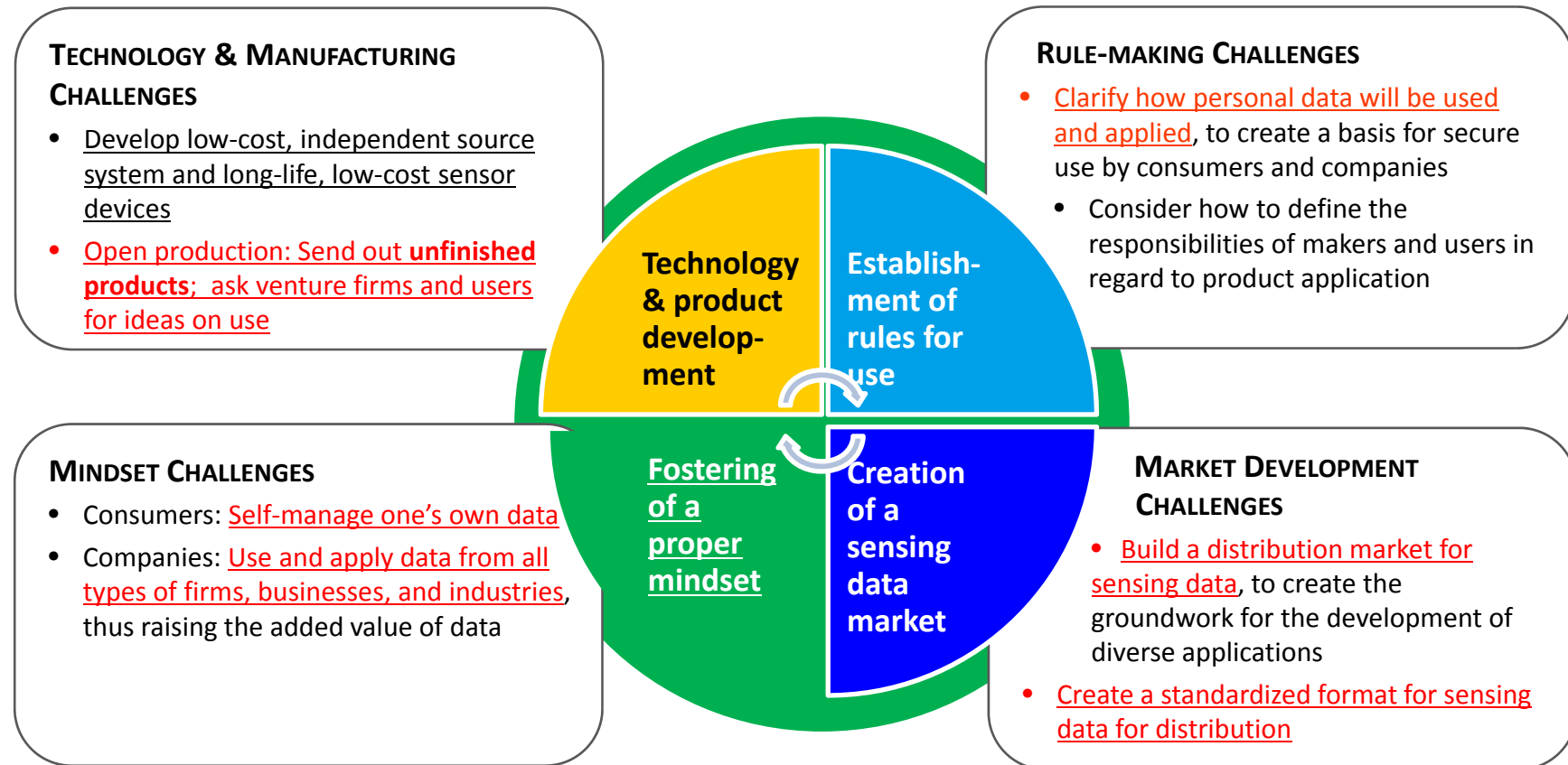
Paradigm Shifts Bring Expanded Business
Opportunities

Structure of Future IoT Business



Conclusions

The Remote Sensing Data Business: What Is Needed



Prepared by DBJ based on interviews.

- ◆ The groundwork is being laid for the development of technology and rules. But when it comes to developing a forward-looking mindset and a market for remote sensing data, the discussion has just begun.
- ◆ By taking on these four challenges simultaneously, Japan can become a global pioneer in the remote sensing data industry.

Thank you for your attention.

Copyright (C) Development Bank of Japan Inc. 2015

This material is created by Development Bank of Japan Inc. (DBJ)

This material has been prepared solely for the purposes of consideration and discussion between you and DBJ. This material is not intended as a solicitation or an offer to buy or sell any financial instrument, product, service or investment or for any other transactions. DBJ does not guarantee any feasibility of transactions described herein.

This material is prepared based on current generally held views of the economy, society and so forth, as well as certain assumptions reasonably made by DBJ. However, the information and content are not warranted as to completeness or accuracy and are subject to change without notice due to changes in the business environment or other reasons.

Please note that DBJ is not responsible for any action taken based on this material and no transactions described herein should be entered into without the independent advice of lawyers, accountants and/or other professional advisors where appropriate. Also please note that it is strictly prohibited to copy, extract or disclose all or any part of this material (including any attachments hereof) without prior written consent from DBJ.