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International ESCO Business Opportunities and Challenges: A Japanese Case Study

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**INTERNATIONAL ESCO BUSINESS OPPORTUNITIES AND CHALLENGES:
A JAPANESE CASE STUDY**

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1. Introduction

Recently, U.S. energy service companies (ESCOs) have begun to actively explore markets outside the United States. Despite the needs of many countries for ESCO involvement, ESCOs face many challenges (i.e., marketing, financial, institutional, political and cultural barriers). Consequently, most of these firms pursue international project opportunities very selectively due to the costs and risks associated with project development. Despite these barriers, some ESCOs view international work as a strategic expansion of their business, assuming that there will be adequate business in the future to repay them for their initial investment.

In this paper, we present the findings from a recently completed study on the proposed development of an ESCO industry in Japan. The study was based on four sources of information: (1) a review of the published and unpublished literature on ESCOs; (2) interviews with 26 ESCOs in the U.S., the U.S. Department of Energy, and the National Association of Energy Service Companies (NAESCO); (3) ESCO presentations at the October 1996 NAESCO meeting; and (4) informal discussions with ESCO experts in the U.S. We believe that the lessons learned in this study can be transferred or applied to other countries interested in developing an ESCO industry.

While energy prices have remained relatively stable over the last several years in Japan and energy capacity is not perceived as a near-term problem, other "market drivers" necessary for the emergence of a successful and vibrant ESCO industry exist in Japan. Despite the presence of these market drivers, significant barriers to the successful development of an ESCO industry exist in Japan. After discussing these barriers, we present (1) general guidance for helping Japan to develop its own ESCO industry, (2) specific ESCO development strategies for Japan, and (3) recommendations to U.S. companies considering joint ventures between U.S. ESCOs and Japanese companies. We conclude the paper by describing the latest activities in developing an ESCO industry in Japan.

2. Market Drivers

The Japanese government has been very active in promoting energy efficiency in Japan. While energy prices have remained relatively stable over the last several years in

Japan and energy capacity is not perceived as a near-term problem, other "market drivers" necessary for the emergence of a successful and vibrant ESCO industry exist in Japan, such as the following:

1. A large market. A very large market of commercial, institutional and industrial companies exists in Japan which can significantly improve their energy utilization through adoption of energy-efficient technologies and practices.
2. A highly educated workforce. In Japan, there is a ready supply of highly educated technical (e.g., engineering, financial, marketing, and managerial) expertise needed by ESCOs to implement energy-saving technologies and processes on behalf of customers.
3. Stable and supportive political system. Japan has a democratic political system that is receptive and supportive of improvements in energy efficiency; in addition, the legal and financial systems are stable.
4. Availability of efficient equipment. Japanese manufacturers are adding energy-efficient technologies to their product ranges.
5. Environmentally concerned government. Japan is one of the leading countries in the world in trying to reduce its CO₂ emissions, and improvements in energy efficiency are regarded as a key stratagem to meet their environmental commitments.

Despite the presence of these market drivers, significant barriers to the successful development of an ESCO industry exist in Japan, as discussed in the next section.

3. Barriers

The barriers to the successful development of an ESCO industry in Japan are similar to those encountered in the U.S. In particular, the following barriers appear to be formidable in Japan:

1. The concept of ESCOs and energy performance contracting is new to nearly all of the parties that need to be familiar with it (i.e., lack of

awareness): financiers, attorneys, contractors, insurers, utilities, government agencies, and customers.

2. Government policies regarding energy performance contracting are uncertain.
3. Legal and contractual issues specific to performance contracting are unclear.
4. Economic conditions are presently adverse (e.g., stagnant economic development) for investments in energy efficiency.
5. There is a lack of capital (equity financing or equity investments) for establishing ESCOs.

3.1. Financing

Financing is often considered the main barrier to the development of ESCO projects. For example, with respect to Japan, are there financial institutions that will provide long-term debt financing to facility owners for amounts under, e.g., \$1 million? Are local banks ready to finance performance-based energy efficiency projects? And if they are, will rates be very high and repayment terms be too short to structure loans around repayment from energy cost savings? Two additional problems compound the lack of financing: (1) bank loan officers typically lack the experience necessary to evaluate loans for energy efficiency projects backed by performance guarantees; and (2) weak or nonexistent credit histories for some prospective customers render credit analysis close to impossible. Added together, these factors make new project development a difficult task.¹

¹ Some ESCOs have turned to international financial institutions for financing, but many of these agencies have no prior experience with performance contracting either, and would be seeking projects of a certain size to meet their minimum project size requirements.

3.2. Cultural barriers

In our survey of ESCOs, we found some ESCOs concerned about possible cultural barriers to the formation and development of an ESCO industry in Japan. Their image of Japan is that of a very strong, inflexible bureaucracy that presumes an uninformed citizenry and that has the following characteristics: centralized authority; tight regulatory policies, rules and regulations, favoring businesses' interests over consumers' interests; support of the status quo and precedent; and limited freedom of choice for individuals (e.g., see Miyamoto 1994). While this type of control organization did foster impressive industrial growth in Japan in the latter half of the twentieth century, it appears to have limited or prevented individual differences, creativity and flexibility (Miyamoto 1994).

As a conservative and risk averse Japanese society, many U.S. ESCOs believe that it will be very difficult for new practices (e.g., energy performance contracting) to get started in Japan. For example, they expect decision making to take a long time if consensus is emphasized and disagreements are not permitted. Because there are so many issues involved in developing an ESCO industry and energy performance contracting, U.S. ESCOs fear that the need for consensus will lead to indeterminate delays and lost opportunities, leading to frustration and disappointment with the whole process.

This image of Japan may be changing as a result of social pressures for liberalization and individualism (Naff 1996). According to Naff, the Japanese people in the 1990s no longer want to sacrifice anymore: personal happiness and leisure are top priorities. In addition, Japanese bureaucracy and organizations may be changing as well, becoming more flexible and sensitive to individual needs.

4. General Recommendations

During our interviews with U.S. ESCOs, many ESCOs offered many general suggestions for helping Japan to develop its own ESCO industry. In this section, we present eight key recommendations, in no particular order, based on their experience in the United States.

First, expect the process of creating and developing a Japanese ESCO industry to take a long time (e.g., it will take twice as long to get a contract in place than expected). Japanese companies must be patient and realize that the development of an ESCO is a long-term commitment and that returns on investment will not occur for at least several years. Accordingly, Japanese companies need to set realistic expectations about how long it takes to get the ESCO market going. Second, although the ESCO business can be profitable, the ESCO business is risky and one should be prepared to lose money on some projects.

Third, marketing is the key to success in the ESCO business. Japanese ESCOs need to conduct appropriate research to understand and know the market, including an assessment of customer needs and potential energy savings. They need to talk to customers and financiers and learn where they are on the learning curve of energy awareness and knowledge. And Japanese companies need to have an effective marketing and sales organization in order to develop contacts, strategic alliances, and partnerships with local contractors, utilities, and equipment manufacturers.

Fourth, Japanese companies need to know that the ESCO industry is a relationship-based industry, not project-based. These companies must offer services and solutions, not simply market projects. Fifth, Japanese companies need to know what the key barriers to energy efficiency and energy performance contracting are and how they can be overcome.

Sixth, the Japanese government needs to be committed to supporting an ESCO industry. In the U.S., the federal government helped facilitate energy performance contracting in federal buildings and remove some of the "procurement stoppers." Seventh, price signals to consumers should include externalities associated with fossil fuel use. If these conditions are met, the ESCO industry will have a better chance of thriving.

And eighth, as noted by several ESCOs, Japan needs to change its "mind set." For example, Japanese businesses and government need to look at their decision-making processes, to see if alternatives to consensus decision making can occur. As noted earlier, the Japanese culture is perceived by U.S. ESCOs as designed to limit startups and innovation, making it very difficult to start a new business from scratch. Therefore, the Japanese will need to be more creative and innovative and take more risks to create a viable Japanese ESCO industry.

5. ESCO Development Strategies

Energy performance contracting and an ESCO industry can be developed in Japan if appropriate strategies are taken (Table 1). Because of the prominent role of the Japanese government in pursuing past economic policies, the following strategies rely on government assistance (either implicitly or explicitly). Because the U.S. ESCO industry was not critically dependent upon utility programs for its existence, Japan should not rely on its own utilities to promote energy performance contracting and an ESCO industry. Given the experience of Japanese utilities in DSM so far (i.e., primarily load management), these utilities may be unlikely to greet ESCOs and energy performance contracting (as well as DSM bidding) with even the limited enthusiasm shown to it by U.S. utilities (although some utilities in the U.S. are forming their own ESCOs in the last year). At a minimum, potential conflicts of interest between ESCOs and utilities need to be minimized, and good relationships need to be established.

Table 1. Strategies for Developing an ESCO Industry in Japan

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1. Promote information, education, and training
 2. Develop funding sources
 3. Standardize contracts and proposals and M&V
 4. Conduct ESCO demonstration projects, perhaps as joint ventures
 5. Promote energy performance contracting in government buildings
 6. Establish a national ESCO
 7. Establish JAESCO
 8. License or certify ESCOs
 9. Develop a third-party financing network
 10. Establish an equipment leasing organization
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5.1. Promote information, education, and training

Customers (especially, facility managers) need to be sufficiently aware of energy management issues in general before they will be receptive to energy performance contracting. This awareness may be very low particularly if energy prices are low or relatively stable, or if energy represents only a very minor proportion of operating costs. Therefore, programs for raising basic awareness of energy use and efficiency should be

one of the first actions taken in Japan.¹ These information programs (including seminars, World Wide Web sites, videos, workshops, case studies, brochures, and other publications) would disseminate information on: energy-efficient technologies, products, and equipment; energy-saving opportunities; current and future energy costs; and energy consumption and energy efficiency norms by sector. One type of publication that is needed is a model or sample contract and guidebook to guide energy users through the issues involved in negotiating and implementing such energy performance contracts, similar to those produced for the European Commission (Warren 1993).

Many of these information activities could be used for customized training in contracting, financing, marketing, project management, equipment procurement, and business operations. U.S. experts experienced in energy performance contracting and ESCOs could help to assist these training programs.

The information and training programs should target the general public and other key stakeholders: banks and other lending institutions, energy utilities, government (especially, officials responsible for procurement), energy efficiency engineers, energy managers, lighting and equipment manufacturers and suppliers, leasing companies, and energy auditing companies. These same groups could then disseminate this information.

5.2. Develop funding sources

Japanese companies and U.S. ESCOs will need working capital for marketing and project preparation and development. Funding feasibility studies, energy audits and the preparation of financing applications would increase their ability to secure additional information and decrease the amount of equity capital required. In addition, sources of debt and equity financing need to be located.

Several possible funding sources should be investigated: private banks and lending institutions in Japan; U.S. financial institutions that are already familiar with energy performance contracting; venture capital firms; equity funds; strategic partners

¹ The information and training programs could be new programs by new institutions, or an expansion of existing programs by existing organizations.

(e.g., utilities and engineering firms); leasing companies; and equipment manufacturers. A revolving fund to finance energy efficiency measures could also be set up.

Dedicated debt organizations offering 80-100% financing for projects could be established and could use the above sources. Under this option, a master loan agreement would be standardized and executed between an ESCO and the debt facility which would commit the lender to provide financing according to defined terms and conditions. Funds would be drawn down on a project-by-project basis. The balance of financing would come from the ESCO, the customer or another equity investor. Alternatively, the debt facility could provide 100% of project costs, but returns to the debt facility would be higher to reflect the higher risk.

5.3. Standardize contracts and proposals and M&V

The development of standard procedures for the measurement and verification (M&V) of savings as well as for standard contract terms can help both end users and the financial community better understand performance contracting. The development of standard contracts has been an elusive task because various companies consider their contract approaches unique and proprietary. Rather than developing a single standard energy services agreement, NAESCO, for example, is now focusing on standard language for a set of key contract provisions, such as insurance, equipment ownership and purchase options, which will allow standard contract forms to be built up gradually. It would also be useful to have standard contract provisions that could be adapted for use in smaller size projects.

Japan should fund only those performance-based projects that are subject to M&V protocols, and the U.S. Department of Energy's International Performance Measurement and Verification Protocol (IPMVP) protocols would be a good first step.¹ There is no reason for Japan to repeat the U.S. experience of vast expenditures for

¹ The U.S. DOE official responsible for the development of the IPMVP noted in his interview: "We would like to benefit from Japan's expertise and experience. We all share an interest in reducing environmental damage, slowing global warming, and promoting efficiency for economic, social, and environmental reasons. The efficiency industry will be much more successful if the methods used in implementing efficiency are international consensus methods that are used across all countries. . . We are hoping that because it is international and because it is open, we can avoid the situation where different countries or groups of countries create their own protocols that are different."

energy efficiency never subject to verification. The questionable results of unverified efficiency programs invariably place a cloud over the entire industry.

5.4. Conduct ESCO demonstration projects, perhaps as joint ventures

A critical factor in the future role and success of ESCOs in Japan will be the ability to demonstrate successful applications of the ESCO concept. The purpose of these demonstration projects would be to illustrate the applications of energy-efficient technologies, demonstrate the concept of energy performance contracting, and create areas of expertise in ESCO development.

Collaboration and joint ventures involving U.S. or other western partners with local partners in Japan will be the most likely mechanism for successful ESCO operations. Incentives (grants) may be needed for the development of joint ventures between U.S. ESCOs and local energy management companies. This benefits both U.S. ESCOs, which will face difficulties in conducting business in Japan without local partners, and local partners, which can benefit from the transfer of skills.

In order to attract potential customers, government agencies (or utilities) could identify and qualify customers with energy efficiency potential and, acting on behalf of a single customer or preferably a group of customers, undertake the procurement of turnkey energy efficiency equipment installation and services. The typical method is to develop and issue a request for proposals (RFP) to the energy efficiency industry. Before issuing the RFP, the procuring agency should secure the customer's commitment to the program, assist the customer in defining its decision making process and the acceptable range of financing and contracting terms, perform a preliminary analysis of the customer's creditworthiness, and assemble basic information on the energy cost, consumption and end use characteristics for the customer's facilities. The RFP should define the proposal format, its evaluation and selection process. This preliminary work delivers to the ESCO community a qualified and decision-ready customer.

Along with the training assistance of U.S. commercial lenders and U.S. ESCOs with experience in efficiency loans backed by performance guarantees, the people trained in these demonstrations could help train additional people in Japan. Experienced lenders can impart valuable information as well as demonstrate the

importance of M&V to these projects' success. Early success of ESCO projects will be critical to the long-term growth and prosperity of the ESCO industry in Japan.

5.5. Promote energy performance contracting in government buildings

Government-owned property is a major energy user and can represent a significant proportion of the potential ESCO market. ESCOs can provide government organizations with valuable expertise and private sector investment capital. However, energy performance contracting is very often regarded as unconventional finance by government authorities. Rules and regulations may simply not allow energy performance contracting on government property. Therefore, an important first step is to review regulations and remove institutional barriers to provide a more hospitable environment for performance contracting. The Japanese government should expedite the process as much as possible by providing subsidies to ESCOs and/or allowing 10-15% of government buildings be made available to performance contractors, raising the credibility of the ESCO business concept with major banks. The buildings could be made available to the top 3-4 qualifying ESCOs (the work should be divided up among the ESCOs). After this initial stage, all government buildings should be made available to energy performance contracting.

5.6. Establish a national ESCO

Although not tried in the U.S., the Japanese government could establish its own national ESCO as a startup company. The national ESCO would target energy performance contracting in government buildings. In addition, the national ESCO would promote the development of a robust and competitive market for energy efficiency services in sectors where significant market barriers remain (e.g., smaller customers) or where customers may be less attractive to serve financially (e.g., low income). Once the market was developed, the national ESCO should go out of existence.

5.7. Establish JAESCO

The National Association of Energy Service Companies (NAESCO) assisted the development of the ESCO industry in the United States. A similar organization in Japan, e.g., the Japanese Association of Energy Service Companies (JAESCO), should be a high priority for promoting the development of an ESCO industry in Japan. The government could provide financial support for establishing this organization (ongoing expenses would be covered by membership fees). A less expensive, but perhaps less effective, option would be for Japanese companies to become members in NAESCO.

5.8. License or certify ESCOs

The licensing or certification of ESCOs is needed for consumer protection, particularly if ESCOs assume traditional utility functions (e.g., metering, billing) as part of their package of bundled services. Even if they do not assume these functions, it may be prudent to license or certify ESCOs in order to improve the public image of ESCOs and to avoid (or ameliorate) any possible harm by unethical ESCOs. The accreditation of Japanese ESCOs could be done by JAESCO (e.g., NAESCO does this for its members in the U.S.) or a government agency.

5.9. Develop a third-party financing network

A third-party financing network could be developed in Japan, as envisioned by the European Commission for Europe (Fee 1993). The network would include ESCOs, national and regional energy efficiency agencies, JAESCO, lighting and equipment manufacturers and suppliers, financial institutions, community agencies, utilities, and other suppliers of energy services that have an interest in accelerating investments in energy efficiency. All of these actors have a role to play in disseminating information on how third-party financing can be used to overcome barriers to energy efficiency and thereby accelerate energy efficiency investments. The network would have as its aim the coordination of the efforts of the various and diverse actors to accomplish market penetration of energy-efficient technologies. They could coordinate activities, collaborate on information dissemination, and periodically exchange information about their experiences.

5.10. Establish an equipment leasing organization

Existing leasing companies might be persuaded to offer energy-efficient equipment.. Depending on the availability of energy-saving measures, equipment leasing organizations may need to be established to provide a supply of energy-efficient equipment for leasing.

6. Advice for U.S. ESCOs Planning Joint Ventures with Japanese Companies

U.S. ESCOs offered ten specific recommendations (in no particular order) for U.S. and Japanese companies interested in forming joint ventures as ESCOs.

First, a U.S. company must discover and understand the Japanese company's long-term objectives and financial commitments (i.e., their commitment -- in terms of time and money -- in doing a project right). The Japanese company should be able to describe its business plan, the revenues and profits anticipated for a particular project, and what assurances of return on investment (or equitable risk sharing) could be provided to the American ESCO. The U.S. ESCO should determine how well the Japanese company's objectives "mesh" with the U.S. ESCO's goals, objectives, and principles.

Second, in order to create a joint venture, each company has to decide on the type of joint venture that is desired. They have to make sure each partner has a clear definition of the expected roles, responsibilities, objectives, profit/loss sharing, and dispute resolution methods. The joint venture should be an equal partnership where there is a sharing of capital, risks (costs) and rewards (profits). Both sides should recognize that the venture is a long-term commitment, where initial and long-term costs are shared. Each company should also indicate what they are bringing to the joint venture (e.g., is the Japanese company bringing a sales network, an equipment vendor business, or a real estate business?). The Japanese company should realize that: (1) it is costly to be successful -- substantial investments are needed; (2) it will need lots of working capital for training, equipment, and hiring skilled people; and (3) it will most likely need to locate project financing.

Third, the American company would need to understand the quality of the Japanese partner in terms of its strength and position in the market: (1) reputation,

recognition, and presence; (2) size; (3) engineering, marketing, construction and management credentials, experience, and resources; (4) financial stability (credit worthiness); (5) knowledge of local markets; and (6) ability to handle the political side of a deal to protect the joint venture's interests. The higher the quality of the company, the greater the likelihood that there will be a joint venture. In addition, the U.S. ESCO should know the Japanese company's expectations and sincerity: why does the Japanese company want to get involved in energy efficiency?

Fourth, both companies should be prepared to make significant investments in market education. The economic and operational benefits of energy efficiency are not immediately evident. There is a need to educate and clarify the benefits to customers. As noted above, the Japanese company should have a clear understanding of what markets to start with and why, and the differences between the U.S. and Japanese markets.

Fifth, Japanese companies will need to provide some of the following information before a U.S. ESCO would commit to working in Japan:

1. The laws, regulations, and administrative practices about investing money in Japan and, in general, about doing business in Japan.
2. Market assessment information based on past marketing efforts, and current and future marketing plans and budgets.¹
3. The government's commitment in supporting energy efficiency, energy performance contracts, and the ESCO industry.
4. The structure and organization of the energy industry, including the views on energy efficiency by key stakeholders (utility regulators, government, utilities, and customer groups), the regulation of utilities, the status of deregulation, the recovery of utility expenditures on energy efficiency, financial (utility) incentives for energy efficiency, the funding of utility energy efficiency programs, current and future energy demand (capacity situation), current and future energy rates, structure

¹ One ESCO indicated that the Japanese company would have to do all of the marketing before his company would commit to working in Japan. Another ESCO wanted access to the Japanese company's data base of all existing customers and extensive data on the marketplace.

of electric utility bill, current and future avoided costs, and resource planning.

5. Availability of capital (lending) for projects.
6. The structure and organization of the energy market, including the availability and saturation of energy efficiency measures, market channels (equipment manufacturers and distributors), and level of technical expertise regarding specific technologies.
7. Current financing (rates and terms) of energy efficiency projects.

Sixth, the Japanese company must be very flexible in working with end users. The Japanese company needs to be able to adapt to a variety of end users and meet diverse customer needs. Seventh, the Japanese company must have royalty agreements and provisions for the protection of proprietary information and products. Eighth, the Japanese company's lawyers must review and agree to the joint venture.

Ninth, the U.S. ESCO should already be successful in implementing its own systems in other parts of the U.S. before entering the Japanese market. And tenth, the U.S. ESCO should be aware of the difficulties in working with foreign companies in other countries.

7. Latest ESCO Developments in Japan

In Japan the ESCO industry has just begun. As of September 1997, there were only two private sector ESCOs. The government is providing leadership to foster the growth of the industry.

7.1 Government actions

The Ministry of International Trade and Industry (MITI) set up the ESCO Study Committee in 1996. This committee studied the ESCO industry in the U.S. and Europe, with emphasis on the U.S. They surveyed the industry's current status and plans and policies for encouraging growth in the future. Based on the committee's work, in 1997

the Association for ESCO Industry Introduction (tentative name) was set up, headed by Professor Yoichi Kaya of Keio University. About 200 companies participate in the association, which is run by the Energy Conservation Center Japan (ECCJ).

The goals of the ESCO Industry Introduction Research Association are the following:

1. Study public sector barriers to the industry and develop countermeasures.
2. Study private sector barriers to the industry and develop countermeasures.
3. Develop energy conservation guidance.
4. Research adaptation of model contracts from the U.S. and Europe for use in Japan.
5. Develop model contracts for use in Japan.
6. Research American and European measurement and verification protocols (MVP).
7. Develop Japanese MVP.
8. Survey the U.S.'s system of financing.
9. Offer plans and advocate for adoption of a financing system for Japan's ESCO industry.
10. Perform theoretical case study research.
11. Perform actual case study research.
12. Carry out demonstration projects through competition.
13. Provide information to Association members, and give presentations when necessary.

The Comprehensive Sectional Meeting is intended to unify the various opinions arising from the above research. There are three working groups in the Sectional Meeting: (1) Systems Working Group, (2) Contract/MVP Working Group, and (3) Case Study Working Group. The Systems Working Group investigates removal of public and private sector barriers to the ESCO industry. The Contract/MVP Working Group develops model contracts and measurement and verification protocols. The Case Study Working Group estimates how much energy can be saved in demonstration projects and studies economic feasibility.

After presenting a written report, each working group plans to carry out demonstration projects in actual buildings. The goal of the demonstration projects is to

accumulate knowledge for the ESCO industry. However, the activities of the Association for ESCO Industry Introduction do not create all the preconditions for growth of an ESCO industry in Japan. For example, the issue of financing mechanisms remains to be solved.

7.2 Private sector actions

There are currently two private sector ESCOs in Japan, FESCO and GAS & POWER. FESCO does not actually hire its own staff. Engineering companies, manufacturers of measurement instruments, leasing companies, and others send their own staff to FESCO, which is a virtual corporation for participating in the planning of the ESCO industry. GAS & POWER is a subsidiary of Osaka Gas Co., LTD. Both companies have only just been established and have yet to begin major activities. In this sense, the formation of Japan's ESCO industry has not really happened yet. But as can be seen by the participation of 200 companies in the Association for ESCO Industry Introduction, there is keen interest in ESCOs among Japan's private sector.

On the other hand, the response of financial organizations has been very different from those in the U.S. It is very important for the ESCO industry to have the understanding of financial institutions, but in Japan there is no experience (or precedent) of performance contracting. In order for the ESCO industry to mature Japan's financial organizations must understand and cooperate.

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