

## **“What is KRI?”**

### **- R&D based on excellent tradition and innovation -**

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**SUMMARY:** As far as KRI's clients were concerned, KRI's appeal was not only in having researchers who had a high level of expert knowledge, but it was also in the efficiency with which high risk jobs were conducted, and the speed of response time, especially when corporations made comparisons with their own in-house labs. KRI, while being a facility for contract research, is also capable of becoming a profitable corporation, mostly thanks to the adoption of this system. KRI sincerely hopes to continue serving as a group made up of quality professionals who embrace a dream, and to contribute to society through its achievements. At the same time, the company strives to be sensitive to changing needs, and, of course, to conduct R&D and consulting activities which will ensure success for its clients.

## **1. What is KRI**

### **1.1 The First Comprehensive Think Tank Combining a Consulting Division and a Contract Research Division**

KRI, an abbreviation for Kansai Research Institute, Inc., was established in 1987 under the auspices of OG (Osaka Gas), which has a 100% investment in it. It was established as Japan's first comprehensive think tank which has both a consulting division and a contract research division. Differing from the Japanese style of management seen so far, this think tank with its own unique style of management achieved recognition for its existence and capabilities.

### **1.2 KRI's Current Areas of Business**

The revenue for 1998 reached approximately 4.3 billion yen and the company grew to over 300 people, but KRI has not yet broken through the boundary of small to medium size

companies. However, in the industrial arenas of R&D-related business, KRI is the leading company with no competitors yet making an appearance. The Consulting Division, the Contract Research Division, and the Technology Trend Analysis Division were established in 1987, and in April, 1999, the Analysis Center was set up. KRI is a subsidiary with 100% investment from OG, but since its establishment, to the best of its abilities, KRI has kept a check on the loaning of personnel from OG. The KRI we see today was shaped in the climate created out of being a venture company.

## **2. The Circumstances of KRI's Establishment**

### **2.1 Why Was KRI Established?**

At that time in Japan, there were no genuine think tanks that did consulting and had laboratories, and all the major corporations in Japan had to use think tanks outside of Japan, spending a lot of money on R&D for new fields. Therefore, Osaka Gas believed that a genuine think tank could be successfully established in Japan. A business tie-up with SRI was realized.

### **2.2 About KRI's Ideas on Management**

From the beginning, we have intended for KRI to become a genuine think tank which combines a consulting division with a contract research division, and after achieving the successful results, we have sought to gain the trust of our clients, which would further contribute to their development. We are also aiming to become an ideal think tank whereby researchers and consultants can exhibit their abilities to the fullest.

### **2.3 The Way of Thinking about Outsourcing in Japan at the Time of KRI's Establishment**

An awareness of outsourcing had begun to take hold in Japan, but for corporations within Japan, the field of R&D was still kept strictly in-house at the time of KRI's establishment, and it was a time when the environment for outsourcing R&D was still quite harsh.

## **2.4 The Establishment of the Japan Research Industries Association and the Trends of Research and Industry in Japan**

During the period when private research facilities were gradually playing a bigger role in Japan, efforts were being made to promote the smooth development of both research and activities supporting research. To this end, the Japan Research Industries Association was established in March of 1991 with the objective of contributing to the industrial development of Japan. Now, the official role of contract research facilities in Japan was at last clearly confirmed. KRI immediately began to participate. However, the fact that there were only 5 companies which were registered as independent R&D corporations, is demonstrating the difficulty of establishing companies based on R&D-related business.

## **2.5 Extending the Scope of Outsourcing and R&D Outsourcing**

Around the time of 1991, Japan was going through a recession which meant that companies had to take sole responsibility for their business, making proceeding with R&D more difficult. Yet, at the same time, companies preferred to outsource their R&D to speed up the time it took to get to see the results and to avoid risk besides taking care of their core technologies. Moreover, the fact that restructuring had created a shortage of highly skilled researchers increased the value of contract research facilities like KRI which had maintained a high technical level.

# **3. Concerning the Steps Required to Begin Contract Work at KRI**

## **3.1 A shift to outsourcing on the project- proposal model /strategic model**

KRI was not such a strong company at its inception, and most of its business was from the promotion of projects partially contracted by clients. However, from an expansion of KRI's scale and growth in strength as a company, KRI came to develop projects based on its own original ideas which were used in presentations. This fostered KRI's abilities to become a company capable of its own business undertakings and led to a shift to contracting projects based on the project proposal model and the strategic model. Presently, these types account for approximately 70% of all projects contracted.

### **3.2 Steps for Acquiring New Clients**

The abilities of KRI members to make proposals, develop, and conceptualize all with an eye on the times, in the climate at KRI whereby specialists of varying backgrounds and fields coexist, are born out of a stimulating environment. KRI's biggest strength is not in gathering together a group of experts all of the same quality. Rather, KRI's biggest strengths lie in having a group of experts of different qualities who can value each other's techniques from different perspectives as well as in fostering a climate which sublimates new ideas. There are still no other corporations in Japan with such strengths. Each of the ideas of KRI members is represented as a think piece put on one piece of paper (A-4 size) and is used as a sales tool. Projects based on think piece facilitate meetings between KRI and its clients. The industrial property rights of any project results are basically belong to the clients. However, the proportion of property rights granted to KRI, and to the client will depend on the monetary amount of the contract. This is in order to avoid problems after an agreement has been reached at the contracting stage.

### **4. Concerning the Corporate Activities of KRI to Date**

In the 1st period ('86-'94), KRI was in a state of lateral growth in its actual profits and number of personnel, as it experienced a difficult period of management and an unclear future. In the 2nd period ('95-'98), despite the recession, the environment and times improved for contract research companies, and efforts were made both to be more aggressive in marketing practices and to increase the scope of business. From there, KRI was able to achieve a yearly rapid growth of more than 30% in the last 5 years. The number of contracted projects almost doubled from 320 in 1995 to 620 in 1998. Several factors which were important to the development of research are mentioned next. One was the feeling on the part of researchers and consultants that their research themes challenged them. Another was that they had a sense or feeling of the approach they took toward their research and the results they got from it. And one more was the importance of public support for the research themes that had been chosen. KRI didn't concern itself solely with big revolutions in technology based on "Something New". Besides that, KRI's important accomplishments

worth mentioning include such things as tackling with equal energy and zeal areas in technology that deal with improving the usability of everyday goods and also responding diligently to the needs of the client. Moreover, whatever project formation was considered most suitable in order to get results quickly, for the sake of that, KRI would coordinate matters so innovations of the organization were facilitated, and the abilities of researchers and consultants could be fully brought out. Domestically, without taking OG into account, the percentage of clients in the Kansai area is lower than that of the Kanto area. Because of this, marketing efforts organized around the Kanto area are directed by the Tokyo Market Development Division at potential clients. On the one hand, foreign clients amount to only 10% of the total, but with the economic recovery of South Korea, and aggressive marketing in North America and Europe, it is expected that this percentage will increase.

## **5. KRI's Research Administration**

### **5.1 Personnel Policies and Methods of Evaluation**

Due to the differences in scope, one would hesitate to make comparisons, but KRI was originally established with the intention of being a Japanese version of SRI, and as such it incorporated SRI's management administration. Therefore, KRI's system of management administration, which basically emphasized the importance of SRI's efficiency in getting results, was most favored by KRI's clients. As far as KRI's clients were concerned, KRI's appeal was not only in having researchers who had a high level of expert knowledge, but it was also in the efficiency with which high risk jobs were conducted, and the speed of response time, especially when corporations made comparisons with their own in-house labs. KRI, while being a facility for contract research, is also capable of becoming a profitable corporation, mostly thanks to the adoption of this system. From the beginning, personnel policies and evaluation methods for all employees followed those of SRI, with yearly contracts, no seniority system, no discrimination based on gender or nationality, and all members evaluated on their own merits alone. The majority of the research staff at KRI supports this system.

## **6. The Corporate Climate at KRI**

### **6.1 Creating A Body of Researchers Who Want to Continue Doing the Work They Like**

As has been previously stated, the main source of research contracts secured by KRI is not from projects commissioned by corporations. Rather, the main source comes from proposal-based research coming out of contracts secured after aggressive presentations by KRI targeted at specific corporations. As research following this pattern advances, the number of people changing jobs will increase. Examples of such cases include, members of large corporations who are no longer able to continue research due to restructuring despite single-mindedly conducting their own research; people who prefer to do laboratory research as scientists over obtaining a managerial position; people at the level of assistant or assistant professor within the university system who wish to conduct their research more freely. It is taken for granted that what is sought is not the desire to do research one likes as one likes, but the ability to produce results under the given time constraints.

### **6.2 The Climate Surrounding Career Path Choices**

In this way, KRI fosters a climate which encourages the development of technologies and the intellectual stimulation in meetings among researchers of different fields; all of which cannot be gained at a single corporation or research laboratory. KRI offers a climate whereby employees with KRI as their base can pursue their own career aspirations, while contributing to KRI by way of their own achievements. This is not to say that KRI urges employees to leave the company quickly. Rather, what it meant is that while KRI as a workplace retains its appeal, it is hoped that employees will continue to strive hard at their research. Furthermore, KRI by no means wants employees to feel tied to the company. As part of choosing one's career path, KRI wants each individual to make his or her own decisions independently.

## **7. The role of the International Advisory Council**

### **7.1 The function of the external management board**

Since the very beginning of its establishment, when KRI had nearly 30 employees, the International Advisory Council was organized. The board consisted of many internationally well-known people. Though this first seemed too much for such a young company, being backed up by the board is now considered to have been an appropriate decision. During the period when KRI was being established, the names of the members contributed greatly to KRI, lending support as KRI started marketing itself abroad before it had time to demonstrate its own reputation and credibility.

## **8. An introduction to the technologies and topics owned by KRI**

### **8.1 An overall image of KRI's technologies**

KRI has been producing research results of quality based on its accumulated wisdom and ideas grown in a unique climate. In the next decade, the main current in technology will be related to the environment, energy, and electronics. Each research center at KRI has been strategically acquiring technological know-how and capabilities relevant to their particular field. Today, I would like to briefly introduce KRI, concentrating on its three research centers, the Advanced Materials Research Center, the Surface Science Research Center and the SQUID Laboratory. Some examples will follow with a short explanation.

### **8.2 Advanced Materials Research Center**

This center consists of six laboratories. Among these six, the Inorganic Fine Lab. has been active in conducting studies based on the sol-gel method and organic inorganic molecular hybrid technologies. Another major lab, the Polymer Lab. has been trying to find functions and characteristics of novel polymer materials based upon the unique polymer synthetic technologies.

#### **(1) Introduction of the plans for Sol-Gel technology at KRI:**

The Sol-Gel method is one of KRI's important technologies, and is similar to organic polymer synthetic technology though it is an inorganic synthetic technology. Organic

polymer synthetic technology is representative of projects undertaken at KRI, and KRI is the best company for this technology.

The following methods are now reviewing at KRI.

- a. The Micro-Capsule Sol-Gel Method of which various functional chemical compounds are encapsulated with inorganic chemical compounds.
- b. The Emulsion Sol-Gel Method which is a result of a combination of a surfactant and sol-gel method.
- c. The Combinatorial Sol-Gel Method of which combinatorial chemicals are useful in novel materials research.

(2) Novel Elemental Technology for Plastics Materials Recycling:

At KRI, accumulated polymer technology is applied to waste plastics recycling. This novel technology which solves contamination problems leading to the deterioration as materials, has been developed and published. Concretely speaking, KRI succeeded in developing a new polymer called a premending reagent which prevents performance decrease and encapsulates contamination included in waste plastics without removing them.

### **8.3 Surface Science Research Center**

Material surfaces and interfaces play an important role in the development of intelligent materials with applications in self-regulation, self-response, self-decomposition, self-diagnosis and self-identification among others. The Surface Science Research Center develops intelligent materials and related applications technology by focusing on these physical and chemical phenomena.

(3) Determination of catalyst structure by Atomic Force Microscope technique:

This latest technological development enables us to see ultra-fine particles directly at nano-order level, however, to do so, a special instrument and an excellent technique are both indispensable.

Generally speaking, it has been fairly difficult to take a clear picture at a nano-order level even when using Atomic Force Microscope Technology.

## 8.4 SQUID Lab.

SQUID Laboratory of which KRI is proud, both experienced and is responsible for the first technology advances in unique and superconductive sensing technology by using highly sensitive magnetic sensors. The lab is directing quite promising technology which as successfully been used in the development of new equipment.

### (4) Development of superconductivity/magnet sensing technology

The most sensitive magnetic sensors the world has ever seen, SQUIDs detect ultralow magnetic fields - as low as one billionth of the Earth's magnetic field (0.4 gauss) -not detectable with conventional devices and so promise new possibilities and a broad field of applications [medicine (magnetoencephalography and agnetocardiography), nondestructive material inspection and geophysical exploration].

## 9. Strategic development of the materials industry ('60s to present; looking toward the 21st century)

Many companies in the materials industry pursued improvements in productivity in the '60s. The period from 1970 to the mid '80s saw a shift to new business management based on strategies aimed at aggressive diversification. In late '80s, strategies for the kind of diversification and business expansion which would distinguish a materials company from others were devised. At present, during a long period of inactivity, even more drastic restructuring strategies are to be carried out.

One question we are faced with as we enter the 21st century: Will materials producers be able to maintain business growth and continue to survive only depending on their principal business based upon competing with other producers in the same market while they slow down the development of new business? In the new era, it is said that materials producers must be creative more than productive. Developing new business is the premise for growth in the future. Success is dependent upon innovation in research development and technology management. Advantages lie in quality not quantity in terms of the way we respond to advanced society of the future. Rapid response is indispensable especially in changing and developing fields. These are reasons that a company outsources R&D. It is

needless to say which is more important, to be the champion of quantity, or to be the finest in quality.

## **10. The Role of New Business and Research Development**

The market for most company's core businesses is now ripe. Companies tend to compete for a limited slice of the market. New business development must focus on specializing and the high functionality of commodities. Niche markets are also required in order to acquire a complete line of products. Growth markets depend on and are led by consumers needs and changes in lifestyles and industry trends such as in the areas of information/communication (multimedia), health (health care), and the environment. Leaders of the markets are required to have concepts that are needs-oriented rather than seeds-oriented.

## **11. Company Objectives of KRI**

KRI is a contract research company which conducts R&D for leading and advanced science/technologies. The range of business reaches from basic research and applied research, to the engineering of proto-type manufacturing. The results of information and studies produced by KRI represent active innovation processes. In R&D, a coordinating role is very important to draw out the capabilities of researchers and consultants at each of the stages. KRI has proved its excellent technology management capabilities through its achievements in the past. Both innovation and technology management are the key for success in R&D for new business management in the 21st century. KRI, which incorporates these two functions, will, through its R&D activities, be expected to further produce major contributions.

## **12. In Conclusion**

While the influence of Japan's long recession has been quite large, during this time, the number of companies that can be counted as profitable is by no means small. Characteristics of these companies are originality in technology and products in addition to management style. Many of the innovative technologies were born in and grew under a rather unfavorable economy during which people felt uncomfortable or had a sense of something missing in their lives. Superb technological advances in computer software and biotechnology are overwhelming examples of some of these innovative technologies.

Now is the time for you to be a driving force in developing innovative technologies through positive R&D investment for your future. KRI sincerely hopes to continue serving as a group made up of quality professionals who embrace a dream, and to contribute to society through its achievements. At the same time, the company strives to be sensitive to changing needs, and, of course, to conduct R&D and consulting activities which will ensure success for its clients.

