〈論　説〉

NEW PRODUCT DEVELOPMENT AND MARKETING STRATEGIES in SMEs:

Japanese Experience in the 1990s

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ABSTRACT [*1]

Manufacturing SMEs in Japan now face a difficult time. One of the important issues for them is to launch new products, but there are new problems. This paper aims to investigate a number of actual cases in Japan which show manufacturing SMEs' efforts of developing products based on more advanced technology or new business concepts and selling their products, to establish new footholds and the paths for growth in new markets. After carrying out around 30 detailed case studies between 1994 and 97, some findings are reported and their experiences discussed.

The result shows that SMEs' efforts are not always commercially viable. Their competitive edge is not dependent on distinguished technological innovations alone. Key issues for successful new product developments include: carefully organising the development process, thoroughly combining market needs and technological seeds; employing external resources, and developing bridging systems or sub-systems, in order to reduce the *distance* to the market and customers; as well as choosing saleable products and markets.

There appears to be a need to develop closer *relationships* with collaborating partners, or prime customers, in order to promote their competitive strengths

and allow further developments. Closer relationships, however, carry risks, such as other parties' opportunistic behaviour or potential imitation by competitors. This raises the matter of how to protect their intellectual property and their *'masterly'* competence and skills. In order to continue development or even survival, SMEs have to understand their market positions and conditions, organising systematic development processes, and enhancing more marketing efforts, which are often spontaneously based on their own experiences.

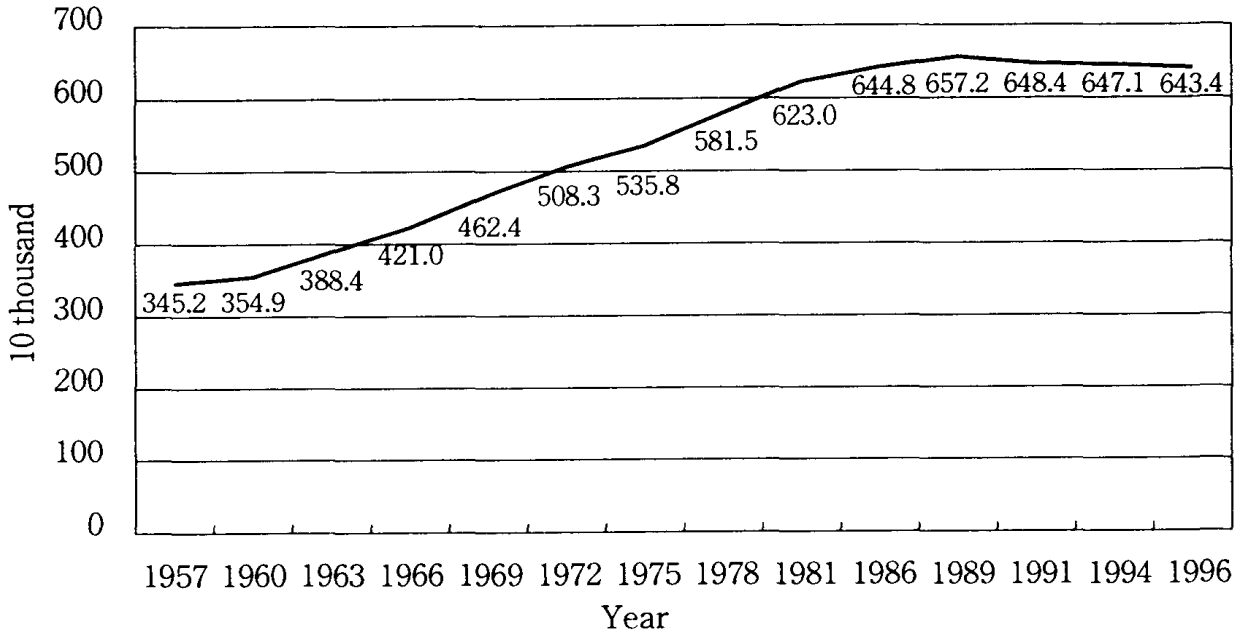
Very unfortunately, an once successful small manufacturing firm, which constitutes one of the cases examined in this paper, was reported to go bankrupt in November 1998. Nevertheless, its failure shows not only another typical story why a meteoric and growing SME faced a common barrier for its continuous growth and could not evade a tragic finale. It also suggests that the basic arguments in this paper are strongly supported by the reality.

1. PREFACE - THE DECLINING SME SECTOR IN THE 1990s

For 4 decades after World War II, the SME sector in Japan showed a considerable growth. For instance, the number of SMEs almost doubled between the 1950s and 1970s (SME Agency, 1997a). SMEs were playing important competitive roles in a high economic growth era: as competent suppliers for big firms; as small manufacturers dedicated to the exporting industries in many industrial districts; as specialised construction firms indispensable for new developments in many towns; and as small wholesalers, retailers and service businesses supporting a complicated distribution network.

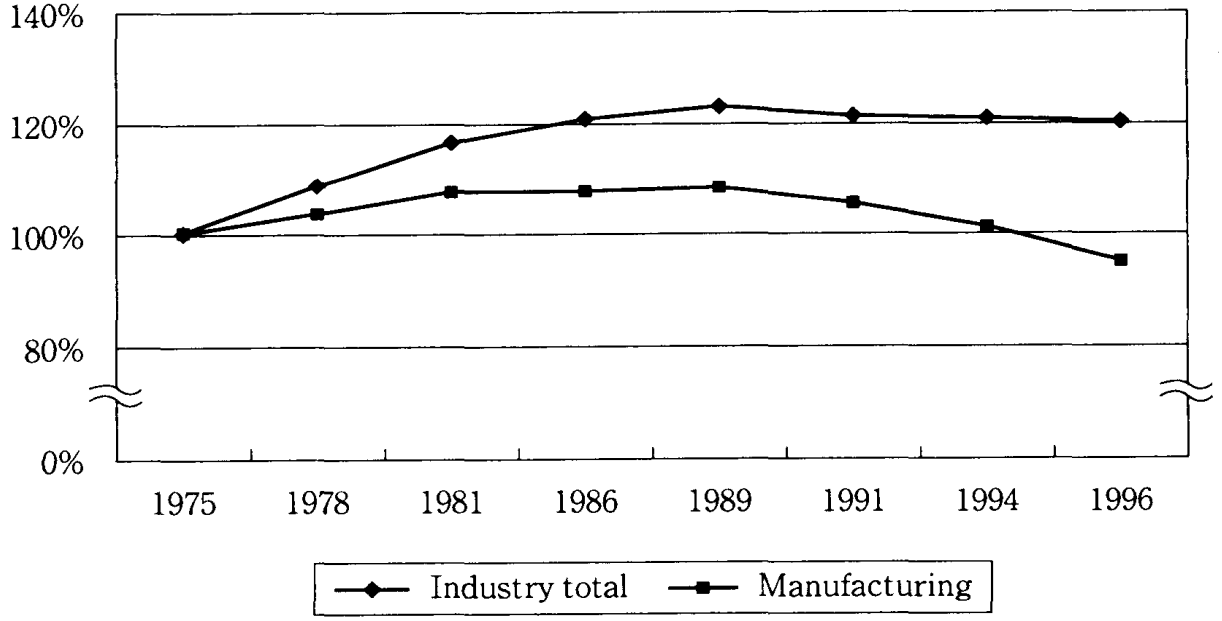
However, this started changing in the late 1980s. In the last decade, the birth rate among SMEs has been decreasing and the SME sector has shown an unprecedented decline(see **Figures 1 & 2**), in contrast to the British or

Figure 1 The trend of the number of SMEs



SOURCE: *Census of Establishments in Japan*

Figure 2 The trends of the number of SMEs (1975=100)



Notes; Establishments based.
Excluding the primary industry.

Source: *Census of Establishments in Japan*

European experience. Obviously many Japanese SMEs now face a difficult situation. A changing industrial structure, the globalisation of economies, the stagnating of domestic demand, turmoil in the financial market, and the restructuring of management in big businesses combined to militate against a thriving SME sector. They are under a sort of triple pressures, i.e. depressing economy, the aftermath of 'bubble economy' and business restructuring (Mitsui, 1997).

It is argued that SME's survival will depend on their success in the new development of products, services, management strategies, organisations and even their philosophy, because their conventional *raison d'etre* has been remarkably weakened (Kurose, 1996). New developments, however, are not easy for many entrepreneurs who have little knowledge about business management other than their own experience.

This paper aims to investigate a number of actual cases in Japan which illustrate the efforts of businesses in developing new products based on more advanced technology or new business concepts and selling their products to new markets. These cases are characterised by the economic and social contexts in Japan, but they also offer some universal implications, through the application of theories of economic organisation and institutional (inter-firm) relations, as well as of market competition and industrial organisation. Discussions are about the different results of performance between management's choices and decisions concerning new product development and marketing efforts in SMEs. Attention is focused on their market opportunities, development process, combination of market needs and their technological advantage or business competence and protecting their products in a competitive market.

2. RESEARCH METHODOLOGY

This paper mainly draws on evidence from two qualitative research projects[*2], sponsored by the Medium and Small Business Research Institute, Tokyo (SME Research Centre), which were carried out in 1994 and 1997. Each consisted of 12 and 16 case studies based on interviews with owner-managers. The enterprises employed between 2 and 500, but the majority were around 50 to 100. Cases were chosen among manufacturing SMEs known for their recent invention, new products developments or business expansion, including those in the Institute's regular contact after its 'Excellent Small Businesses' annual award giving. Their reports are published in Japanese (Medium and Small Business Research Institute, 1995; 1998).

3. A DIFFICULT DILEMMA FOR SMEs

Some debates about the constraints on SME's innovation

In discussing small firms in high technology, Oakey (1984) has argued that 'the growth and subsequent decline of sales from an initial or subsequent new product imply that the profits will not be uniform. This cyclical revenue will thus detract from overall security of the firm'(pp.92-93). Above all, riskiness and financial issues are likely to overshadow the SME's efforts in research and new product development.

If SMEs are to be innovative, leaving financial issues apart, Hyvarinen (1990) suggests the importance of parities, i.e. enterprise, technology and markets and other environment together, as well as influencing factors of time and environment in general. Environmental conditions are, after all, a stern reality for them. Adams and Wallbank (1986) also classify the determining factors for innovation in small firms and cite technical feasibility, business capability, commercial viability and personal competence.

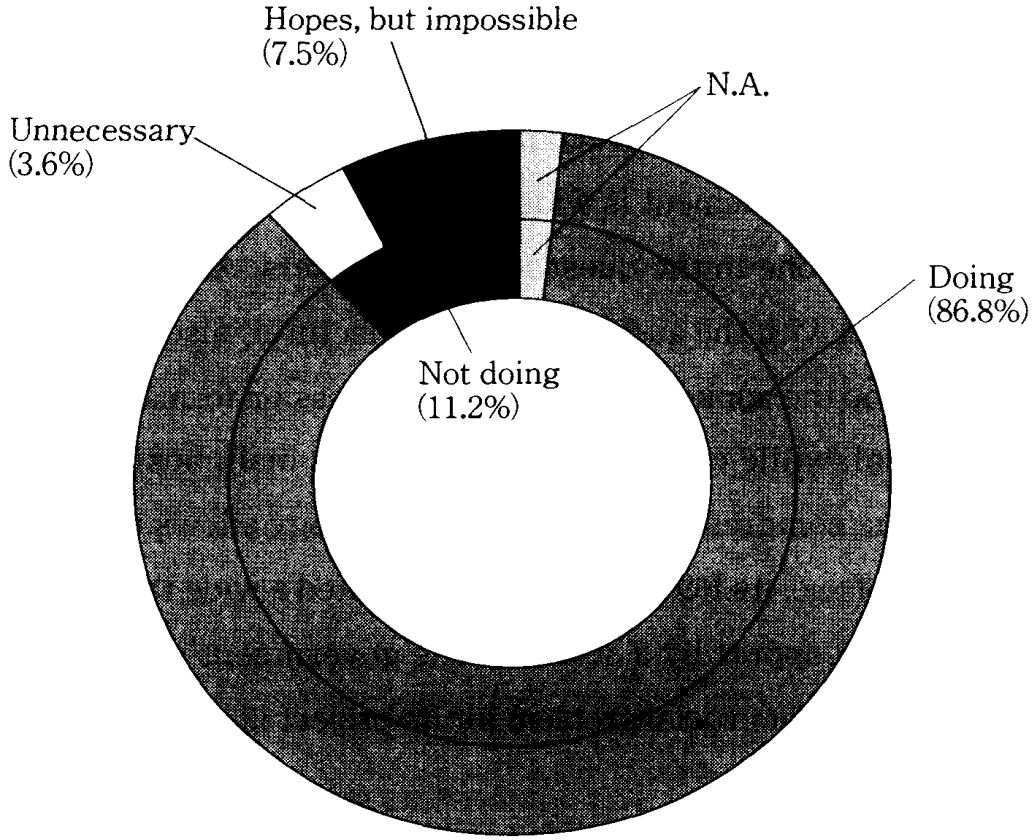
Rothwell (1986) argues that both small firms and large firms can play important roles in industrial innovation, and often supplement each other. However, he also admits that the former often lack time, resources, specialists and risk capital, and cannot cope with patent system or government regulations. His main point is that small firms enjoyed the advantages of entrepreneurial dynamism and open-mindedness rather than their disadvantages. Pollard and Hayne (1998) shows that developments in IT change SMEs' competitive position and allows wider scope of markets and stronger organisation if they keep flexibility and control. However, despite the liberating effects of new technologies, SMEs still tend to have a variety of constraints on their innovation activities. Smaller firm's advantages may be basically working well, assisted by IT, but the urgent matters for SMEs are how to overcome their disadvantages and to secure stronger market footholds.

Entrepreneurial dynamism is always the basic source of vitality for SMEs' survival, but it is not so helpful to advocate it alone when thinking of SMEs' effort of new product development. From the views of marketing concept and choice, their size restraint may lead SMEs to adopt smarter and less expensive measures.

Many trials and difficulties; a far way from original innovation to earning business

Japanese SMEs are now desperately seeking to find new business opportunities. For instance, as **Figure 3** shows, one recent large scale study found that 86.8% manufacturing SMEs (except those of employment size are less than 4) were carrying out new development activities, in the Tokyo Metropolitan area (Daiichi Kangin Research Institute, 1997). Typical examples can be found among subcontracting SMEs, which now face more overseas competitors and shrinking business orders, mainly due to their prime customers or parental firms expanding overseas production and global

Figure 3 Doing new development activities or not?



Number=4,250 (TOKYO Metropolitan Region)

SOURCE: Daiichi Kangin Research Institute (1997)

procurement policies. In addition, there has also been a switch to large scale capital investment and expanded capacity in many big factories in the 1980s, leading to the expansion of in-house (in-company) production in the 1990s (SMEA, 1997a).

Even among the 'elite' suppliers, there has been dramatic restructuring. One example is Unicraft Nagura, which mainly supplies forged parts of gearshift levers and axle joints exclusively to Toyota group and still claims a good reputation, and is trying to find a new and completely different market. Its new product is an automatic precision measurement tool based on double refraction theory and super heterodyne method, which came from its present

managing director's own academic background. Despite Unicraft Nagura's effort and Toyota's encouragement, after 6 years of investment its high-tech based business so far has not contributed to its profitability. The most difficult problem is that it has not succeeded in finding good customers, even though its technological advancement is widely recognised.

Unicraft is not alone in the quest for new markets. Aiwa Manufacturing (not to be confused with the audio system manufacturer) also launched a new venture to develop the application of a new compression formation technology to wood material, while continuing to operate its main business of plastic moulding. As the compression formation technology allows untapped wood resources to be of use, its R&D project has attracted a wide range of interests and has received support by a series of the government's policy schemes. Nevertheless, the most crucial problem for its project is that no market needs have been found.

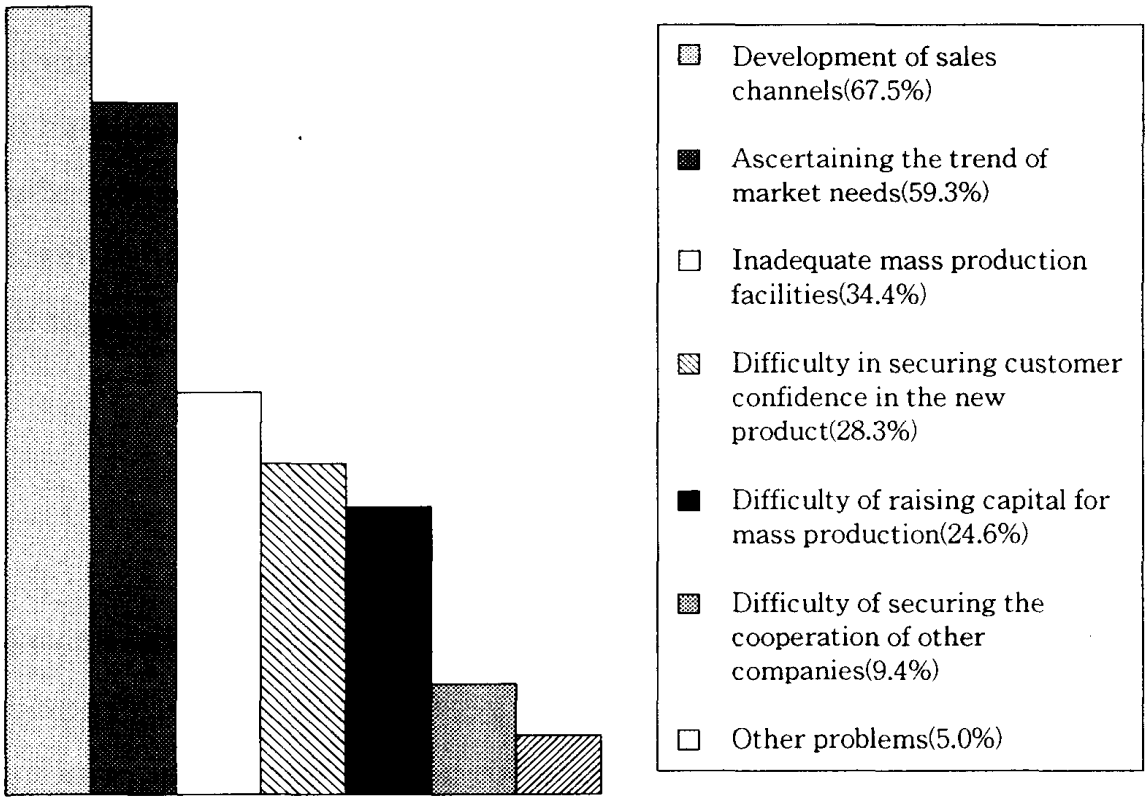
These cases illustrate that SMEs do sometimes contribute to epoch-making or innovating developments in technology, or its application. However, they also show groundbreaking technological applications do not quickly lead to market success. They also suggest how difficult it is for SMEs to find unknown wants, promoting needs, combining needs with technological seeds and creating a new market single-handedly. Most SMEs still have a series of disadvantages if they try to develop new products or services. These problems apply to both the establishment of a new niche segment of an existing market and more so for the creation of a new market (Rothwell, 1994). As many suggest, 'large firms have an important advantage in commercial application, because they can ensure quicker market penetration of new products and processes' (George and Joll, 1981; p.68).

SME's disadvantages and constraints

SMEA's survey (SMEA, 1996) indicates that small manufacturers which do not carry out R&D give the prime reason as the shortage of human resource and time. In addition, when launching newly developed products, as **Figure 4** suggests, the most serious problem SMEs face is the development of sales channels, and the second ascertaining market needs. In short, they show that many SMEs have basic difficulties in following the first steps of an established marketing strategy.

Most SMEs which are carrying out R&D single out that their disadvantage is their lack in financial and human resources (Daiichi Kangin Research Institute, 1996). As their existence generally depends on a technological

Figure 4 Problems with launching newly developed products onto the market



SOURCE: SMEA(1996)

specialisation and their size is small, resources are fully invested in their daily production and operations. Yet new product development demands considerable amounts of resources, which are to be put in very different activities for a long time detracting from their daily operations.

As a result, although most SMEs are eager to develop new products and to diversify their businesses, they are rather reluctant to commit themselves to well established and organised R&D planning and its long term enforcement, including market development and sales promotion. Though such a dilemma is very common among SMEs and accentuates their difficulties, it is argued here that their problem is not simply the shortage of financial or other resources, but the misallocation of resources. Public policies may ease their difficulties to some extent, by giving subsidies, information and advice and supplementing the lack of resources, but the dilemma cannot be completely solved. Public policies are often targeted simply on the sole technological R&D project alone, and is rarely combined with support to other business operations, including broader marketing resources and skills. The cases discussed here show how some SMEs have been successful in developing new products, finding a niche market and securing their position in it, or at least in minimising their difficulties and avoiding being caught in a trap of R&D obsession.

4. CASE STUDIES

Cases A; Masuko, innovative and collaborative forerunner

Masuko Industry succeeded in developing an epoch-making, ultra-fine micro grinding machine after more than 10 years effort. As its product is distinguished and consists of a number of new technological principles, advanced materials and mechanisms, it has registered more than 130 patents, as well as overseas registrations, which can prevent any sort of perfect

imitation without violating its rights. In addition, rather than having a single prime customer, its product has a very wide application, and it can develop a new use with the collaboration of individual customers. As a result, every year it also applies 3 or 4 new inventions for patents to cover new developments, sometimes jointly with its customer.

Case B; Magex, keeping know-how confidential

By contrast, Magex, which is supplying magnetised plastic materials to hundreds of customers and claiming almost 20% of the market, gives less emphasis on registered intellectual property rights (IPRs). Its product is also epochal and widely applicable, but its advantage is not dependent on technological principles nor unique materials, but on the delicate composition of materials and manufacturing and moulding methods. Obviously registered patents about the details of manufacturing process would publicise these know-hows and neutralise it against easy imitators. By concealing its manufacturing operation exclusively within the house and keeping the know-how as trade secrets, Magex has succeeded in protecting its competitive advantage against most rivals.

Case C; Nihon Chiko, enjoying patents protection and strong foothold

Nihon Chiko has been manufacturing sinking earth anchors and enjoying comfortable business growth for more than 30 years. The unique shape of its product allows users, power suppliers, telecommunication operators or railway companies, to do necessary electric power construction work easier and quicker than conventional ones. Nihon Chiko places an emphasis on the strategic deployment of its IPRs and has registered more than 100 patents, including overseas ones. It won a legal suit against a big imitator at its early days, and since then has succeeded in preventing imitators' entry in the

market. Its registered patents are not only about the basic concept and designs, but also relate to many peripheral matters. In addition, it is constantly applying for new registrations before older ones have expired, based on new developments, modifications and uses.

Case D; Kyoritsu - keeping collaboration with a prime customer

Kyoritsu Electric is an opto-electronics equipment manufacturer which boasts of 30 years of history and a good reputation among its customers, such as big photo and video camera manufacturers. It has been developing several new products, and one of them is a new information system which can control roll books in offices or schools. Though Kyoritsu can offer an all-in-one order-made system complying customers' request, its business is not so successful as beating other larger competitors. As it developed the system without any collaboration and committed its sales in the charge of agent firms, such as trading companies or office supplies dealers, it now finds difficult to attract many good clients and to negotiate details, which is rather decisive to offer well order-made products. Agents are less earnest to sell its system.

Kyoritsu's other development is a new luminous source, which can be used in a video projector machine. This is based on the exploitation of its original invention 10 years ago for the purpose of producing high quality optical testing instruments. This time it was consigned by its big customer, Sony, to support its new development project of high quality video projectors with brighter but inexpensive luminous source. Sony gave various supports in turn, including technological information, discounted components supply, testing instruments and trial operations. Officially Sony gave no financial support other than favourable pricing on purchasing, and demands no binding on Kyoritsu's business and sales, but patents have been jointly registered. Sony and Kyoritsu once jointly developed an in-line optical colour tuning instrument and, since

then, good relationship has been maintained.

Case E; Kankyo - a challenging new innovator

Kankyo shows a very unique case of a meteoric rise in 10 years. Its owner-manager, Dr. Fujimura, started the business in 1984, after having resigned his post as a senior researcher in a big manufacturing firm. His original idea was to launch a socially-useful product, which could survive well into the 21st Century. After careful and systematic research work, he focused on domestic air cleaning equipment which could protect families from allergic diseases and hay fever, by applying anion-catalysed electrostatic adsorption theory. Although he had an academic background, his method was strongly based on needs-oriented concept.

After the successful invention and subsequent product development, Kankyo mostly showed remarkable growth. In 1992, it claimed more than 20% of the domestic market. Its success was depending on its carefully established plan and strategy, and strong investment in R&D activities. Dr. Fujimura's detailed business plan was enough to convince government offices and financial institutions of the social usefulness and feasibility of his product concept, and he had no difficulties in raising fund to invest in R&D and production operations for 10 years, thanks to many subsidies, grants and share holdings. In addition, Kankyo adopted 'fab-less' manufacturing, whereby large manufacturers did the production, and concentrated its resources on R&D, products design, planning and marketing. It also adopted a step by step promoting measure, by organising non-profit associations to offer information for suffering families.

As the market has been growing quickly, many businesses entered and threatened Kankyo. Dr. Fujimura made more than 70 applications for patents, out of which almost 20 were registered. However, its product has been

repeatedly threatened by imitators. In some cases, trade partners or development collaborators had changed their minds and took an opportunistic behaviour, by launching similar products or start selling the product of joint development without further agreements.

For more than 5 years Kankyo spent most of its resources on keeping abreast of competition, maintaining its market leader's position and establishing its own sales network. Its effort is now rewarded; imitators can only help the further expansion of the market without exceeding Kankyo's growing sales records and its reputation.

Nevertheless, we must be careful about the Kankyo's development in its second decade. The implications of its business failure will be discussed later in this paper.

Case F; Twinbird, difficult survival race based on new products 'shotgun' strategy

Twinbird Manufacturing, once a small local electroplating factory, started new product development as early as the beginning of 1970s. After successful expansion based on the sales of metal trays and a variety of gift products, it entered the electric home appliances market mainly as part of the extension of its gift goods. In that market, it has launched more than 600 items, including a best selling desktop inverter fluorescent light, an electric porridge cooker and outdoor goods, including lanterns with TV screens. Its development division has been keeping close contacts with sales and other divisions and resulting in quicker product launches, whilst the manufacturing division has been doing every effort to reduce costs. Nevertheless, Twinbird's new products 'shotgun' strategy (see Section 7 in detail) faces a turning point, having failed in claiming high profile and good profitability.

Case G; Seikatsu Kogaku, new concepts and unique sales methods

Seikatsu Kogaku, a unique one-man enterprise, has been launching a number of original goods for domestic use. Its business priority was always to find new ideas of consumer products, by combining potential needs and new innovations, and to establish new distribution channels and sales promotion measures in parallel with creating new markets, which could match with new original products and their potential needs. Product image was mostly decisive to arouse wider interests, and it has no manufacturing facilities.

Its latest success is a 'Clean doll' ball which improves the washing rate and saves detergent powder in washing machines. The sales operations of the ball are mainly dependent on its agent's network and contract sales representatives, who were recruited by showing high responsibility and work on a commission basis. Thanks to their committed efforts and its product's earth-friendly image, the ball's sales is extremely good. Seikatsu Kogaku illustrates a neat and skilled way of exploiting new markets and applying new products.

Case H; SOTEC, a pioneer and new struggle for survival

SOTEC was founded in 1977 and its founder, Mr. Obe soon changed its business from the 'radio ham' products to the computer market, and launched mobile PCs. Thanks to a trading firm's kind offer, it was able to procure the most up-to-date parts, concentrate its operation on product development, and to depend on an original equipment manufacturing (OEM) product market, despite its very small fund and no marketing facilities. The first product, an IBM PC/AT compatible mobile PC with LCD, pioneered the market and succeeded in claiming a number of OEM sales contracts with American firms.

Since then, SOTEC has become dedicated to mobile PC development, leaving its manufacturing operations to domestic outsourcing. Mr. Obe has been giving

emphasis on being the top runner in a niche market, where a small manufacturer could not be beaten by the most big competitors because of its quicker delivery of new products to the market, using the latest technology and skilled designing.

After successful business development for 7 years, SOTEC faced the drastic changes in the PC market, including 'downsizing' trend of computers, price revolution and the coming of WINDOWS age. As many of its overseas OEM partners were forced closure or pullout, Mr. Obe decided to start business in the domestic market under its own brand name.

Developing a new domestic market, however, was an ordeal. Although SOTEC succeeded in having a foothold in the market, competition was extremely stiff. Many big manufacturers were competing, and there was a shortening of the product life cycle and a price war. Its reputation as a technological pioneer and globally successful OEM supplier did little to help in this market. As a result, it was dependent mainly on 'volume sales' retailing chains and faced severe pressure for making discounts after the delivery. Its products were seen suited for 'leading articles' to attract customers. SOTEC was reduced to being a loss making business with a small share of a very competitive market.

Mr. Obe made a decision in 1997, that SOTEC had to change its course by giving up volume retail sales, and more emphasis on a 'direct marketing' operation, developing a business use market and keeping OEM supply business. Its 'direct marketing' can save considerable cost of sales and inventory stock, and make it more possible to control the selling price. The fact that many big manufacturers followed its way clearly shows its decision was right.

Its 'direct marketing' also includes internet sales operation. Thanks to its high profile among 'power users', sales orders via Web pages have been much more than expected. Obviously it will be easy for it to establish a direct and

tight relationship with loyal customers and receive their needs and requests quickly and correctly.

Case I; JAM, closer relationship with many end users

JAM was once an ordinary subcontracting firm for many years. It started new developments in response to a crisis in 1973, launching an automatic terminal press bonding machine, which was widely demanded by many electronics appliance manufacturers. Although this was not technologically pioneering and its sales was mainly depending on a big trader, it was obliged to start its own sales operation because of its trade partner's sudden failure in 1981. Since then, JAM has expanded sales division and established direct connections with a number of end users, including those formally buying from its sales agent firms. The close links with and advice from these customers have helped JAM improve its sales operation further and bring on-stream new designs and products. It has launched many new models of bonding machines and a variety of industrial equipment.

Case J; Alfa Electronics, claiming 'word-to mouth' reputation

Alfa Electronics was engaged in developing advanced and detailed technology of a precision metal foil resistor. Although it was almost the sole pioneer, its difficulty was to find suitable industrial needs and good customers. Its way of breaking into the market was by making dedicated sales efforts to potential and prominent customers, such as a big electronics scale maker, or the American NASA, and gradually extending business by exploiting its 'word-to mouth' reputation among them. Thanks to its rising reputation and successive new product developments based on closer relations to customers, Alfa's sales has been growing and its product was recently qualified as one of the industrial standards.

Case K; Shin Denshi, a distinguished technological application inventor

Shin Denshi, originally a measure instrument manufacturer, has been launching a number of unique inventions. One of its biggest sellers was an automatic hit yield information management system for 'Pachinko' pinball parlours. However, it allowed many imitators because it registered no patents. Another pioneering product was an automatic in-circuit PCB tester, which applied a unique mechanism and could help saving considerable time. Later a more revolutionary invention was added to it, namely linear motor-driven tester heads travel mechanism. That invention attracted the world's biggest semiconductor testing system maker to request that Shin Denshi became an OEM supplier. In addition, once it was mostly leaving sales operation to trade firms and OEM supplies, but recently started its own active sales efforts, including direct fax. mail promotion, by exploiting its reputation in a niche market.

5. OVERALL CHARACTERISTICS IN SMEs' NEW PRODUCT DEVELOPMENT AND ITS PROCESS

Characteristics in SMEs' new product development

From the cases of rather successful SMEs, several factors can be singled out (see **Table 1**).

1. SMEs can be more successful when they choose producer goods market than consumer goods one (In 1994 research, only 2 cases were offering new products to the consumer market). This is connected with their development process and marketing tendency, and relates to the necessity of closer relationship with customers or trade partners (see Section 7 for further details).

2. SMEs are more likely to carry out successful product development,

Table 1 Characteristics in SMEs'new product development

1. Producer goods market
2. Needs-oriented conceptualisation
3. An entrepreneur's competence, not a prominent inventor's
4. The decisive stage of developing experimental products, and sending them for testing and monitoring
5. Obtaining virtual approval on their new products in the markets
6. Less importance of organising internal production systems
7. Unexpected problems and underlying hidden costs
8. Follow-ups and aftercare
9. The usage of overall experiences and skills, learnt from and related to product development

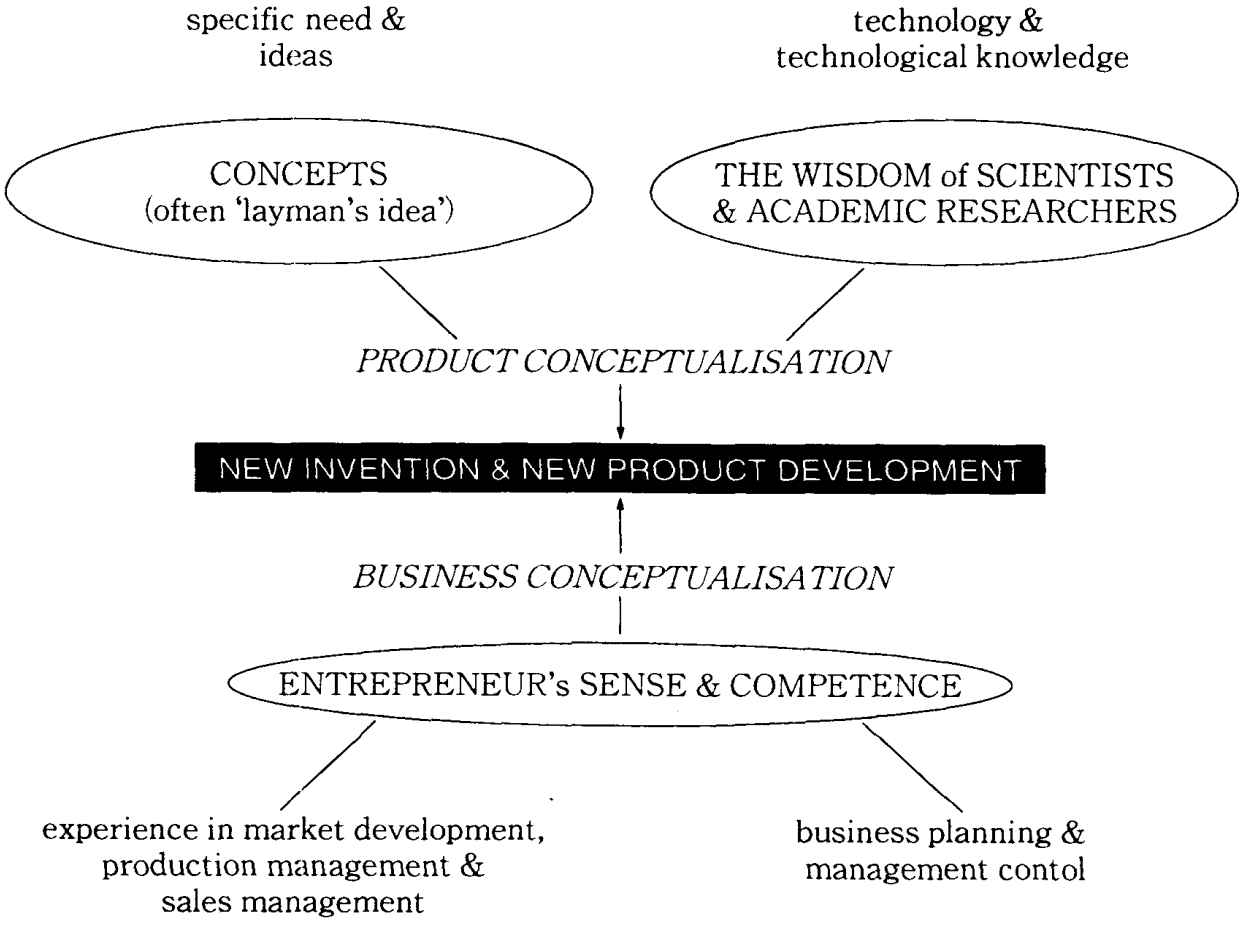
depending on needs-oriented conceptualisation than on seeds-oriented ones, and the distance between unprecedented scientific or technological innovation and its application to actual social usage is considerable. Typical illustrations can be found in Case E.

3. A successful entrepreneur in new product development, therefore, is not necessarily a prominent inventor nor a skilled researcher. His/her competence is based on the idea of market needs, the way of combining a technological principle, invention or new materials with the concept of products and the manageability of processes for development, manufacturing and marketing. An entrepreneur may often take the role of 'A layman's conception and

creation', such as Case A. It works much better than professional's, who commonly takes a narrow view of things (see **Figure 5**).

4. The real difficulties in product development are not within the phase of conceptualisation nor that of scientific research, but on the stage of developing experimental products, sending them for testing and monitoring, and improving them based on the results of trials. Yet these stages often demand more than years and considerable investment (see Case D).

Figure 5 INDIVIDUAL PARTIES and THEIR ROLES in PRODUCT DEVELOPMENT



5. The decisive factor in the product development process is on whether SMEs can obtain virtual approval on their new products in the markets or not. Approval may be given by potential prime customers, authoritative academic or administrative institutions, or those who have strong influence within business communities or group of consumers. This necessity of receiving prime customers' approval, as well as of needs-oriented development, also leads many SMEs to prefer closer and tighter relationships.

6. The necessity of organising good internal production systems is not so decisively important after completing the design of the final production model. As the investment in keeping one's own manufacturing facilities and staff is mostly too big for SMEs to quickly raise funds by themselves, they are often to consign outside suppliers for production, as 'fab-less' firm, i.e. manufacturers without factory and using subcontracting. In some cases such as Case B, however, keeping own production facilities is crucial to protect its technological advantage.

7. Even when a product is brought to market successfully, there may be a series of unexpected problems and underlying hidden costs. There may occur when the product is being used under the customers' own environment and individual conditions. For instance, Case E experienced a huge setback after having launched its products, by receiving many customers' claims. These problems are often good suggestions for further development and improvement, or product modification.

8. One single product cannot guarantee good business for so many years, even if the length of product cycle considerably differs. Therefore, the follow-ups and aftercare are very useful for SMEs to identify the market and customers'

further needs in detail, to ignite next development or to establish good relationships with new customers. Obviously follow-up and aftercare are also indispensable for promoting confidence and reputation in the market.

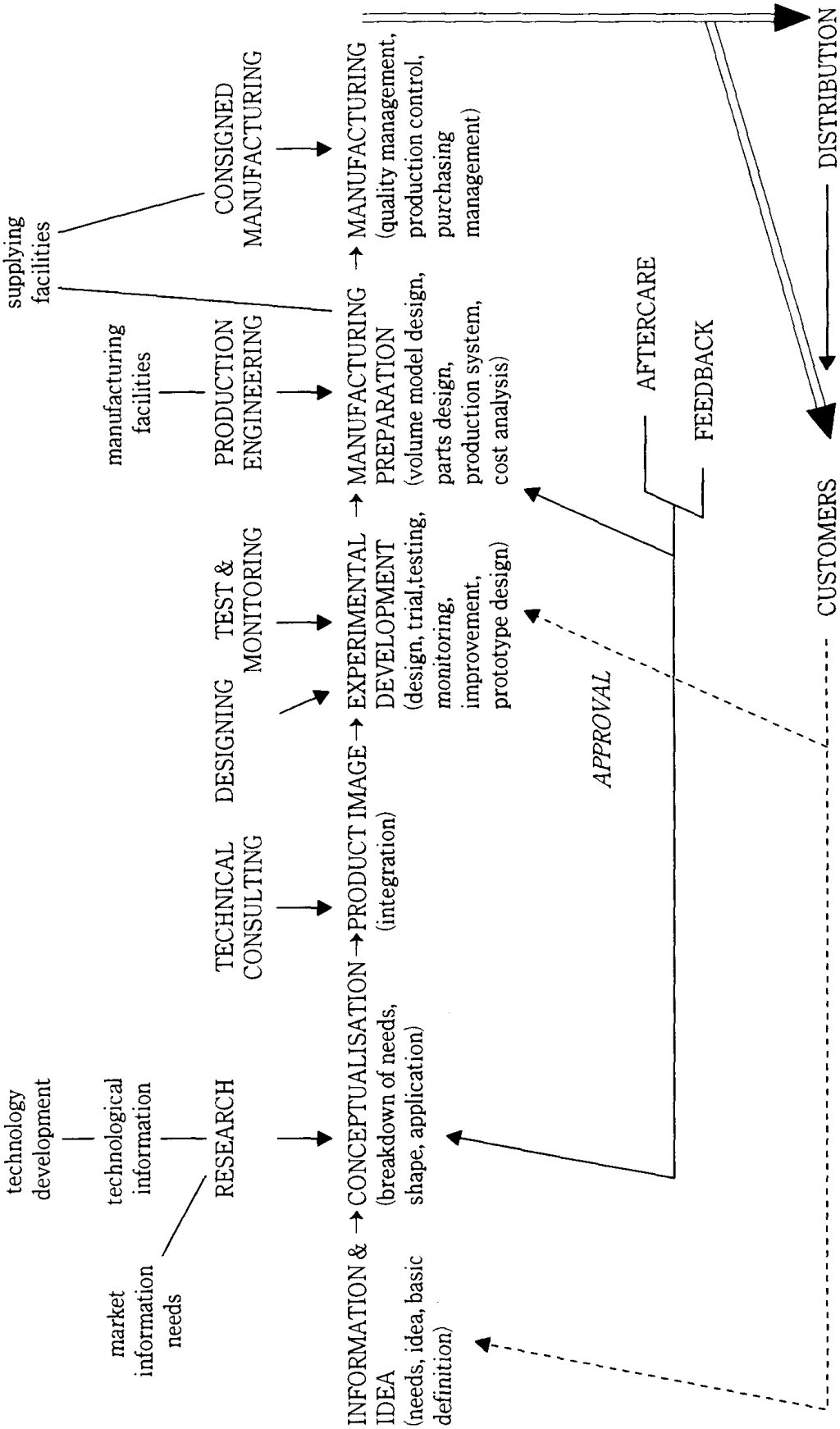
9. New product development sometimes takes considerable years, as Case A showed 10 years, and it is not easy for SMEs to make comprehensive management plans for it, including the aggregate investment amount and the period when the development is completed. This uncertainty and unforeseeability, involves SMEs' risk, as well as their dependence on individual persons' (mostly entrepreneurs themselves) creativity and enthusiasm rather than organised ways. On the other hand, the important lessons for SMEs are about their overall experiences and skills which have been learnt from and are related to product development itself.

The importance of understanding the product development process

In these contexts, successful SMEs are taking advantages not by inventing a very original and epoch-making idea, but by learning about the ways to make the whole process as much controllable as they can. In other words, to comprehend and 'master' the ways of organising whole process for product development is decisive, as with like Case H.

In addition, as most SMEs have to carry out the whole procedure of development without enough resources, 'supplementary assets' must be supplied externally. This means the process is a complex of different parties and involves collaboration. This collaboration may demand negotiation between different parties, to combine external and internal resources, new concepts or ideas and technological knowledge, to develop a feasible business and a marketing plan and to control the whole development procedure. Entrepreneurs often double as the developers of ideas or concepts, and have

Figure 6 CONCEPTUAL PROCESS of NEW PRODUCT DEVELOPMENT



to commit themselves to the various efforts in each product development stage (see **Figure 6**).

Collaborative relationships with prime customers

Because of the necessity of 'supplementary assets', it is often found that a SME has a close relationship with a prime customer, developing a new product to serve its customer's needs. In this relationship, like Case D, the SME may receive a series of supports or facilities. In contrast, successful partnerships or collaboration between smaller firms alone for new product development are surprisingly rare. This is because of difficulties of combining primarily scant resources between each other and of keeping mutual human reliance tightly and permanently among individualistic personalities. Reliance seems indispensable to promote working co-operation and commitment among small entrepreneurs, but is not developed so quickly.

As far as capital goods or producer goods are concerned, to catch needs, to gain resources, to win virtual approval on their new products and to achieve their stable sales growth, it is often easier for SMEs is to keep collaborative relationship with one or a few larger customers.

Even in the consumer goods market, manufacturing SME's collaboration can be found in variety of forms, one of which is OEM production for bigger firms (see Case H). In this case, SMEs can enjoy the advantages, of identifying market needs, using their client's facilities, and saving on sales costs by relying on an already established distribution network.

These closer relationships might be suggestive of 'classic' subcontracting system. However, the decisive difference between the conventional 'subcontracting relationship' model and 'collaborating relationship' in new product development is that the latter is based on SME's distinguished invention or products and own choice, not managerial competence in quality

or delivery control as the former. This different relationship presents its own potential problem. In the 'collaborating relationship' model, SME must be more careful over how to evade its subjunction and unfavourable transactions to a big customer, or how to protect its own invention or products against fraud and plagiarism. Ironically, imitators are more likely to be former collaborators or partners than an unknown third party, because the product development process is decisive to understand new product.

6. INTELLECTUAL PROPERTY RIGHT AND SMEs' OWN WAY OF PROTECTION

As is rather common among SMEs, not many of them are fully depending on the legal IPR such as patents. In Japan the number of annual patent applications is very big, exceeding 400 thousands, as well as their registration, but most are applied by big corporations and their staff. According to SMEA's survey, the ratio of SMEs' annual registrations of patent is less than 10% out of all registrations, and only 13% of manufacturing SMEs keep their registered patents (SMEA, 1997b). Some simply complain the high cost and complicated procedure to apply to patent or other legal property rights. Some SMEs prefer to protect their intellectual property through other measures rather than engage in the legal system.

These attitudes have already been pointed out by Blackburn & Kitching (1998), such as 'informal protection practices' or 'active networking protection practices'. Our 1994/97 research suggests that SMEs often use rather informal measures, not simply because of high cost to register formal IPRs, but also because of some positive reasons. In addition, many SMEs take a combination of formal and informal measures to protect their rights more tightly.

Legal IPRs are not seen so much decisive to protect SME's position and interests against the customers' opportunistic behaviour or potential

imitators. In the producers goods market, most owner-managers, such as Case D, believe good and co-operating relationship itself is crucial, and legal right is a sort of safety fuse to keep their positions stronger enough. More emphasis is given on the necessity of 'intellectual property protection strategy', by Case B and others, which employs both formal and informal measures corresponding to the technological characteristics of products, the possible growth and size of their markets, and the relationships with prime customers or collaborating firms.

The uses of formal and informal measures, however, are not substitutes. Case A still keeps confidential its assembly operation and design of know-how related mechanisms without formal registration. Case B, on the other, does not believe it can keep its know-how confidential forever, and may publicise part of its innovation to offer licensing arrangements.

Another way is adopting a 'containment and successive offensive' strategy (Case C), which means to register patents including technically peripheral issues, and/or to register successively patents about rather closely related issues. This strategy is effective to protect a product innovative but rather easy to imitate its shape or design, and to pressure potential imitators out of trial even after the expire of a single registration. As mentioned above, big companies often register all inventions together, which may not be in use for years, but this is usually too expensive for SMEs.

As Case E shows, in the expanding consumer goods market, it is difficult for SMEs to protect their original invention even by registering a number of IPRs. The market size and growth are enough to attract many imitators, including powerful big firms. Litigation against a malefactor takes up resources as well as loss of the opportunity cost. Registered brand names are not so effective for SMEs to cope with big businesses' popular names.

Answering to the question whether IPRs can protect SMEs from illegal

imitators or immoral traitors is therefore not so easy. It can be said that legal IPRs can protect them (see Case K's failure), both in the producer and consumer goods markets, but not completely. More emphasis is given by owner-managers on their learnt tactics of how to keep the core invention confidential, or, more broadly, implementing orthodox strategy for business development and keeping superior position to rivals like Cases E and H.

In sum, the decisive factors for SMEs to protect their products are, on the one hand, their overall 'masterly' competence and skill in understanding their position and surrounding conditions, organising development process which, as an integrated system, is robust against partial plagiarism or imitation, and accumulating their own facilities and experiences in marketing efforts. On the other, it is also effectual to make up consents, rules and methods to allocate burdens and returns between collaborating parties, and securing their leadership and controlling power, as well as sharing interests with them.

7. MARKETING EFFORTS AND THEIR IMPLICATION

Marketing issues and SME's restraints

Basically, all firms which try to penetrate or to develop a new market, have to understand potential customers' needs, persuade customers to buy their products and achieve sales. Besides these efforts, they must expect potential competitors and battle in the market. These efforts are not focused on the ways of how to sell, but how to choose and develop saleable products, how to reach the market and how to concentrate resources effectively.

In reality, most SMEs cannot keep sophisticated ways of marketing, and have least resources to commit to it. Fitchew et al. (1997) suggests that most SME owner-managers in Britain often regard 'marketing' as the tactics of selling and promoting the business, leaving out any conceptualised idea of strategic marketing and planning. There are also somewhat strong reasons

for this limited conceptualisation of marketing in Japan. SMEs in metal or machine engineering were once strongly depending on subcontracting businesses, with a small number of customers and expectations of long term relationships with them, so that the idea of the marketing was less dominant among manufacturing SMEs than cost management or quality control. It was not rare to find a subcontracting firm without any sales staff. Another common case was where SMEs were dependent on putting-out systems, in industries such as textiles, in which trading houses or wholesale merchants took most responsibility for marketing, sales and even product designs. High tech small businesses have been mostly dependent on individual innovative characters and prone to lack for sales personnel.

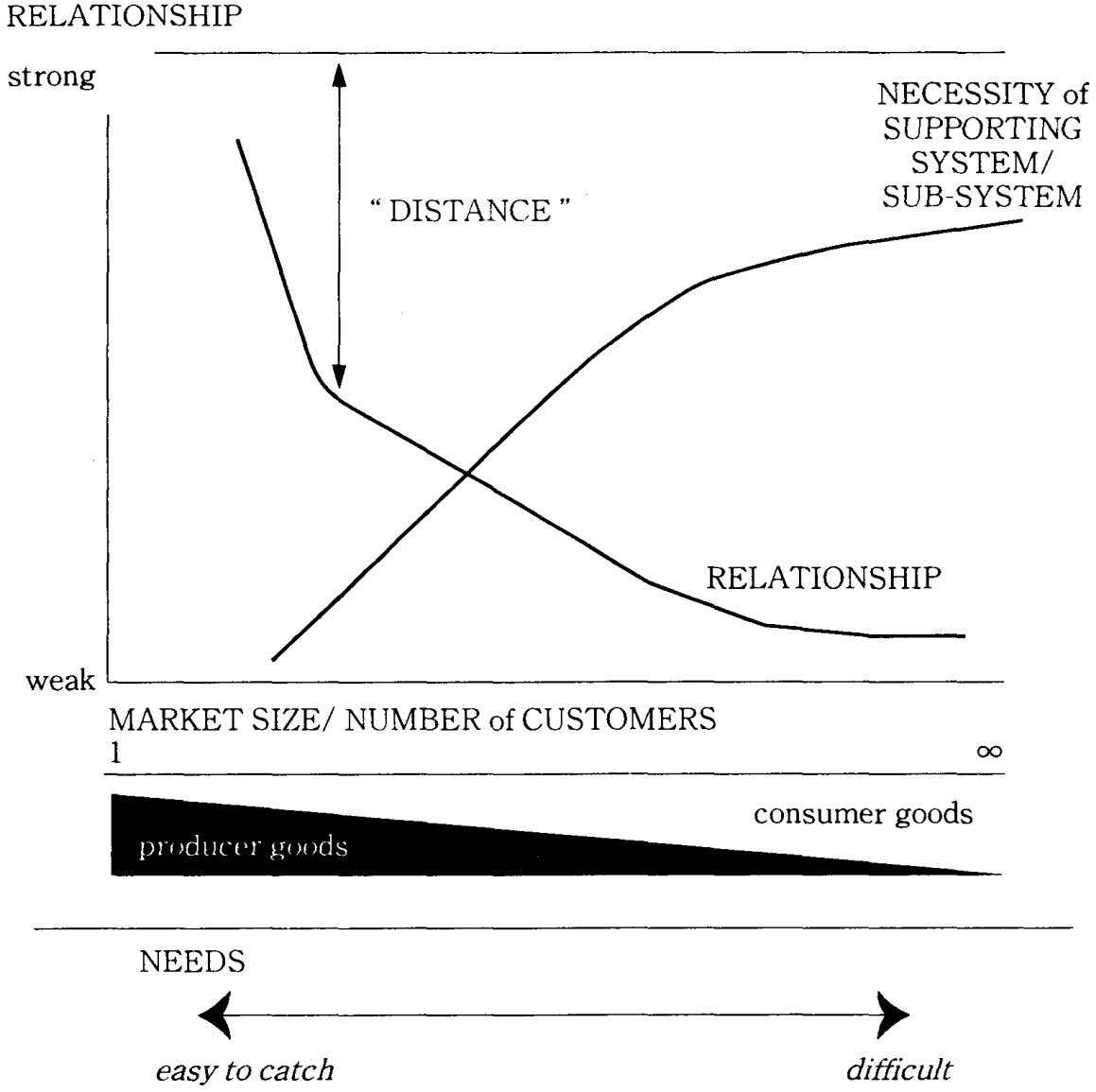
If most SME managers have less knowledge about the sophisticated ways of strategic marketing and are concerned about the internal scarcity of resources and external difficulty in obtaining them, as Fitchew et al. (1997) also shows, they are likely to develop their own spontaneous practices of monitoring market place and focusing around customers' needs to maintain loyalty. Therefore, we must adopt an alternative framework to understand the actual meaning of SME's effort towards markets, and try to empirically discourse on it.

Marketing effort and 'distance'

After completing our 1997 research project about SMEs' marketing efforts, the basic idea can be extracted that the key issue for SMEs efforts to do with the market and to employ 'marketing' idea is to know how to reduce the 'distance' between them and the market, as well as to understand their own domain and position in the market (see **Figure 7**).

Here, 'distance' carries 3 meanings. The first one relates to information about the unknown factors of a market where a firm tries to enter and start

Figure 7 A CONCEPTUAL SKETCH about MARKET, CUSTOMERS and the " DISTANCE "



business. The second meaning is the relationship to individual customers, to catch customer's needs and to produce an effect on customer's conduct decision. The third meaning is actual accessibility to the market and customers, when depending on distribution network or trading firms, which may make it difficult to know at first hand customers' further needs or satisfaction with their products.

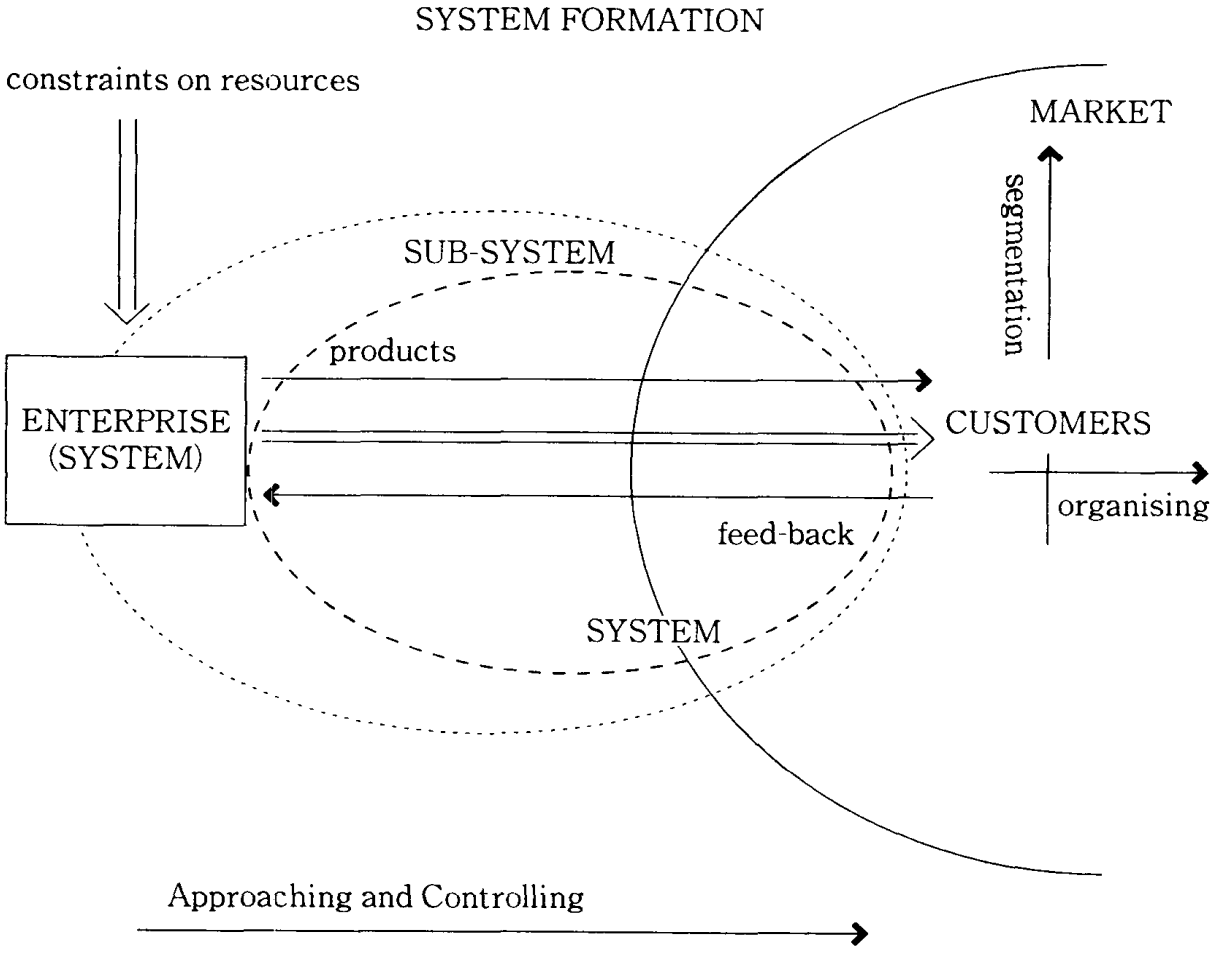
There may be almost no distance between a big manufacturer and its attached suppliers, which were once dominant. However, the newer market

and the more unknown customers manufacturing SMEs try to cater, the more distance they have to cover. To reduce the 'distance', they may have to develop their own strategic efforts and to establish their own 'system' or 'sub-system', to keep accessibility to the market, establish closer relationship, and maintain controllability on mediating agents or network (see **Figure 8**).

Allegorical typology of manufacturing SME's marketing strategies

Our research suggests that most SMEs have to use resources in a careful and concentrated manner, and choose a narrow but effective marketing strategy and measures, which are almost spontaneously developed and not

Figure 8 CONCEPTUAL RELATIONSHIP BETWEEN ENTERPRISE, MARKET AND BRIDGING SYSTEMS



so much as 'strategic marketing'. Therefore, we can formulate their ways of management decision and conducts for choosing products and markets and reducing 'distance' as individual strategies, in allegorical expressions. Practically the typology is based on products, marketing concept and target settings, system formation and control and sales promotion measures (see Table 2).

a. 'Rapid shotgun firing' strategy

Expecting melee fighting, priority is to contend over the number of new products and their quicker launches, and promptly to catch good response from the market among trial and errors; also promoting own presence and impression among broad customers (see Case F).

b. 'Image/concept creation first' strategy

Creating a new market and quick development of own way of sales measure/channel and leading position; mainly not expecting a long term sale but 'hit and run' success (see Case G). Case E's way rather resembles, but Kankyo has already established its own distribution network and popular fame as well.

Table 2 Allegorical typology of manufacturing SME's marketing strategies

a. ' Rapid shotgun firing ' strategy
b. ' Image/concept creation first ' strategy
c. ' Market territory priority ' strategy
d. ' Constantly customers' door step ' strategy
e. ' Halo effect taking ' strategy
f. ' Dazzling salient technology ' strategy

c. 'Market territory priority' strategy

Priority is given on producing own market segment and securing position, highly concentrated investment of resources and strong commitment to a group of customers, expecting stronger territory and barriers (see Case H).

d. 'Constantly customers' door step' strategy

Priority is strongly given on the shortest distance with customers, by keeping tight and frequent communication with them, quickly responding to any troubles or requests, and offering new suggestions of products or improvement measures (see Case I).

e. 'Halo effect taking' strategy

Supplementing own weak sales strength and low profile by materialising other party's stronger presence and high profile or practical endorsement; expecting prominent collaborators or customers' overspreading influence on market and customers, and often 'word-of mouth' (Fitchew et al., 1997) spread of reputation (see Case J).

f. 'Dazzling salient technology' strategy

Emphasis is mostly on own unique and distinguished technological innovation and competence and attracting wider customers' interests or offering a series of technologically linked products to specific customers (see Case K).

These different strategies can be generally understood as effective ways for SMEs to make good use of resources (Hill et al., 1975), to improve their products development processes and to secure the positions of their products in the markets.

8. SUPPLEMENT DESCRIPTION - A fallen meteor

In November 1998, a report from Japan informed of Kankyo's business failure, which disappointed many economists and business consultants who once believed that it would be a good example of a challenging and innovative SME in Japan. I quoted it as the **Case E.**

According to news reports, one of the main causes for its failure was stiffening competition and losing share in the air cleaner market in the recent years. In particular, many big manufacturers had recently entered the market, attracted by the market's high growth and future expansion prospects. In addition, economic stagnation in the domestic market in 1998 strongly hit Kankyo, which led to it having to hold massive amounts of unsold stock.

There may also have been some mismanagement in Kankyo's development strategy. The company had made what could be regarded excessive investment in marketing campaigns and adverts, which management believed necessary to compete with large manufacturers' well-known brands and to promote its product image among wider consumers. In the long term, its failure in launching the next hit product to succeed to its air cleaners was rather detectable. As a result, Kankyo could not enter the second stage of business development after recording a meteoric growth from the scratch in 10 years.

If the 1998 economic depression had not been so severe and financial institutions had been more friendly to it, Kankyo might have averted collapse, or at least could have made a rescue partnership with a bigger company. For instance, very recently, Akia, another small but prominent PC manufacturer with a meteoric rise, and once competed with SOTEC (Case H), announced that it was to be virtually acquired by Casio. Although this is another unsuccessful story, Akia was certainly rescued from bankruptcy.

The important lessons from Kankyo's case are;

1) Above all, Kankyo's choice of marketing to a growing *consumer goods market* typically and inevitably involved a number of difficult and restricting conditions. Imitation by new competitors and increasingly stiffening competition were likely to demand a series of critical decisions on its strategy and allocation of resources, and a single error would prove fatal.

2) To compete with the growing number of rivals, Kankyo adopted a similar measure to big manufacturers, making considerable investment in mass adverts, in national newspapers, trying to make its name popular. These efforts did not seem to help its sales. Kankyo's original product has been seen as rather specialised and difficult to claim millions of unit sales, except families suffering respiratory diseases. Its huge investment in sales promotion could only work when it could successively launch different new products to the market under the same name. Unfortunately, its new goods were less innovative, dedicated to the same usage or not so different from the existing products, such as water purifiers or vacuum cleaners.

A report about Kankyo's failure strongly suggests that it was less enthusiastic in keeping *continuous new product development* efforts, depending on its skill in development process and follow-ups and organising sophisticated R&D methods (see *Nikkei Venture*, January 1999).

3) Although Kankyo's product concept and sales target were originally clear, it was contradictory to adopt a step-by-step promotion measure, such as organising non-profit associations and attracting supporting volunteers, and to expect huge volume of sales by expensive advertisements. Its concept of offering socially-useful products was obviously more connected to the former way, which could reduce the *distance* to the market and work as a good *supporting system*. Nevertheless, these associations and its own sales

network, including a number of sales agents, did not contribute enough to achieve an adequate sales volume, and instead demanded it considerable expenses to keep them alive. Kankyo inevitably tried to expand its business through big volume retail chain stores, discount shops and mail-order firms. However, as it had no strong relationship with particular trading firms or any other business partners, its short term volume sales simply forced it to make price discounts. This led to a damaging blow to its product image and company reputation, as well as agents' disappointment, and ultimately profits.

4) Kankyo failed to become another SOTEC (Case H), neither Twinbird (Case F), nor even Seikatsu Kogaku (Case G). These comparisons of different strategies are very suggestive. SOTEC decided quickly not to rely on volume retail sales, and started its own mail-order sales operation. In addition, it has been depending on the OEM market, which can guarantee large volume sales and save investment in marketing. Kankyo, on the contrary, never tried to make an OEM sales contract for its air cleaner. It would be difficult for Kankyo to have done so because its technological originality was mainly its advantage in the market, and it sticked to its high profile as a socially useful manufacturer.

Though Twinbird's (Case F) products have been rather less innovative, it could claim a wider range of demands in the consumer product market. Its *'rapid shotgun firing'* strategy could work by launching many different products. Even though its profile in the market remains low and its relationships with big retailers and trading firms difficult, it can expect relatively stable sales. Kankyo's product concept, on the other hand, was too narrow, despite its strong ambition.

Seikatsu Kogaku's (Case G) strategy was rather similar to Kankyo. Both tried to create and promote an *image/concept of their products*, because of their products' uniqueness and novelty. Both originally developed their own

sales channels and measure, and depending less on existing distribution networks. Nevertheless, Seikatsu Kogaku's strategy was more of a 'hit and run', and as such short-termist. Initially, it paid little attention to its own company image. However, it did have the advantages of flexibility in its costs and workforce. In contrast, Kankyo's products were regarded as a more stable and less gimmickry ones, which had been carefully developed based on academic researches. In addition, though Kankyo tried to minimise its size and reduce fixed cost, it was gradually growing in employment size, and made huge investment in sales promotion measures.

Overall, the fact that Kankyo's high ambition and huge investment were unable to guarantee its market position and stable sales growth, as well as its failure in launching the next hit product, does provide some general errors. It might be also said that Kankyo's less dependence on partners or customers, except supplying firms, originally involved difficulties and risks, above all when it was short of management skill and competence as a rather young enterprise. Even its partnership with the supplying firms might be less favourable to it by reflecting the different economic power positions between both parties, above all when Kankyo faced slacking demands and price reduction.

This may be regarded as a typical case among meteoric SMEs which cannot overcome their size related disadvantages so easily and are still ambitious. Needless to say, directly competing with powerful big businesses in the same market for many years is always extremely difficult and pressing hard for SMEs without any strong ties with partners.

9. CONCLUDING REMARKS

Analysing the process of new products development in SMEs obviously involves studying a complex of economic and management issues.

Here, by applying theories of economic organisation and institutional

relations, as well as of market competition and industrial organisation, an attempt has been made to understand how some SMEs have been successful in new product development and marketing efforts, despite their overall constraints. As far as financial issues are concerned, most owner-managers still feel financial institutions turn a cold shoulder to SMEs, and suggestions such as the feasibility of collateral loan on intellectual properties are not yet working. Venture investment schemes are mostly available to growing companies having finished their primary and hardest stage. These issues have to be examined in further studies.

Though financial problems are still serious, Kankyo's case clearly shows that it failed not because of the overall shortage of long-term funds, but their mis-allocation. Its failure was strongly connected with its own management decision and business system formation for successive new product development and marketing efforts, as well as obtaining and implementing *supplementary assets* from outside.

For manufacturing SMEs, one of the key issues is not only to find or create unique inventions, but to carefully organise the *development process*, by combining market needs and technological seeds and employing external resources. Another strategy is not only to choose saleable products and markets carefully, but to develop *bridging systems* or *sub-systems*, in order to reduce the *distance* to the market and customers.

These inevitably invite tighter and closer *relationships* with collaborating partners, prime customers, or trading firms, which are either offering supplementary assets or information about market and needs, or taking the role of *agents* meditating information or sales promotion means, throughout the overall process of new product development and sales. These will help considerably to cover SME's conventional disadvantages, promote their competitive strength and allow further development in the next stage,

especially if they can enhance and hold their leadership and control on the relationship. This successive and spiral climb may be understood a sort of *learning effect* feasible for SME's.

Closer relationships with customers, traders or suppliers carry another risk, and they may suffer from various pressures, or face opportunistic behaviour and lose their invention and business advantage. This requires them protecting intellectual property. Yet, use of the legal system is not enough. More important factor is their *'masterly' competence and skill* in understanding and improving their conditions, organising systematic development processes, and accumulating their own facilities and experiences in strategic IPR protection and marketing efforts. Eventually, successful growth and presence in a market also promises SMEs more secured position.

SME's effort of new product development is far from an easy way, but it must be worth to challenge. 'The more errors an entrepreneur made, the more he/she has learnt and the more successful will be in the future', said Mr. Obe in the Case H.

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Post-Script

Obituaries

In 1998, I lost two of my closest people. In July, when I was writing the original version of this paper in London, I was deeply shocked by the report from Japan, which informed of the saddest fact, Professor Yoshio SATO had passed away at the age of 64. For more than 2 decades, I owed him so much for his kind but strict advice and help. Though I was never under his official supervisorship at the Graduate School, Keio University, he always warmly and sincerely cared for me, in his private research groups, field projects and many occasions. I can say his help and advice made me an academic researcher in SME studies.

I have too many recollections of the days when I was with Professor SATO, including the days in Seoul, Warsaw and Berlin. Sadly enough, as I could not say my farewell to him at his funeral in Tokyo, I cannot yet believe in the fact I will never able to meet him again. Another death, my Father's, obliged me to make a short break in my study in London in September 1998, and, when I came back home and tried to start to play my answering/recorder phone machine at home in Japan, I could not stop bursting into tears. Professor SATO's live voice was suddenly revived by the machine, which had been recorded just a few days after my own last departure. His voice was so weak and lost the natural vitality, but his last words were another kind and warm farewell, and he promised our reunion.

Therefore, I would like to devote this paper to two lost souls, Professor Yoshio SATO and my Father, Tametomo MITSUI.