Environmental network to promote "green" markets

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Abstract

In order to promote markets of environmentally preferable products, institutions are established in many countries based on bottom-up activity with some guidance from the government. A Japanese NPO, the Green Purchasing Network (GPN), is such an institution but differs extensively in the constitution of its human-nonhuman network compared with similar institutions in Europe and North America. The study conducts an extensive fieldwork on the GPN and shows, adopting insights from Actor Network theory, how different they are and how the differences contribute to the GPN's success. The study next examines the GPN's new attempt to include individual consumers who have so far been excluded from the "hybrid forum" that the GPN is promoting. Finally, the study compares the GPN's activity and their information tools with environmental labeling scheme and the LCA national project that the government and scientists are urging. Important implications of this comparison will be elucidated as to co-production of knowledge in a society and the mode of stakeholders' participation.

Keywords

green purchasing, hybrid forum, stakeholder participation

1. Introduction

Industrialized societies face an urgent problem in trying to find ways to counteract serious environmental degradation. It is the argument of economists that the value of nature has not been adequately reflected in market price, consequently it has been over-exploited: i.e in the present market place there is no mechanism for the protection and preservation of nature. They also argue the government's intervention in market behaviors causes environmental peril. Therefore, the situation is basically explained either as market failure or institutional failure.

While defining it as institutional failure, government-directed regulation policies have been implemented. In many countries (especially in European countries), under the concept of extended producer responsibility, various regulations, at various stages from material extraction to disposal, are formulated and thrust against industries. On the other hand, defining it as market failure, economic measures such as Carbon Tax are proposed and actually implemented in some European countries. Economists regard economic measures as having a less unfavorable impact on the market than legislative measures.

However, there is a serious problem. These measures cannot be effective solutions in practice. They do not adequately urge manufacturers to produce more environmentally preferable products, nor do they encourage consumers to use them more. Considering the seriousness of the environmental peril, we should urgently make markets sensitive to a product's environmental impact. However, a shift from the present market to "green" markets where environmentally preferable goods (goods with less environmental impact) prevail, is difficult to attain.

In fact, there is discrepancy between how theoreticians and practitioners perceive the situation. Be it laws or taxes, industries are basically opposed to a top-down regulatory policy. They fear that such measures will weaken industries and eventually result in the decline in national power.

Notably, this assertion is sound and reasonable. When green markets are just about to be developed, measures to alleviate the environmental load are often costly. It adds up to production cost, resulting in a contradictory situation where companies have to sell expensive goods of lower quality (because of immature recycling technology, etc.). Ideally, product price should be relative to its environmental impact. But ideal is after all ideal. Actual markets do not respond so easily and quickly to industries' efforts. For the time being, companies have to keep on selling in an unfavorable situation until environmental technology and green markets develop to a certain level. It is one assertion that companies have been absolved of responsibility for exploiting the environment, thus they are obliged to pay the price. However, unless supported by green markets, it is difficult for companies to adopt advanced environmental policy.

Therefore, promoting green markets is at most a necessity. But how can green markets work effectively in practice? Governments are not so adept at green market polity. Hence,

new attempts have been proposed by practitioners. In Europe and North America, it is argued that public procurement has a high potentiality in changing the market share of green products. After mid 90's, new institutions were established and existing institutions evolved with a new aim of "greening" public procurement. With similar goals, Japan also recognized the need for creating an advanced green market structure, and in 1996 a new institution, known as the Green Purchasing Network (GPN), was introduced. Although the goals of the GPN are similar to green market institutions in Europe and North America, the GPN can be considered quite unique and has gained recognition both at home and internationally.

Thus, important questions for the present study are how the GPN is different from other institutions and how the differences contribute to the GPN's success. These questions lead to clarify what we can do and should do to promote green markets. This study, through extensive fieldwork conducted on GPN, attempts to answer these questions. The implications of the these findings will be elucidated adopting insights from the Actor Network theory (eg. B. Latour, M. Callon, J. Law.)

2. GPN and its success

2.1 method of the study

The method of the study is observatory participation. The author participated in the GPN's activity as an observer for about 10 months. This included attendance at frequent meetings of various kinds-in total, once or twice a week with one meeting approximately of three hours long. The author also accompanied the GPN executive members to tour overseas and to make official visits to related institutions. The utterance data presented below come basically from the records of discussion made during the meetings. When necessary, additional interviews were conducted to members and other related people.

2.2 Success of the GPN

The GPN was founded in 1996. Within 7 years after the formation, it has grown to become a huge and influential network of 2,809 member-institutions. Major companies in Japan and all the prefectural (local) governments are included[1]. In fact, the GPN seemed to win great success in promoting green markets. The GPN conducts questionnaire surveys on green purchasing every year. Their 1997 report (one year after the foundation) showed that there was limited amount of green purchasing practice. On the contrary, their 2003 report indicated that 83 % of the institutions surveyed (members and nonmembers) were actively involved in expanding green purchasing practice. The percentage of companies that reported increases in the sales of environmental preferable products is 60 to 70% for three consecutive years after 2000. Out of total sales, the percentage of green products was 51% in 2003. Those products the GPN has been promoting score much higher in the percentage: i.e. personal computers, copiers and printers, office furniture, and electric appliances. The GPN estimated the total sales of green products as 46 billion dollars, 9% of the GDP, totaling 5 trillion 500 billion yen in 2003.

Ushered in by the GPN activity, the Law on Promoting Green Purchasing was enacted in 2001. The law mandates public authorities to adopt green purchasing polity of a certain level. The steady development of the GPN paved the way to this law enactment. A former government official in charge of the Law admitted that the GPN had a strong influence on the law enactment.

2.3 Change in Japanese situation

Before going into a comparison between the GPN and other similar institutions, it is important to present an overview of the recent situation in Japan. Environmental policy, both by the Japanese government and Japanese industries has changed drastically in the last decade or so. As of 1990, the SustainAbility Ltd. warned that the level of environmental policy of Japanese companies is so meager that some decisive measure should be taken. When the GPN was founded in 1996, the environmental law system in Japan had not taken shape as yet. The first step of corporate environmental policy in Japan was aimed at major electronic and electric appliance manufacturers, who were dealing in the European market. It was at this time that Europe was already implementing strict regulative policies. Therefore, industries preceded government in environmental policy in Japan.

When the ISO 14001 (environmental management system) was established, it soon became a pivotal around which corporate environmental activity was organized in Japan. From 1996 up until now, the number of business sites adopting the ISO 14001 certificate has increased dramatically up to 12,392 sites in June 2003[2]. This number covers 17% of the TSE (Tokyo Stock Exchange) listed companies. Since mid 1990's, Japan has been enjoying the No.1 country in the number of business sites with the certificate.

These days, this management system provides a common language for "environmental aspects", "environmental impact", "PDCA" (plan- do- check- action) cycle, etc. It enables all personal to recognize the environmental load of their corporate activity and directs them how to keep taking action. At the same time, the introduction of the system works to standardize the way to recognize environmental impact and counteract it within business activity.

Since the mid 1990's, Japan has also experienced a rush of environmental law enactments. New laws have been enacted to mandate companies to improve energy efficiency of products and to raise reuse and recycle rates of automobiles and electric and electrical appliances, etc. There are also new laws to ban the use of certain toxic chemicals and to mandate companies and other institutions to report the use and storage of certain chemical substances along with their proper management. The

introduction of Carbon tax is now under discussion.

3. Why the GPN won success

3.1 Similarities

I will now compare the GPN with other green marketing institutions to identify their similarities and differences. Surveys on institutions in Europe and North America were conducted when the author accompanied the GPN executive members to visit those institutions (Feb, 2002).[3]

European and American institutions have exerted considerable influence on the promotion of green markets. However, compared to the GPN, their performance is still limited in scope. The first international survey on green purchasing by ICLEI (funded by EC) admitted as of 2001, "No country in the world can present such a wealth of green purchasing activity as Japan does (Erdmemger, C. et al, 2001)". In fact, the GPN is the largest of this kind of institution.

As for similarities, both types of institutions set the same objective----to promote green purchasing. Second, both types provide similar information tools----tools to help institutional purchasers to search, compare, and select green products (products with less environmental impact). Third, both of them act as a sort of information clearinghouse. For instance, the GPN keeps members informed, through newsletters, workshops, and training sessions, of the state of affairs in environmental policies in Japan and other nations and members' showcase examples of successful green purchasing. In addition, the GPN awards the winners of the best in Green Purchasing every year. Other institutions in other countries provide similar service. Therefore, we can say basic functions are the same between the two types[4].

3.2 Differences

Then, what are the differences? The first and most conspicuous difference is the participation of multiple stakeholders, in particular, the participation of industries. The GPN enjoys the participation of heterogeneous actors, including industries, local authorities, and consumer and environmental groups. Industries are the major members, occupying 78%. The GPN defines itself as "a slack network" of industries, administration, and NGOs. It connects not only various industries but also heterogeneous stakeholders, which were considered previously as having contrasting interests and often at conflict.

On the other hand, European and American institutions are characteristically constituted of purchasers, such as local authorities. They are, in a sense, purchasers-only networks. This is partly because green purchasing practice came out of the context of public procurement in Europe and North America. Main questions being asked in such an institution are legal and technical conditions concerning the integration of environmental criteria in calls for tenders. As such institutions usually have a close link with Environmental Protection Agency (EPA), industries that fear further regulations refuse to join and thus the practice of green purchasing has not expanded to industries. Note that those institutions indirectly---but not directly as the GPN--- affect the market by way of changing the market share of green products. A staff of the European Commission indicates (as of Feb. 2003) that one serious problem in EU is that industries are not interested at all in green purchasing. The EC conducted a survey on green purchasing in 2000 indicating possible positive effects if industries participate in the practice. However, the survey did not influence industries: when asked if they felt the practice of green purchasing exerted some kind of impact on their business or themselves, they answered. "no" One staff member of the ICLEI also complained of industries' indifference to green purchasing.

We should note that industries' participation is critical since companies are powerful propellers of green markets. The GPN's strength comes partly from the fact that two huge assembly industries in Japan are incorporated, automobiles and electric and electrical appliances. Green purchasing activity is at first targeted at buying such conventional products as office equipment, paper, copiers, computers, etc. When such activity attains a certain level, it is directed toward the procurement of green parts and material. Assembly industries are upstream buyers in a supply chain. Alleviating environmental impact in a supply chain is a prerequisite for the production of green products. They thus demand parts and materials to have less environmental impact. Altogether, companies can act as powerful promoters of green markets since they are double-role players in two meanings—producers and buyers of complete products, as well as producers and buyers of parts and material. By coordinating with each other to produce what they themselves will buy, they can act as a self-catalyst for green market.

3.3 Ministry and Academia

The second difference is the strength in the influence from the Environmental Ministry. As noted above, European and American institutions generally have a close link with the EPA. The GPN also has a link to the Japanese Environmental Ministry. However, the link is not like that of other institutions. The GPN was founded under the financial support of the ministry. Yet, within a few years after the foundation, it stands almost by itself financially. In addition, the GPN's decision-making process is completely independent from the ministry, even from the beginning. This favorable distance from the ministry enables participation of heterogeneous stakeholders and fosters contested debate among them. If the link had been much stronger, industries would oppose to the GPN and not dare to participate. Conversely, if the link had been much weaker, the GPN would not entertain the credibility it now does. One member's comment attests to this. "Previously, the environmental division of my company has limited administrative influence. It can raise its voice now as it is

connected to an institution that has a close link to the central government."

I would like now to explain two other features of the GPN, although they are not related to the comparison.

First, the GPN's attitude toward academia is ambivalent. There are a few members from academia participating in the GPN. To a question why academia is not well represented in the GPN, the secretariat's response was as follows: "Scientists are not basically interested in practical and concrete things. Besides, producers have practical knowledge. That is much more useful here."

The GPN seems to keep some distance from academia, although it asks specialists, if necessary, to come and give lectures in various GPN meetings. Specialists here usually are not from pure academia but from more practical fields. This also helps to keep distance from scientific knowledge and thus to foster practical knowledge.

Second, the GPN has a many-headed system, with one or two heads from each stakeholder. The chief executive of the GPN contends that a many-headed system is its key property since that enables balance of power among stakeholders. Interestingly, each stakeholder seems to expect different things from the GPN's activity. The following comments attest to this.

Consumer Organization member: "Our organization has been working on shopping guides. But product areas we have so far covered are still limited. We consider other organizations should take part in this project. The GPN is one candidate. If it won't work, I will try other institutions."

Company member: "There is something that big companies expect from the GPN. They reckon the GPN as intermediary agent, a kind of shock absorber. They recognize that there is something that only NPO can do."

Expectations might be different, but they coincide in perceiving that the GPN will achieve what their own institution would not achieve by itself. That is one important motive for them to participate in the GPN. Besides, most of the members seem to realize that the GPN is not like other conventional institutions.

3.4 Information Tools

The next difference between the GPN and European and American institutions is in the information tools used. The information tools European and American institutions provide are specifically designed to assist calls for tenders. They thus tend to contain product evaluation by EPA related bodies. This includes cases where the institution does not have a close link with the EPA, yet introduces the guidelines and other information provided by the EPA.

For instance, there is in Denmark a private company, called the National Procurement Ltd., which was established with an aim to promote efficient public procurement. In 1995, the company adopted a new policy to include environmental protection criteria into public procurement. As the Danish Environmental Protection Agency issued purchasing guidelines for procurement officers to use (which covers 50 product areas), the company built a system of "framework contract" (blanket contract) with suppliers. Namely, substituting plural purchasers (basically administration and local governments), the company makes calls for tenders. The company formed "requirements" and "award criteria", which comply with the EPA's guidelines. The former specifies conditions for suppliers to meet in order to bid, while the latter designates product features that give advantage to tenders. In fact, they act as product evaluation. After the company makes blanket contracts with some suppliers, it discloses to the purchasers the conditions of the contracts and the list of products. Purchasers choose their preferable products from the list.

This tool of NP Ltd. becomes so sophisticated that it might, according to a staff of the company, yield a system of joint calls for tenders that can pass across borders. This tool surely helps purchasers for it reduces the burden of calculation and comparison. However, it will conversely stave off industries even further. Purchasers-only institutions, as they improve their tools, seem to become less powerful to bridge the separation between supply and demand sides.

On the other hand, the Ecological Sustainable Development (EKU) Committee was formed in Sweden, with the Swedish Environmental Protection Agency as a pivot. It plays a role in promoting green public procurement of the central, regional and local authorities. The committee is supported by working groups of more than 100 people and attempts to construct purchasing guidelines and internet-based tools. In the beginning, industries participated in the EKU committee[5]. Participants however had hot disputes over criteria and threshold for environmental preferable features of products. Idealism and realism collided. Industries raised objections to the criteria proposed mainly by EPA and specialists, as they were practically hard to realize. Unfortunately, industries eventually withdrew from the committee. This episode illustrates the difficulty in keeping industries incorporated in an institution with a strong EPA influence. Furthermore, product evaluation is a very sensitive matter and is a critical feature in determining whether the institution attracts industries.

As far as information tools are concerned, the GPN takes quite a different approach. Its tools dexterously keep off product evaluation. Companies compete with each other to gain consumers' preferences. Naturally, they are wary of product evaluation. The GPN's tools take that fact into consideration.

In fact, companies have every reason to be wary of product evaluation. The following comments of GPN members show that.

Company member: "Consumers have a variety of preferences. Some like A and others like B. Awarding a certain product as No.1 is not compatible with this fact."

Company member: "The point at issue here is evaluation method, if it is fair and transparent. There are various

evaluations and we, as manufactures, are not satisfied with any of them. They are derived from an ambiguous basis and do not make sense to us. The GPN should avoid making such evaluation at any cost."

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Company member: "A product made mainly out of iron is easy to recycle, whereas a product made of plastic is light but difficult to recycle. We do not know which is eventually better for the environment. What we can do then is to bring both to the market and let consumers and other stakeholders investigate."

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Consumer organization member: "Some companies are now developing a phosphorus-free synthetic detergent with rapid resolution. Consumers who prefer a soap detergent are in a minority. What we need to do is to evaluate soap and synthetic detergents in a particular situation. In Lake Biwa, the problem of soap contamination is of grave importance. Granted that synthetic detergent is of rapid resolution, it might be better for Biwa. But a new question arises. What is the exact magnitude and speed of resolution? After all, it is hard to say which detergent is better for a particular environment. It also depends on what criteria we base our evaluation on."

Company member: "There is the same problem with every product. We do not know the exact conditions of product use. We have to take that into account, in every decision we make."

Obviously, it is difficult to decide the No.1 product for environmental preferability. After all, the environmental load of a product cannot be determined without knowing how consumers use it and dispose of it. Strictly speaking, we cannot say that a product has an environmentally preferable property. Such features are not a property of a product but that of the whole process of production and consumption. Therefore, if we decide a certain product is No.1, there is always some arbitrariness and inconclusiveness.

Besides, practitioners usually hold a different view on awarding the top runners and stimulating followers. The following remark illustrates that.

Company member: "It is widely believed today that a third-party certification is effective in promoting green products. However, it will have an adverse effect if a certification was issued before the innovation of a product spreads across the industry. First, we need to spread innovation. When we have attained a certain level of coverage, we can question by a third-party certification the credibility of environmental information. I think that is better."

3.5 How the guidelines are constructed

We have seen the differences between the GPN and other institutions. To explore the implications of the differences, I will next examine how the GPN's tools are constructed. The GPN has constructed two tools: purchasing guidelines for each product type and a database of product information.

The guidelines are originally formulated by a task group and then open to public for consultation. The task group is organized for each product type. It consists of, from the supply side, manufacturers and, from the demand side, consumer organizations, environmental NGOs, local authorities, and purchaser companies. They are recruited from the GPN members. Each major manufacturer sends product engineers and staff of the environmental division to the Task Group. They are expected to provide product information. There is a rule that the number of members coming from manufacturers does not exceed more than half of the number in the task group.

The guidelines are constructed through tough and careful discussion among task group members. I will cite some discussion and demonstrate the ambience of the task group meetings, and then try to elucidate important organizing principles for the guidelines.

First of all, we can say that the task group is basically very sensitive and prudent to trends in the market, as testified by the following remarks.

Company member: "We need to check if our guidelines are compatible with the market. We had better revise them if the market demands. Laws and market do not go together. Sometimes laws precede and sometimes the market precedes."

Secretariat:"So far, the GPN has been ahead of laws."

Second, through tough negotiation between manufactures and buyers, buyers' opinions (including those of consumer and environmental organizations) are incorporated in the guidelines and thus reflected in product design, as exemplified by the following remarks.

Company member: "PVC has superior features. It might emit toxic chemical dioxin when it is burnt at low temperature, but as we have a complete recycling system now, we do not have to worry about it any more. Today, using or not using PVC is a matter of taste."

Consumer organization member: "Who are the GPN guidelines for? They are for consumers. Consumers came across PVC through wrapping film. We have been fighting against wrapping film as there is a high risk of that being burnt with food waste. We cannot easily get over the fear that new products containing PVC might by any chance get out of the recycling system and be burnt. We want real relief."

Company member: "Today only naive consumers who are not studious insist on that. It is an assertion without enough scientific basis. ... But, we cannot and won't sell what consumers don't want."

Secretariat: "Then, it will be included in the place of Other Considerations."

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Consumer organization member: "The Asahi Daily News carried an article arguing that a synthetic detergent is not always inappropriate, but have some favorable features too (referring to the feature of its rapid resolution). That article, however, met with incredible opposition from consumers. ... It

is finally concluded that what matters most is the amount of detergent used... It is not a world of reasons but that of emotions. You will be sometimes accused, even if you present scientifically proven facts."

What we can see here is that industries lay stronger emphasis on scientific proof (probably the government does as well), while consumers do not. Layman's sense of risks appears to be characteristically elusive. They seem to place technical problems in a broader context and judge their adequacy from there. There surely is a possibility that a dumped product somehow gets out of the recycled system, no matter how complete the design of the system is. There actually is a good chance that it will be exported to the third world countries as a second-hand good. As far as a detergent is concerned, layman feel vague uneasiness with a synthesized product no matter how improved it is and feel more at ease with a natural product. This attitude has resulted from a different risk sense and sometimes is very important, since scientists are not allowed to speak until the facts are proven, thus might not be eligible to foresee the nature of compound risks.

Negotiation among manufacturers is also tough and scrupulous. As attested by the following remarks, the task group examines in details how each expression in the guidelines should be, depending on the exact conditions of product development and the market.

Company member: "Today, companies have succeeded in tracing hundreds of chemical substances in a supply chain. An incredible thing is actually happening in electric and electrical appliance industry. So, the GPN guidelines here should include `Use of the six substances will be reduced even thoroughly in the future.'"

Company member: "We understand the problem of lead, mercury, cadmium, hexavalent chromium, polybrominated diphenyl ether. But in the present circumstance where reliable measurements, calculative methods, and equipment are yet to be devised, and an officially defined threshold has not been specified, we can only say that we do not intentionally add those chemicals to products. Such expressions should be included in the guidelines."

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Company member: "Companies have been making steady progress in product development. One year ago, PC technology was changing at fast pace. At that time, no one could believe that parts of products are to be reused in new products. Now, technology is near the point of maturity. Our company is also saying that it will buy back used products. Therefore, the guidelines had better include `products are designed so their parts can be reused in new products' in addition to material recyclability. We will soon be able to sell used products as new with only some of the parts replaced. Companies want to take back used products and sell them as new. We would like to resell a product only by adding a small amount of the latest technology. That is a desirable situation for us. Therefore, the GPN guidelines can now emphasize `longer use and reuse.'"

This last remark shows that the GPN modulates its guidelines to reflect the phases of product development; the fact that it is difficult to reuse in earlier phases. What the GPN guideline defines as environmental preferability is not a fixed feature but flexibly arranged according to the developmental path of a product itself.

Secretariat: "Look at the guideline that reads ` ...should be designed so as to use up to the last part.' In order for a toilet paper roll to have such a feature, new chemicals should be added. New methods to overcome this problem are being developed but it is already a registered patent. It cannot be widely used in the industry. The last portion left is not likely to be thrown away but used in a different way. So, we should change the guidelines from `a product is a type without a paper core and so designed as to finish off' to just `a product is a type without a paper core.'"

This utterance illustrates that the GPN changes its guidelines to be finely tuned to the state of product technology. Interestingly, patented innovation is likely to be excluded from the guidelines, as it is not likely to spread across the industry.

In sum, through a good deal of tough negotiation, the GPN members reach consensus as to how green features should be for each product at that moment of technological and market development, which they express as guidelines. Companies carefully study where to compete and what to share. They check where they stand and balance the distance from other companies. But they try hard to draw the guidelines to their own product strategy. As a consequence, discussion here works to extract environmental technology that can be widely and securely introduced in the industry or even across several industries. Furthermore, as the guidelines are so constructed, they can mobilize companies' efforts to raise the average level of environmental policy of the industry as a whole.

In an unfavorable situation of a premature market, going far ahead of or lagging far behind other companies in environmental practices is damaging to a company. Corporate interests in the former case and corporate reputation in the latter are at stake. Companies do not want to take precedence but to go hand in hand in improving environmental policy. The mechanism that GPN provides enables this. It facilitates coordinated amendments in environmental policy. Besides, companies' efforts are supported by emerging green markets, of which companies themselves are main buyers.

3.6 Environmental division in a company

I would like to briefly touch on the GPN's influence on "purchaser" companies. Of course, the GPN tools are useful for purchasers, but other general information the GPN provides and the simple fact that the GPN is such an influential network changes companies' internal atmosphere. The GPN connects,

side-by-side, companies of various industries by an environment division as a point of contact. Thereby it allows information to flow from company to company. It is useful for companies, since they have to be aware of the overall situation. The following statement indicates that the environmental division of a company connected to other companies via the GPN can become more influential within the company.
Company member: "The GPN enables us to see where we are right now."

Company member: "Adopting environmental product policy is, in a sense, additional to conventional competition strategies evolved around cost, quality, and safety. It is therefore difficult to demand it to the production division, where efficiency is the top priority. Our strategy is to use information that the GPN provides and to emphasize that other companies start taking such a measure. We warn that the company might get behind."
Thus, the GPN facilitated the environmental division to have favorable relation with other divisions in a company and to establish its secure identity within the company.

3.7 Database construction

Another information tool the GPN provides is the database of environmental information of products. The GPN makes the framework of the database in line with the guidelines. The database is provided on the Internet (previously, presented as data book as well). It is a matrix of rows and columns, where rows represent manufacturers and columns represent product environmental information. Companies are very sensitive to the order of presentation as it is related to ranking. The task group meticulously discusses the order of presentation along the vertical and horizontal lines of the database.

When the framework is provided, manufacturers enter their product information into the database. They pay for that and afterwards they are responsible for keeping the information updated (4 times a year). Note that the GPN database is attractive enough to motivate companies to keep updating it although they have to pay for that.

In this way, the GPN has created the database of more than 10,000 goods from approximately 600 manufactures. It covers almost all the products major Japanese companies produce. It surely is a remarkable success as a database. At a time of steady technological development, product database would soon be outdated unless manufacturers themselves update them. In fact, as for the LCA public database (see below) which is maintained by a public research institution, there is already concern over it being outdated even before it is completed. We can say that it is quite clever of the GPN to involve practitioners themselves to keep transforming the database, so that live practical knowledge is always maintained.

3.8 Conclusion

This study explored how the GPN is different from other related institutions and why the GPN won success. It was found that the mechanism the GPN provides is very unique. The GPN incorporates heterogeneous stakeholders along production/consumption lines. Furthermore, while incorporating the Environmental Ministry and consumer organizations, the GPN keeps a critical distance from them. The main role these institutions play is limited to that of a purchaser. Consequently, the GPN can keep a favorable balance among stakeholders.

Thanks to the heterogeneity in actors and their favorable balance, the GPN could construct the guidelines and the database, characteristic tools that do not contain product evaluation. This combination of the guidelines and the database is a critical asset to the GPN. As those tools are of such nature, they attract companies, important double-role players (manufacturers and purchasers) and keep them attached. As they attract companies, the database becomes large and is always kept updated. Consequently, the tools attract institutional purchasers. The success of the GPN, therefore, stems from this particular constitution of human-nonhuman network.

Note that the GPN's characteristic network of stakeholders, with its favorable balance among them, is inseparable from these tools. They literally construct each other. This constitution has been functioning so effectively that the GPN has greatly facilitated the disclosure of environmental information of companies, and the development and production of green products. It has profoundly increased the amount of green products institutions purchase in such a short period of time.

4. Exclusion of individual consumers

4.1 New Stage coming in

The latter half of this study reports the GPN's new attempt to influence individual consumers. We have to admit that individual consumers have so far been completely excluded from the hybrid forum (Callon et al, 2002; Gibbons, et al, 1994) the GPN has created. As the information tools involving product evaluation shuned companies away, the GPN's tools shun individual consumers away. The hybrid forum the GPN creates expels individual consumers as it lacks an appropriate tool to extend the network to consumers.

As far as office-use goods and electric and electrical appliances are concerned, the GPN has greatly promoted environmentally preferable products. The market share of those products reached over 50% (see above). The situation surrounding the GPN thus naturally changed. When the situation changes, the GPN itself became unstable. The members sense this fact, as shown by the following remarks.
Secretariat: "Today, many companies feel that they have accomplished a certain level of green purchasing."
Company member: "As the practice of green purchasing spreads, the GPN itself as a network might taper off. We've got to find a new direction to go."

It seems that the GPN's activity enters a new phase. As for corporate environmental policy in general, a new stage is also coming in. Ways of thinking embodied in the LCA (Life Cycle Assessment, see below) has been gradually permeated into the corporate activity along with methods and equipment. This yields new attempts to measure environmental impact of production and consumption process.

Companies, after attaining a certain level of green purchasing of standard goods, begin to shift its activity to supply chain management. They now steer their efforts towards greening parts and materials. The GPN survey report, the GP awards, and companies' environmental reports all attest to this new trend. The trend is also ushered by new directives of EU. The European Commission issued the RoHS directives and ELV directives (to automobiles) banning the use of 6 chemical substances in certain products from 2006 and from 2003 respectively.

Today, we can observe that hundreds of chemical substance reports come and go every month within a supply chain. Searching for more efficient ways to transmit information, electronic and electric appliance manufacturers have begun discussing the possibility of standardizing the report. [6]

Thus, the new stage is coming in where companies are encouraged to have a precise measurement of their environmental load and to regulate their business activity accordingly. It is quite a change since companies previously only expected to establish an environmental management system. Information of products' environmental impact is now transmitted along production line and thereby begins to restructure production process.

4.2 Countermeasure toward individual consumers

However, as environmental information of parts and materials started flowing in the production process, the information of complete products became detailed too. Hereupon, a new problem arises. Detailed and complex information is trusted against individual consumers. Consumers, who are not equipped with any tool to help interpret it, have trouble digesting it.

The GPN started discussing how to promote green purchasing among individual consumers. However, this change shakes the basis of the GPN identity. As a measure to help individual consumers, such GPN members as consumer organizations propose to change the GPN's tools to something that includes product evaluation or ranking. Of course, companies oppose to it and tension is resulted between company members and others. Favorable balance among stakeholders is now at stake.

Although it has not come to surface so far, the GPN members differ extensively in the way to evaluate their own tools. The following remarks show the difference.

Consumer organization member: "Product information the GPN provides is basically company's information. There is nothing original about it. On the other hand, there is originality in the Eco-marks (see below). My colleagues always tell me that the GPN's information is not good because it basically comes from companies. That is consumer's candid impression of the GPN."

Consumer organization member: "To tell you the truth, I don't see the point of the GPN's tools. How desirable is the GPN database? It is just the enumeration of data. Consumers have difficulty in understanding it."

Consumer organization member: "As for data, reliability is important. However, our database carries a message that the GPN cannot be responsible for the content."

Consumer organization member: "The Eco-mark committee holds the authority to conduct investigation. Consumer organizations come to trust the Eco-marks. Besides, the Eco-mark is improved to carry 5 items of detailed information under the label."

NGO member: "In a society where change in consumer's lifestyle is the most imminent, it is one way for the GPN to develop a new method of product evaluation and thereby to cultivate its brand image."

On the other hand, company members see the tools quite differently.

Company member: "The information the GPN provides is our treasure, our message to consumers, fruits of severe efforts and negotiation of companies."

Company member: "I always wonder if it is OK for us to recommend the Eco-mark. I think that the Eco-mark disables people to think and act by themselves, and thus I personally am against it. That reinforces people's dependency."

Company member: "The guidelines are the bottom line of the GPN's activity. We have to deliberate what is the GPN, what is the GPN for. If we make ranking of products so as to help consumers to understand our information, we will eventually break up. Information has to be presented as fussy as possible."

They also differ in the judgement about giving numerical values in the information tools.

Consumer organization member: "The GPN has to go ahead of the Eco-mark and give numerical values in product assessment."

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Company member: "The Eco-mark committee has started debating on the necessity of giving numerical values in product information. Recycling rate is one thing. They will soon demand to prove it by some documents. That's for sure."

Company member: "Be it recycling rate or chemical substances, numerical values are becoming emphasized these days. We have to be responsive to such trend."

Company member: "If manufactures can cope with it, numerical values should be used in the tools."

Company member: "There are many problems that even the Eco-mark committee cannot handle. Some measurement methods are not reliable and others are not accountable."

Company member: "The GPN's database should include numerical values, but it is another issue if the guidelines should do."

The GPN is very prudent in giving numerical values, for they are directly linked to evaluation. Being fear of setting clear criteria, the GPN tries to avoid them from the guidelines. However, it is also true that the trend of including detailed information is hard to resist. Such product labels as the Eco-mark designed in the first place to show product favorable properties by a simplified label comes to include detailed information. The GPN guidelines and databases will eventually be more complicated. However, it is different matter if that includes evaluation and ranking. Companies are opposed to that, since evaluation and ranking are naturally incompatible with the fact that the GPN, as a network including vendors, provides information for sales promotion. Besides, the Japanese Environmental Agency, as an observer, expressed fear that if an organization of which members are mostly companies makes product evaluation, credibility cannot be warranted. Apparently, the GPN is encountering difficult situation.

It should be noted here that a minor change in information tools has a potential to change the identity of the organization itself. As this episode attests, tools and a human network are not two separate things but co-constituted. Common understanding that a human network comes to existence first and it, as a subject, invents tools is not warranted.

Hereupon, it was found not easy for the GPN to make their information tools agreeable to individual consumers. Concurrently, a new approach is proposed. Companies and local authorities tend, out of distrust, to consider consumers as "capricious and unwise" and, as a solution, speak of far-reaching grand projects of educating an enormous number of individual consumers. Obviously, a search for a valid solution is blocked by a view of "homo clausus" (Callon, 1998) that a rational computation necessary for a product selection is purely a psychological process (internal to a person) and thus depends on a person's ability.

4.3 Conclusion

The GPN, as it changes its surrounding situation, has to change by itself. We saw that just attempting to modulate a tool will shake the identity of the network itself. It indicates that what is to change is nothing but the constitution of humans and nonhumans, as what is involved here is a practice of humans and nonhumans.

The GPN now seems to have a new objective, to incorporate individual consumers to the hybrid forum it has been promoting. What should be done to attain this objective? It is a practice of humans and nonhumans. What is to be extended is not human alone or nonhuman alone but human-nonhuman network. I suggested that product information provided by the GPN is a result of a collective performance of measurement and computation apparatus, substance reports, accumulated data, human network, and so on. To involve individual consumers, the GPN might need a specific tool that is based on the information the GPN provides but designed to fit to individual consumers' use. The GPN might need, along with a new tool, a new actor separate from itself but closely linked to it, which acts as a mediator between the GPN and individual consumers. Such a measure will save the GPN from breakup.

This conclusion coincides with the argument of Callon et. al.(2002). The paper emphasized the necessity of distributed apparatus of qualification of products. Namely, various specialists and cognitive apparatus have come into play to determine the qualities of goods. Consumers can make spontaneous attachment depending on close interactions with supply intermediaries, be it humans or nonhumans. In addition, it is argued as important to make a tool to let consumers actively involved in determining the qualities of goods, and thus to reinforce cooperation between supply and demand sides.

5. General discussion

5.1 LCA and environmental labeling scheme

As a new dimension of environmental impact is added to conventional dimensions of product selection like price and quality, the role of various stakeholders and various cognitive apparatus become much more important. We saw that, among various cognitive tools, the GPN's tools are criticized as originated in private domain and thus lacking credibility. In order to elucidate the implications of this criticism and appreciate the GPN's activity and tools more fully, I will refer to a large and influential project that the government and environmental specialists are now urging. We will also examine the meaning of stakeholder's participation.

The project is an environmental labeling scheme. The purpose of this scheme is to attach a label to a product and to make consumers informed of environmentally preferable features of the product, so that their purchasing decisions are favorably regulated. So far, three types of labels have been implemented. Type II is a label that companies originate and attach to their own products. This label was criticized as not guaranteeing credibility, and different labels were demanded and constructed. Type I is a label awarded to an environmentally preferable product by a third party, which specializes in environmental assessment. It is aimed basically to nominate the best or better product with the least environmental impact.

A Japanese Type I label called the Eco-mark was launched in 1989. According to the surveys conducted by the GPN, the Eco-mark has been a source of information institutional purchasers consult most frequently. It is awarded by the Japanese Environment Association to top-runner products which cover less than 30% of the market share. When this attains 50%, the label is usually withdrawn. What the Eco-mark is meant to do is to stimulate followers by awarding top runners. Top runners are selected by an assessment committee consisted of various stakeholders. Yet, specialist hearings are organized if necessary and consultation with scientists of various academic

fields is heavily valued.7 It was originally a mere label, but today, reflecting tendency of emphasizing the LCA, it comes to carry detailed product information.

Now, specialists' concern is shifting toward Type III label, which developed most recently and is also awarded by a third party. But unlike Type I, it is not a mere label but includes detailed information of product's environmental impact. The Eco-leaf label, as Type III label, is now being introduced in Japan. It is called EPD (Environmental Product Declaration)8 and carries the results of the LCA (life-cycle assessment).

Then, what is the LCA? It attempts to assess the environmental impact of a product or a service along its lifecycle, from raw material extraction to disposal. Recently, European countries and Japan make much of it. In Japan, a national project "Development of environmental impact assessment and LCA techniques" was launched in 1998.9 So far, more than 1 billion yen (10 million dollars) has been injected into the program. The program aims at standardizing the method of environmental assessment of a product or a service while emphasizing scientifically legitimate knowledge of environmental impact mechanism. It also aims at backing up assessments by providing actual data of input and output of industrial processes in Japan (impact substances and impact categories). To this LCA database, 23 industry associations complied with a request and provided raw data. There is prospect of another 40 associations participating in the near future.

Note also that there is a movement in ISO (international standard organization) to standardize environmental assessment and environmental labels in addition to environmental management system stated above. The LCA method is standardized as a series of ISO14040 to ISO 14049: what are specified are principles and framework, goal, scope and Inventory Analysis, Impact assessment, life cycle interpretation, and documentation format. Environmental labels are standardized as a series of ISO14020 to ISO 14024. Considerations to be included from a lifecycle perspective when to make environmental claim as labels are specified. There is also a movement to standardize Type III label, although an international agreement is still difficult to reach.

5.2 Dualistic perspective as basis

The LCA project will surely have profound influence when completed, as industries or companies have so far not disclosed to each other information about input and output to the environment of their industrial activities. As a cognitive tool, the LCA method and database will surely be an interesting experiment. However, the way this project works would not be as widely expected.

It is apparent from the way practitioners react to the idea of centrally controlled knowledge system. Market practitioners usually question the usefulness of detailed labels as Type III label. They say that it is too difficult for practitioners, let alone for consumers. They also complain that they cannot imagine who will use it for what purpose. Furthermore, as to the LCA methodology, practitioners discern limitation in application. An assessment takes a considerable amount of time, money, and energy. It sometimes takes more than several years to complete one assessment. An assessment is especially cumbersome for products consisting of many parts, like electric and electrical appliances, and especially unsuitable for product technology that develops day by day. The LCA thus can be applied only in limited cases. Besides, as for the data which industries provide, practitioners confess that they are just an average value within an industry, since companies are fearful of a request of price reduction if they present detailed data. If that is the case, correct assessments will not be possible from the beginning, which is exactly the practitioners' complaint[10]. There is another problem of updating the database if not managed by practitioners. In general, practitioners sense that those tools will not achieve the job as claimed by theoreticians.

As far as standardization by ISO is concerned, most of the third world countries oppose it, as they consider standardization of environmental measures as trade barriers. Standardization certainly has positive power to advance environmental policy in general. Yet, it produces at the same time important overflow. It functions to eliminate the possibility of small and medium sized companies (SMC) participating and, in a larger scale, third world countries participating, since they cannot afford to purchase costly measurement equipment or to create and keep database of product environmental information. Standardization is thus intricately related to competing strategies of major international enterprises and of advanced nations.

We will now scrutinize the environmental labeling scheme and the LCA project and unveil what is assumed and intended. We will do this to elucidate the GPN's activity in comparison to those projects.

Logic guiding those projects is as follows. As the market would not reflect the value of nature, assessments of environmental load of industrial activity should be made in some way and let them be reflected in markets. What is crucial there is to make those assessments as correct as possible. Otherwise, they will not be persuasive. For that, the latest sciences and technology should be mobilized. The LCA project thus promotes study on the LCA on one hand and, on the other hand, requests industries to provide data of input from and output to the environment of various production processes. This data is accumulated, combined, refined under scientific knowledge and controlled centrally as public knowledge. Namely, product information is taken out of the place of use, reformed and provided back to practitioners along with a legitimate assessment method and knowledge of environmental impact mechanism. Practitioners here include product designers, decision-makers, and even consumers. Such a procedure is considered as essential to make knowledge authentic. It is considered further that an effective way to

change production/consumption process is to let such authentic information of products' environmental impact flow all the way through the production/consumption process. Environmental labels are thus constructed more and more to reflect such information. That is, as labels evolve, the role of specialists in product assessment is actually enlarged. We could thus conclude that these projects are a far-reaching grand enterprise to regulate economic activity by controlling centrally the method of environmental impact assessment and the provision and the content of environmental information.

We should note that the widespread notion of science is apparently behind this procedure. According to this notion, science is pursuit of the truth and thus occupies public space. It is believed that natural order resides outside of the society (Latour, 1993). Then, what should be eliminated at all cost is contamination of social forces. Therefore, the production of knowledge in a society is placed in the hands of scientists and carried out separately from the actual site of use.

We should also note that there is another important assumption underlining this procedure: that is, a strictly individualistic view of product designing, purchasing decision, or other decision-making activities. According to this view, those activities are after all reduced to psychological processes, internal to an individual. So, whether or not products become environmentally preferable and are sold well depend eventually on designers' or consumers' psychological process.

The argument then naturally develops as follows. In order to change the market, we eventually need to influence psychological processes of designers, decision-makers, and consumers. Furthermore, in order to modulate their psychological process, the best strategy is to provide better information. When we come to know the fact, we will change. We need to provide as much information as possible, to make that information as elaborate, sophisticated, and scientific as possible.

Interestingly, the individualistic view is then coupled with the notion of science (legitimate knowledge in a society) and warrants the validity of the above stated practice. Namely, we endeavor to refine scientific knowledge out of practical site and provide it back to practitioners as a perfect black-box package. Information here is treated as if transferable as a tangible object, as something that can be handed down from person to person.

It is not surprising to find further that, when this measure will not work, we still try to influence agents' psychological process but in a different way: educating individual consumers is one of such options. What is expected there is that consumers acquire enough ability to understand difficult labels. This situation obviously reflects what Latour (1993) describes as purifying practice in modernity. People act as if natural order and social order are completely separate: their belief in natural order and that in social order are respectively so strong that nature and society (and humans) are considered even as ontologically distinct. Latour argues further that we, along with this practice, do seemingly contrasting practice behind the scene. That is, we construct hybrid systems that mix politics, science, technology and nature.

The dualistic view is very adamant and defines what we think we do. It thus sometimes blocks a right solution and drives us into irrelevant proposals. When solving a problem, either order is resorted to but not the both. Speaking of the present study case, the knowledge of product information is pursued in a way to eliminate social influence (yet, in reality social influence of particular sort), while product designing and purchase decision are defined as social phenomena and tries to manage it only through social and psychological manipulation. In other words, natural sciences are requested to come in first to refine product information, whereas social sciences are invoked to change product designing and purchasing decision. Both attempts are made separately and interaction between the two is not even considered to exist.

Consequently, practitioners are not in a true sense participating in knowledge production. They participate in the LCA project but only as a provider of data. Important questions like how to manage and combine data, how to make assessments and what weighting method is used in impact analysis are all left to specialists. Practitioners are only considered as the recipients of knowledge. It is even more so for individual consumers. This also means that nature is not open to debate. On the contrary, as those projects develop, new specialists multiplied, including inventory analysis specialists, impact assessment specialists, and weighting method specialists, and come to intervene in production/consumption process. As Otsuka (2003) rightly pointed out, there will be specialist-layman boundaries everywhere. Consequently, although these projects allegedly help form a consensus in a society to environmental impact assessment, it only functions to reinforce the monopoly by specialists of knowledge production in a society.

The strict individualistic view also inhibits stakeholders from playing a substantial role on the scene and that is not even noticed. Participation of various stakeholders is more and more regarded as important and thus encouraged. However, due to the individualistic view, usual participation procedure remains to be something like letting stakeholders sit in a round table and express their opinions, as in consensus conference and stakeholder meetings. I do not question the significance of such attempts. Yet as a style of participation, it has critical shortcomings. What is intended is still to pump up ideas from stakeholders so as to take them back to designers and decision-makers. An important point is that such procedure suppresses to pay attention to possible involvement of nonhumans. It is a problem yielded by the practice that "participation" is treated as a theme of social sciences.

5.3 Success of the GPN illustrates

Then what should we do? This study showed that GPN exerts power to change the existing market. An important finding is that the GPN's activity is a practice involving both humans and nonhumans----heterogeneous actors and tools. Here, the dualistic view does not help understand the practice. In order to get rid of the fetter of dualism and to explain the practice of human and nonhuman network, the notion of distributed cognition (collective cognition) is useful. Huchins (1995) introduced this term to describe navigation of a ship by ship crew and technology. Likewise, product designing and purchase selection here is a collective process in which humans and nonhumans collaboratively participate. In other words, the act of designing or purchase decision-making is distributed across humans and nonhumans and cannot be regarded as the outcome of, say, someone's internal process. Thus, point at issue here is how to develop a network of humans and nonhumans.

Although the knowledge that the GPN produces is doubted of authenticity, we saw that it is effective in practice. We have to note that those tools are produced collectively at a practical site, i.e. at a site of use. Each stakeholder alone cannot create the GPN's guidelines and database. They are basically to regulate coordinated efforts among stakeholders. By creating guidelines and database, purchasers participate in the process of designing: that is, they do so in exchange of promise to actually buy them. On the other hand, manufactures negotiate conditions for buyers to purchase and thus participate in purchasers' product selection. The process of collective production of knowledge realizes, at the same time, participatory designing of green products and green market. Through the mechanism the GPN provides, the environmental features of a product are effectively modified so that purchasers are more willing to buy. It is also to help creating green markets so that manufactures are more willing to produce environmentally preferable products. Hereupon, the GPN's activity, the practice of human and nonhuman constitution, acts to shake the basis of traditional market.

The GPN's activity is in a sense collective exploration and collective learning. New questions are raised and solutions are reached one by one through contested interaction among stakeholders, which utilizes tools and yields new tools. The GPN's tools are not mere objects but the embodiment of a stabilized relation between the stakeholders, stabilized yet only temporarily. Besides, the practice of the GPN changes the GPN itself, thus the reconstruction of its identity is always in progress.

As a concluding remark, I would like to add that I do not deny the positive influence of both the LCA and environmental label scheme, or more generally of top-down environmental policy. Presumably, the LCA would eventually be an important tool that influences the whole process of production/consumption. Without the introduction of regulative policy in Europe, Japanese companies might not even have adopted environmental policy in the first place. However, those measures will not do the job as claimed by theoreticians. They are not enough for fostering green markets. It is different matter if the knowledge produced outside of the practical side and introduced from there can effectively modulate the practice. We should rather be aware of contested nature of knowledge. In practice, there is always contested negotiation between theoretical and practical knowledge. If we consider that seriously, we should not just rely on the environmental labeling scheme and the LCA project but foster practical knowledge as the GPN tools. We also have to empower an emerging group as the GPN which works to change the traditional market place.

Notes

1 The members include NEC, Matsushita (Panasonic), Sony, Fuji Xerox, Toyota, Honda, Nippon Steel, Canon, Japan IBM, Tokyo Gas, Nissan, Ricoh, Mitsubishi Corporation, NKK, Oji Paper, Suntory, National Environmental Ministry, all the prefectural governments, municipal governments of Tokyo, Osaka, Yokohama, Kobe, Nagoya, Sapporo, Kyoto, Hukuoka, WWF-J, Japanese Consumers' Co-operative Union.

2 As of December 2001, business sites acquired IS14001 amount to 3,675 sites all over the world. Among these, 202% are in Japan, 9% in Germany, and 7% in England (ISO survey).

3 Institutions visited in Europe and North America include International Council for Local Environmental Initiative (ICLEI) : BIG Net, Europe an Commission European Partners for the Environment, Danish Environmental Protection Agency (DEPA), National Procurement Ltd., EKU in Sweden, The Swedish Environmental Protection Agency, European Commission, Environmental Agency UK., the Center for a New American Dream, and the North America Green Purchasing Initiative (NAGPI) etc..

4 Institutions I surveyed have some of the features mentioned here but not all. Features are inclusion as members of local governments, the provision of information tools for purchasers, the construction of information tools, the provision of members' showcase examples of successful green purchasing, workshops, and training sessions.

5 The EKU committee disbanded with a final report issued in 2001. The Environmental Management Council took over the EKU from 2003.

6 A new management system of hundreds of chemical substances is now being constructed involving parts and material manufacturers. A new network called "Green Procurement Association" was formed around some GPN company members, aimed specifically at providing tools for advancing green procurement in a supply chain. For instance, the network attempted to standardize the checklist of chemical substances in parts and materials, so as to lessen the load on part and material manufactures to report to upstream assembly makers. The network of 7 companies at the outset grows now to

be that of 46 companies.

7 I had an interview with one member of the Eco-mark committee. She attested to this feature.

8 According to the Swedish Environmental Management Council, the EPD is a system for science-based, verified and comparable environmental information open for all products and services.

9 There are similar projects in Europe, such as EPS (Environmental Priority Strategies in product design) system 2000 in Sweden and El' 99 (Eco-Indicator) in Holland.

10 Nikkei Ecology, Sep 2001.

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