How to Re-energize R&D Organization in Large Corporations in Mature Industries – The Impact of Hot Groups

by

Hideaki Murata

M.E. Mechanical Engineering
Toyota Technological Institute, 1992

Submitted to the Alfred P. Sloan School of Management and the School of Engineering in Partial Fulfillment of the Requirements of the Degree of

Master of Science in Management of Technology

at the

Massachusetts Institute of Technology
June 2000

© 2000 Hideaki Murata
ALL RIGHT RESERVED
The author hereby grants to MIT permission to reproduce and to distribute publicly copies of this thesis document in whole or in part.

Signature of Author: ________________________________

MIT Alfred P. Sloan School of Management
May 9, 2000

Certified by: ________________________________

Joel Cutcher-Gershenfeld
Visiting Associate Professor of Sloan School of Management
Thesis Supervisor

Accepted by: ________________________________

David A. Weber
Director, Management of Technology Program
How to Re-energizing R&D Organizations in Large Corporations
in Mature Industries – The Impact of Hot Groups

by

Hideaki Murata

Submitted to the Alfred P. Sloan School of Management and the School of Engineering in Partial Fulfillment
of the Requirements of the Degree of Master of Science in Management of Technology at the Massachusetts
Institute of Technology, June 2000

ABSTRACT

Fostering creativity in research and development (R & D) operations, especially in large
corporations in mature industries, is a critical challenge. I hypothesized that very creative
groups, what some have termed “hot groups,” can be formed even in such organizations and that
they may have an impact on the entire organization. A hot group is a lively, high-achieving,
dedicated group whose members are extremely excited to work on challenging tasks. The
principal research questions in the present study are, “What are the kinds of situational settings
where hot groups can arise, grow and sustain in an organization?” and “What are the effects of a
hot group on the parent organization?”

Based on the literature review and interviews, this study concludes that hot groups can be
formed even in cold, hierarchical organizations. Strong sponsorship by senior managers is the
most important success factor for the formation of hot groups. In addition, introducing
fluctuation or “unfreezing” into organizations, forming a creative culture and formulating policies
and systems that stimulate autonomy contribute to the viability of hot groups. In order to
sustain the creativity of hot groups, the importance of what has been termed “virtual knowledge”
should also be recognized by the sponsors and group members. If top management fails to
recognize the achievements and also the effects of hot groups, members of the hot groups often
leave the company, causing the diffusion process to cease. Organizational boundaries largely
impair the penetration of hot groups’ excitement and creativity.

The thesis identified two different patterns in the diffusion process of hot groups into the
parent organization. In the horizontal diffusion model, the excitement and creativity of a hot
group first diffuses horizontally to other people in the parent organization, typically middle to
bottom people. The organization changes from the bottom of the hierarchy. Although this is
the best way to share the virtual knowledge of how to be creative by the bottom people, it may
create disordered chaos in the organization and may take a long time to change the organization.
In the vertical diffusion model, top management of the company jumps into the diffusion process
in the early stages, and establishes policies and systems to facilitate formation of hot groups.
The organization changes from the top of the hierarchy. Although this is the best way to quickly
introduce the hot group concept into the organization in a controlled manner, there exists the
potential for ending up with insufficient “heat” in the organization. The horizontal and vertical
diffusions are complementary and sequential. In order to energize organizations and to make
them creative by the hot group concept, both the horizontal and vertical diffusions are required.

Overall, the hot group can be a powerful tool for re-energizing organizations and fostering
creativity in large corporations in mature industries when they are stuck on the past narrow
incremental improvement.

Thesis Supervisor: Joel Cutcher-Gershenfeld
Title: Visiting Associate Professor of Sloan School of Management
Acknowledgements

I would like to thank Yazaki Corporation for its support during this program. This extraordinary sponsorship has given me insights that I do not think would be possible anywhere else. I am looking forward to helping improve the company by applying all that I have learned here.

I would also like to thank my thesis advisor, Professor Joel Cutchera-Gershenfeld, for his extremely helpful supervision throughout the thesis work. He listened to my interests, and suggested better ways to approach the issues. His thoughtful comments about organizational management will be treasures for my life. I also very much appreciated the time and reflections of everyone who agreed to be interviewed.

I very much enjoyed the experience in the Management of Technology Program. I would like to thank all of my classmates and MOT Program office for their friendship and kindness.

The completion of the MOT program literally would not have been possible without my family’s support. Although they could not come here, their mental support was tremendously important for me. I would like to thank my wife, Miki, and two angels, Keisuke and Yusuke.
# Table of Contents

Abstract .................................................................................................................. 2  
Acknowledgement .................................................................................................. 3  
Table of Contents ..................................................................................................... 4  

**Chapter 1**  
1-1 Recent Changes in Japanese Automotive Component Manufacturers  
1-1-1 Lifetime Employment and Seniority-Based Salary  
1-1-2 Destruction of the Keiretsu System  
1-1-3 Modular Subassembly  
1-1-4 Suppliers Association  
1-2 What to do?  
1-2-1 Kaizen System  
1-2-2 Hot Groups  

**Chapter 2**  
Research Method ........................................................................................................ 20  

**Chapter 3**  
3-1 Yufuin – Hot Spring Resort  
3-2 Matsushita – Home Bakery  
3-3 Grupo Vitro  
3-4 Union Bank of Switzerland  
3-5 Sharp – Electronic Organizer  
3-6 Honda – Compact Car, City  
3-7 Swiss Stock Exchange  
3-8 Xerox PARC  
3-9 Data General – Eagle Computer  

**Chapter 4**  
Formation of Hot Groups and Sustaining Them  
4-1 Conditions that Support the Formation of Hot Groups  
4-1-1 Sponsorship  
4-1-2 Organizational Culture  
4-1-3 Crisis  
4-1-4 Policies and Systems  
4-2 Supporting the Growth of Hot Groups  
4-2-1 Virtual Knowledge  
4-2-2 Sponsorship  
4-2-3 Culture of Hot Groups  
4-2-4 Policies and Systems  
4-2-5 Fluctuation and Chaos  

**Chapter 5**  
Impact of Hot Groups on the Parent Organization  
5-1 Horizontal Diffusion  
5-2 Vertical Diffusion  
5-3 Conditions that Restrict the Impact of Hot Groups
Chapter 1: Introduction

1-1. Recent Changes in Japanese Automotive Components Manufacturers

The automobile industry has grown substantially since the last century. Automotive parts and components industries were established and have experienced substantial, steady growth. In these days, however, not only the automobile industry but also the automotive parts industry has had to change in order to survive. Historically, automotive parts suppliers, especially in Japan, were under very strong umbrellas of automobile manufacturers. They did not always have to be concerned about customers needs or solicit their ideas, because very specific requests were often coming from customers, i.e. automobile manufactures. They have grown up under a competitive environment that was less demanding, compared to some other industries such as the personal computer industry. Because of the growth in a less competitive environment, many of these organizations have come to be inflexible and less creative. Of course, the automotive component industry is huge, with many creative and innovative firms. This focuses more on the firms that are struggling to be more creative.

Japanese automobile manufacturers and their suppliers are known for their capabilities as lean producers. Lean production is a process innovation that was enabled Japanese automobile and component manufacturers to be competitive in the global market. However, since situations are continuously changing, some of the features of the lean production methods were turned into liabilities. Those changes in the situations and also challenges due to the changes are discussed in the following sections.

1-1-1. Lifetime Employment and Seniority-Based Salary

Both the lifetime employment and seniority-based salary could enhance employer – employee relationships and employee participation in management, both of which were the key factors in the success of Japanese lean productions and lean product development\(^1\). Those practices worked very well during the rapid economical growth period of the 1940s to late 1980s. Since the macro-economy as well as individual firms had been growing, firms could raise salaries and create new positions in the organizations. Therefore, companies could make most of their employees happy enough. However, after the rapid growing period, those systems became huge
liabilities. Businesses were not growing as before, and as a consequence, it became much more difficult to raise salaries and create positions. Motivating people with promotions was more difficult under the restrictions of lifetime employment and graded payment by age.

In addition, most Japanese firms hesitated to fire employees who are not contributing to the firm because of the lifetime employment policy. Even though such employees are not doing as much for the firm, the firm still cannot reduce their salaries because of the compensation system graded by age. This situation can easily de-motivate other employees who are contributing to the firm. Their precious creativity may be ruined.

Former president of Toyota, Okuda, said in an interview, “We have changed our compensation system. Now maximum difference in annual salary of employees at our average age is approximately $30,000.” It seems the situation is changing, but is the difference of $30k enough? Here in the United States, the difference would be much larger, and age is not an important factor in determination of the salaries. That way is better for motivating people, although it generates high turnover, and may cause the “money is everything syndrome.”

During the past rapid growth period of the 1970s and 1980s, many Japanese automotive component suppliers suffered from a scarcity of human resources. But instead of trying to encourage people, they tried not to discourage their people by focusing too much on factors such as harmony, equality in compensation and promotion. Encouraging people is not same as trying not to discourage. In harmonious organizations, new radical R&D ideas that may create new businesses or products, but may hurt existing businesses, are likely to be discouraged. Even if an aggressive idea were born from the middle or bottom of the organization, it would be forced to shrink to incremental one through discussion with managers, who often attempt to protect their current business region and tend to be more conservative. During the rapid economical growth period before the 1990s, it was not a serious problem, because their parent automobile manufacturers kindly described what they wanted. In other words, the track for future growth was already well constructed by their buyers, i.e. the automobile manufacturers, which resulted in destroying the creativity of component suppliers. Currently, it cannot be foreseen what the future track will look like. Automobile manufacturers cannot afford to build the track for their suppliers. Therefore, automotive component manufacturers need to be much more creative and create their own future tracks on their own.
1-1-2. Destruction of the KEIRETSU System

The Keiretsu system, in which an automobile manufacturers and quasi-independent first-tier suppliers shared equity each other, worked very well in the 1940s and 1950s for building strong relationships, sharing information and joint product development. At that time, the Japanese capital market was not well established. By sharing corporate equity, suppliers were able to access capital for new investments. According to The Machine That Changed The World, written by an MIT research team\(^1\), Toyota held 22% of Nippindenso (now DENSO), a company that made electrical components and engine computers; 14% of Toyoda Gousei, which made seats and wiring systems; 12% of Aishin, which made metal engine parts and navigation systems; and 19% of Koito, which made trim and upholstery. All other Japanese automobile manufacturers had similar systems. Even now, many of them retain fractions of suppliers' equity.

The Keiretsu system could be another example of the liabilities. Its necessity is highly questionable. Cooperation between an automobile manufacturer and its suppliers is extremely important. However, having a good relationship and retaining equity are completely different. The key in lean production is the good relationship, not sharing stock. In fact, stock sharing creates problems. Frequently, some Japanese automobile manufacturers purchase their automotive parts from their Keiretsu suppliers even if the parts are inferior to those available from Keiretsu competitors in terms of price or quality. This is done because they partially own the suppliers, and therefore are responsible for the suppliers' businesses. That is good example of inefficient vertical integration, which may reduce the transaction costs, but kills the opportunity to find the best and cheapest parts.

The new COO of Nissan, Carlos Ghosn, who was sent from Renault, said in an interview, "We have 1400 suppliers’ stocks right now. We will start selling them with considerations of the profits & costs of retaining them. It is very unreasonable and unpractical to control 1400 suppliers by owning their stocks. It is difficult to control even 100 suppliers. Nissan owns these stocks, but actually could not control them. Selling non-strategic assets and utilize the money for investment or to reduce liabilities is a very reasonable practice, but nobody in Nissan has done that.\(^3\)" After the interview, Nissan’s stock price went up. This means that stock sharing is also not the preference of shareholders. Automotive component suppliers should recognize that the umbrella of their parent automobile manufacturer is shrinking.
There are many non-Keiretsu suppliers in Japan, but they also have been under the umbrellas of automobile manufacturers in terms of new process and product developments. Often, new product ideas came from automobile manufacturers with detail specifications, and the production process developments were supported by their buyers, i.e. the automobile manufacturers. The current competitive environment of the automobile manufacturers does not seem to allow them to continue holding the umbrellas for their suppliers.

1-1-3. Modular Subassembly

In addition to the changes in the industry structure just described, assembly process technologies are going to have a major innovation that will further modify the industry structure. According to The Machine that Changed The World1; “In lean production system, a third to an eighth as many suppliers are involved, compared with a mass-production company, because lean producers assign a whole component – for example, seats – to what they call a first tier supplier. This supplier is in charge of delivering complete seats to the assembly plant. In consequence, Nissan, for example, has only one seating supplier for its new Infiniti Q45 model, while GM, in many cases, is still dealing with twenty-five suppliers providing the twenty-five needed parts to the seat-building department of its assembly plants.” This is called “modular subassembly.”

This has been a major trend in the automobile industry in recent years. Japanese automobile manufacturers and suppliers were advanced in the modular subassembly in 1980s and early 1990s. However, currently American firms are much more advanced in this area. Three American firms, Lear which recently purchased UTA, the automotive division of United Technology, Magna International, and Johnson Controls are well known for their modularization. Also, Delphi Automotive Systems, a spin-off of GM, is intensively working on the modularization. Delphi has just announced its purchase of the diesel fuel injection systems division from TRW for $871 million2. Delphi will now have a very wide range of automotive parts, including various electronic control, fuel control and exhaust systems. Here, the competitive advancement has been reversed between Japan and the United States. It seems the Japanese automotive component suppliers were satisfied with their past strengths and neglected to improve.

In these modular subassembly systems, the responsibilities and risks associated with new product development and the subassembly process technology development are largely shifted from the automobile manufacturers to the component suppliers. The suppliers can no longer
wait for requests from their customers, the automobile manufacturers, as they had been doing before. They now need to proactively search for the input of automobile users and manufacturers, and from the information, craft new products. Their core competencies will thus shift toward creativity. Creativity had been important before, but organizational capability of meeting customer requirements as accurately, rapidly and inexpensively as possible was more important. In order to meet customer requirements, the component suppliers had been trying to systematize their business processes. Most of the business processes had become routine works and therefore been able to provide speed, low cost and accuracy. At the same time, creativity was often sacrificed.

1-1-4. Suppliers Association

Suppliers associations are likewise becoming liabilities. The association was a feature of the lean supply system where all first-tier suppliers shared new findings on better ways to make parts\(^1\). The associations played important roles at the inception of the lean supply system. However, at least for now, the advantages offered by the associations are questionable. There is no knowledge-sharing by the associations, especially in the important area of production know-how. One of the most important tasks of suppliers in the associations is to help automobile manufacturers with their sales activities. Every supplier employee, for example, is encouraged to introduce someone who is contemplating buying a car to automobile manufacturers by filling out certain forms with the person’s name, address and telephone number. Members of the association compete with each other on the number of introductions of potential customers. Thus, its employees in suppliers are acting like the sales forces of the automotive manufacturers.

One Japanese automobile manufacturer partially owns a telecommunication company. Suppliers in the association need to perform similar sales activities for the carmaker’s telecommunication business, i.e. to identify people to join the telecommunication company’s long-distance call program, although it is nothing to do with the automobile businesses.

Automotive component suppliers need to realize that they cannot rely on others anymore. The powerful umbrella of the automobile manufacturer is shrinking, and cooperation with other suppliers is becoming merely a name. In other words, entire industry structure that was protecting Japanese automobile-related industries in its global competition is changing. Each firm is going to be exposed to severe competition. It can represent a change from Japanese
social capitalism to global competitive capitalism. Nobody can avoid the change.

Why did these problems arise? Of course, not all the Japanese automotive component manufacturers have experienced the same situations. However, it seems that there are some similar causes for these relatively common problems.

1-2. What to do?

Japanese automotive component manufacturers need to recognize their problems and change in order to survive. There are ranges of possible solutions for any problems. Systems need to be modified or totally changed. Strategies need to be redefined. In particular, R&D strategies for differentiation in technologies and products are very critical. People and the organization should be one of the main themes in any change.

Henry Mintzberg asserts that; “The formation and implementation of strategies do not have to be separated. Strategies are often crafted while they are being implemented.” In other words, not only is setting strategic goals important but also the people who craft and implement the strategies are important. Employees need to be more creative, and the organization needs to support the employees who are trying to be creative. Many of the component suppliers became too big and bureaucratic to be competitively innovative. Actually, the people, especially the middle to bottom employees, and the organizational management in Japanese automotive component suppliers had been their competitive advantages in the global competition till 1990s. A collective suggestion system and quality circle, called Kaizen activities, is an example of organizational management that emphasizes the participation of middle to bottom employees. Do these systems still offer competitive advantages? Can they be tools to survive the big changes in the industry?

1-2-1. Kaizen System

Kaizen worked very well for incremental process innovation. However, imagine making at least two suggestions every month, and doing that for ten years in the same work place. Can employees remain excited by making suggestions? Can they keep offering excellent ideas for
improvement? It seems that the answer is no. Usually, companies pay a small reward for each suggestion, ranging from $1 to a few thousand dollars, depending on the actual effect of the suggestion. Even for seemingly meaningless suggestions, which account for more than 95% of the total number of suggestions, companies pay $1 per suggestion.

In 1997, the Yazaki Corporation, whose wiring harness business ranks number one in worldwide market share, spent approximately $2 million as the total annual rewards for Kaizen suggestions. They started questioning the effects of the system, and as the result, reduced the amount of each reward. The modification enabled the company to reduce the reward expenses, but also discouraged employees who were once enthusiastic about offering suggestions.

Many other companies in the automotive component industry are questioning the effect of current Kaizen systems. They seem to work for a short period of time, but when they become routine works, the marginal effects come close to zero. In short, the Kaizen systems are becoming or have already become in name only. They have almost become commoditized routine works as any products are commoditized over time.

As product innovation is needed, system innovations are needed to improve organizational systems also. In addition, the Kaizen system is like building stairs by piling bricks, one by one. Such incremental improvement systems might not be sufficient to creatively innovate new products and process technologies in the largely changing environment previously described. Incremental innovation is important, but may prevent a radical innovation if systematic incremental work is emphasized too much in the organization. Senge suggested that, "We are acutely aware of the gaps between our vision and reality. These gaps can make a vision seem unrealistic or fanciful. But the gap between vision and current reality is also a source of creative energy. The gap is called CREATIVE TENSION." Imagine a rubber band, stretched between vision and current reality. When stretched, the rubber band creates tension, representing the tension between vision and current reality. The more the rubber band is stretched, the higher the tension, i.e. more creative energy, can be generated. In short, the automotive component suppliers seem to need higher tension, agitation or hot spices in order to be more creative in this era of on-going environmental changes.

What are some high tension generators or hot spices? This thesis proposes a very hot spice, so-called "hot groups", to make people and the organization more creative.
1-2-2. Hot Groups

A hot group is simply a group of people who are excited about their tasks, are extremely creative and enjoy overcoming difficult challenges. Most people have had such an experience. Maybe at school, putting together a show or preparing a party. They are so creative that they can achieve something unbelievable even for themselves. According to Jean Lipman-Blumen and Harold J. Leavitt, "Hot group is not a name. It is a task-obsessed state of mind, an attitude shared by a group’s members." The Macintosh design group is an example of the hot group. John Sculley described the group as he first encountered; "It was almost as though there were magnetic fields, some spiritual force, mesmerizing people. Their eyes were just dazed. Excitement showed on everyone’s face. It was nearly a cult environment." The group at IBM that developed the first PC and the programming group that developed Microsoft with Bill Gates were also hot groups.

A hot group may consist of hot individuals. Hot individuals often capture the attentions of the public and become heroes. However, in many success stories, the group of people as a whole had actually played more critical roles than the individuals. Soichiro Honda was a successful businessperson who grew Honda to be a globally competitive automobile manufacturer. However, he could not have done that if he had not had Fujisawa and other top managers on his management team. Lee Iacocca could not have rescued Chrysler by himself. When Tylenol was poisoned and several people died, the entire Johnson & Johnson was a hot group. The top management group decided the direction, the public relation group produced videos, the engineering groups developed tamperproof containers, and thousands of employees made more than a million personal visits to physicians, hospitals and pharmacists in a very short period of time. Such huge and rapid movement could not be orchestrated by just the top management group. Many heroes were actually supported by groups of people, i.e. hot groups. Of course, some hot individuals prefer to work alone, and can be more creative in that way. However, there are other personalities and occasions with which groups of hot individuals, i.e. hot groups, can perform much better than the individuals. In this rapidly changing and complicated business environment, hot individuals are not sufficient. Recent automotive components have required hybrid knowledge, for example, mechanical engineering plus electrical engineering plus chemical engineering. The creativity of hot individuals might be amplified if they form a group. One of the objectives of this thesis is to identify such situational
settings where hot individuals come together to form a hot group and create innovations.

Often venture companies are hot groups. Because new venture firms have fewer rules and restrictions, people in the firms can act relatively freely, based on their own thinking. Can hot groups not be born in large organizations? Of course they can, but it seems more difficult than in venture companies because the rules and norms have already been established.

Hot individuals such as entrepreneurs often did not fit to many large organizations, and tend to be treated as poor team players. As a result, they often leave the organization and start their own venture companies. By taking those frustrated R&D people and their rejected ideas out of large companies, and financing the commercialization of those ideas, the venture capital industry was able to producing a 35% return on investment. This means that if the hot individuals remained in the organizations, the organizations themselves could have earned a 35% ROI. Venture capitalists could manage those entrepreneurs very effectively.

Why can managers of corporate R&D organizations not manage them? According to Gifford Pinchot, large corporations fail in innovations because they do not backup intra-company entrepreneurs (intrapreneurs). He found that venture capitalists choose class A entrepreneurs with class B ideas rather than class A ideas from class B entrepreneurs. Thus, they put their faith in choosing the right people and then sticking with them. On the other hand, large corporations would have difficulty, relying solely on the people. They must have procedures to examine any new business ideas or even new R&D projects. Thus, they put their faith in establishing the right procedure or system. However, in this decade, corporate manages have seen a lot of successes achieved by entrepreneurs. Therefore, more and more companies started searching for ways to create and utilize their intrapreneurs. What should they do to grow, retain and utilize the groups of intrapreneurs in their organization? This is another question that this thesis will address.

Growing hot groups in a large organization is not easy, especially if the organization does not have enough flexibility, as is often the case with Japanese automotive component manufacturers. Occasionally, hot groups may be formed, but they may be seen as enemies of the organization, and therefore, they are isolated or simply driven out. There are possibilities that anarchistic hot groups become violent and create chaos in the organization. An example of a violent hot group is a Japanese motorcycle gang. They get together to make illegal runs with tremendous noise.
One of participants described the experience; “We are not in completely harmony at the start. But if the run begins going well, all of us feel for others. How can I say this? ---- When our minds become one, I understand something. All of a sudden I realize, “Oh, we are one.” ---- It is really super." It is a perfect hot group in which members share the feelings, thinking and many other things. However, what they do is illegal. This is an extreme example but is illustrates the importance of managing hot groups in ways that do not generate increased chaos for the organization.

Although there are risks that the entire organization may become chaotic, hot groups present opportunities to change a bureaucratic, inflexible and non-creative organization into a very creative, innovation one. Jean Lipman-Blumen puts it this way in his article; “A few hot groups scattered around the system make excellent organizational alarm clocks. They stimulate and agitate. They wake up sleeping units and release frustrated people who have been held captive within them." Therefore, the third objectives of this thesis is to search for answers to the following questions. How do hot groups affect the parent organization? Under what kinds of situational settings, can bureaucratic and non-creative organizations be changed by hot groups? In what type of circumstances do hot groups create chaos in organizations?

The following is how I visualize the organizational change by hot groups. When I was working on an R&D project for a new glass synthesis technique, called the sol-gel method, we found an interesting phenomenon. The sol-gel method is designed to fabricate glass monoliths or coatings through chemical reaction of metal-alkoxide. The mixture of metal-alkoxide, water, alcohol and catalysts was cast into a mold. It becomes a wet gel, which is then dried and sintered. Using this method, very pure high quality silica glasses can be obtained. Also, glass-shaping works, i.e. cutting, grounding and rough polishing, can be eliminated because the final glass shape is same as the mold shape. In the drying process, wet gel is placed in an oven with many parameters controlled. Usually the wet gel dries from the top-surface of the gel. However, the interesting phenomenon we found was a drying pattern in which dry pockets were formed within the gel. This means that drying was taking place from the inside of the gel. Figures 1 and 2 demonstrate the usual drying pattern and the dry-pocke: pattern.
The opaque dry pockets grew over time and more dry pockets appeared as the gel dried further. Finally, the whole gel became opaque, which indicated it was dry\textsuperscript{15}.

I often see the dry pockets as hot groups that are eager to change their organizations into something that is more creative and innovative. The gel monolith represents the organization. The drying (gel becomes transparent to opaque) represents a change in the organization. As shown in figure 1, the usual drying takes place from the top-surface, i.e. organizational change from the top of organization. The gel tends to crack in this case because of high capillary force developed in pore structures of the gel. On the other hand, the dry-pockets pattern is the change from the inside of the gel, i.e. bottom-up or inside-out organizational change. The gel tends to be dried successfully (crack-free). Thus, the drying pattern with dry pockets could be a desired model of an organization changing to be more creative and innovative.
At first, the hot groups are very small. Over time they can attract more people, involve them and grow in size. Also, over time, the hot groups' overflowing energies are absorbed by surrounding people, and other hot groups are formed. The number of hot groups in the organization increases, and finally the entire organization becomes energetic and creative. Of course, “temperature” and “partial vapor pressures” of alcohol and water need to be very carefully controlled for hot groups to grow properly. If temperature is too high, for example, hot groups can grow too fast in size and in number, and the skeleton of the gel (organization) may be destroyed due to the strain accumulated by the hot groups’ growth. In other words, controlling the growth of hot groups in the organization is critical.

Harold J. Leavitt has observed that “Hot group members are seldom motivated by the promise of bonus or of their material rewards. The challenge of the task is its own pot of gold.” If that is so, activating a large, uncreative organization by hot groups can be particularly suitable for Japanese automotive component manufacturers. Because of their traditional culture, which emphasizes equality even in compensation, it would be difficult and consuming time to change the compensation systems. They can start looking for hot groups and trying to grow them. They then might be able to activate the organization without waiting for the change in culture. It does not mean that the compensation system does not need to be changed. It must be changed. However, changing systems from top of the organization is not the only way of making the organization creative. The hot group can be an ideal way to change the organization with bottom-up fashion. Dual directional changes would be more effective. Workers and management should be organically interactive and should learn from one another.

According to Joel Cutcher-Gershenfeld et al, “We use the term “virtual knowledge” to refer to the sets of understandings that emerge in the course of interactions within groups of people. --- This knowledge does not reside in any one individual, and it is not fully captured in manuals, policy documents, contracts, or other records. Though the knowledge itself is hard to identify, its impact can be seen in the way in which groups and even organizations anticipate and respond to events.” Hot group members certainly share virtual knowledge through intensive interactions, particularly the virtual knowledge of how to be creative, which would be important for hot groups to grow and sustain their creativity. Management and also middle-bottom people
outside hot groups can learn the virtual knowledge by sharing the experience and excitement through interactions with them. Therefore, virtual knowledge is important in the discussion of the impact of hot groups on the parent organization as well. Virtual knowledge will be intensively discussed in the following chapters.

In summary, this research has first focused on current problems being experienced Japanese automotive component manufactures. Circumstances have been changing for these component manufacturers, as described in sub-chapter 1-1. Risks and responsibilities are being shifted from automobile manufactures to the component manufactures in accordance with the trend of the modular subassembly. There are no more umbrellas from the automobile manufactures due to the destruction of the Keiretsu system. Also, in the human-side management, the traditions of lifetime employment and seniority-based salary structures have been changing. Therefore the previous ways are no longer effective. There is a need to change in order to accommodate the changes in circumstances, reactively and proactively. Each change itself should be innovative, and further creativity should be brought into the organizations by the change.

People are creative in the nature, but the organization to which they belong may not be supporting their creativity. Thomas Kiely put it this way; “The problem is not the people. There are lots of good ideas out there. The problem is the system for managing research and development.” Of course, top management in the organization needs to manage its systems and people. Top management should play an important role in generating creativity in the organization. However, there could be a way for creative people at the bottom of the organization to change the entire organization into a very creative one. They may not manage the changes for creativity, but they could be igniters of change. Hot groups have such possibilities.

There are a few articles that discuss hot groups. Most of them are well organized and explanatory. However, more analytical works based on actual cases would be advantageous for many organizations such as the Japanese automotive component manufacturers that need to be more creative. In addition, those articles place less emphasis on the formation of hot groups and the effects of the hot groups on the parent organization. Therefore, this thesis focuses on these two aspects of the hot groups, analytically rather than conceptually. The principal questions that are addressed through the literature review and the interviews are “How are hot groups formed,
grown and sustained in relatively large, cold organizations, especially R&D organizations?” and “What are the effects of hot groups on parent organizations?”

Although the starting point of this thesis are the problems being experienced by the Japanese automotive component manufacturers, the research results are not limited to those firms. They can be applied to any company and organization.

References

Chapter 2: Research Method

In order to address the research questions presented in the chapter 1, a comprehensive literature search was first conducted. “Creative,” “Innovative,” “Intrapreneur,” and “hot group” were the keywords for the search. Only a few articles and books actually use the word, “hot groups” and specifically discuss them. However, there are many articles, papers and books that consider the creativity and innovation in an R&D organization. Numerous examples of creative groups were found in the search. In reality, it is not important to categorize and distinguish the hot groups from any other form of teams or groups for the purpose of this thesis. Most any groups will typically have a period of being excited and extremely creative. Such groups could be called hot groups. According to Lipman-Blumen, the hot group is not a name for another kind of structural unit. It is a task-obsessed state of mind, an attitude shared by a group’s members\(^{18}\).

Although distinguishing hot groups as a category does not make any sense, some common features of hot groups described in literature\(^ {18, 19}\) needed to be used for screening the potential case study materials. Some of such features are listed below.

- Hot groups are very task-oriented teams.
- Members are excited and stretched, and therefore, they can be very creative by going beyond any performance level previously achieved.
- Members work very diligently to achieve their goals, and willingly make sacrifices. They do not perceive what they are doing as work.
- Members often think like children, and sometimes do silly things.
- Members often have standards of thinking and of achieving style.
- Members think through noisy, passionate and often chaotic discussion. When a hot group thinks, it can be heard loudly and clearly.
- Members are encouraged to think differently, and they appreciate different ideas.
- The groups are relatively short-lived. They do not try to live forever. Once the goals are achieved, the members disperse to find next excitement.

Nine groups that appeared to have at least three common features of hot groups were selected for further study. Since distinguishing hot groups by strictly defining their features was not the main interest of this thesis, the “at least three” seemed to be appropriate.
After some preliminary case studies, the case of a project team in US Navy was dropped because it seemed difficult to obtain detail information. Three cases of 3M, Hewlett Packard and Lucent Technologies were also dropped. They are known as innovative companies. In order to see the impact of hot groups more clearly, only the hot groups that were formed in mature and relatively cold organizations were selected for more detail case study. Primary sources of these case studies are listed below.


In addition to the literature-based case study, interviews were conducted to gather more cases to study. By showing research prospectus to faculty and students through either direct contact or e-mail, ten creative groups were identified as potential case study materials. The research prospectus is attached in appendix 1. Among the ten cases, four cases were dropped after applying the criteria described above, and two cases, an NEC’s internal venture company and a special project team in Fuji Xerox, were found to be difficult to interview due to either time constraint of potential interviewee or confidential issue.

The research prospectus and a list of potential questions were sent to interviewees before the actual interviews. The question list is attached in appendix 2. The interviewees were identified by discussing with Professor Jim Utterback and Professor Ralph Katz of Massachusetts Institute of Technology. Each interview was conducted with a key member of the hot groups, talking in face. Later, additional interviews were conducted through telephone or e-mail for some of the cases. The cases studied by interviews and their interviewees are listed below.
- Yufuin – Hot Spring Resort: Hidenori Sato, the president of Creative Systems Lab. He is from Yufuin and is a friend of the leader of the hot group.

- Grupo Vitro: Roberto M. Cabrera, Senior R&D Leader, Corporate Technology, Vitro Corpativo, S. A. de C. V. He was a principle member of the hot group (detergent project).

- Union Bank of Switzerland: Thomas H. Hornstein, Consultant, Securities Management & Private Banking, Comit Financial Systems AG. He previously worked for the Union Bank of Switzerland. He was the leader of the hot group (telephone-banking group).

- Swiss Stock Exchange: Nicolas A. M. Haenni, IT Division, Swiss Stock Exchange. He was the leader of the hot group (real-time data publish group).

The research methods used in this study were opportunistic. The selected cases may not be representative of an entire population, a specific industry or a certain culture context. It may not be appropriate to compare different hot groups in different industries or different countries. Based just on these cases, it is not possible to fully assess the influence of industry or culture.

Another limitation of this research method, especially interviews, is not fully objective. For example, interviewees will be happy to talk about good things, but may be reluctant to talk about bad things, such as bad human relation in the group. Addition or use of archival materials could have certainly made the case study more objective. Although having interviews with multiple numbers of group members as well as people outside the hot group would be more appropriate, time constraint did not allow implementing that.

In this work, the case study methods were not identical. Some cases were learned from literature and some were from interviews. This is because there is only one book that specifically discusses hot groups. Important factors of hot groups were first identified from the book. Then, other books on learning or other topics were used not only to validate the importance of the factors, but also to draw other important factors. The interviews were conducted for further validation and expansion. Those factors were also supported by various articles that are referred in this paper.

References
Chapter 3: Case Outlines

3-1. Yufuin – Hot Spring Resort

In the 1980s, the Japanese economy was still growing, and the Japanese currency, the yen, was extremely strong against any other currencies, including US dollars. Therefore, many people traveled abroad. This trend caused serious harm to domestic tourism industry in Japan, including the resort called Yufuin. In addition, by that time, the domestic tourist industry had matured, and therefore, price competition was becoming intense. Many tourist resorts attempted to attract tourists by incorporating a modern Western atmosphere. They built, for example, modern hotels of the type found in New York and served French food. Yufuin Hot Spring Resort was not a famous one, and hotel owners there could not pursue such a strategy.

A young energetic man, Kentaro Nakaya, returned to his hometown, Yufuin, to run his father’s business, a traditional Japanese inn, because his father had died. Previously Nakaya was an assistant movie director in Tokyo, and he loved the job. Although he wanted to remain in the exciting city of Tokyo, and continue on with his exciting job, Nakaya decided to help his family and Yufuin. At that time, the occupancy rate of his inn was very low, as was the case of all the hotels in Yufuin Resort.

Nakaya often socialized with his childhood friends, most of whom were also in the tourism industry. They complained about the trend of traveling abroad, and they subsequently decided to do something about it. Soon a group of young 27 to 35 years olds was formed. It was certainly a hot group. They talked every night for entire night about the future of not only their inns and shops, but also about all of the Yufuin Resort. The group grew in size with people who were likeminded in their desire to bring change to Yufuin. Nakaya recalled that “Our goal was not very clear. Maybe the goal was to make Yufuin the best hot spring resort in Japan. But I feel we just wanted to be exciting by doing anything.”

The group decided to go to Europe to learn about Western tourism. Since they did not have enough money, they had to borrow money, as entrepreneurs do in these days to start their new businesses. What they found on their trip was that many Japanese still feel very comfortable with their traditional culture. People who want to feel excitement and different cultures like to travel abroad. However, Nakaya and his group saw many Japanese travelers who were carrying soy source and pickles with them, traditional foods of Japan. Many travelers chose Western
foods on the plane when going abroad, but most people had Japanese food on the return flight. Also, they noticed that people looked relieved and relaxed when they arrived in Japan.

Nakata and his group observed; “Many Japanese people still want to have green, peace, calmness and old traditions. They may want to experience something totally different, but willingly come back to traditional Japan after the excitement. Modern concrete buildings can not provide the relaxation, Yufuin’s old style wooden environment can do that. We already have the comfort to provide. We do not need to build concrete hotels. We just need to provide some excitement.”

After they came back, they developed several plans to attract tourists. Even though they were weary from their work in their business, they got together every night to discuss their plans. They decided to ask some elders their opinions about what they were doing. Although their plans were not something to deny Yufuin’s traditional business method, elders did not want to listen to them. The culture in not only Yufuin, but also most of countryside was very conservative. In such communities, there were solid hierarchies based on seniority and many implicit rules that people had to follow. The circumstances were very far from the entrepreneurial environment in the United States, which is flat, loosely ruled, flexible and independent. Thus, the group worked alone on the plans. Nakaya and his group held several events, including the Yufuin Oscar event and a screaming contest. Those were successful in attracting Japanese tourists. The success also attracted some of the young people of Yufuin. Some joined the hot group. Others formed another hot group and worked together with the original one. One such group was composed of farmers in the area. The farmers provided organically grown vegetables. For them, it was beneficial because they did not have to worry about variation in demand. It was also beneficial for hotels and inns because they could be certain about the supply of high quality fresh vegetables. None of the members knew anything about supply chain management, but they somehow come up with an excellent supply chain.

The energy and excitement of the hot groups infected other members of the community. At first, youngsters joined, then the middle ages. Finally, even the elders got involved. The hot groups could obtain community-wide collaboration. The number of tourists visited Yufuin rose from 700,000 to over 4 million annually.
3-2. Matsushita – Home Bakery\textsuperscript{20)}

Household appliance, especially the kitchen utensil market, is a mature industry. Prices have been very competitive over the past 20 years. Matsushita Electronic Industrial Co., Ltd. was traditionally good at cost reduction by incremental improvement. In 1983, Matsushita top management decided to shift its business focus from household appliances to high-tech industrial products, because price competition for household appliance became even more severe as a result of new market entrants from some of the newly industrialized countries. Accordingly, three household appliance divisions were combined into one to eliminate duplication of efforts. However, the combined division could not significantly improve its perform for 3 to 4 years.

People in the division were concerned. They loved their jobs, and were proud of their products and the company. But they felt the possibility that the company might decide to get out of the household appliance business. In addition, because three divisions were merged, there was much confusion and conflict in the organization. Everyone in the organization knew they needed to change, and that they needed to launch new products, but did not know what to do.

The idea for automatic bread maker was brought to the planning team of Matsushita by a parts supplier. (Recall, this is what Japanese automotive component manufacturers are expected to do.) The planning team saw a potential for success because Matsushita already had the technologies of microprocessor controllers, thermal electronics, motors and heaters in many of their existing products, e.g., rice cookers, food processors and hot plates.

In 1984, a project group was formed by general manager Keimei Sano. His strong sponsorship had a significant influence on the group’s activities. Although the group was unofficial, members could get the full support of the division. There was no marshaling event to turn the members hot. They naturally got excited, perhaps because of the virtual knowledge, which is “We need to change to be more creative.”

The group, which consisted of 11 members, was multi-functional. The leader was Masao Torikoshi. Their goal was very clear to develop a product that consumers could use to make professional bread at home. They struggled to achieve the goal. Then one day, one of the members, Ikuko Tanaka, presented an interesting idea. She proposed to go to the best bakery in Osaka and to ask the famous chief chef to teach her how to make the best bread. Other members thought that her idea was not realistic because their proposed new product would
compete with the chef and thus he would not be willing to help them. However, the members were willing to try. It turned out that the chief welcomed the group.

Many techniques used by professional bakers involve tacit knowledge. Bakers could not explicitly describe their techniques. Thus, Tanaka had to learn those techniques by actually making bread with the professional bakers. She also needed to transfer the tacit knowledge that she acquired to other members of the development group. The only way to accomplish that was to work together and to share experience. Thus, several more engineers were sent to the bakery. The general manager, Sano, recalled, “Since it was so difficult for the professional baker to explicitly tell his tacit knowledge, we thought engineer had to become bakers.” This process fostered a culture in the group that encouraged doing things together and sharing experiences thus sharing the excitement.

As the result, the group finished their development work in 1987. In the first year, 536,000 breadmakers were sold, and they were at the top of the list for Mother’s Day gifts. This success story has been described in Fortune. The success of the Home Bakery development group had major impact not only on the division, but also on the entire company. First of all, the success of the breadmaker group provided the whole division with confidence and eager to develop new innovative products. As a result, an automatic coffee brewer with a mill function and a rice cooker with an electromagnetic heater were developed. Both were innovative in the market and achieved great success.

The effects of the hot group were not limited to the division. It affected entire company. From Tanaka’s experience in the professional bakery, the company learned the importance of sharing knowledge via cross-functional communication and collaboration. These factors led to success in another business unit: a high quality TV known as The One was developed concurrently and multi-functionally. Also realizing the value of young people’s opinions, Matsushita established Human 200-people Committee, where selected 200 young people come together periodically to talk about the future of the company. Their opinions provided feedback to corporate top management.

In addition, the top management introduced a program to reduce working time. They thought that the low efficiency in the office routine work was eating precious time for creativity. The program, called Mind & Management Innovation Toward 1993 (MIT’93), utilized its strength of incremental improvement to reduce routine office work in order to generate time for creativity.
Matsushita’s culture was known to be conservative. The Home Bakery project injected creativity and risk-taking attitudes into the culture.

3-3. Grupo Vitro

Founded in 1909, Grupo Vitro’s primary business is glass fabrication. It is the largest glass firm in Mexico, with an annual revenue of $2.4 billion and 33,000 employees in 1999. Its shares are traded on both the New York and Mexico stock exchanges. Grupo Vitro currently has 5 business units: flat glass, bottles, glassware, diverse industry, and a joint venture with Whirlpool. The diverse industry division produces plastic and aluminum containers, soda ash, sodium silicate for detergents, fiber optics, and many others. The company’s management style has been very traditional. Seniority is an important factor in the organizational hierarchy.

Grupo Vitro’s corporate technology department is responsible for corporate R&D, technology planning, and various systems for generating creativity. In 1996, the department established what it called a “technical community.” Anyone in the company could join. They were all of them were connected via a local area network (LAN). Technical information was shared by members in R&D, process engineering, manufacturing and other divisions.

Scheduled conferences were held every month to reinforce face-to-face communication. Also, unscheduled meetings with other divisions were highly encouraged. In addition, the corporate technology department designed a system called “Special Projects,” whereby an individual who had an idea could present a proposal. In fact, the proposal could be made even before a feasibility study was conducted. Proposed projects were then screened by the top management team. If an idea is approved, the owner of the idea could dedicate his or her time to the project. Also, he or she could get colleagues from anywhere in the company, including the marketing and finance divisions. The group was given independence and freedom. The only obligation was to report periodically to the top management team. If the project achieved a commercial success, the group would be given 2% of sales for 3 years. After the implementation of the system, several projects were approved and started. However, all of them except only one were initiated by senior managers.

In 1998, several engineers were chatting at a technical community conference. One of the engineer noted, “We use same raw material (sodium silicate) for both glass and detergent
fabrications. Why can’t we make a new detergent by using our glass fabrication process? That is much simpler than the current detergent fabrication process.” This observation triggered a new product development project. The idea owner recalled, “If we had not had the cross-divisional technical community, where we could think without having any divisional boundary, we would not have been able to come up with this simple idea.” They quickly summarized the new project idea, including possible solutions, and applied for the Special Project status. The feasibility study was soon approved. The group started working on the project with much excitement because it was the first Special Project initiated by middle to bottom engineers without directives from corporate senior managers.

The group successfully proved the feasibility, and then stepped it up to process engineering. The production costs of detergent were substantially reduced as a result of the new fabrication process. In addition, they found that the detergent produced by the new process had higher performance than the conventional method. Still another benefit is that the new fabrication process emits less carbon dioxide and other potential pollutants. The project is now under process engineering for mass-production and business development.

Although the commercial success of the project is not guaranteed, the potential success has encouraged other engineers to propose their own ideas freely. More and more autonomously initiated projects are coming forth.

3-4. Union Bank of Switzerland

Union Bank of Switzerland has a unique system for its R&D. The Information Technology Lab. was established to foster creativity. The lab was separated organizationally from the other divisions of the Bank. In contrast to the traditional and conservative atmosphere of the bank itself, the lab had distinct freedom. Engineers wore casual clothes, were very independent and could come to work late. They were free to work on almost any projects they wanted to, and could have sufficient funding without enduring struggles and politics. They were encouraged to maintain close communications between projects. They also conducted frequent technical conferences. Most of engineers in the lab were fresh out of school. They typically worked in the lab for 3 years, and then were transferred to various divisions in business units.

One day an engineer got an idea dealing with telephone banking. The telephone banking is
now very popular, but not in Union Bank of Switzerland in 1991. The telephone banking system he had thought of was very innovative. His concept involved voice recognition and speech synthesis, which would enable customers to listen to their e-mail over the telephone, without having to use their computers or cellular phones, and with a very user-friendly interface. The engineer discussed his idea with three other engineers, and they all agreed to work together. In two years, they developed a prototype, and presented it to corporate top management and the R&D managers of business units. But, none of them expressed any interests. The engineer recalled, “Union Bank of Switzerland is the most conservative bank in Switzerland. They did not want to take a risk, or maybe they did not understand the benefits of the telephone banking system.”

A few months after the presentation, a competitor of the Union Bank of Switzerland announced its 24-hour telephone banking service. The competitor’s system was quite simple; there was no voice recognition and no computerized data transfer. Instead, have operators simply answer the questions of callers. Right after the competitor’s announcement, the telephone banking system development project became a top priority at the Union Bank of Switzerland. A group from divisional development department was assigned to join the original development group. They were more business-oriented. The leader of the original hot group also felt that they did not appreciate his group’s results. They treated the original hot group as no more than perfunctory advisers. In fact, they actually did not want the group to take leadership role. Therefore, they contacted outside venders to re-develop the system. The system that finally evolved was far from the hot group’s prototype. According to the hot group leader, perhaps it was more reliable, but it was much less technologically advanced. “I understood that reliability is the most important for this very conservative bank. But this system would not give any competitive advantages,” he said. His opinion was nonetheless ignored. In 1994, a telephone banking system was introduced at Union Bank. Soon, the leader was transferred to a Hong-Kong branch.

According to the leader, many engineers in the Information Technology Lab felt that the bank was not really trying to exploit their R&D efforts in the business, although the bank had been spending a lot of money for their autonomous projects. They were happy doing R&D autonomously after coming out of school, but they did not feel that they were belonging to the bank. Actually most workers at the bank perceived the lab engineers as being isolated outsiders.
Therefore, almost half of the lab engineers left the bank before or when they were told to move to divisions of business units.

3-5. Sharp – Electronic Organizer\textsuperscript{22)}

As was the situations with household appliances, the calculator market was mature by the 1980s. Price competition was severe because of not only competition from Japanese makers, but also from the entry of newly industrialized economies (NIES) companies. The future of the Sharp’s calculator business was highly uncertain. In 1985, an R&D project team was convened by Toshio Honda, a product development manager in the Calculator Division. Their target was to develop a value-added calculator that works as not only a calculator, but also an address book, a dictionary and a daily scheduler. Sharp’s R&D system, called Urgent Project System, enabled a project leader to assemble members cross-functionally without the need for obtaining approval from their managers, and to have the same authority as corporate directors during the project period. Since a gold-colored badge was given to the leader, the project was called the Gold Badge Project. The group reported directly to president of the company, and had no limitation on its R&D budget. Certainly, this kind system will be helpful for growing creative hot groups. Sharp already had certain soil for creativity, unlike the cases of Matsushita and Yufuin.

The electronic organizer development team got the Gold Badge. The team had 8 young employees gathered cross-functionally. The team leader was Hiroshi Nakanishi. The average age of the members was 32 years old. They were extremely excited to work on a Gold Badge project. The excitement was further enhanced by the short deadline of one year. The group had the strong sponsorship of Toshio Honda, a corporate director at that time.

The team finished making a prototype within one year, and presented it to corporate top management. Unfortunately, top management decided to terminate the project. This is not unreasonable. Even hot groups can fail.

The group members were depressed, and members from other divisions went back to their original jobs. However, some of the members of the Calculator Division could not give up. They discovered what was wrong. They knew from market research that many users wanted to use Chinese characters with the product. The members, including the leader, became even hotter, and asked to be allowed to continue the project, not as a Gold Badge project, but as an
ordinary divisional undertaking.

It was approved. Again the corporate director, Honda, provided strong sponsorship. Because of the hotness, the group solved the problem of not having Chinese character entry and display in only two months. Sharp commercialized it, and sold more than 5 million of them, which accounted for a 70% market share. Interestingly, while the group existed in an incubator of the Gold Badge, they could not identify the solutions, but once they were removed from the incubator, they solved the problem in a very short time period.

After the success of this project, top management established other systems in addition to the Urgent Project System in order to encourage further creativity. Top management realized that that system alone was not sufficient and that there should be systems that provide more chances to a wider range of people. The new systems allowed creative groups of people to develop their ideas in their own division to a certain level that could be designated as a Gold Badge project. Also, an intra-firm position-offering system encouraged the formation of cross-functional creative groups within a division. Under the system, an engineer from any division could apply for a position offered by any intra-divisional R&D project. This gives a great deal of flexibility to human resource re-allocation, which prevents engineers from adhering to a particular mind-set, which in turn helps to foster creativity.

3-6. Honda – Compact Car, City\(^{23, 24}\)

Honda had substantial growth in 1970s, 1980s and 1990s. The first quantum leap was achieved with the success of the Civic and the Accord. Both of them were successful in the Japanese and the US markets. In 1978, top management at Honda built a strategic intent, “Adventure,” and formed a development team for a completely new car. This case is an example of a hot group formed under non-crisis circumstances.

Very young (average age of 27) engineers and designers who really love cars were gathered by the founder Souichiro Honda. Such a team formation was extremely unusual in Japan at that time, especially in the automobile industry, where a hierarchy of position as well as a social hierarchy of seniority were important factors in the community. Such young employees were supposed be in training, and were not typically allowed to freely express their opinions in most companies in the automobile-related industries. Honda could do that because of the very strong
leadership of Souichiro Honda. Without such strong sponsorship, the group could not have developed an innovative car. From this case, it can be seen that even under non-crisis circumstances and on non-preferable soil, a creative R&D group could be formed if top management of the company provided strong sponsorship.

The top management at Honda gave the team freedom. The only one request was to “Do something different enough to capture the youth market.” All the members of the group including leader Hiroo Watanabe, got very excited. Watanabe first tried to create a slogan to explicitly describe his tacit goal. He came up with “Automobile Evolution.” Then, the question was how an automobile evolves. After intensive discussion, the team came up with another slogan, “Man-Maximum & Machine-Minimum.” It meant to maximize space for man and minimize space for machine. It was a challenge to the common wisdom of Detroit. These concepts helped the team share the members’ virtual knowledge with other people in the organization, and to involve them in further product development.

The car that the group developed was very innovative in its style and function. It was called “Tall Boy,” a car shorter, taller and lighter than most, a packing concept that promised a roomy interior, superior acceleration and miserly fuel consumption. Honda acquired a substantial market share in the market segment for young consumers. As a result of the success, senior people came to realize the importance of listening to young staffs.

This whole process created a culture of innovation in Honda. For example, Honda often holds informal meetings, called Brainstorming Camps, to conduct detailed discussions to solve difficult problems in development projects. The meetings are usually held outside the workplace, often with sake being served. People who are not members of the projects can join the meetings if they are interested in solving the problems. In the discussions, people do not care others’ positions or status. The only taboo is criticism without constructive suggestions. The new culture, which encouraged creativity, is one of the critical success factors of Honda’s innovative new product development processes.

Honda purchased an old factory from Peugeot located in China, and formed a joint venture with a Chinese automobile manufacturer for production of the Accord in July 1998. Honda’s 24 employees were sent to China. They encountered a lot of new experiences there. For example, in the Chinese automobile industry, dealers do not usually provide maintenance and after-service. Honda believes that service and maintenance are very important aspects of automobile business.
Those present the best opportunities to listen to the voices of the customers. The Honda’s marketing people in the initial project group, therefore, had to explain the necessity of having service and maintenance functions to the Chinese car dealers, and also to convince Chinese government of the benefits.

They established the sales network in only several months. Purchasing people traveled to every city in China and selected suppliers in only 5 months. Process engineering and manufacturing people renewed and improved all the necessary equipment without a major investment in only 17 months. Although there was no significant innovation in the production of the new manufacturing company, the approaches used by the initial project group were certainly innovative. They had to be much different from the ways used in Japan, Europe and the United States. Surprisingly, the average age of the creative group was 55 years old. So, it is the generation that created an innovative compact car, City, in the late 1970s.

According to Business Week, Toyota recently formed a marketing team in the United States called Genesis. The team consists of 8 young staff 20 to 30 years of age. Toyota’s cars are well supported by older customers whose average age is 46, but they do not attract younger people. The team focuses on young customers. The marketing team of Toyota resembles the Honda’s compact car development group.

3-7. Swiss Stock Exchange

The Swiss Stock Exchange has a long history. The organization is relatively solid, and the management style is traditional. In 1997, a group was formed to consider and conduct technical customer support at Geneva Stock Exchange, which soon merged with the Zurich Stock exchange to form the Swiss Stock Exchange. The new headquarters were in Zurich, which fostered discomfort from the people in Geneva. Historically, there were communication barriers between the people in Geneva and the people in Zurich, which was caused by language difference and some cultural prejudices. Tension between two organizations rapidly intensified, and many ensued as a consequence.

The group consisted of 9 people, four were computer scientists, while the others were translators or administrative persons. Since the Geneva Stock Exchange had matrix organizations, all the members had different supervisors. Their primary responsibility was to
solve technical problems for customers, especially banks. The workload of the technical customer support people fluctuated substantially. The services of 9 people were for the highest peak of support needs. However, the Geneva Stock Exchange kept all the 9 people fulltime for the task because it was emphasizing customer satisfaction activities. Therefore, the group often had some free time available, at maximum, 50 to 60%. One of the group members lamented, "That implies how inappropriate the top management's resource allocation was."

One of the members came up with an idea to fill the empty time slots by establishing an Internet server for real-time stock information display. The information included things such stock prices and Index like S&P 500 in the United States. Customers can access the real-time data through Internet. Such a system is very common now in many countries, but was an innovative idea at the time. All of four scientists in the group were interested in developing the system. The leader of the group talked to top management and convinced them to approve the project, albeit unofficially. They worked very diligently. They were the last persons to leave every evening. Since such an independent project environment was so unusual in the organization, the members were very excited in being different from the rest of the organization. They soon established a system and opened a web site (http://www.swx.com/index_en.html). It provided the quickest and best data for customers.

Partially because the entire organization was in chaos because of the merger, and partially because of its unusually independent working style, the group was isolated in the new organization. They wanted to increase the variety of available data and modify the system to make it more convenient for customers to use. To accomplish that, they needed to obtain the cooperation of the other divisions for the data collection. However, they had a very difficult time getting cooperation, especially from the Zurich divisions. The leader recalled, "In the new organization, it seems everybody sees others as enemies. People were so suspicious on anything. Also maybe because we were working so differently from others, I could strongly feel jealousies of people in my level, middle managers."

The group encountered some boycotts in their attempt to access data from some of the middle managers. They often heard the criticism, "They are not working, just fooling around." Their working style was actually very different from others. Most of middle managers said "yes" to whatever top management wanted, but the leader of the hot group said "no" if he did not agree. Many people criticized that attitude. They said the leader was selfish. But the members of the
group were very proud of the leader. The leader had long hair, which was uncommon in stock exchange business. It was also another seed for other middle managers to criticize the leader and group, but attracted younger people. The whole group was further excited by being isolated and unofficially supported by young people. The presence of enemies often energizes people. For the group, all middle managers were the enemies, who actually fueled to the group’s hotness.

The group finally completed the new system development after struggling with the bureaucracy. Even then, a lot of people wanted to eliminate the group. Eventually the leader and most of the group members left the company. When the leader was about to leave, he told his manager, “Please make sure the real-time stock information site is running.” The manager said, “Oh, I don’t care. This whole Internet thing is just a fad.”

No significant changes were introduced into the organization by the hot group. The organizational culture was still bureaucratic from the group leader’s point of view. Many young people seemed influenced by the group, but they could not form new hot groups, likely because of extremely strong pressures from internal enemies. Many of them actually left the company, too. As the result, the Swiss Stock Exchange suffered from high turnover of young, talented people.

There was a mentor who sometimes supported and gave suggestions to the group. Although his position was high enough, a corporate director of Computer Science Division, he did not actively support the team. Even when the development project was over, top management, including the mentor, did not attempt to tap into the group’s energies and creativity, and to establish systems that could stimulate excitement and creativity.

3-8. Xerox PARC

In early 1970s, a visionary psychologist, Bob Taylor, established Xerox PARC and became a director. It is located in Stanford Industrial Park, near Palo Alto, California. The task of the lab was to provide Xerox a head-start in developing the office of the future.

Its researchers were independent, irreverent and extremely motivated. They invented the first high-speed computer networks and the first laser printers, and they devised the first user-friendly computers, with intuitive graphical displays. However, Xerox never became a major player in any one of these product areas.
Xerox Corporation and PARC could not develop a critical linkage between them. Although Xerox had itself been founded based on a brilliant technical invention, it missed its opportunity to exploit other technical inventions that might have allowed it to dominate the whole gestating PC industry.

3-9. Data General

In 1978, the “Eagle Computer Project” was instituted by the project leader, Tom West, at Data General. The project group initially consisted of 15 people. They were located in the basement of Data General, in Westborough, Massachusetts. Their target, to build the fastest computer in the world in one year was very challenging.

The team seemed to think of itself as an independent, entrepreneurial group within the company. The physical separation from other functions of the company, i.e. they were located in the basement, certainly helped to foster the group’s culture. Only a few members wore jackets and ties. The rest dressed casually. The leader, Tom West, gave the members freedom and fostered autonomy. One of the members described the autonomy: “We got our commitment to this project within ourselves to put extra effort in the project.”

As the project progressed, the group needed more people. Because of space limitations, the members were to close each other, physically and mentally. One member recalled, “Knees were practically touching.” The group was indistinguishable from any other groups, except at night. More lamps burned than elsewhere in the basement. Betty Shanahan, the group’s lone female engineer, described their work style: “You can end up staying all night. You can forget to go home and eat dinner.” Certainly the group was very excited and worked extremely diligently without getting extra pay for working overtime. The excitement was further enhanced by hiring and working with engineers right out of school. It was self-reinforcing excitement. Each member got further excited by noticing that another was excited. In addition, the existence of a rival, another computer project at Data General called North Carolina, made the group even hotter. The rival was bigger, had more people, stronger political power and more recognition from top management.

The group achieved their technical targets in only one and a half years. By early 1981, the dollar value of orders for Eagle computers represented more than 10% of the value of all new
orders for Data General. The commercial name of the Eagle computer was Eclipse MV/8000.

In spite of the group’s efforts and its success, many members felt that they had been neglected by the company. The leader, Tom West, was transferred to a marketing-related division. When he was out of town, some of the group members moved his belongings to his new office. When they got upstairs, in their words “distant country,” they were lost. They had to ask directions to West’s new office, from “some stranger in a suit.” His new office was as small as his old one, very narrow and windowless. Going back downstairs, one member, Alsing, had the feeling he had just attended a funeral. Far from being rewarded, they all felt unappreciated by the company.

At around the same time, Data General released a disappointing financial report. As a consequence, an unusually large number of people in crucial positions left the company, including Tom West. The company sent psychologists to visit the group and distributed questionnaires. These seemed designed, one young member of the hot group felt, to find out what was wrong with the group. He could not understand why they were being asked that questions, given what the group had accomplished. They were not just being neglected, but even punished for what they had done for the company.

References


37
Chapter 4: Formation of Hot Groups and Sustaining Them

Jean Lipman-Blumen and Leavitt explained how to treat hot groups in a corporate organization. "It is useful to think of hot groups as more like plants than manufactured products and view organizations as potential farmers of hot groups. Companies can manufacture lots of bicycles, but they can’t manufacture even a single kernel of corn. Farmers can’t manufacture corn either, but good farmers know how to grow lots of it. They do it by seeding, feeding, weeding, and fertilizing, and they water generously. That’s also the way companies can grow corps of hot groups." According to the two writers, hot groups can arise quite spontaneously in many organizations, like weeds. A hot group may begin over lunch when a few friends start kicking around an idea. In some companies, though, members of such a newly born hot group may feel that they had better not mention their radical idea at work because they might be seen as misfit people. Or they may simply give up because they think the organization does not want them to pursue the idea. At many Japanese automotive component manufacturers, where harmony and equality are strongly emphasized, hotness can be quickly undercut. It would be interesting to investigate on what kind of feeding, weeding, fertilizing, and water are suitable to grow the hot groups, as well as what kind of soil and weather are suitable for new hot groups to arise in relatively large corporate R&D organization.

In this chapter, I will discuss how hot groups are formed, especially particular soil and weather for embryos of hot groups to be formed. Then I would discuss particular fertilizers, water and weeding to grow and sustain their creativity.

4-1. Conditions that Support the Formation of Hot Groups

Based on the case studies and the literature review, there appears to be no strictly defined set of conditions for the formation of hot groups. Hot groups can arise under many different circumstances. However, four factors -- crisis, organizational culture, systems and sponsorship -- are important for the embryos of hot groups to be formed.

4-1-1. Sponsorship

According to Rosabeth Moss Kanter, power is necessary to go beyond any formal established
position in order to create innovation. Also the power needs to be circulated in the group when some people have too much unused power and others too little. The principal sources of the power are excitement and sponsorship\(^{30}\). Sponsorship of a very senior person was extremely important in most of the cases studies examined in this thesis.

In the case of Data General, the leader of the hot group played two important roles, leader and sponsor. As a sponsor, he shielded the group from the bureaucracy and politics of the company at the inception of the hot group.

In the case of Matsushita's Home Bakery, the general manager, Keimei Sano, allowed the group to work on their idea unofficially, and put his efforts into making the pilot project an official one. It is easy to imagine how difficult it was to form the hot group in a conservative culture. Sano also helped the group form a cross-functional team, which can enhance the creativity of a group by encouraging the members to share their perspectives.

In the case of Honda's new compact car development group, top management, especially the founder, was the sole driver of the formation of the development group. They foresaw the necessity and intentionally formed the group in the context of an organization that had been getting too big and too bureaucratic. They also provided the freedom, the autonomy and creative environment for the group to be hot.

A corporate director of Sharp, Toshio Honda, sensed the necessity for changing Sharp's traditional way of doing R&D. He introduced the tacit knowledge into a group of people and attempted to convert it to virtual knowledge. In that sense, he played an important role in the formation of the development group. Honda also helped the group form a cross-functional team. When Sharp's top management evaluated the group's first prototype and refused to continue the project, Honda encouraged the members of the hot group, and allowed the project to go on as a divisional R&D project. Responding to his great sponsorship, the group got even hotter, and solved the problem in only 2 months.

There were no particular individual sponsors in the cases of Grupo Vitro and Union Bank of Switzerland. However, both firms had creative policies and systems in place that stimulated the formation of hot groups. The hot groups in those organizations did not have to depend on senior sponsors for formations.

There seemed to be no sponsors in the case of Yufuin Hot Spring Resort. Everything from the initiation to the actual formation of the hot group was done by the groups of people, including
the leader, Kentaro Nakaya. The reason why the group did not need any sponsorship was that Yufuin was not a corporation, but a community. There were hierarchy and bureaucracy in the community based on seniority, but there was no clear hierarchy of status and positions. Therefore, perhaps it was easier for the groups to do new creative things in the community without the benefit of sponsorship. In addition, the parents of most of the members were part of the community, and they may have given hidden support to the members, i.e., they may have functioned as sponsors.

In contrast to these cases, no obvious senior sponsor was present in the formation of hot groups at the Swiss Stock Exchange. The hot groups formed without the aid of any sponsorship. In this case, however, we see why sponsorship is necessary for the hot groups to be successful. A key reason of the failure of the hot group at the Swiss Stock Exchange was the lack of support from a senior sponsor.

4-1-2. Organizational Culture

Shapero discussed the environment for creativity in his paper. He described the characteristics of creative organization as follows.

- Open channels of communications are maintained.
- Contacts with outside sources are encouraged.
- Non-specialists are assigned to problems.
- Ideas are evaluated on their merits rather than on the status of their originator.
- Management encourages experiments with new ideas rather than making "rational" prejudgments.
- Decentralization is practiced.
- Much autonomy is given professional employees.
- Management is tolerant of risk-taking.
- The organization is not run tightly or rigidly.
- Participative decision-making is encouraged.
- Employees have fun.

Thamhain and Wileman studied the drivers of creativity. The drivers they proposed include the following.
• Professionally stimulating and challenging work.
• Professional growth potential
• Freedom to choose decision-making
• Good overall direction and leadership
• Tangible rewards
• Mutual trust, security and open communications
• Proper experiences and skills
• Sense of accomplishment
• Good interpersonal relations among team members and with management
• Proper planning
• Sufficient resources
• Low interpersonal conflict

Because a hot group is intended to be a creative group, the characteristics of creative organization and drivers of creativity must be able to promote the formation of hot groups, if those exist in the parent organization. Those characteristics and drivers should also be able to energize the hot groups to sustain the creativity. Elements for sustaining creativity will be discussed in sub-chapter 4-2.

Freedom, independence and autonomy are the most important aspects of a corporate culture that stimulate the formation of hot groups33). Here is a dilemma. As organizations grow, though, some amount of formalization is inevitably introduced. The organization needs discipline, hierarchy and orderly processes to get its works done. But hot groups need freedom and disorder.

Nonaka and Takeuchi also discussed the importance of autonomy. They observed that “At the individual level, all members of an organization should be allowed to act autonomously as far as circumstances permit. By allowing them to act autonomously, the organization may increase the chance of introducing unexpected opportunities34).” These discussions seem to be very reasonable in sustaining creativity in existing hot groups, which will be discussed in 4-2, but do not always support the formation of hot groups.

The cultures at Grupo Vitro and Matsushita were known as traditional and conservative. They were very good at incremental improvement. The organizations had relatively solid
discipline, a hierarchy and orderly processes. The Swiss Stock Exchange and the Yufuin Hot Spring Resort were extremely traditional in terms of the way they conducted their business. Even Honda was big enough to have bureaucracies in its organization when the new compact car development group was formed. Freedom and autonomy were provided in those cases for the creative groups after they were formed, and they were naturally generated in the case of Yufuin. However, both freedom and autonomy had not been emphasized in the cultures of the parent organizations when the hot groups were formed. These observations informed the hypothesis that the formation of hot groups does not strongly depend on the background culture. The concept of “creative tension,” proposed by Peter M. Senge, helps to understand why culture, freedom and autonomy were not required in the formation of some of the hot groups. The gap between vision and current reality is a source of tension, i.e. creative energy\textsuperscript{35}. If the gap between the existing culture and the ideal culture for sustaining hot groups is larger, the energy of creative employees to form a hot group could be higher.

The formation of hot groups does not always depend on the other important characteristics of culture for creativity, such as open communication, risk-taking, flexibility and low organizational boundaries. Those are important for sustaining the creativity of hot groups in organizations, but not always for the formation, as can be seen in many of cases studied in this thesis. In the success stories of Sharp, Matsushita and Honda, the hot groups were formed intentionally by the corporate or divisional top management. Therefore, to be accurate, it seems that our hypothesis on the effect of background culture on the formation of hot group should be modified. It should state that “The formation of hot groups does not necessarily depend on the background culture if the formation is achieved by top management.” In other words, top management can create hot groups irrespective of the background culture. Strong sponsorship from the top management should allow the drivers of creativity for the newly formed hot groups to sustain their creativity, especially in a cold organization.

4-1-3. Crisis

In almost all the cases described in chapter 3, there were crises at the inception of the hot groups. The sense of urgency and importance to be creative was shared by the members of the group.
In the Yufuin Hot Spring Resort case, the domestic tourism market had matured, and an alternative, i.e. traveling overseas, was a trend supported by the strong Japanese yen. In addition, the domestic market was experiencing strong price competition. Also, in both the Matsushita Home Bakery case and the Sharp Electronic Organizer case, the market was saturated. Severe price competitions were further exacerbated by new entrants from newly industrialized countries. Thus, crisis can be a driver of hot group formation. However, the mere existence of a crisis may not be sufficient for the formation of hot groups. In a large organization, people at the top level in the hierarchy may easily recognize the crisis, but lower level employees, especially in R&D, who typically do not see or understand the balance sheet and income statement, may not realize the crisis as being their own risk. The sense of urgency and necessity to deal with the crisis should be introduced to and shared by members of a hot group in order for them to be really creative. In the Yufuin case, it was relatively easy because most of the members who formed the hot group were young owners or sons of owners of small traditional Japanese inns. In the case of Matsushita, the sense of necessity was generated in the engineers when three different divisions were combined into one, but still could not improve profit and sales. The engineers must have felt that the company might give up on the business, but which the engineers loved and were proud of. In these two cases, the crisis was understood and the sense of necessity to respond to the crisis was brewed and then shared by the occasionally gathered people. Such a sense of urgency or necessity is a certain type of virtual knowledge when it is shared by a group of people. Once it is shared, the virtual knowledge becomes a strong driver for the formation of a hot group. The same sharing of the similar virtual knowledge occurred in the Sharp case. In this case, however, the virtual knowledge was not brewed by the members, but was introduced by a corporate director to the members of the group. The latter case seems typical if the group was intentionally formed by top management. Even though the members did not brew the virtual knowledge by themselves, as long as they all understood and shared the virtual knowledge introduced by a sponsor, the group seemed to be able to be creative.

Real or imaginary enemies seem to enhance the sense of crisis by increasing internal cohesion, and thus, promote the formation of hot groups. In both the Matsushita and Sharp cases, newly industrialized economies, and domestic competitors in the industries were the enemies. The
Eagle Computer project had a strong rival, another computer development project called North Carolina, which certainly excited the Eagle group.

In the case of Yufuin, competitors in the market were certainly the enemies, but it seems the group’s real enemy was boredom. As the leader of the group, Nakaya, recollected, they just wanted to be exciting by doing something. The formation of the hot group at the Swiss Stick Exchange represents the same pattern. They had too much free time when their primary task, customer technical supports, were not at peak. The willingness to be excited in order to deal with boredom was certainly a driver in the formation of the creative hot group.

According to Nonaka and Takeuchi, fluctuation or creative chaos, which stimulates the interaction between the organization and the external environment, can be a driver in the formation of creative groups36). Fluctuation is different from complete disorder, and is characterized by “order without recursiveness.” When fluctuation is introduced into an organization, its members face a “breakdown” of routines, habits and cognitive frameworks. They then have an opportunity to reconsider their fundamental thinking and perspectives. Thus, creativity can be brewed apart from the existing routines and habits. This intentionally introduced fluctuation is what Nonaka calls “creative chaos.” This happened in the Matsushita’s household appliance division, when three different divisions that had different culture were combined into one. However, the similar fluctuation brought in by combining two different organizations could cause real disorder, as seen in the case of the Swiss Stock Exchange, when Geneva and Zurich stock exchanges were merged. Creativity was not brewed, but instead the fluctuation introduced an anti-creative bureaucracy.

In the Honda case, there seemed to be no sign of crisis. Honda was growing steadily. Even in that case, however, the development group was in fluctuation when it was formed. Chaos is generated naturally when the organization faces a real crisis, such as when there is a rapid decline of performance due to changes in market needs or significant growth of competitors, as seen in the cases of Data General, Yufuin, Matsushita and Sharp.

Nonaka proposes that chaos can also be generated intentionally when the organization’s leaders attempt to evoke a sense of crisis among organizational members by proposing challenging goals. Ryuzaburo Kaku, former chairman of Canon, noted that “The role of top management is to give employees a sense of crisis as well as a lofty ideal37).” This intentional
chaos, referred to as "creative chaos," increases tension within the organization and focuses the attention of organizational members on defining the problem and resolving the crisis at hand. It is not difficult to understand how chaotic the situation was in Honda's new compact car development group. All the members were young. Almost no fixed reporting route and hierarchy existed. The situational settings were extremely unusual at not only Honda, but also at most Japanese companies of the time. In addition, the given goal, which ignored traditional development procedures, was extremely challenging for them.

Therefore, it is concluded that both the unintentional chaos generated by crisis and the intentional chaos generated by top management can both be drivers in the formation of hot groups. In addition, fluctuation and existence of enemies, including boredom, seem to be able to be drivers also. The effects of those potential drivers can be reinforced by sharing the sense of necessity and importance to be creative in order to overcome the circumstances. Crisis or chaos is not always required for the formation of hot groups, as seen in the cases of Grupo Vitro, Union Bank of Switzerland and Xerox PARC.

4-1-4. Policies and Systems

There are policies and systems that can stimulate the formation of hot groups, as seen in the Grupo Vitro and Union Bank of Switzerland cases. Both firms had excellent systems in place to encourage employees to form hot groups.

Any systems that encourage the culture listed in section 4-1-2 would be able to stimulate the formation of hot groups. Systems that force or encourage employees to communicate cross-functionally and cross-divisionally would be an effective driver of the hot group formation, as seen in Grupo Vitro's hot group. Also, such systems can encourage followers to form hot groups, as seen with Matsushita and Vitro. A former chairman of Kao, one of the biggest Japanese producers of laundry, cleaning and cosmetic products, claimed; "When information differentials exist within the organization, organizational members can not interact on equal terms, which hinders the search for different interpretations of new information."^38^"

Policies that allow engineers to form off-line R&D groups would certainly promote the formation of hot groups. Lockheed calls the activity, "Skunk Work." GE and 3M refer to similar activities as "Bootlegging" and "Scrounging," respectively.^39^ 3M's 15% rule, which allows technical employees to spend up to 15% of their time working on any ideas of their
choosing, is intended to create an environment for creative groups to flourish. Pinchot claims that if technical people with a high need for achievement exist at the firm, then the company needs only to create the appropriate environment, and the intrapreneurs will emerge. This is well illustrated by 3M's 15% rule\textsuperscript{40}.

However, these policies and systems are not always necessary, as a creative culture is not always required for the formation of a hot group. As long as there is strong sponsorship for the formation of a hot group, and the policies and systems that promote creativity are developed after the formation, such systems are not necessarily required at the formation. It seems that the policies and systems are more important for sustaining the creativity of hot groups and to diffuse the hotness and creativity of the hot groups into the whole organization. Those will be discussed in section 4-2-3.
4-2. Supporting the Growth of Hot Groups

Once a hot group is formed, can it grow by itself? Even if the embryo is formed, some organizations will not allow it to grow further, as in nature. In some organizations, members of the embryo naturally give up because they think that their organization does not allow them to pursue their ideas. At many Japanese automotive component manufacturers, where harmony and equality are strongly emphasized, such suicide of hotness can very often happen.

Hot groups cannot survive in organizations if they are not fertilized, watered nor weeded. They have great potentials to grow sweet fruits for the companies, if they keep sustaining and enhancing their creativity.

In this sub-chapter, I will discuss desirable actions and environments to grow hot groups in terms of creativity.

4-2-1. Virtual Knowledge

In the interview with Hidenori Sato, who discussed the Yufuin case, he said, "We did not know why, but we were very excited and were in fact able to create innovative ideas. We somehow knew how to amplify our hotness by ourselves. I can not really describe how we did so, but certainly there were something among us which kept us being creative." This is so-called, "virtual knowledge," as described in introduction. Virtual knowledge involves the sets of understandings that emerge in the course of interactions within groups of people. It is knowledge that is not yet codified in the form of tacit or explicit understandings\textsuperscript{41}). It seems that the members of hot groups get excited by realizing that they are all excited, as seen in the cases of Data General, Honda and others. And they know how to sustain the excitement. The excitement brings them creativity. They cannot describe in words how to achieve and sustain the creativity, but they certainly share the virtual knowledge of how to accomplish it. Perhaps, each member of the group tried not to kill the ideas of others without offering constructive suggestions. It would be the simplest way to sustain creativity. But virtual knowledge is much more complicated than just trying not to kill the notions of others. There should be a wide range of norms and implicit rules to maintain their creativity. This is one of the most important features of hot groups. In addition, virtual knowledge plays an important role in the diffusion of creativity and excitement into the parent organization, which will be discussed in the subsequent
chapter.

As discussed in section 4-1-3, another type of virtual knowledge is important in the formation of hot groups. The virtual knowledge involves a sense of crisis, necessity or urgency to respond to the crisis. People who sensed the crisis jointed together in several of the cases reviewed here. In some other cases, persons who sensed the crisis introduced that into a group of people. In those cases, the sense of crisis was shared by the members at the formations of the groups. Then, through intensive interaction, the virtual knowledge was gradually converted to shared explicit knowledge by discussing the problem, its causes and its potential solutions. Therefore, virtual knowledge is important for not only forming hot groups, but also sustaining them.

While the members of a hot group discuss their goals, another type of virtual knowledge plays a crucial role. The goal the leader has in his or her mind may not be able to be expressed explicitly, i.e. it is tacit knowledge. The tacit knowledge of each individual member should be shared, discussed and then incorporated into a common goal. This is a conversion process of knowledge from tacit to virtual and then explicit. The case of Honda illustrates well the process of making tacit knowledge explicit. They used figurative language and symbolism to express the inexpressible tacit knowledge. Figurative language can take a form of metaphor or analogy, and the symbolism can take a form of slogan42). The top management’s “adventure” and the hot group’s “automobile evolution” and “man-maximum & machine minimum” were the examples discussed. Through metaphor, analogy and slogan, people put together what they know in new ways and begin expressing what they know, but can not yet say. Virtual knowledge is highly effective in fostering direct commitment to the creative process in the early stages of hot groups. In addition, the conversion process itself generates creativity in the hot group. Honda’s top management gave the development team a very ambiguous slogan, a new compact car with completely new concepts. Converting the slogan to their words requires and forces the group to be creative.

In any type of virtual knowledge formation, an attitude of sharing knowledge through intensive interaction is absolutely necessary. Matsushita’s Home Bakery group emphasized knowledge sharing by sharing experiences. The knowledge Tanaka obtained from a professional baker was transferred to other engineers by sharing the experience, i.e. by making bread together. It
fostered a culture in the group that encouraged doing things together, sharing experiences and, therefore, sharing excitement as the result. Grupo Vitro emphasized information sharing by connecting employees through LAN and the Technical Community. The R&D lab of Union Bank of Switzerland encouraged researchers to maintain close communication.

4-2-2. Sponsorship

Sponsorship is important for hot groups to grow and sustain their creativity. The sponsor should give the group freedom and flexibility to stimulate their autonomy, rather than tightly managing the group. The “leave them alone” attitude and acting as a mentor seems to be the optimal sponsorship approach in the growth periods of hot groups. It seems that providing not only freedom but also ambiguity in direction yields more creativity. Honda’s top management is a typical example. They gave the development group an ambiguous goal, which was to develop a new compact car with completely new concepts. They did not specify how to achieve the goal. Then, as discussed, the group was forced to be creative through activities of converting the ambiguous targets to explicit concepts by themselves.

When the existence of organizational boundaries restricts the hot group’s communication with other divisions, the sponsor should assume an important role by constructing bridges or providing the hot groups with materials for them to construct their own bridges. Otherwise, the hot groups may ignore their parent organization, and also, the parent organization will ignore the hot group. The isolation of hot groups is a very common, undesirable phenomenon. That was seen in the cases of Xerox PARC, Union Bank of Switzerland, Data General and the Swiss Stock Exchange. The isolation will be discussed further in the next chapter.

Although an important role of a sponsor is to sustain the excitement of the hot group, the sponsor needs to monitor for burnout. Because hot group members are at least temporarily workaholics, burnout can certainly become a serious problem, as in the Data General case[43]. As discussed in section 4-2-1, a member of a hot group becomes excited by realizing that others in the group are excited. This means that if a few members experience burnout, it may infect others. Creativity and excitement may last longer if the sponsor sometimes offers relief when the members are experiencing excessive stress. It would also be the task of the leader of the hot
group.

The hot group in the Yufuin Hot Spring Resort actually experienced burnout at least once. Since they often had alcohol at their meeting, a few members got sick as a result, and therefore, the group’s creativity was impaired for a time. If they had a sponsor who had kept an eye on the burnout factor, they might have been able to avoid the temporary burnout.

Another important role of a sponsor and leader of a hot group is to make certain that the growth of the group is appropriate in terms of size. As discussed in section 4-2-1, members of hot groups share virtual knowledge on “how to be creative together.” If there are too many newcomers to the group, the sharing process may not catch up with the growth. In addition, the old members need to devote a lot of time to explaining previous work to the new ones, thus temporarily slowing down the creative process.

4-2-3. Culture of Hot Groups

Here, the culture I refer is the culture of hot groups. The culture of the parent organization at the formation of hot groups was discussed in section 4-1-2, and the cultural changes introduced by the hot groups will be considered in chapter 5. Certainly, most of the characteristics of creative organization and drivers of creativity listed in section 4-1-2 will promote the growth and maintenance of creativity.

Autonomy seems to be the most important fertilizer for growing creativity in the hot group. In order to stimulate autonomy, freedom should be secured. Lipman-Blumen and Leavitt emphasize the freedom and autonomy. They proposed that hot groups need generous “time spans of direction”

Some organizations do not bother their people for long periods, while others check up on them frequently. The length of that period between inspections are “the time spans of direction.” Lipman-Blumen claims that the longer the time spans of direction, the more creative the group will be due to the freedom and autonomy stimulated by the freedom. In all the cases studied in this thesis, the members of the hot groups utilized and enjoyed the freedom, and were, therefore, autonomous. The top management at Honda allowed generous time spans of direction. They only presented the ultimate goal, which was to develop a new compact car with completely new concepts. They did not specify how to achieve the goal. The hot group did not have to report officially to top management until the prototype was
fabricated. After the success of the development group, it became a part of the culture of Honda in its new product development projects. The Yufuin group had a norm of freedom and autonomy from inception. They were free to do anything, including leaving at anytime. There was also freedom for others in the community to join the group as long as they were autonomous. It is obvious that this norm was one of the drivers of the group’s high creativity. Grupo Vitro and the R&D lab of Union Bank of Switzerland both had the systems that systematically provided full freedom and independent environment for the project group.

When the development group at Matsushita was stuck on improving the taste of bread, one young woman came up with a very interesting notion, which was to go to the best bakery in the Osaka area and ask the chief chef to teach her how to make the best bread. Some members thought that the chef would not welcome her because their Home Bakery was a potential competitor. Also, many members did not think that she could learn much in such a limited time period. Additionally, at that time at not only Matsushita, but also Japan, the opinions of young women were relatively slighted. In fact, most women hesitated to express their opinions at that time. Even in those circumstances, the hot group members did not deny her idea and they let her try. There was a norm that encouraged different ideas and methodologies, which was a part of the virtual knowledge of being creative, as discussed in the previous section. Certainly the norm played an important role in sustaining the group’s creativity. And actually, she made it finally, as described in chapter 3. Lessons from this story would be importance for encouraging risk-taking and experimentation with new ideas, idea evaluation on merits rather than on the status of the originator, and internal and external open communication. The same three lessons can be drawn from all the other cases examined in this thesis.

Relaxing rules would be another important driver for creativity. Lipman-Blumen claimed, “One way to encourage hot groups was via relaxation, by loosening organizational rules.” However, he also warned that “Hot groups don’t do well in such summer resort cultures. They prefer the tension and exhilaration of the bobsled ride to lying around by the pool.” Loosen rules, freedom and autonomy are certainly important factors for hot groups to sustain their creativity. However, as Leavitt suggested, there should be tension, too. The tension, as noted, is called “creative tension.”
4-2-4. Policies and Systems

Although it is not possible to separate the policies and systems from the culture, there are particular ones that encourage the growth of hot groups in terms of their creativity.

According to a former chairman of Kao Corp., one of the major producers of laundry, cleaning and cosmetic products in Japan, when information differentials exist within the organization, organizational members cannot interact on equal terms, thus, hindering the search for different interpretations of new information \(^48\). Kao believes that all employees should have equal access to corporate information. Accordingly, the company developed a computerized information network and databases for just this purpose. As discussed in section 4-2-1, sharing knowledge is extremely important for growing and sustaining creativity in hot groups. Matsushita’s Home Bakery group explicitly emphasized knowledge sharing by sharing experiences. Grupo Vitro emphasized information sharing by connecting employees through LAN and the Technical Community. The leader of the hot group recalled, “If we had not had the cross-divisional technical community, where we could think without having any organizational boundary, we would not have been able to come up with this simple idea.” The R&D lab of Union Bank of Switzerland encouraged researchers to have close communication. Other hot groups studied here also shared knowledge through extensive communication. Information systems can make knowledge sharing more efficient and effective.

Performance measures and rewards are important for growing and sustaining its creativity of hot groups. For example, Grupo Vitro’s reward system, which promises to give commercially successful employees a certain percentage of the new product’s sales. The system encouraged employees to be more creative. Pinchot III observed that “For many intrapreneurs who have given up and are hiding in the woodwork, rewards for innovation are the litmus test of a company’s sincerity. If a company isn’t willing to reward intrapreneurship, it does not really want it \(^49\).” According to his discussion, rewards are important for not only the growth of hot groups, but also for attracting other creative people into the group. There are various types of rewards, for example, recognition programs, financial rewards, and providing resources and freedom. Pinchot claimed in the same article that “Compensation alone or even combined with recognition still does not make an adequate reward. In fact, if it is not combined with increasing freedom to try new things, bonuses may simply provide seed money for successful intrapreneurs
to start their own businesses. The essential reward is freedom.” Lipman-Blumen and Leavitt explained it in a different way. They wrote, “Hot groups shoot for stars. They intend to do great things and do them extremely well. Their members feel they are stretching themselves, surpassing themselves, moving beyond their own prior performance limit. Hot groups, therefore, don’t need to be motivated by the promise of bonuses or other extrinsic rewards$^{50}$. As noted in the previous section, they claimed that hot groups are eager to have freedom. Therefore, it seems that what Lipman-Blumen and Leavitt discussed in their book about rewards is similar to what Pinchot claimed in his article, which is, “Essential reward is freedom.”

However, this does not mean that conventional forms of reward are not necessary for hot groups. As the Data General case clearly illustrates, promotion, monetary compensation and other rewards followed by recognition of colleagues and appreciation of top management could have prevented the members of hot groups from leaving the firm together with their creativity. As Pinchot and Lipman-Blumen claim, hot groups in general may not need such rewards, except for freedom, while they are working toward achieving the objectives. Once this is accomplished, however, they should be properly rewarded. Otherwise, not only the members of the hot group, but also other people who are discouraged by the poor recognition will soon leave the company together with their invaluable creativity.

Another question about reward is whether individuals or groups should be rewarded. According to Lipman-Blumen and Leavitt, individual performance appraisals disrupt the work of hot groups by destroying interpersonal trust$^{51}$. This is arguable. If the individual appraisal is obviously reasonable for any other members of the group, it is not a problem. However, in all the cases studied here, no individual performance appraisal was given while the groups were working on their respective projects.

4-2-5. Fluctuation and Chaos

Katz described the life cycle of a project. “Research and development groups seem to have performance curves analogous to the human life cycle – tentative youth, productive energy, and decline with maturity.” He also noted that “In the course of long-term job tenure, an individual may be said to pass through three broad stages: socialization, innovation, and stabilization$^{22}$. It is not difficult to imagine group members becoming stabilized because they feel comfortable with standard and familiar patterns, resulting in less stress. Hot groups need to avoid too much
stabilization in order to sustain their creativity. Therefore, introducing fluctuation and chaos intentionally might be necessary at certain times. Task rotation might be one way of breaking the stabilization. In fact, according to Lipman-Blumen and Leavitt, every hot group member performs multiple tasks, and very frequently and flexibly exchanges his or her job with other members. Sometimes, the members even take unscheduled turns at being leader\textsuperscript{53}. The position of leader tends to rotate, depending on who called the meeting, who set the agenda and what was preset. As one member of a hot group put it, "We are all leaders --- No one dominates, there is sharing and respect for ideas." Another said, "If you were to ask me who was the leader in the group, I am not sure I could answer that question\textsuperscript{54}."]

In the case of Sharp's electronic organizer project, the group became even more excited and creative after the project was officially terminated. In other words, a failure re-energized the group. When the hot group at the Swiss Stock Exchange was isolated from the organization, the members became even more excited. Also, the existence of a rival North Carolina Project kept the Eagle Compute project group creative in the case of Data General. These are some examples of the unintentional introduction of fluctuation and chaos in order to sustain creativity. Fluctuation and chaos, however, do not always support the creativity of hot groups. When another business-oriented group joined the hot group of the Union Bank of Switzerland, the new members started dominating the entire telephone-banking project. Soon the culture, systems and virtual knowledge, which were intrinsic for the creativity of the original hot group, were eliminated. Also, the intentional introduction of fluctuation at the Swiss Stock Exchange by combining two different stock exchanges caused disorder, instead of creativity.

There seems no absolutely necessary requirement for the formation of hot groups. Rather, they can arise anytime, anywhere. Sustaining hot groups seems more difficult than forming them, but there seems no typical situational setting. However, the factors discussed in this chapter will certainly help hot groups if they are well managed. Forming and growing hot groups are not our ultimate goal. The goal is to re-energize organization. In order to achieve the goal, enthusiasm and creativity of hot groups should diffuse into the organization. The diffusion process, which seems to be much more difficult, is discussed in the following chapter.

References
Chapter 5: Impact of Hot Groups on the Parent Organization

Lipman-Blumen and Leavitt explained the impact of hot groups on the parent organization. “A few hot groups scattered around make excellent organizational alarm clocks. They stimulate and agitate. They wake up sleeping units and release frustrated people who have been held captive within them. We need to breed multiple crops of small, spirited hot groups. We want colonies of such groups to be an ongoing characteristic of the organization’s culture.” To move in that direction, what changes should be made? What barriers should be removed? What should be the rules of the game? How should people and project be rewarded and evaluated?

In order to answer these questions, each hot group described in chapter 3 should be further examined in this chapter. Several patterns of hot groups’ impacts were found, as described in the following sections.

5-1. Horizontal Diffusion

In the case of Yufuin Hot Spring Resort, the group had been ignored by the community for some time. However, as the group achieved small successes in attracting tourists, young people started to join. One such person who joined the group one-year after the initial formation of the hot group recalled, “People around me, especially my parents, criticized the group. They did not follow our traditional implicit rules. They did not fit the society. But actually I had been envious of their excitement. They were working hard, but enjoying a lot. I thought the way I had been doing business in this small resort, which was the way my father had been doing, was the only way. I had not had any questions on that. But the way they were doing their business was different, and looked fun. One day I was talking with one of the group member in a small bar. Then other members gathered gradually, and finally they started to discuss a new event. No one treated me as an outsider. Everyone asked me my opinion as if I had been in the group for a long time. I enjoyed the meeting very much. After that, I often took somebody, who was not the member, to the group’s discussion, because I was very sure it was beneficial for him. Some time later, I actually formed another group with some members of Nakaya’s group and some new comers. We collaborated with his group and focused more on involving other people in the community. Nakaya usually tried to do everything by himself. Maybe he thought it was
only way for him to do something in this very traditional community. But I really thought this excitement should be shared by the whole society. By sharing that, we can do something larger. Nakaya and others understood and helped us quite a lot\cite{56}.

The second hot group involved not only tourism people, but also farmers in the area, as described in chapter 3. A few more hot groups were formed, although who belonged to which group seemed to continuously change. The groups expanded, i.e., the energy and excitement of the hot groups infected others of the community. At first, youngsters joined, then middles. Finally, the elders faced the situation where they could no longer ignore the changes the groups had been instituting. Over time, they started to understand youngsters. Accordingly, the hot groups could obtain community-wide collaboration. Several years after the initiation of the hot group, they could re-energize the community.

One model was formulated based on the case. It is schematically drawn in figure 3.

![Horizontal Diffusion Model](image)

**Figure 3  Horizontal Diffusion Model**

In this model, the excitement and creativity of the original hot group first diffuse into other people horizontally. They are attracted and encouraged by the hot groups. The attracted people join the original hot group or form their own hot groups. The new members or new excited, creative group of people make the original hot group even more energized.

As discussed in section 4-2-1, the members of a hot group share virtual knowledge that generates and sustains creativity. The non-describable knowledge of being creative, which consists of implicit rules and norms, were somehow shared by people in the same layer. None of the hot group members taught the knowledge to the others. Actually, they could not do that because they could not describe the knowledge explicitly. Perhaps through conversation or by closely looking at the way the hot group worked, the other people around the group could also share in the virtual knowledge. Involving a member of a hot group in another group might be
the easiest way to transplant the virtual knowledge.

Matsushita’s Home Bakery case showed the same pattern. The success of the hot group had considerable impact on the Cooking Appliance Division as well as the entire company. First of all, the success of the home bakery group built confidence and a desire to develop innovative products for other project groups in the same division. Other project groups learned from the Home Bakery group. Engineers were willingly visiting customers, as the Home Bakery group had done. They brought the users’ voices close to the engineers, which seemed like a breath of fresh air to the Cooking Appliance Division. Having previously dealt with mature products, the process brought a sense of enlightenment to the engineers. Previously, engineers were not supposed to visit customers without getting the approval of the manager of the marketing division, or at least the engineers assumed so. By observing the way the members of the Home Bakery group worked, the members of other projects were encouraged to do anything. They could see that organizational boundaries were disintegrating, and that they were participating in breaking down the barriers.

Two new hot groups were formed in the same division, and developed new products, an automatic coffee brewer with a mill function and a rice cooker with an electromagnetic heater. Both were somewhat innovative in the market and experienced great success. The effects of the hot groups were reflected in other divisions and business units as well. Soon a high quality TV known as “The One” was developed in another business unit. The creativity and enthusiasm of original hot group diffused horizontally to other people in the same level, as schematically shown in the figure 3.

After some extent of horizontal diffusion, corporate top management of Matsushita started to emphasize the cross-functional communication and collaboration. It also created and implemented two systems to further amplify the creativity introduced by the hot groups at the company. One was the Human 200-people Committee, at which selected young 200 people get together periodically to discuss the future of the company. Their opinions provide useful feedback to top management. Another was The Mind & Management Innovation Toward 1993 Program, which was intended to increase efficiency in office routine work and to generate time for creativity, as described in chapter 3. Those systems can be effective for sharing virtual knowledge, “how to be creative”, with more people. Matsushita’s culture was known as
conservative. The Home Bakery project, however, could inject creativity and risk-taking attitudes into the culture.

In the Matsushita’s case, enthusiasm and creativity of the hot group first diffused horizontally to other people in the same level as the hot group. After energies for creativity ripen at middle to bottom level of the organization through enough horizontal diffusion, top management of the company recognized the value of hot groups. Then, it began to develop policies and systems that stimulated more hot groups and creativity within the organization. The recognition by corporate top management followed by the system development was termed as “vertical diffusion” of hot groups, which will be discussed in the following sub-chapter. It seems that the horizontal diffusion model is highly successful if it is followed by the vertical diffusion.

5-2. Vertical Diffusion

After the success of the Sharp’s Electronic Organizer project, top management of the company noticed the desirability for more flexibility and expansion of its product development systems. The project was originally conducted under the Urgent Project System, which enabled a project leader to gather members cross-functionally without the need to get approval from their managers, and to have the same authority as corporate directors during the project period. The system was effective in making the project members excited by giving them autonomy and authority. However, only a few projects could be accepted by the Urgent Project System. Right after the success of the hot group, Sharp’s top management realized that the system was not enough to support more engineers to make their dreams actually happen. Accordingly, they established another system that facilitates intra-divisional projects. The new system was a kind of preparation stage for the existing Urgent Project System, and allowed creative groups of people to bring their ideas to an acceptable level for Urgent Project System. Also, an intra-firm position-offering system encouraged the formation of cross-functional creative groups within a division. Under the new system, an engineer from any division could apply for a position on any intra-divisional R&D project. It provides great flexibility in human resource re-allocation, which prevents engineers from sticking with mind-sets and helps them to foster creativity.

In contrast to the Yufuin and Matsushita cases, the effects of the Sharp’s hot group were first
recognized by corporate top management, before the creativity and enthusiasm of the hot group diffused horizontally. Then, the top management created and implemented the policies and systems that had possibilities to encourage formation and growth of hot groups. This is another model of the impact of hot groups on the parent organization. The model is schematically shown in figure 4.

![Diagram of Vertical Diffusion Model](image)

**Figure 4** Vertical Diffusion Model

There are many systems and policies that possibly stimulate the formation of hot groups, other than the systems implemented by Sharp. As discussed in chapter 4, the systems that encourage engineers and others to be autonomous and allow them to form off-line development groups, e.g. "skunk work" and "bootlegging," are examples.

Certainly such policies and systems implemented by top management will help the formation of hot groups, but they may unintentionally restrict people to go beyond the policies. If such systems are established before sufficient horizontal diffusion, it is possible that people will rely on the systems instead of attempting to propagate the virtual knowledge of "how to be creative" or to steal it. Therefore, overprotection or excess nurturing of hot groups may actually prevent the hot groups from achieving higher energy level than the level easily achieved under the protection of the systems and policies. In other words, the vertical diffusion alone may have a limitation in re-energizing the entire organization. It should be followed by horizontal diffusion in order to re-energize the entire organization. How can it be achieved?

The impact of Honda's hot group, the development team for a compact car, "City," was similar to that of Sharp. The success of the compact car project caused Honda management to recognize the importance of listening to young people. Top management established an
informal system, called Brainstorming Campus, for problem-solving. In the Campus, any attendees should not and do not care other attendees’ positions or status, unlike Japanese ordinary discussion. Top management implemented various other policies and systems to encourage good communication, especially with young engineers. As a result, open communication regardless of positions or status became a part of Honda’s culture. Accordingly, many other hot groups such as the marketing team in Accord China, as described in chapter 3, were formed and contributed to keep energizing the company. As in the case of Sharp, the organizational effects of the hot group were first recognized by the corporate top management. Accordingly, top management created and implemented policies and systems. However, those policies and systems did not actually make the formation of hot group easier. In other words, top management of Honda did not overprotect or over-nurture hot groups. They just encouraged or forced the communication. The answer to the question in the previous paragraph seems to be the system or policy that stimulates communication. Communication stimulates the horizontal diffusion of creativity and enthusiasm of hot groups through virtual knowledge sharing.

Rotating personnel is one proven method. In fact, all the members of the Honda’s City project group, for example, are now making use of the virtual knowledge and leading innovative R&D projects in the company. Another system would be providing a field in which individuals can interact with each other through face-to-face dialogue. Here people can share their experiences, knowledge and opinions. If they can synchronize themselves, a new hot group will be formed. With such systems and policies that encourage human interaction, a part of virtual knowledge of hot groups can be converted to explicit knowledge in the form of concepts, although all virtual knowledge cannot be converted. Then, various explicit knowledge can be combined to form a creative culture in the organization. Nonaka et al. explained this process in the following way. “Combination is a process of systemizing concepts into a knowledge system. This mode of knowledge conversion involves combining different bodies of explicit knowledge. Individuals exchange and combine knowledge through such media as documents, meetings, telephone conversations, or computerized communication networks. Reconfiguration of existing information through sorting, adding, combining, and categorizing of explicit knowledge can lead to new knowledge.”

In the case of the Grupo Vitro, policies and systems that could stimulate the formation of hot
groups already existed before the hot group began to work on its new detergent project. It seems that corporate top management foresaw the possibility of intrapreneurs, and therefore established systems that promote the formation and growth of hot groups. The Special Project System, which is very similar to the skunk work of Lockheed, represents such intentions of the corporate top management. Therefore, the vertical diffusion, which basically consists of the recognition by corporate top management on the effects of hot groups and the introduction of policies and systems that further stimulate creativity, was not needed in this case. In other words, the situation of the Grupo Vitro at that time was almost like the situation where vertical diffusion process was done and ready to move to horizontal diffusion. Timely, the hot group described in chapter 3 was formed and showed potential success. The excitement of the hot group just diffused horizontally. The group’s potential success encouraged other engineers to propose their own ideas freely. More and more autonomously initiated projects have been proposed. As in the case of Honda, The Technical Community certainly helped the horizontal diffusion by providing fields for individuals to interact with others through face-to-face dialogue. One of the hot group members said, “Previously, the Special Projects Program was not for us. It was for senior managers to make their dreams come true. However, after we proved we could make our own dreams come true without having guidance from senior managers, energies hidden in young engineers’ insides exploded.”

5-3. Conditions that Restrict the Impact of Hot Groups on the Parent Organization

In the sections 5-1 and 5-2, successfully re-energized examples were discussed. In this section, cases in which the hot groups failed to re-energize the organization are discussed by focusing on the conditions that restricted the impact of hot groups on the parent organization.

5-3-1. Recognition and Rewards by Top Management

As discussed in section 5-1, the creativity and excitement of hot groups can diffuse into others in the organization. The members of a hot group usually share virtual knowledge that generates creativity and excitement. In order for the diffusion to take place, the virtual knowledge needs to be shared by other people in the organization. Since virtual knowledge is non-describable, the best way to share it is to have interactions with the hot group. Working together with
previous hot group members might be the easiest way to transfer the virtual knowledge. Then, what will happen if the members of hot groups have left the company? It seems that the diffusion does not take place or stops. Why they leave? Here are the cases of failure in vertical diffusion.

One of the answers is illustrated in the Data General’s case. In spite of the leader’s great efforts and success in managing the radical engineers, he was merely rewarded. Some members were promoted and/or got special vacations and stock options. However, many members, including the rewarded ones, did not feel they were appreciated by the company. In fact, they felt that they had been neglected by the company. Many of them, including the leader, left Data General.

The recognition of the value and effects of hot groups was missing in this case. Therefore, there were almost no proper rewards and no attempt to develop systems and policies that encouraged formation and growth of hot groups. Rewards are absolutely necessary for preventing hot groups leaving. It is thus necessary to diffuse the creativity and excitement. According to Pinchot, rewards are important for not only the growth of hot groups, but also attracting other creative people58).

A similar example is the case of the Swiss Stock Exchange. The hot groups efforts and success in the real-time data publishing were not appreciated by the organization. Also the group was not rewarded at all. Instead, they were perceived as anarchists and attacked by middle managers of the organization. Many young employees, however, recognized the excitement of the group and unofficially supported it. Thus, they were certainly influenced by the hot group. In other words, there were horizontal diffusions. Those young people could have formed hot groups, but they did not because of strong pressures from internal enemies. If the top management had recognized positive effects of hot groups, they might have attempted to reduce the pressures or established policies and systems that fostered more hot groups. In other words, if vertical diffusion had taken place, the entire organization could have been re-energized. Many of such energetic young employees actually left the company, too. As the result, the Swiss Stock Exchange suffered high turnover rate of young, talented people.
As discussed in sections 5-1 and 5-2, in successful diffusion models, corporate or divisional top management recognized not only the success of the hot groups projects, but also the effects of having such groups in the organization. Thus, top management sooner or later became involved in the diffusion process by supporting the process and establishing various policies and systems that stimulate the formation and growth of hot groups. If there is no vertical diffusion attempted by the top management, as occurred at Data General and the Swiss Stock Exchange, surely the creativity and excitement of the hot groups will never be utilized by others in the organization.

5-3-2. Organizational Boundaries and Isolation

Even if the members of hot groups ended up leaving the company, people around the group could have been influenced and shared the virtual knowledge of being creative while the group were there. Such sharing of virtual knowledge would take place if the group was not isolated. In other words, even if the members did not leave, the horizontal diffusion process can be destroyed by isolation with organizational boundaries. Because of the organizational boundaries, technologies developed by the hot groups are not sometimes transferred either. Then, the members become unhappy, and they soon leave the company. The followings are some examples of failure in horizontal diffusion.

The R&D Lab at the Union Bank of Switzerland had very nice systems to stimulate hot groups. In the organizationally separated R&D lab, extensive freedom was provided, as described in chapter 3. Researchers could select their own projects with sufficient funding from the parent organization. The situation was almost like the one where vertical diffusion process was done and ready to move to horizontal diffusion, as in the case of Vitro. In addition, since close communication with other projects of the lab was highly encouraged, the creativity and enthusiasm of the telephone-banking development group diffused horizontally to other researchers in the isolated lab. The environment of the lab was almost perfect to re-energize the organization. However, the environment was applied only for the lab.

In contrast to the Vitro's case, diffusion of creativity and excitement of the hot group into the parent organization did not happen. At the Union Bank of Switzerland, there were big walls between the isolated lab and all other divisions. Although close communication was
emphasized in the R&D lab, researchers at the lab did not have any channels to communicate with people in other divisions. Since most of the researchers were fresh out of school, they did not know the businesses of the bank either. They were isolated. The hot groups’ creativity and excitement could not diffuse horizontally across the organizational boundaries. Since corporate top management was satisfied with the autonomous R&D systems at the lab and was not aware of the boundaries with other divisions of the bank, refinement of vertical diffusion process did not take place either. In fact, not only the excitement or creativity, but also the technologies or products developed by the lab were seldom transferred to the business units. Many engineers in the lab became frustrated because they felt that their efforts had been neglected by the company. Accordingly, many of them left the bank. Approximately 50% of the engineers in the lab left the bank before, or when they were told to move to divisions of business units.

The problems at Xerox PARC seemed to be very similar to those found at the Union Bank of Switzerland. Xerox PARC seemed to have many hot groups under the independent autonomous environment. They invented the first high-speed computer networks and the first laser printers, and they devised the first user-friendly computers, with intuitive graphical displays. However, Xerox Corporation never became a major player in any one of these products areas. It might be too simplistic, but this might suggest that Xerox was too hidebound or too bureaucratic to comprehend the enormous potential of the hot groups’ creations. Xerox Corporation and PARC could not develop a critical linkage between them. Lack of communication caused by the isolation of PARC is one of the reasons of the miss-recognition. In this case also, many brilliant scientists left the company and started their own businesses. No diffusion of creativity into Xerox took place.

From these cases, it is possible to say that organizational boundaries are the killers of hot group diffusion. Even if there are excellent systems that stimulate formation and growth of hot groups in a division, horizontal diffusion may not take place unless the policies are understood across the entire organization and the organizational boundaries are removed.
Although it seems that isolated hot groups have problems in the commercialization of their ideas as well as in the diffusion of their creativity, the isolation is often considered to be a driver of innovation. According to James Utterback, product innovations often take place outside the product’s industry. He noted, “A typical sequence of events involving the traditional firm’s response to a technological threat begins with the origination of a technological innovation outside the industry, often pioneered by a new firm. —— Not only do the sales of the established technology decline, but the traditional leaders in the industry also lose position. Why is this so? Clearly the traditional firms are financially strong, and they have sophisticated market knowledge and distribution channels as well.” The reasons he proposed include the following. “Established firms carry the burden of large investments in people, equipment, plant, materials, and knowledge, all of which are closely linked to the established technology. —— Finally, there is the very human problem of managers resting on their laurels, or in this case, on the technologies that have made them successful.” Based on this reasoning, Utterback proposed to create separated organizations with clear mandates and a great deal of independence from the staffs, committees and other encumbrances from their parent companies. However, organizational separation often leads to problems. Cooper and Smith found that even in the rare instance in which a large firm did decide to organize separately to pursue a radical idea, other problems sometimes emerged. These included intense conflicts between organizational units and tacit attempts to derail the new initiative by withholding critical support and experience when needed. In all the cases discussed in this sub-chapter (5-3), these problems actually emerged.

Here is a dilemma. The isolation provides preferable atmosphere for hot groups to be creative, but it prevents cooperation, communication and diffusion of hot group effects. Are there any solutions for this dilemma? It depends on the type of innovation being pursued. It seems that the isolation is not the best way in many innovative product developments, especially when the project needs to utilize and combine existing technologies across the firm. Examples include almost all the cases studied in this thesis, e.g., Matsushita’s Home Bakery, Honda’s City, Sharp’s Electronic Organizer, Grupo Vitro’s new detergent and Yufuin’ hot spring resort. In such innovative product developments, the project groups should work cross-functionally and cross-divisionally. The project group cannot have infinite numbers of people. It makes sense to include R&D engineers, marketers, process engineers and finance people. The group, however, may not be able to include people from manufacturing, quality control, legal and
logistics, for example. Therefore, the group should have close communication and collaboration with them. It should not be separated from the parent organization. If hot groups are formed within the organization, there should be better opportunities for communication and collaboration, and as a result, better chances of diffusion of creativity and excitement of the hot group through the virtual knowledge sharing.

On the other hand, if the new product or technology is going to make the company’s existing products and technologies obsolete, the organizational separation would be needed in order to avoid resistance, conflicts and disturbance due to sunk costs and mind-sets. Some examples would be development of transistors by a vacuum tube producer, development of electronic typewriter by a mechanical typewriter producer, development of personal computers by a mainframe computer company, and many others. If the firm is the market leader in the existing product market, such new product developments will be even more difficult without separating the project group. When the company needs such a disruptive innovation, re-energizing the organization can be done differently from the hot group method. Re-energizing organizations by hot groups seems to be more suitable when the hot groups work on the development projects that require communication and collaboration with other divisions of the company.

Traditionally, innovations were often categorized to either incremental innovations or radical innovations. Incremental innovation introduces relatively minor changes to the existing product, exploits the potential of the established design, and reinforces the dominance of established firms. Radical innovation, in contrast, is based on a different set of engineering and scientific principles and often opens up whole new markets and potential applications. Henderson argued, “Incremental innovation reinforces the capabilities of established organizations, while radical innovation forces them to ask a new set of questions, to draw on new technical and commercial skills, and to employ new problem-solving approaches. --- Radical innovation often creates great difficulties for established firms and can be the basis for the successful entry of new firms or even the redefinition of an industry." It seems that if a firm needs a radical innovation, it is better for the firm to separate the project group organizationally, or to obtain the radically innovative technologies from outside the organization. The innovations Utterback focused on in his book were the radical innovations. On the other hand, most of innovations studied in this work seem to be incremental in nature or even of another type. Henderson discussed in the same article: “The distinction between radical and incremental innovation has produced important insights, but
it is fundamentally incomplete. There is growing evidence that there are numerous technical innovations that involve apparently modest changes to the existing technology but that have quite dramatic competitive consequences. --- We define innovations that change the way in which the components of a product are linked together, while leaving the basic knowledge underlying the components untouched, as “architectural” innovation.” Honda’s City, Grupo Vitro’s new detergent, Matsushita’s Home Bakery and Sharp’s Electronic Organizer are the examples. Since the core knowledge needs to be utilized in the architectural innovation, an architecturally innovative project should not be isolated from the parent organization, but rather be conducted cross-functionally across the firm.

5-4. Risks of Chaos

If the hot groups are not isolated, they may bring problems into the parent organization. There are always possibilities for creating chaos and violence. Clark and Wheelwright explained them in the following way. “With the autonomous team structure, often called the “tiger team,” individuals from the different functional areas are formally assigned, dedicated, and co-located to the parent organization. --- In essence, the autonomous team is given a “clean sheet of paper”; it is not required to follow existing organizational practices and procedures, but allowed to create its own. --- Unless clear guidelines have been established in advance, it is extremely difficult during the project for senior managers to make midcourse corrections or exercise substantial influence without destroying the team. More than one team has “gotten away” from senior management and created major problems."^54^"

Lipman-Blumen and Leavitt described the potential influences of independent working style of hot groups: “In conventional organizations, such behavior, particularly when laced with casual disregard for others, won’t do at all. It is deemed predatory and immoral. In many organizations, if a group acts that way, top management will find itself besieged with complaints – frequently exaggerated – about that gang of raiders who pirate our people, do their own “creative” accounting, and violate all the rules."^55^" This actually happened in the cases of the Swiss Stock Exchange and Data General, as well as in the initial periods of the Yufuin Hot Spring Resort case. In the first two cases, these violations were a part of reasons for the groups’ isolation.
Then, how can these chaotic problems be prevented from arising? It seems that when the hot groups are strongly supported by very senior sponsors, such problems do not arise. It means that recognition of top management on the potential advantages of having hot groups for organizational change is absolutely necessary. Once top management recognizes the effects, it needs to make policies and systems to force organizational-wide communications and collaborations, to break organizational boundaries, and to motivate employees to feel the necessity to change.

In reality, introducing chaos may ignite necessary changes. Lipman-Blumen and Leavitt explained changes as involving three-stage process, starting from an initial “frozen” stage, then moving to an “unfrozen” state, and only after that to a new “refrozen” state, based on model first developed by Kart Lewis. They noted that “The most important and most neglected part of that “freeze, unfreeze, refreeze” formula is the middle, the unfreezing part. Neither individuals, groups, nor human organizations simply change from condition A directly condition B. We must first pass through a vulnerable, risky swamp of “unfrozenness.” We must give up the security of the old before we can enjoy the benefits of the new.” They also used a metaphor of lobsters molt; “Individuals, and organizations, too, change much the way lobsters molt. A period of soft-shelled vulnerability intervenes between the past security of the abandoned old hard shell and the new security that can come only when the new one hardens. We don’t know whether lobsters feel anxious during the changeover, but humans certainly do.” We feel anxious about the unfrozen state, often chaos, but unless we go through it, we cannot achieve the change. We cannot change our shells to grow further. As discussed in section 4-1-3, fluctuation and creative chaos can be a driver of the formation of creative groups. Fluctuation, which is different from complete disorder, is characterized by “order without recursiveness.” When fluctuation is introduced into an organization, its members face a “breakdown” of routines, habits and cognitive frameworks. They then have an opportunity to reconsider their fundamental thinking and perspectives. Thus, creativity could be brewed apart from the existing routines and habits. The chaos can be generated intentionally when the organization’s leaders try to evoke a sense of crisis among organizational members by proposing challenging goals. This intentional chaos, which is referred to as “creative chaos,” increases tension within the organization and focuses the attention of organizational members on defining the problem and
resolving the crisis situation.

References

56) captured by interviewing Hidenori Sato.
Chapter 6: Conclusions

6-1. Formation of Hot Groups and Sustaining Them

A series of conclusions on the formation of hot groups and sustaining them were derived from the case studies. In this sub-chapter, those conclusions will be described mainly from a management perspective.

6-1-1. Formation of Hot Groups

There seems no typical situational setting or absolutely necessary requirement for hot groups to be formed. Rather, they can arise anytime, anywhere. However, the following actions by top management will certainly help hot groups to arise.

1) Providing strong sponsorship for people who have creative ideas

A sponsor, especially if he or she is in a senior position, can provide power for a creative group of people. Not all the hot groups are brave enough to battle the routines and habits of the parent organization. Embryos of hot groups can be formed relatively easily at any place, even in a very cold organization, like some Japanese automotive component manufacturers. However, many newly born embryos in such organizations do not try to go further, and just give on their dreams because they do not want to be seen as misfit anarchists, or they think the situation is too difficult to do. Sponsors can give energies for such embryos to fight organizational mental models.

Then, what do the sponsors actually have to do? They should listen to, understand and support hot groups. They may need to protect them from isolation and attack. Above all, sponsors have to convince top management to take action on the factors described in this section.

In success stories studied in this work, senior managers played very important roles in the formation of hot groups. Other factors described below are not always required for the formation of hot groups. It can be concluded that the sponsorship is the most important factor for the formation of successful hot groups. Although hot groups can be formed without sponsorship, they will experience a lot of difficulties in surviving and achieving their goals.

Of course, we should not forget that overprotection by sponsors may result in reducing hungry spirits of the groups, and therefore, lower creativity. In other words, top management may just arm the groups with education, survival tools and mental supports. The groups actually fight
with the bureaucracy.

2) Introducing fluctuation or “unfreezing” into organization

In most of the cases studied in this work, there were crises prior to the formation of the hot groups. People who sensed a crisis came together and formed a hot group in some cases. The sense of crisis was intentionally introduced to a group of people by senior managers in some other cases. With either pattern, as long as the sense of crisis was shared by the members of the group, the group can be a hot one.

The sense of crisis is not necessarily based on a generally perceived crisis. Managers can increase awareness in an intentional way. The intentional crisis is called “creative chaos.” Organizational restructuring, setting challenging goals, setting competitors or enemies and giving plenty of responsibilities may generate the creative chaos, so long as there is a clear logic for the changes. The creative chaos stimulates fluctuations in the organization. Group members face a breakdown of routines, habits and cognitive frameworks. They then have its opportunity to reconsider their fundamental thinking and perspectives. Accordingly, creativity can be brewed apart from the existing routines and habits. There is a risk of generating real chaos, i.e. disorder in the organization, especially if the changes are not seen as legitimate or defensible. However, intentionally introduced creative chaos with mature consideration has a high potential for generating successful hot groups.

3) Forming creative culture

According to literature, hot groups can be formed relatively easily under a culture that encourages internal and external communication, being independent, and risk-taking challenges, and that provide freedom, mutual trust, autonomy and flexibility. Here is a dilemma. As organizations grow, though, some amount of formalization needs to be introduced. The organization needs discipline, hierarchy and orderly processes to get its works done, while hot groups need freedom and disorder.

However, our case studies suggest that the formation of hot groups does not necessarily depend on the background culture of the organization, although all of those aspects of the culture will contribute to the formation. Especially when the hot group is intentionally formed by top management, the effects of the background culture on the formation are not considerable. In
other words, top management can create hot groups regardless of the background culture. The intentional formation of hot groups itself would introduce creative chaos to the organization. Often the hot groups formed in less creative cultures have higher energy for generating creativity. The larger the gap between the current and desired situations, the higher the energy to tackle the gap could be. The gap is called “creative tension.”

4) Formulating policies and systems that stimulate hot group formation

Policies that allow engineers to form off-line R&D groups, e.g. bootlegging at General Electronics, seem to be very effective in stimulating the formation of hot groups. Systems that force or encourage employees to communicate cross-functionally and cross-divisionally would also be an effective driver of the hot group formation.

However, as in the case of the culture, as long as strong sponsorships are provided by senior managers, those policies and systems are not always the required conditions for the formation of hot groups. In fact, even a cold and bureaucratic organization can give birth to hot groups if strong sponsorships are provided by senior managers.

6-1-2. Sustaining Creativity of Hot Groups

Based on the case studies, we feel that having hot groups grow and sustaining their creativity are much more difficult than stimulating the formation of hot groups. As in the formation of hot groups, there seems no absolutely necessary requirement for growth and sustaining of hot groups. However, the following aspects of organizational management would have a significant impact on the growth and sustaining.

1) Recognizing the role and importance of virtual knowledge

Members in a hot group often share virtual knowledge that can generate creativity and excitement in the group. Members of the group, however, cannot describe in words what the knowledge is and how it works. That is why the knowledge is called “virtual.” The virtual knowledge forms implicit rules and norms. This would be one of the most important features of a hot group to sustain and grow its creativity as a group. In addition, this virtual knowledge, we believe, plays an important role in the diffusion of creativity and excitement into the parent
organization.
For the conversion of tacit knowledge to virtual knowledge, and also from virtual to explicit knowledge, figurative language and symbols can be powerful tools. The figurative language can take its form of metaphor or analogy, and the symbolism can take its form of slogan. Through metaphor, analogy and slogan, people put together what they know in new ways and begin expressing what they know, but cannot yet say. In any type of virtual knowledge formation, an attitude of sharing knowledge through intensive interaction is critical. In essence, even if knowledge itself is hard to manage, the process for fostering virtual knowledge can be supported.

2) Providing sponsorship

Sponsorship at this stage is important in the following three ways, other than just providing freedom and flexibility. At first, when organizational boundaries are hindering communications of a hot group with other parts of the organization, senior sponsors should not only give power to the hot group, but also construct bridges, or alternatively supply materials for the group to construct bridges that enable the group and other people to cross the “rivers,” i.e. organizational boundaries.

Although an important role of a sponsor is to maintain the excitement of the hot group, the sponsor may need to keep an eye on burnout. Because hot group members are, at least, temporary workaholics, burnout can become a serious problem. Creativity and excitement may last longer if the sponsor sometimes opens appropriate relief valves when excessive stress of the members seems to be too high. It can also be done by the leader of the hot group.

Another important role of a sponsor and leader of a hot group is to make certain that the growth of the group is appropriate in terms of the size. If there are too many new comers in an insufficient time period, the virtual knowledge sharing process may not catch up with the growth.

3) Forming creative culture in hot groups

The culture of an organization is somewhat important for both the formation of hot groups and the diffusion of the hot groups’ energies to the parent organization. On the other hand, once a hot group is formed, the group’s own culture seems to be more important for its growth and creativity.
Autonomy seems to be the most important fertilizer to grow creativity in an embryo of hot group. In order to stimulate autonomy, freedom should be secured, especially freedom in expressing opinions, irrespective of status and position. It sounds easy, but it is not straightforward in bureaucratic, hierarchical organization, as is the case with some Japanese automotive component suppliers. A norm that emphasizes the freedom is a key factor.

The culture that encourages members to take risks with new ideas and to have internal and external open communication is very useful for sustaining the hot groups' creativity.

4) Formulating policies and systems that sustain creativity

Internal and external open communication is very useful to not only sustain creativity, but also to diffuse the creativity of the hot groups to the parent organization. It should become a part of the organizational culture. Therefore, systems that force or encourage employees to communicate cross-functionally and cross-divisionally should be formulated. The recent development of information system technologies can make the knowledge sharing more efficient and effective.

Performance measures and rewards could be important to grow and sustain the creativity of hot groups. Those are important not only for the growth of hot groups, but also for attracting other creative people and encouraging them to form hot groups. It seems that the essential reward is often freedom. If monetary rewards are not combined with increasing freedom to try new things, bonuses may simply provide seed money for successful intrapreneurs to leave the company and start their own businesses.

Top management should be careful on the timing of the rewards. Hot groups often do not care about the rewards while they are pursuing the challenge at hand. Once they accomplish their goal, however, they must be rewarded properly. Otherwise, not only the members of the hot group, but also other people who are discouraged by poor recognition will soon leave the company, together with their creativity. Top management also needs to consider individual versus group rewarding. Individual performance appraisals sometimes disrupt the work of hot groups by destroying interpersonal trust. On the other hand, group appraisals, without recognizing individual performance, may introduce frustrations to some of the members of hot groups.
5) Introducing fluctuation into hot groups

In the course of long-term job tenure, groups pass through three broad stages: socialization, innovation and stabilization. Even very excited hot groups may get stabilized, and may set their mind with metal models. In such a case, creating constructive chaos by introducing fluctuation to the hot groups may re-energize them. Task rotation, threats of the project termination and setting competitors may generate creative chaos, if those are done carefully, without losing the hot group’s trust.
6-2. Impacts of Hot Groups on the Parent Organization

The hypothesis, "Hot groups have the potential for re-energizing a cold organization" has been examined through case studies. The hypothesis appears to be correct. The thesis identified two different patterns in the process of hot group diffusion into the parent organization. We also realized that the diffusion does not always occur. In the following sections, characteristics of two diffusion models, how to be successful in re-energizing organization by the hop group concept, and conditions that restrict the diffusions will be discussed mainly from a management perspective.

6-2-1. Horizontal Diffusion Model

In this model, the excitement and creativity of original hot group diffuses horizontally to other people in the organization. The virtual knowledge shared by the members of the hot group, which is non-describable knowledge of how to be creative, is shared by people in the same layer as the group. The attracted people join the original hot group or form their own hot groups. Higher energy of newly formed hot groups in the organization comes back and makes the original hot group even more energized. The diffusion takes place mostly through interaction between the members of hot groups and the people around the groups. The diffusion and formation of new hot groups can begin right after the original hot group's success or even before the completion of its project.

In this model, sharing the virtual knowledge of how to be creative is the key. In order to stimulate the process, management should encourage or even force communications between employees. It needs to be cross-functional and cross-divisional. Direct interaction with hot groups through communication is the most effective way to share the virtual knowledge. Rotating personnel and providing a field in which individuals from different divisions or groups can interact with each other through face-to-face dialogue will certainly help the communication.

The horizontal diffusion process is intrinsic in organizational change. However, it usually takes time because virtual knowledge needs to be shared. In addition, there are possibilities that the company becomes chaos because nobody controls the process. Thus, the horizontal diffusion model alone may have a limitation in re-energizing the entire organization.
6-2-2. Vertical Diffusion Model

In this model, top management of the company recognizes the potential effects of hot groups for re-energizing the organization. Top management enters into the diffusion process at the early stages to establish policies and systems that facilitate formation and growth of hot groups, before the horizontal diffusion through interactions between the members of hot groups and people around the groups. The policies and systems are designed to articulate the critical success factors of hot groups described in sub-chapter 6-1. Well-known examples of such policies and systems that encourage engineers and others to be autonomous and allow them to form off-line development groups are the “skunk work” of Lockheed, “bootlegging” of General Electronics, and “scrounging” and “15% rule” of 3M.

In this model, a key success factor is obviously the recognition of potential impact of hot groups by corporate top management on re-energizing the organization. The recognition should be followed by the development and implementation of policies and systems that promote formation and growth of hot groups.

The vertical diffusion is also intrinsic in organizational change. It can be achieved in a relatively shorter period of time under the control of top management. In such case, there are fewer possibilities of chaos or violence occurring in the organization. On the other hand, there could be fewer opportunities for people in the organization to share the virtual knowledge of “how to be creative,” compared to what transpires in the horizontal diffusion. Some of newly formed hot groups might be able to create their own virtual knowledge for being creative and excited. However, some of them may form a group under the umbrella of the controlled system without being creative, i.e. without brewing the virtual knowledge. The policies and systems implemented by top management will help in the formation and growth of hot groups, but it may unintentionally restrict people from going beyond the policies. The top management may attempt to formalize the virtual knowledge into the systems. However, it is not possible to convert every piece of the virtual knowledge because it can hardly be described explicitly for the purpose of explicit policies and systems. Direct interaction with the hot groups would still be the best way to share the virtual knowledge of being creative. If the systems are established before sufficient direct diffusion, it is possible that people will rely on the systems instead of trying to propagate the virtual knowledge or to steal it. Therefore, over-emphasis on the system
establishment before ripening of the virtual knowledge among employees may result in insufficient heat in the organization. In other words, the vertical diffusion model alone may have a limitation in re-energizing the entire organization.

6-2-3. To Successfully Re-energize the Organization by Hot Group Concept

The horizontal diffusion and vertical one are actually complementary and also sequential in order to re-energize organizations and to make them creative by the hot group concept. Both the horizontal and vertical diffusions are required.

Even if horizontal diffusion takes place, unless corporate top management recognizes the effects of hot groups and develops systems that stimulate the formation and growth of hot groups, the hot groups cannot have a great impact on the entire organization. They may be seen as enemies of bureaucratic hierarchy, or may create disordered chaos in the organization. In addition, the horizontal diffusion process takes time because virtual knowledge should be shared.

Similarly, even if corporate top management recognizes the effects of hot groups and develops the systems, unless people in the horizontal line of the hot groups really share the enthusiasm and virtual knowledge of how to be creative, the hot groups will be isolated, ignored or even attacked by colleagues. In addition, groups that are not creative can be formed under the umbrella of the systems and policies, and therefore may increase bureaucracy.

In conclusion, when horizontal diffusion is dominant, vertical diffusion should be promoted. When vertical diffusion is dominant, horizontal diffusion should be stimulated. Horizontal diffusion stimulates bottom-up organizational change, pushing corporate top management by mentally unionized bottom people who share virtual knowledge of being creative. On the other hand, the vertical diffusion stimulates top-down organizational change through systems and policies that help hot groups to be formed and to grow.

Changing an organization from the top is not the only way of making the organization creative. Changes initiated at the bottom can also have a significant impact on the organizational changes. Top-down management is basically the classic hierarchical model. Simple and selected information is passed up the pyramid to top executives, who then use it to create plans and orders, which are eventually passed down the hierarchy. Information is processed using a division of
labor, with top management creating the basic concepts so that lower members can implement them. On the other hand, bottom-up management is basically a mirror image of top-down management. Instead of hierarchy and a division of labor, there is autonomy. Instead of knowledge being created at, and controlled from, the top, it is created at the bottom and, to a large extent, uncontrolled by any particular personnel. Nonaka et al. put it this way. "The top-down model is suited for dealing with explicit knowledge. But in controlling knowledge creation from the top, it neglects the development of tacit knowledge that can take place on the front line of an organization. Bottom-up, on the other hand, is good at dealing with tacit knowledge. But its very emphasis on autonomy means that such knowledge is extremely difficult to disseminate and share within the entire organization." Then what should we do? The reality is that a really effective organization needs both the "top-down" and "bottom-up" management.

An organizational change is an iterative process. It is like joint product development by both the users and the manufacturer; for example, a development of customized integrated circuits. Here the product is the organizational change for being innovative. The users are middle to bottom employees, and the manufacturer is top management. Each of them needs to interact each other. Information including ideas on the organizational change should flow in both top-down and bottom-up directions. In other words, the company that wants to re-energize itself needs to have both horizontal and vertical diffusion of the hot groups.

6-2-4. Conditions that Restrict the Hot Group Diffusions

Direct interaction with the hot groups would still be the optimal way for other people in the organization to share the virtual knowledge of being creative. Therefore, if the members of the hot groups have left the company, diffusion cannot take place. Poor recognition from top management of the work of the hot groups can lead to loss of talent. The recognition by the company and proper rewords are absolutely necessary for preventing hot groups from leaving. Thus, those are necessary to diffuse the creativity and excitement into the organization. In successful diffusion models, corporate or divisional top management recognizes not only the successes of the hot groups projects, but also the general effects of having such hot groups in the organization.
In addition, when the hot groups are isolated by organizational boundaries, diffusion cannot take place. Even if a division has been re-energized by hot groups, horizontal diffusion from the division to other divisions may not take place unless the organizational boundaries are removed and the effects of hot groups are well understood by the entire company. Often, such boundaries impair not only the transference of the technology developed by the hot groups, but also the attempts to understand the benefits of hot groups. Here again, recognition by the top management of the effects of hot groups is necessary. The organizational boundaries must be removed for the creativity of hot groups to efficiently diffuse across the organization.

Separating a group organizationally sometimes is effective means for developing innovative products and technologies. If the targeted innovation is radical, i.e. an innovation that is going to make the company’s existing products and technologies obsolete, perhaps organizational separation would be needed in order to avoid resistance and conflict. However, if the targeted innovations are incremental or architectural, the project needs to utilize and combine existing technologies across the firm. Therefore, the project group should not be isolated. Collaborative projects with intensive cross-functional communication should precipitate enhanced opportunities for the utilization and combination of existing technologies across the firm. In addition, the creativity and excitement of the hot group can infect others who work with the group through the virtual knowledge sharing.

There are risks that hot groups cause chaos in an organization. When hot groups are strongly supported by very senior sponsors, such problems do not arise. There is also a need to remove our mental model; “chaos is problem.” In order to change a frozen organization, we need to unfreeze it first.

References
Chapter 7: Epilogue - Implementation

Now I would like to shift the viewpoint to people in middle to bottom positions in an organizational hierarchy. Nikkei Business had an article about a recent trend in Japanese corporate management. Based on an extensive survey, they reported that management has begun to focus more on value of the company for shareholder satisfaction. More than half of the responding companies’ top management said they attach greater importance to their shareholders than before. Also, most of them placed a higher priority on customer satisfaction and contributions to society. Accordingly, relative importance of employees is fairly declining\(^{69}\). Corporate management tends to make light of its employees, especially people at the middle to bottom levels. It this a right direction? The middle to bottom employees are closer to customers than are the executives. They can be the most important for customer satisfaction, and therefore, shareholder satisfaction.

Management is sometimes considered to be the important factor in a company. Top management builds strategies and the people below just implement whatever they are told. Of course, management is important, but it is not the be all and end all. Henry Mintzberg argues in his article that “The formation and implementation of strategies do not have to be separated. Strategies are often crafted while they are being implemented.” He is implying that not only setting strategic goals, but also people who really craft and implement the strategies are critical\(^{70}\).

As proposed in conclusions, there are two patterns in the diffusion of hot groups into the entire organization, i.e. horizontal diffusion and vertical diffusion. The horizontal diffusion and vertical one are actually complementary and also sequential in order to re-energize organizations and to make them creative by the hot group concept. When horizontal diffusion is dominant, vertical diffusion should be promoted. When vertical diffusion is dominant, horizontal diffusion should be stimulated. Both the horizontal diffusion, which stimulate bottom-up organizational change, and vertical diffusions, which stimulate top-down organizational change are required.

In order for both directional changes to occur, middle managers, including myself, should play important roles. We can belong to either top or bottom part. We should belong to both parts to achieve a smoother, two-directional information flow. For top-down organizational changes, we
should understand the objectives and procedures, translate them into practical language, and lead people in implementing the changes. For bottom-up organizational changes, middle managers should understand radical ideas, craft strategies, and convince or argue with top management. Above all, we should initiate hot groups by encouraging juniors and convincing seniors.

In the west, where companies are laying off middle managers by the thousands, the very term "middle manager" has become almost a term of contempt, synonymous with "backwardness," "stagnation," and "resistance to change." However, I strongly believe that middle managers are the key not only to organizational changes but also to continuous innovation. As proposed in this thesis, the hot group can be a tool especially for middle managers in Japanese automotive component manufacturers to achieve creative organizational changes.

Several key factors in the implementation of hot group concept have been presented in this thesis. As an error proofing for myself to implement the concept in a Japanese company, I think I should highlight a few factors that are important in our cultural context.

Sense of crisis already exists in organizations because of the radical changes in the industry. Many people know that things are changing and that they need to change. However, most of them cannot explicitly say what to do. Such a company is ready to implement the hot group concept. Japan, as a nature of a relatively homogeneous country with a single race, is good at sharing and managing virtual knowledge. A well-know example is the knowledge creation in lean production system through virtual knowledge. Under the existence of the sense of crisis, a group of people, hot group, who share the virtual knowledge of how to be creative can be more powerful in Japan than in other countries.

On the other hand, isolation of hot groups is the biggest issue in Japanese context. According to a Japanese proverb, "A tall tree catches much wind." In other words, those who push themselves forward more than others can expect to take a beating. A group of people who do something radically different from the current customs can be isolated or even attacked by other people who feel comfortable with the customs and hate to change. In this sense, sponsorship provided by senior management is extremely important. The sponsor must protect the hot group from bureaucracy and also help the group to establish communication channels across organizational boundaries. Obviously, it is not easy, but not impossible because Matsushita,
Sharp, Yufuin and Honda could do that, as described in this thesis. As discussed intensively in this thesis, sponsorship is the most important factor in the success of hot groups in terms of its birth, growth and impact to parent organization. Therefore, my important responsibility is not only to find the senior sponsor, but also providing sponsorship as a leader of a hot group.

Although there are some factors whose importance varies depending on the cultural context, the basic concept of hot groups as a tool to make creative organizations is I believe applicable in many companies of various countries.

Finally, I have to emphasize that the ultimate goal is not forming hot groups. It is to re-energize organizations and to make them innovative. The hot groups represent one way to foster innovation, and I believe the hot group concept is one of the most powerful tools especially in large organizations in mature industry, but they are not the goal in themselves. Even if I can successfully form a hot group, I should not be satisfied until the entire organization becomes much more creative.

References

Research Prospectus

1/20/2000

Title of Project: How to re-energize R&D operation in large corporations in mature industries -- Impact of Hot Groups

Researcher: Hideaki Murata, Massachusetts Institute of Technology, Sloan School of Management, Management of Technology Program

Supervisor: Professor Joel Cutcher-Gershenfeld, MIT Sloan School of Management

Research Questions:

As a part of my thesis research at MIT, I am studying ways of fostering creativity in R&D operations, especially in large corporations in mature industries. I believe that very creative groups, what some have termed “hot groups”, can be formed even in such an organization and that may have an impact on the whole organization. The hot group is just what the name implies: a lively, high-achieving, dedicated group, whose members are extremely excited to work on challenging tasks. A well-known example would be the initial group in IBM who developed the PC.

The principle questions I would like to address are, “How your excited creative team, a hot group, was formed, grown and sustained in an organization?” and “What were the effects of the hot group on the whole organization?”

Research Method: Interview (meeting, telephone or E-mail)

Desired Interviewee:

At first, I would like to discuss with the leader of the hot group, with direct experience in the creative process. Secondary, I would like to know the influence of the hot group to the whole organization by interviewing a manager who was responsible for the whole division or department.

Hideaki Murata
Address: 50 Memorial Drive, Suite E52-126, Cambridge, MA 02142-1347
Home Address: 175 Freeman Street #504, Brookline, MA 02446
Phone / Fax: 617-278-9913
E-mail: hideakim@mit.edu
Possible Questions in Interviews

**Entry Questions**

- A hot group is just what the name implies: a lively, high-achieving, dedicated group, whose members are extremely excited to work on challenging tasks. A well-known example would be the initial group in IBM who developed the PC.
- What are examples of such groups in your organization?
- Which would be the most important to study in your view?

**Questions for the Group Leader: (1 hour)**

1. Background of the Project
   - Please describe the project briefly. (when, what, why, who, how)

2. Establishment of the Hot Group
   - How your group was formed?
   - Please briefly describe the culture of your organization – to understand context facing the hot group.

3. Operation of the Hot Group
   - Please briefly describe the working styles of your group.
   - What did you do to keep the group creative?

4. Impact of the Hot Group
   - In your experience, what has been the impact on the organization?

**Questions for the Manager: (1 hour)**

1. Impact of the Hot Group
   - Please describe the effect of the hot group on your whole organization. How was your organization affected by the hot group?
   - Who first reacted to the creative working style of the hot group? Management or other groups?
   - How did you respond to the results of the hot group? Did you encourage others to work similarly, or let each engineer decide?
   - What relevant metrics or indicators might be examined to better understand the group’s performance?