

Implementation Mechanism of the Four-Group Shift System at Yuhan-Kimberly^{*}

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Abstract

Research has long reported the difficulty of adopting a new system into an organization. Therefore, we have examined the introduction process of a new system through Yuhan-Kimberly's case for finding the solution. The new system such as the four-group shift of Yuhan-Kimberly is an effective combination of technological skills and HR management skills respecting human beings. It also generates competitive advantages contributing to the formation of lifelong education, decreased safety-related accidents, and in-

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creased product quality and productivity. This system allows employees to trust that the company regards its employees as true companions. From the Yuhan-Kimberly's case, we could reveal the secret of the successful introduction of a new system via a mechanism framework.

Keywords: Implementation of New Systems, Innovation, Four-Group Shift Production System, International Joint Venture

INTRODUCTION

Successful implementation of new technologies and systems is one of critical factors to gain competitive advantages for expanding market share and sustainability. However, a great amount of recent business research deals with the difficulties of the implementation of new technologies or systems (e.g., Christensen 1997; Christensen and Bower 1996; Leonard-Barton 1992; Noble 1984; Scott 1998; Tripsas and Gavetti 2000; Tushman and Anderson 1986). Previous research argues that the difficulties come from a company's pre-existing capacity, customer relations, rigidity or inertia of management behavior. These difficulties result in less satisfactory efficiency despite continuing efforts to introduce new systems or innovative methods, such as automation equipment, BPR, re-engineering, Six-sigma, ERP, or SCM. Noble (1984) argues that there is a laborers' resistance against new automation equipment, especially without full understanding and training. Tushman and Anderson (1986) assert that appropriate structural changes are also needed for a company to adopt new systems successfully. Leonard-Barton (1992) points out that while a company's core competencies can create comparative advantages that are valuable assets for the company's survival, they may conversely strengthen the rigidity of the structure, thus preventing adaptation to new systems or to changes. These scholars conclude that management's capacity is important in order to eliminate this two-faced character of a company's core competencies. From the viewpoint of structuralism, Scott (1988) defines a company as an open system whose rise and fall depend on continuous interactions with various internal and external factors around it. However, Scott further argues that changing a structure is difficult due to the inherent inertia that creates a tendency to change in just one direction. Tripsas and Gavetti (2000), upon researching the digital optical technology industry, conclude that many companies

do not adopt themselves to fast changing technology. Similarly, a number of previous studies assert the importance of new technologies or innovation and discuss the barriers of introducing them. However, most of these studies have not included successful examples.

On the contrary, several analyses have been carried out on Yuhan-Kimberly as a successful example of a company introducing and managing new technologies and systems. To better understand the factors leading to this success, a deeper analysis of Yuhan-Kimberly's case with an analysis framework is needed.

Founded in March, 1970, Yuhan-Kimberly has been a role model company not only as a successful joint-venture with the largest market share in the major diversified chemicals industry, but also as a leading pioneer in corporate social matters, such as transparent management, corporate social responsibility and ethical management. In spite of both internal and external hardships during the past decade, which include labor-management disputes, drastic fall in market share and Korea's financial crisis, Yuhan-Kimberly has maintained a firm stance in the Korean market, becoming the industry leader. More notable, the company has its own capacity to introduce and stabilize various innovative systems. It owes these successes largely to those management tools such as ethical management, environmentally friendly management, ERP (Enterprise Resource Planning), and the system of two of three shifts for four groups (four-group shift system), as these tools helped the company to cope with the fast changing environment (e.g., Cho 2004; Kim 2004).

This paper identifies the mechanisms that Yuhan-Kimberly introduced to stabilize these new systems and to develop its competitive advantage within the industry. For deep analysis of the introduce and implementation process, the four-group shift system, which changed working conditions greatly at manufacturing sites, has been examined. This paper presents the case of Yuhan-Kimberly in two sections. After the introduction, the background of introducing the four-group shift system, the application process, the problem-solving process, the effects and results and overall information about the four-group shift system have been explained. Next, we have analyzed the fundamental mechanisms which enabled Yuhan-Kimberly to achieve fruitful results by utilizing the new system. Finally, conclusions are provided.

Table 1. 3-Group 3 Shift System

	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T
Group 1	A	A	A	A	A	A	A	C	C	C	C	C	C	B	B	B	B	B	B	B	B	A	A	A	A	A	A	A	C	C
Group 2	B	B	B	B	B	B	A	A	A	A	A	A	A	C	C	C	C	C	C	C	C	B	B	B	B	B	B	B	A	A
Group 3	C	C	C	C	C	C	B	B	B	B	B	B	B	A	A	A	A	A	A	A	A	C	C	C	C	C	C	C	B	B

A: Morning Shift (7 AM~3 PM), B: Afternoon Shift (3 PM~11 PM), C: Night Shift (11 PM~7 AM)

INTRODUCTION OF FOUR-GROUP SHIFT SYSTEM

Yuhan-Kimberly’s four-group shift system has two forms; three shifts and two shifts. When this system was first adopted in 1993 at the *Daejeon* plant, Yuhan-Kimberly had employed the first form but now it use the latter form in all sites including *Daejeon*.

Before implementing the four-group shift system, Yuhan-Kimberly (hereafter, YK) also used the common three-group three-shift system. Table 1 shows that a worker’s schedule depends on the weekly shift system. As the shift usually takes place on Sunday, if any team or a certain number of people takes a day off on the shift day, the others have to replace them by working two shifts. Machines working ceaselessly allow no day off. Under this system, laborers hardly enjoy their own time away from work with their friends or families since they are tied to the work schedule. In addition, regular shift in working hours often have negative effect on the health of laborers. All these result in less worker satisfaction and finally lead to a high turnover rate.

YK adopted the four-group shift system in 1993 at the *Daejeon* site for the first time. At first they had to adopt the three-group system. In this system, one group takes a rest while the other three groups work in three shifts for 8 hours a day. The shift takes place at 7 AM, 3 PM and 11 PM. One laborer works 42 hours a week; and if training sessions are considered, 44 hours. After a laborer works the night shift for 7 days, 2 off-duty days are provided. Laborers can choose one of those two days as a training day. Usually, the normal

Table 2. 4-Groups 3 Shift System

	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S
Group 1	N	N	N	N	N	N	H	C	A	A	A	A	A	A	A	H	C	T	M	M	M
Group 2	C	A	A	A	A	A	A	A	H	C	T	M	M	M	M	M	M	M	C	H	N
Group 3	A	H	C	T	M	M	M	M	M	M	M	C	H	N	N	N	N	N	N	N	H
Group 4	M	M	M	M	C	H	N	N	N	N	N	N	N	H	C	A	A	A	A	A	A

M-Morning shift, A-Afternoon shift, N-Night shift, H-Day-off, C-Day-off or Training, T-Training

Table 3. 4-Group 2 Shifts System

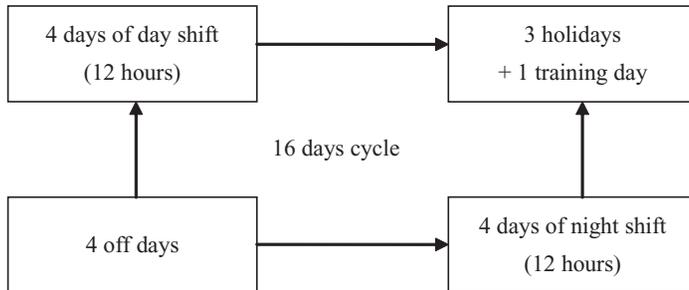
	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W					
Group 1	H	H	B	B	B	H	H	H	H	A	A	A	A	T	H	H	H	B	B	B	B	H	H	H	A	A	A	A	H
Group 2	A	A	H	H	H	T	B	B	B	B	H	H	H	H	A	A	A	A	H	H	H	B	B	B	B	H	H	H	A
Group 3	H	H	A	A	A	T	H	H	H	B	B	B	B	H	H	H	A	A	A	A	H	H	H	T	B	B	B	B	H
Group 4	B	B	H	H	H	A	A	A	A	H	H	H	T	B	B	B	B	H	H	H	A	A	A	A	T	H	H	H	B

A: Day Shift (7 AM~7 PM), B: Night Shift (7 PM~7 AM), H: Off Days, T: Training

amounts of training hours per one laborer are 104, but if these selective training hours were added, they would exceed 300 hours (see table 2).

Later, YK enforced a system of four groups on two shifts for the entire fleet of plants, including *Daejeon*. This system assigned all workers into one of four groups to work in 16-day cycles. The cycles included 4 days of day shifts at 12 hours per day, 4 off days, 4 days of night shifts at 12 hours a day and another 4 off-duty days. The 4 off-duty days right after the day shift period include one training day. A worker under this system works 42 hours weekly, or 45.5 hours including training hours. The worker is paid extra for the 1.5 hours. The annual training hours are 183, and extra sessions are held during off-duty days if necessary (see table 3 and figure 1).

The turnover rate was quite high in the *Kimcheon* plant under the three-group system, which forced laborers to do irregular night duties. On the contrary, the four-group shift system, by adding one group, provided more leisure time to workers so that they could



Source: International Role Model Korean Company: Yuhan Kimberly, 2005.

Figure 1. 4-Group 2 Shifts

feel more settled in their lives. Under this system, the productivity gained outweighed the labor cost of adding one additional group. This rise in productivity happened for several reasons: (1) number of days that the factories operated rose from 320 to 360 and (2) total costs decreased as reductions in safety-related accidents and defect rates decreased. These outputs also support Kim, Kim, and Park's research (2003) that insists the positive relationship between high-performance and firm training.

Background of Introducing the Four-Group Shift System

Each plant of YK has a unique background in its adaptation of the four-group shift system (see figure 2). In 1993 the entire *Daejeon* site inaugurated this system of four groups on three shifts, and after 4 years, the *Kimcheon* site partially adopted the four-group two-shift system. Later, in 1998 and 1999, this four-group two-shift system expanded to *Gunpo* and the entire *Kimcheon* plant. With *Daejeon* finally turning to a system of two shifts in 2003, all the plants of YK now execute the four-group two-shift system.

The decision to implement the system for the first two attempts at the *Daejeon* plant in 1994 and the *Kimcheon* plant in 1997 was made for the purpose of boosting YK's competitiveness as competition in the market was quite fierce at that time. Additionally, it served in job creation as YK needed to build new factories, install facilities and hire skillful workers to operate and maintain them. The vice president, Kook Hyun Moon (Moon hereafter), recogniz-

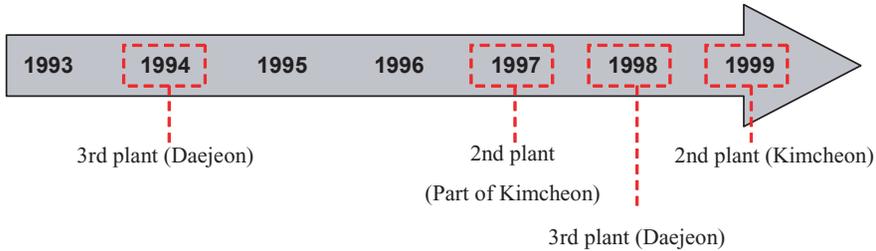


Figure 2. Starting Years 4-Group Shift System.

ing the importance of training from the case of Huggies College at the *Gunpo* plant, asserted the need to keep one group on reserve to maximize the efficiency of training.

The acceptance of this new system at the *Gunpo* and *Kimcheon* plants was also based on other factors. In these cases, both suffered from overflow of workers as a result of automation. To make things worse, an economic recession threatened job security, creating a labor-management dispute, leaving workers on strike for a week. In response, the CEO proposed guaranteed job security and the four-group shift system. Those proposals were intended to produce knowledge workers through lifetime training and stable jobs.

The factors that encouraged the adoption of the four-group shift system can be found both within and outside of the company. The cases of *Daejeon* and *Gunpo* plants explain this in detail. The *Daejeon* plant had several external factors. Competition in the market became fiercer during the 1990s, forcing the company to think of new management methods. For example, the great success of P&G in the domestic market lowered the market share of YK by a large portion. Internally, YK needed new manufacturing facilities in order to produce the kind of top quality goods that would allow it to realize its vision. Specifically, it needed more automated, highly productive machinery and a new system of operations to recapture the leading position in the market. In the light of this situation, Vice President Moon, at that time, seriously considered the four-group shift system, which had been used in other markets throughout the world already and would help the company to reserve a portion of laborers for training to create knowledge workers.

It was not very difficult to introduce the new system in *Daejeon* since it was a newly established plant with no pre-existing corpo-

rate culture. Therefore, there was not much opposition to the new system. Further, the demand within the company was quite high for more intensive and extensive labor training, including general culture education, as well as job-related training. This presented the need for more systematic training since people witnessed fruitful yields from Huggies College at the *Gunpo* plant. The four-group shift system looked like a reasonable solution in this situation. A four-group & three-shift system was the first form attempted because the labor law at that time mandated overtime allowance for shifts requiring more than 8 hours of work per day.

The external factor for *Gunpo* plant's adoption of the new system was the fast-changing environment. Korea's economic crisis in the late 1990s slowed down operations of factories, threatening job security. Hence, a more flexible employment form had to be considered. Internally, failures to provide balanced human resources impeded consecutive production and high productivity. Laborers had to suffer from accumulated fatigue coming from continuous overtime work and, as a result, risk of accidents rose. Their complaints grew even bigger as busy schedules kept them from training opportunities. The *Daejeon* plant's successful example of four-group shift system was focused on as one of the solutions to these problems. After a careful review of the *Daejeon* plant's case, managers and laborers discovered that there would only be a slight drop in wage level and the new system would give them more time off. After these considerations, they finally decided to implement the new shift system.

IMPLEMENTATION AND PROBLEM-SOLVING PROCESS

Daejeon vs. Gunpo Plants' Implementation Process

In the process of implementing the four-group shift system, roles of the main players were different in each plant. There was one common feature, however; they organized a design team so that laborers could participate in the system from the development period. During these proceedings, the management staff limited their roles to providing advice on the general direction from the whole company's point of view.

The *Daejeon* plant featured dynamic participation of the entire

management staff and general employees. Vice President, Moon, believed that leaving one group on reserve was necessary for training purposes again, as he was well aware of the importance of training programs from the successful precedent of the *Gunpo* site's Huggies College. Hence, the four-group shift system was chosen in the newly established *Daejeon* plant to replace the three-group shift system. In addition, help from Kimberly Clark's consultants was involved, as it had already implemented four-group shift system on track. There were, however, worries among employees about possible income reductions as a result of reduction in overtime labor with the launch of the new system, but the management committee gathered every employees' participation through ongoing consultation and training. Moon's will to carry on the new system was so strong that he established the management committee to give general direction over the process. Finally, design team preceded the project with wide-open attitudes toward employees' opinions, while exchanging opinions with the management committee.

The design team took a much broader role in the case of the *Gunpo* plant. Consisting of both management and employee representatives; the team first analyzed the cases of the *Daejeon* and *Kimcheon* factories. A deeper analysis was followed through workshops and meetings to derive the most suitable form of management in the *Gunpo* plant's paper manufacturing, infants and female related manufacturing departments. After carrying out employee surveys and collecting various ideas, the design team came to a conclusion that the four-group two-shift system would be the best model for them. This was not so much an imitation of the *Daejeon* plant's precedent as a consequence of the efforts of management laborers to find the best system. Timely amendment to the labor law made it possible for a worker to be on duty for 12 hours a day. The design team kept playing an important role so that the system could be stabilized by making constant efforts to solve problems. In this manner, the mutual understanding and effort of both the management and employees made the process of implementation of the new system flow smoothly in YK.

Problem-solving Process

YK overcame several initial obstacles for the four-group shift system to be successfully established. First of all, YK had to resolve

the issue of workers' fear and repulsion toward changes. In general, people feel threatened when things around them change. The introduction of the four-group shift system was a significant change to all the employees at YK. In addition, this transition was rapid – not gradual – making employees more uneasy. Employees worried about job security. They feared that when the new system was introduced, workers with low performance ratings would be laid off. In particular, when the system of four groups on two shifts was introduced at the *Gunpo* plant, there was a high concern about job security within the company culture overall because of the financial crisis in Korea. Employees were also concerned about drop in real wages. Laborers actually would work fewer hours in a four-group two-shift system than in a three-group three-shift system. As less overtime meant less money, employees feared that they might face a decrease in real wages. YK could overcome these barriers by the strong communication between management and workers as well as the active participation of the labor union.

The system in place is built on the following foundation: First, the effective and smooth communication between the executives and workers can be attributed to the education system strengthened by the introduction of the four-group shift system. Directly below the factory manager in position is an independent education team. The education team is composed of one team manager holding at least a university degree, one education consultant, two job instructors, and one administrative staff member. People who work as job instructors are factory managers, production team managers, process engineers, specialists from functional teams and factory maintenance workers. As job instructors from each department are rotated from the production department, they know the strengths and weaknesses of the human resources in each department, which contributes to the active communication between management and the field. In the process of establishing the new system, through this medium, YK could detect workers' fear of change and could reduce the fear and repulsion with an active response. As discussed so far, education takes a vital position in corporate strategy at YK. Education is not confined just to developing human resources; education and training creates new corporate culture, acts as a memory unit essential for educational organization, consults about issues in the field, renders counseling to troubled workers, and works as a communication channel between management and workers.

Second, YK's labor union also helped overcome the initial barriers. The labor union of YK was first organized to initiate its official operation at the *Gunpo* plant on April 1st, 1994. Immediately after the formation of the labor union, there were intense labor union activities, including a walk out. This happened because with the opening of this new communication channel, fear of job security caused internal conflict. When YK tried to introduce the four-group shift system at the *Gunpo* plant, it was natural for the labor union to oppose it because there was a concern that real wages might decrease due to loss of overtime. The labor union, however, did not act in its own interest only. The union fully understood the hardships the company was going through, and, most importantly, they trusted the company. At that time, the design team suggested that real wages be preserved by increasing the basic salary. They also suggested that education be taken as overtime and that an allowance be paid depending on job classification. Moreover, the labor union acknowledged and accepted most of the suggestions by the design team.

On the other hand, the company aimed at increasing real wages, not decreasing them, by generating profits from organizational transformation. YK set up the principle that with organizational transformation, it would maximize profits through increased productivity and market share and that all the profits would be returned to its employees. In this way, the decrease in actual working hours was offset by allowances and bonuses.

Active participation on the part of the labor union was made possible not only through the persistent persuasion of executives like the former CEO Moon, but also by the trusting relationship between the labor union and executive management. YK had built this trusting relationship with open and ethical management policies, especially after the inauguration of Mr. Moon. In fact, the former CEO Moon and other executives led by example, including coming to the company and cleaning up the site early in the morning. In particular, YK broadcasted a video tape to all the employees every two months, in which Moon himself presented crucial information on management, future prospects and directions for improvement. In short, the exemplary behavior of executives and transparent management by the CEO increased the trust of employees. The trust enticed employees to actively participate in the new four-group shift system.

In conclusion, YK's transformation from the previous production

system to a four-group three-shift or four-group two-shift shift system is a paradigm shift from the reproduction mechanism of vicious cycle to a virtuous cycle.

RESULTS OF FOUR-GROUP SHIFT SYSTEM

The benefits of the four-group shift system can be analyzed from the viewpoint of laborers and the company. First of all, workers can enjoy enhanced quality of life with more holidays on which they can spend more leisure time with their families. They can also live more stable lives because working days and holidays are pre-scheduled. In addition, they can upgrade themselves with increased opportunities for education including: advanced job training, acquisition of new technology/knowledge, and cultural education. More holidays and chances for education bring physical and mental relaxation to labor workers, thus decreasing safety-related accidents.

Secondly, the company enjoys increased productivity with the four-group two-shift system, maximizing factory running days to 360 days a year and decreasing safety-related accidents and the defect rate. The company has also achieved improved quality through advanced job training, as well as increased job concentration of well-rested employees. There are detailed analyses of the cases of the *Daejeon* and *Gunpo* plants. In the case of *Daejeon*, the defect rate decreased from 2.87% in 1998 to 1.8% in 2000; in the case of *Gunpo* the productivity increased 13% in 2000 from 1998, and the accident rate dropped to 0% at present from 0.12% in 1999 (see figure 3).¹⁾ In addition, table 4 shows YK's total sales, profits and the number of employee for the year.

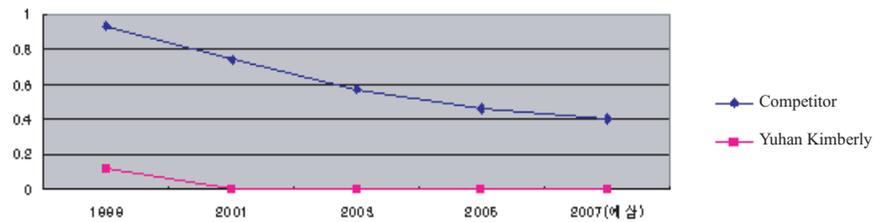
With the introduction of the four-group shift system, Yuhan Kimberly has accomplished not only the tangible outcomes discussed above but also intangible outcomes, such as the change of corporate culture and cooperation between the company and labor workers. First, a culture of participation was established. A realistic and creative mechanism was invented through which labor workers are encouraged to participate in the project from the first steps of development of the system. This encouragement includes respect for creativity and participation of labor workers who themselves would

1) From the inhouse document.

Table 4. Financial Performance

Year	1990	1996	2002	2005	2008
Sales (100million KW)	1,638	3,447	7,011	7,743	10,221
Profit (100million KW)	51	144	844	893	1,153
Total # of Employee	N/A	N/A	1,573	1,680	1,689

Source: Yuhan-Kimberly in-house material and Sustainability Summary Reports.



Source: Yuhan-Kimberly in-house material.

Figure 3. Comparison Of Accident Rate: Yuhan-Kimberly Vs Industry Average.

be subject to the new system. In addition, a task team was designed to encourage the autonomy of labor workers, who themselves decide everyday issues and details for team management, thus improving the labor workers morale.

Second, the relationship between labor and headquarters improved. It was not that a few presidents or factory managers made the new system and then persuaded labor workers to follow. In introducing the new system, YK made a system improvement team composed with equal representation by executives and workers. As a team, executives and labor workers thought over the projects together for at least 6 months, and they came to an agreement reflecting the opinions of the workers. This process contributed to the trust between executives and workers, and the trust contributed to the competitiveness of the company.

We have examined the introduction process and benefits of the four-group shift system, which generates competitive advantages for YK. The four-group shift system of Yuhan Kimberly is an effective combination of technological skills and HR management skills respecting human beings, which deeply underlie YK's values. YK's

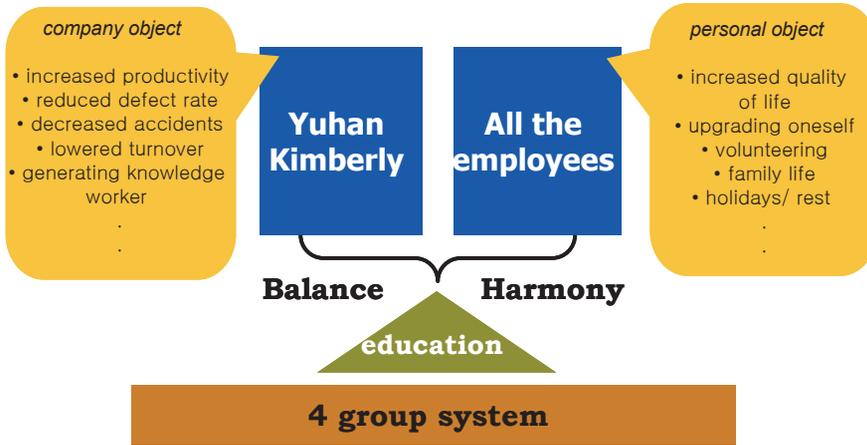


Figure 4. Significance of Four Group System at Yuhan-Kimberly.

3H culture of hand, head, and heart is embodied in the four-group shift system, enabling a win-win relationship between the company and workers. The four-group shift system, along with other highly efficient production systems, has contributed to the formation of lifelong education, decreased safety-related accidents, increased product quality and heightened productivity. An efficient production system based on the four-group shift system gives labor workers enough time for upgrading and relaxing themselves. This system makes employees trust that the company regards its employees as true companions not just as disposable resources (see figure 4). According to the Hawthorne research²⁾ by Professor Mayo, one of the traditional experiments in the operations management field, productivity increases if a company pays attention to its employees. This research was verified through the example of YK.

Though active participation and drive of executives are important in introducing an innovative system, the understanding and participation of labor workers is crucial, as the workers are direct users of the innovative system and objects of the innovation at the same

2) G. E. Mayo, Harvard University professor, and his research team conducted an experiment on the improvement of task efficiency toward labor workers at Hawthorne Electric. Task efficiency increased not as a consequence of actual changes in physical working conditions like working environments and monetary conditions (salary), but as a consequence of informal organizational factors like interpersonal relationship derived from workers' attitude and emotion.

time. Most of all, empathic management makes the introduction of any system successful, which is made evident when management treats employees as family members and offers them quality time for self development.

ANALYSIS OF MECHANISM FOR THE INTRODUCTION OF NEW SYSTEM

If we focus on specific factors in analyzing the behavior of companies and organizations, we may consequently ignore organic relationships and interaction which may result in an erroneous conclusion. Mechanism, a much more advanced form of research than reductionism, is a holistic way to conduct research. The value of the holistic research is highlighted in Dunning's OLI framework and Tichy's TPC framework. In mechanism, we must first identify individual molecules and genes as in reductionism; then we integrated and analyze the interactions of these factors in terms of sequence and timing.

In holistic and integrated mechanism study, we analyze composition of factors (C), which are subject (S), environment (E) and resource (R), its sequence (S) as to the input order of production requisite, and timing (T) as to the temporal factors such as input moment, period, and speed. Mechanism is defined as the way in which core competencies operate and the origin of firm competitiveness, derived by analyzing composition factors, sequence and timing (Cho 2006).

The Daejeon Plant

Subject-Environment-Resource (SER). First of all, subjects (S) are decision making entities that determine business activities, set the vision of a company, and push for the vision (Cho 2006; Cho and Lee 1998). The four-group shift system was first introduced in the *Daejeon* plant. When implementing the four-group shift system at the *Daejeon* plant, the subject's strong drive was a key element. Former CEO Moon, Vice President at the time of innovation, had a strong will to introduce the four-group shift system at the newly built *Daejeon* plant within two factories under his control. Subject demonstrated his strong will to adopt a system of four groups on

three shifts at the *Daejeon* plant by building a steering committee in February, 1993, made up of executives. The committee set the direction and scope of the project.

Second, environments (E) are major circumstances inside and outside of the company that need to be considered for the subject to make decisions (Cho 2006; Cho and Lee 1998). In the 1980's, around the time the four-group shift system was introduced, YK was facing challenges as large conglomerates were entering the market. In the 1990's, the market was turning into an even more competitive world market as multinational companies like P&G entered the Korean market. In this changing environment, YK could no longer maintain its competitive advantage with its previous manner of business. As multinational companies succeeded in the domestic market, YK lost a lot of market share. YK was seeking innovation and was considering adopting a four-group shift system for the first time. Under these circumstances, the fact that the *Daejeon* plant was new was a huge advantage. As a newly built factory, the *Daejeon* plant didn't have a fixed behavioral code, and it had relatively fewer obstacles in introducing a new system. Specifically, a four-group two-shift system was established at the *Daejeon* plant from 2003 to 2004, which was possible with the labor law change under the Tae Woo Noh administration. Kimberly Clark's aggressive support was also a main environmental factor for the success. In particular, while Kimberly Clark did not influence the decision regarding whether to adopt the four-group shift system, it contributed by suggesting its opinions on how to settle and operate the four-group shift system at the *Daejeon* plant. Lastly, the fact that it was a newly built factory was also an environmental factor.

Third, resources (R) are tangible and intangible assets owned by a company (Cho 2006; Cho and Lee 1998). In terms of resources, YK has a culture of pursuing innovation, fostering learning, and giving back to society. YK encourages all the employees to participate in goal setting and this participatory culture is essential for executives' agendas to be implemented enterprise-wide. A design team composed of labor workers and managers participated early in the stages of setting the vision for the *Daejeon* plant. The action plan for the four-group shift system was based on the opinions suggested by the design team. YK could build trust between labor and management in this collaborating culture. This collaborating culture is exemplified by a system allowing for no temporary workers at the *Daejeon*

plant. Accordingly, all the employees, not just executives, could unite in introducing the new system. Successful introduction of the four-group shift system at the *Daejeon* plant was based on the effective collaboration between the steering committee and the design team. Ideas were generated from executives and verified by labor workers and managers. This process was carried out in harmony in a win-win corporate culture. Consequently, the corporate culture to cultivate innovation and learning greatly reduced the resistance against the new system. This leads to success in implementing the four-group shift system at the newly built *Daejeon* plant.

Composition of Factors-Sequence-Timing (CST). First, composition factors, SER, are as demonstrated above. In introducing the four-group shift system at the newly built *Daejeon* plant, subjects played a major role. The direction was propelled by the strong will of the vice president Moon and the efforts of executives. Then, there were environmental factors. As competitive multinational companies entered the Korean market in the 1990's, YK lost a huge amount of market share to its competitors. In hard times, YK introduced a new system at the newly built *Daejeon* plant to obtain competitive advantage. Resource factors like its culture and labor/corporate relationship also played a significant role. YK had culture promoting innovation and learning from its inception, and this culture bred trust between laborers and executives. As discussed above, the successful application of the four-group shift system in *Daejeon* was initiated by subject's strong will. In actual introduction, however, all the employees played crucial roles. In other words, subjects played an important part in making decisions in the introduction of the new system and resources played a leading role in implementing the actual system. In terms of environments, high competition in the industry and the existence of the newly built *Daejeon* plant played vital roles.

Second, the sequence of implementation of the four-group shift system in *Daejeon* moved from a steering committee of executives and then to a design team of labor workers and managers. Because the four-group shift system was first conceived by executives, it was first discussed for agreement and for opinions on clear direction among executives. After reaching an agreement, rather than choosing a top-down method of developing functional and reward systems to force executives' ideas, YK established a design team and let that team elaborate on details based on the agreement among la-

bor workers and between labor and management on issues such as team mission, basic principles of high-involvement teams, process boundaries, optimal number of people for the production team, shift schedules, circular assignment, education, team meetings, team decision making, team administration, qualifications for recruitment, and salary systems. In other words, the four-group shift system at the *Daejeon* plant was implemented first by the steering committee of executives and then by the design team of labor workers and managers. After making the basic framework, step by step the teams laid out details, such as developing an educational curriculum, an indispensable element of the four-group shift system. In conclusion, under the changes of environments, the subjects presented a vision, and the design team (resource) set out detailed action plans.

Last, as for timing, there was a crucial variable: the establishment of the *Daejeon* plant. As competition became tougher worldwide in the 1990's as the need for innovative management systems became urgent. If the *Daejeon* plant had not been built at that time, the four-group shift system could not have been implemented as early as 1993. As market share decreased and sense of crisis rose, a newly built factory with no previous customs made easier the implementation of the four-group shift system as early as 1993.

In conclusion, subjects played a key role in introducing a new system through decisions and drive for the new system. Moon, feeling the need for the new system as competition became severe in the 1990's, looked the new *Daejeon* plant as an opportunity to aggressively push for the four-group shift system. The steering committee set the vision for the four-group shift system and the design team, reflecting trust and cooperation which are traditional values of YK, participated in the process of successfully stabilizing the new system. Thus, the change of environment urged the need for a new system. Subjects quickly sensing the environmental change played a key role in introducing the new system at the *Daejeon* plant by suggesting the four-group shift system and bringing out cooperation from resources. Subsequently the resources thought over the vision with the subjects and devised detailed solutions for the settlement of the four-group shift system, understanding the purpose of the system, which made possible the successful settlement of the four-group shift system in *Daejeon* and dissemination of the four-group shift system in other factories.

The *Gunpo* Plant

Subject-Environment-Resource (SER). First, innovation should be examined in terms of former CEO Moon. Moon had experience introducing the four-group shift system in *Daejeon* where he was in charge of the establishment and management. Faced with the expanding economic crisis and troubles within the company, Moon strongly believed that the four-group shift system, enabling the education of idle production capacity, was the only solution for the betterment of the company. Due to Moon's pertinacious persuasion, the labor union came to trust the CEO and to cooperate with the executives, positively evaluating the four-group shift system as a solution for idle production capacity. Labor workers can be classified as subject in the case of the *Gunpo* plant. Moon and executives asserted the necessity and meaning of introducing the new system and presented the scope and direction of the project. Then, labor workers and managers deliberated and came up with detailed decisions and operation plans. Accordingly, labor workers and managers, who used to be classified as available resources, took the role of subject taking an initiative in introducing the new system at the *Gunpo* plant.

Second, around the time the four-group shift system was considered at the *Gunpo* plant, YK was having internal hardships with low productivity and decreasing market share as well as external hardships due to the foreign exchange crisis. Specifically, YK had to stop its production lines for more than 6 months as demand for its products plummeted in 1998. The sign of restructuring was lingering at YK with the factory operation rate of less than 50% and highly piled up inventory. As the market worsened, the company worsened as well. The idle production capacity rate crossed over 40 %, which meant the possibility of massive layoffs in case of emergency. Accordingly, the tension for restructuring was heightening at YK.

Lastly, among YK's various advantages and resources, the experience of successful introduction of the four-group shift system in *Daejeon* is a notable resource. This experience encouraged the spread of the four-group shift system to other factories, including *Gunpo*. With the *Daejeon* plant's experience, labor workers realized that the four-group shift system was not a short term strategy eventually aiming at restructuring, and that the four-group shift system

could actually improve efficiency. Even though tensions were high due to the economic crisis, the expansion of the four-group shift system to *Gunpo* would not have been possible if it had not been for the underlying trust between executives and labor workers. Eventually, it was corporate culture that played a crucial role – corporate culture that is based on win-win trust between executives and labor workers and in which executives respect the opinions of labor workers. In addition, YK's culture to foster learning and to embrace innovation made possible the expansion of the four-group shift system. In this encouraging corporate culture, the design team made up of labor workers played a leading role in customizing the new system to its factory. In 1994, a labor union was founded as a new way of communication. At first, the union played hardball for employment security, however, in the end it optimistically examined the four-group shift system as a way to make use of idle production capacity. As a result, there are almost no temporary workers except for in inevitable cases, like maternity. This win-win corporate culture is based on education, which has been emphasized since Moon's inauguration as CEO, and on open management abiding by a strict ethical code. This culture, one of the competitive advantages of YK, has been reinforced.

Composition of Factors-Sequence-Timing (CST). First, composition factors of SER for the four-group shift system at the *Gunpo* plant, should be examined. The strong will of former CEO Moon was also noticed in *Gunpo*. He persistently persuaded the labor union to implement the four-group shift system. As for environments, both internal and external environments were deemed unfavorable. Externally, YK was suffering from poor management starting from 1995 and the tension was high because of the foreign exchange crisis. Internally, there was a great concern about job security. Regarding resources, the crucial factors were successful implementation experience at the *Daejeon* plant, the corporate culture of fostering innovation and learning inherited during the company's inception, trust between labor and executive management, and the leading role of labor workers. Consequently, resources played a leading role in introducing the system in *Gunpo*. Resources were already acting as a subject being active and empowered for decision making. Environments were also important factors for the introduction of the four-group shift system although they carried a numerous range of dif-

ferent characteristics from the environments of the *Daejeon* plant.

Second, examining the sequence of implementation of the four-group shift system in *Gunpo*, the aggravated economic situation and successful realization of the four-group shift system at the *Daejeon* plant came first. Next, executives set the vision. Former CEO Moon continuously tried to reach an agreement with the labor union on the four-group shift system but the union didn't view this system positively at first. Later, as the union accepted the introduction of the four-group shift system, the company came up with a detailed plan optimized for its unique circumstances. This brought the successful implementation of the four-group shift system to the *Gunpo* plant. If we examine the sequence of implementation at the *Gunpo* plant, we can see that it started with the environmental change and accumulated previous experience (E, R). Then, the CEO set out the vision and the union accepted the mission (S, R). Finally, the design team established detailed action plans (R).

Lastly, timing is discussed. As time had passed since the introduction of the four-group shift system in *Daejeon*, the *Daejeon* plant started to show positive performance from around 1995 to 1996. On the other hand, YK was suffering from poor business performance and a worsening economic situation. Under an aggravating economy, YK was desperately looking for a solution to maintaining its competitive advantage. At this time, YK found *Daejeon's* system to be attractive and wanted to implement it. Under these circumstances, executives, including former CEO Moon, persuaded labor workers in *Gunpo* to introduce the new system since a sense of crisis heightened due to the fact that other companies had already laid off a number of employees.

In conclusion, when the total experience of introducing a new system has been accumulated, it is possible for resources to lead the innovation. As in the case of *Gunpo*, resources, equipped with the sense of ownership and internal capacity, could make decisions on given agendas and could lead the project. Facing internal challenges of lowered productivity and external turmoil from the foreign exchange crisis, YK looked into the advantages of the four-group shift system. The labor union, established in 1993, acted as a communication channel and examined the four-group shift system, which was proven effective at the *Daejeon* plant, as a positive alternative in utilization of idle production capacity and as a measure to secure job stability. Accordingly, when experience of introducing a new

system has been accumulated, resources, realizing the effectiveness of the system and holding positive attitudes toward education, can cooperate with subjects and take the initiative in implementing and operating the new system as a way of coping with the changing environments.

CONCLUSIONS

We have examined the introduction process and benefits of the four-group shift system, which generates competitive advantages for YK. The mechanism of introducing a new system at the *Daejeon* and *Gunpo* plants has been analyzed in term of SER and CST. The mechanism, aiming to react to the dynamic environmental changes inside and outside the company, is based on the effective communication channel, which is open for all the executives and labor workers, trust between the company and employees, and an actual reward system. The flat organizational structure and family-like relationship between company and employees, which is based on mutual trust and on active mutual participation, will bring out win-win cooperation no matter what system is introduced in the future.

Successful application of the new system at the *Daejeon* plant was the starting point for the upcoming expansion of the new system introduction mechanism. The newly built *Daejeon* plant was an opportunity for the mechanism's subject who was pushing the four-group shift system as a solution for the difficult situations surrounding the stumbling economy. A steering team composed of executives, who insisted on implementing the four-group shift system in *Daejeon* set out the direction of the project; a design team composed of labor workers cooperated with the steering committee for the successful implementation of the system. The existence of the design team was possible because of the trusting relationship between the company and employees and because of the corporate culture of learning and cooperation. Accordingly, executives set out the direction for the four-group shift system and labor workers and managers discussed effective alternatives for the successful settlement of the system. The successful implementation of the new system in *Daejeon* was attributed to this collaborative decision making process. As the *Daejeon* plant was a newly built factory with no previous customs, it was relatively easier for the new system to be established.

As for the *Gunpo* plant, however, it was hard for employees to accept the new system as they had to discard 20 years of practice, despite environmental factors of low productivity and job insecurity. Executives reduced the resistance and stabilized the new system by involving all of the employees during the system's introduction and operation and discarded the one-way decision making process. With the previous experience of successfully introduction of the new system, and also the challenging environment internally and externally, labor workers took a leading role in benchmarking the *Daejeon* plant operations and coming up with action plans for their job security.

Consequently, the mechanism for the introduction of a new system was established with the four-group shift system. As the experience at the *Daejeon* plant diffused around the company in learning corporate culture and in trusting relationship, the mechanism was built through which the new system is introduced and operated.

At the *Gunpo* plant, the implementation of the new system, a solution for changing environments, was made possible through the previous experience of the system at the *Daejeon* plant, active participation of all the workers, and a new cooperative corporate culture, which set up a new mechanism. In this process, executives offered education to labor workers and were patient in waiting for labor workers to fully understand the necessity of the new system, a humane policy. Once the labor workers fully understood, they participated in the introduction of the new system based on the mutual understanding between the company and its workers. YK has a humane corporate culture that encourages understanding and participation of all employees. This culture has become a fundamental principle in the introduction of new systems, and enables a mechanism within which all the employees enjoy participating. (see table 5 and figure 5).

YK should cherish and disseminate its own culture to its workers. The culture including: management by principle, open management, ethical management, respect for employees, and emphasis on education. YK should continue to actively react to its changing environments. Further, the policy of patient management also should be maintained, an idea that says executives should be patient while labor workers and managers need adequate time to fully understand and to participate, not just be propelled by executives' drive. Furthermore, YK's case supports Noble's (1984) arguments that highlight the importance of relationships between management and

Table 5. Mechanism of Successful Implementation of The New System

	<i>Daejeon</i> plant	<i>Gunpo</i> plant
Composition of factors	S - Vice president Moon at the time of implementation - Steering committee	- Previous CEO Moon - participation of all the employees
	E - severe competition as multinational companies enter Korean market - new construction of <i>Daejeon</i> plant - relatively low resistance against new way of work schedule/ system - high need for lifelong education	- external tension heightened in foreign exchange crisis - internal tension heightened for job security - strong resistance against new way of work schedule/ system
	R - innovative and learning corporate culture - trusting relationship between labor and management - communication channel between labor and management - participation and contribution of all the employees	- experience effect at <i>Daejeon</i> plant - innovative and learning corporate culture - trusting relationship between labor and management/ communication channel - education for labor workers and managers - positive examination of the suggestion by the labor union
summary	S played a more important role than E and R	R played a more important role than S and E
Sequence	Change of environments (E) → Vision setting by subject (S) → detailed action plan by design team (R) E (severe competition) } S → R E (newly built <i>Daejeon</i> plant) } * coexistence of needs and opportunity: severe competition and newly built <i>Daejeon</i> plant	environmental change, accumulated experience of the new system (E, R) → vision set forward by executive and agreement by the labor union (S, R) → detailed action plan by design team (R) E } S } R } R } → R * cooperation by executives and labor workers stimulated by foreign exchange crisis and built up resources

Table 5. Mechanism of Successful Implementation of The New System

	<i>Daejeon</i> plant	<i>Gunpo</i> plant
Timing	At the very moment innovation was imperative with severe competition, <i>Daejeon</i> plant was newly built	As the four-group shift system was positively verified at <i>Daejeon</i> plant, and tension heightened with foreign exchange crisis, labor workers agreed to launch the new system.
Implication	At initial introduction, a leading role of the subject was crucial for excellent outcomes along with close cooperation by resources	When experience and competence are accumulated, resources' initiative results in a successful outcome

laborers, firm training, and structure of organizations.

The driving force of YK for sustainable growth has been examined in terms of its mechanism. Previous frames for analysis focus on a single factor or view, such as content or process. Mechanism analysis, however, makes integrated and holistic analysis possible by including content, process, top executives, labor workers, resources, and environment.

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