

Production Systems, Human Resources and Employment Relations in Korea: The Case of Kia Motors

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The emergence of a world-class auto industry has been one of the major achievements of rapid industrialisation in the Republic of Korea during recent decades. It has been argued that much of the success of the Korean auto companies relied not only on Korea's manufacturing strategy but also on previous government policies which suppressed trade unions and enabled employers to unilaterally determine the rules of the workplace (see Amsden 1990; Choi 1989; Deyo 1989, 1996). In recent decades, however, the Korean auto companies have been seeking to move from being low cost, mass producers to higher quality manufacturers by utilising more sophisticated systems of production (OECD 2000). Furthermore, since the 'democratisation' of Korea in 1987, collective bargaining rights have been extended to unions and the employers have faced an increasingly unionised workforce (Woo 1997). Unions in the auto industry have been in the forefront of campaigns to improve wages and conditions of the Korean workforce and have undertaken major campaigns which have often included strikes and other forms of industrial action (Park and Lee 1997).

Although the Korean auto industry originated in the 1930s, during the period of Japanese colonial rule (1910-45), it was not until the 1960s that Korean auto companies began to manufacture cars in significant volumes (Kwon et al. 2000). By the late 1990s, several Korean auto companies were exporting on a global basis and the Hyundai Motor Company (HMC) was among the top auto manufacturers in the world. Although the Asian economy crisis saw the demise of several Korean auto companies and a restructuring of the industry, HMC recovered quickly and has continued to expand its operations to various parts of the world. In 1998, HMC absorbed Kia Motors, which is the focus of this

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paper, and succeeded in becoming the world's tenth largest auto manufacturer, in terms of production capacity, by 1999. The takeover of Kia Motors by HMC was motivated, inter alia, by a desire to protect its market position from international competitors entering the Korean auto market by taking over other ailing car makers.

Kia Motors was selected for analysis because it has been the focus of a longitudinal study by Woo (2000) during the 1990s. Although it is now part of HMC, Kia continues to manufacture vehicles under its own brand name. Until it was acquired by HMC, Kia Motors was Korea's second largest auto manufacturer with 22 000 employees and annual sales of more than A\$3.6 billion. Kia had a unique management structure in that, unlike many other large enterprises in Korea which are part of family-owned conglomerates (known as 'chaebol'), it was management controlled. Prior to early 1990s, Kia also enjoyed relatively harmonious relationships with its employees and their union and had few industrial disputes. This situation changed during the course of the decade. During the 1990s, Kia Motors attempted to introduce a lean production system (LPS), which was derived from the Toyota Motor Company's production methods. The experiment yielded mixed results. Kia's experience is analysed in this paper, which examines the evolution of new forms of production and the consequences for human resources and employment relations in Korea.

From mass production to lean production

Although the auto industry has a long history in Korea, it largely functioned as a repair shop and reassembler of used cars until the early 1960s. When the Korean government, under the leadership of President Park Chung-Hee, introduced the first of a series of Five-Year Economic Development Plans in the 1960s, the auto industry became a key element in the rapid industrialisation of the Korean economy (Park and Lee 1997). The Korean government facilitated the development of auto plants for small passenger and commercial vehicles by merging various auto companies and assigning a particular product to each. HMC was established in 1968 as a complete knockdown (CKD) assembler under an agreement with the Ford Motor Company. By the mid-1970s, HMC was producing its own small passenger car (the Pony) using locally sourced parts but with technical and financial support from Mitsubishi in Japan. Based on the success of the Pony, HMC introduced a mass production system which enabled it to produce 100, 000 passenger cars on an annual basis by 1979. HMC then developed a wider range of models during the 1980s and entered the American market by 1986 with its competitively priced Excel, which achieved considerable success. By the end of the 1980s, however, the Korean government ended HMC's monopoly in the domestic market and allowed other companies such as Kia to begin production of small-sized cars.

During the 1980s, several Korean auto companies introduced systems of mass production using mechanical large-scale assembly lines.

Although Korean companies, such as HMC, had links with Japanese auto manufacturers, they were also strongly influenced by Fordist production systems pioneered in the USA (Jung 1992; Jue 1997). The introduction of industrial robots in the 1980s accelerated the process of automation. For example, 1,355 industrial robots were installed in the HMC Ulsan plant between 1991 and 1995. This enabled the simple model mass production systems to be transformed to allow various models to be produced concurrently. Kia Motors was smaller and less advanced than HMC. Kia's first assembly plant was the Sohari passenger car plant (S1) located in the suburbs of Seoul. Prior to the establishment of S1, Kia produced cars by assembling CKD parts which were imported from overseas. Although mass production was introduced at S1, it was not as sophisticated as the system which was developed at the Asan passenger car plant number 3 (A3), when it was established in 1994.

Under the mass production system in most Korean auto companies, human resource management and employment relations were given low priority. Semi-skilled workers were recruited from a variety of sources and placed on the assembly lines with little formal training. Supervisors were put in charge of work sections and operated under minimal formal regulations. Skilled workers were recruited from mechanical repair shops, factories and arsenals and indiscriminately assigned to production areas. Few managers had any formal training. In their quest to raise levels of quality and productivity, Korean auto companies looked to the Japanese producers, and especially Toyota, for guidance. During the 1990s it became increasingly common for Korean managers and engineers to visit Japan in order to benchmark their manufacturing practices against those of Toyota and other Japanese producers (Amsden and Kang 1995).

Of particular interest to companies like HMC and Kia Motors was the lean production system (LPS) developed by Toyota. LPS is a flexible production system which seeks to respond to rapid changes in market conditions, shortened product life cycles, and growing diversity of consumer tastes. While the Fordist mass production system is generally regarded as a rigid and supply-oriented production system, LPS has been portrayed as a demand-oriented production system, which reacts flexibly to the rapid changes (Womack, Jones and Roos 1990, 100-3).

The most important element in the LPS philosophy is the elimination of waste factors in production such as excessive stock, labour, and facilities. Cost reductions and improvements in productivity and quality can thus be achieved (Monden 1983, 22-5). LPS suggests three important areas in which waste can be eliminated. First, production volume management controls the quantity and types of product, daily or monthly in accordance with changes in demand. Unlike Fordist mass production, one of the major aims of LPS is to produce only the precise quantity needed to exactly meet demand at a precise point in time. Second, a unique quality control system is utilised whereby workers at

each production stage supply only quality parts to each subsequent stage. This is called 'quality guarantee management'. Removing all defective products is vital to produce only the necessary quantity required. If the defect rate increases, this seriously affects the production operation because of the lack of stock kept at the production site. Third, human resources must be effectively utilised in order to manage production volume and quality control. LPS is heavily dependent on the effective utilisation of human resources to avoid excessive labour.

These three elements, which underpin the LPS philosophy, comprise the principles of just-in-time (JIT). The central principle of JIT is producing the necessary products in the necessary amounts at the necessary time. JIT is generally regarded as an effective means of responding flexibly to changes in demand and it enables close control of the production flow.

The introduction of lean production systems at Kia Motors

Kia Motors began to implement aspects of LPS at its A3 plant in the early 1990s. The assembly shop at the A3 plant was established by the Daihuku Company which had been employed by Toyota. A comparison of the production structure at the S1 and A3 plants of Kia reveals not only the process of development of LPS but also the degree to which it was successful. This case-study focuses on the press, body, and assembly shops at each plant. The three shops were selected on account of the different production systems used in plants. The nature of the automotive production system can be separated into two distinct types – facility-oriented and labour-oriented production. In the press and body shops, it is relatively easy to establish an automatic production system which replaces labour as the work undertaken is simple. By contrast, the work undertaken in the assembly shop is more diverse and therefore difficult to automate. The assembly shop relies heavily on the use of labour. Therefore research into both the labour-intensive and automated parts of the automotive production system is essential to obtain a clear understanding of the automotive production system.

Table 1 The production systems in the A3 and S1 plants of Kia Motors

Plant	Press shop	Body shop	Assembly shop
S1	Hybrid of LPS and MPS	Hybrid of LPS and MPS	MPS
A3	Hybrid of LPS and MPS	LPS	LPS

The production structure of both plants at Kia Motors in relation to the introduction of LPS is summarised in table 1. The press shops at both plants provide completed products to all areas of production. For example, the S1 press shop provides products to the S2 plant, while the A3 press shop supplies to the A1 and A2 plants. With the establishment

of new plants, both press shops expanded their press lines to take account of the diverse delivery requirements to plants in the same area, and the timing differences. The use of press lines with time differences led to the introduction of mixed production structures at both plants. As a result, despite management efforts to develop more efficient production lines, the retention of old press lines drove the structure of both press shops towards a hybrid structure which mixed elements of lean production and mass production. The productivity of the A3 press lines was higher than that of the S1 press lines, and the press machines in the A3 press shop were more advanced than those in the S1 press shop. Despite this, efforts to enhance the productivity of the old tandem press machines through semi-automation at the S1 press shop was an important factor in classifying the production structure of the S1 press shop as a hybrid production structure, rather than simply defining it as a mass production system.

Through an examination of the production structures used in both plants, three important findings emerged. First, the implementation of LPS within an existing plant was not successful. In the cases of the A3 press shop, the S1 press shop, and the S1 body shop, efforts to enhance the production structure of each shop resulted in the development of hybrid production structures. These structures emerged because of various factors such as space limits, inefficient linkages between old and new machines, and difficulties in changing production layouts. These problems, in turn, indicated that the introduction of the LPS was best achieved in new plants.

Second, a full understanding of the nature of work undertaken in each shop was essential to fully appreciate the development of production structures and related changes in the organisation of work. The nature of work in each shop was closely linked to changes in the production structure. In shops with machine-centred work using simple and relatively unified work motions, such as the press and body shops, the development of the production structure focused on replacing labour with automation. By contrast, in the assembly shop, where work was simple but required a range of different motions, the development of the production structure assisted workers by providing better machine tools, reducing work intensity and providing better working conditions. Understanding the relationship between the nature of work and the development of the production structure is important in empirical research. Not understanding the details of this relationship can lead to misleading interpretations. For example, in replacing labour with automation, the most frequently discussed matters are job transfer and the re-education of displaced workers. It is assumed that the displaced workers are replaced by automation and that their roles become more indirect, covering tasks such as controlling, monitoring, and the maintenance of robots, and that their re-education needs to be organised accordingly. In practice, this was the case in the body shop, which had a highly automated production structure. However, in the assembly shop which had

low rates of automation, the most common impact which changes to production structures had on workers was their transfer to other production sites. In this circumstance, the focus on the re-education of workers was quite different and resulted in industrial conflict.

Finally, this case-study revealed that a 'better' production structure did not always guarantee improved productivity. Comparison of productivity in the assembly shops confirmed this. Despite the more advanced production structure in the A3 assembly shop, its productivity was lower than that of the S1 assembly shop. This implied that the productivity of a plant could be fully determined by one single part of the production structure. The essence of LPS is the consistency and efficient interrelationships between the production structure, work organisation and employment relations. The lower productivity of the A3 assembly shop may thus be understood in terms of a mismatch or inconsistency between the three factors

The organisation of work at Kia Motors

Kia Motors applied the same pattern of work organisation in all the shops studied, except for a short period when the kanban technique was used at the A3 assembly shop. The case-studies indicated, however, that although patterns of work organisation at the Kia shops were the same or similar to those of Toyota, when work practices for the execution of work is considered, differences were evident between the two companies.

Kia Motors used a stock control system similar to the kanban technique. The company also had a system of production balancing but experienced difficulty in utilising it effectively because of rigid labour deployment practices at the workplace. Reduction of lead time in the sample press shops resulted from a relatively shorter time interval for die changes, particularly in comparison with companies in US, Sweden, and Germany. The evidence provided in this case-study also confirmed that Kia Motors introduced a high level of work standardisation from the late 1980s but faced difficulties with further development during the 1990s because of worker resistance. In terms of on-the-job training (OJT), job rotation, and the multi-skilling of workers, Kia Motors did not utilise the same practices as Toyota, but did employ highly multi-skilled workers. With regard to monitoring management, the company used a yellow lamp system to stop the line and other techniques similar to the Andon system of Toyota. Suggestion and improvement activities at Bunim-Jo at Kia Motors were similar to those at Toyota, but a lack of sufficient incentives and inadequate time resulted in relatively unsatisfactory level of worker participation.

Taken together, the evidence indicated that Kia Motors had a similar pattern of work organisation with Toyota in some areas, but in others it adopted different work practices. Difficulties experienced by Kia Motors with the improvement of work standardisation and production balancing were closely related to labour intensification, which was strongly opposed by the trade union and workers.

The execution of lean production elements of work practices was less effective at Kia Motors than at Toyota. Given that Kia Motor's organisation of its production structure and of work, particularly in the A3 body and assembly shops, was similar to Toyota's, the relatively low level of performance can be partly explained by the ineffective utilisation of human resources. As the effective operation of the LPS relies on establishing efficient interrelationships between the various parts of the production structure, organisation of work, and the effective utilisation of labour, a detailed analysis of employment relations was required in order to gain a full understanding of Kia's human resource practices.

It is important to note that the work organisation and practices at Kia Motors constituted a hybrid production system, which took some elements of the LPS found at Toyota while also using practices based on the mass production system. In some areas, Kia Motors adopted specific elements of lean production prior to its full introduction. These areas included the stock control techniques, work standardisation, OJT, job rotation, multi-skilling, and *kaisen*. These work practices had developed as a result of domestic work conditions imposed on Kia Motors, and the emergence of a mixed pattern work organisation containing different work practices.

Employment relations and human resource practices at Kia Motors

Table 2 shows stark differences in the employment relations between Kia Motors and Toyota. The nature of the employment relationship that developed at Kia Motors under the mass production system was shaped during the 1980s. However, a change in the employment relations atmosphere occurred after late 1993: the environment became significantly more antagonistic. Management faced various barriers during attempts to change the traditional seniority-based wage system to one based more on individual merit. The existence of a rigid wage system had failed to encourage or improve worker motivation or a greater sense of commitment to efficient work practices. Workers relied on the union's strong wage bargaining power to oppose any changes to the system. Furthermore, the elimination of a personnel appraisal system further reduced the chances of introducing a merit-based wage system.

Kia Motors introduced a dual labour market to avoid the rapid increase in labour costs sought by the union. To achieve greater flexibility, tasks were allocated to contract workers who were not union members. Kia Motors did not experience a serious reduction in employment levels until 1997. Employment levels had gradually increased from 1987 to 1996, with annual recruitment numbers higher in the late 1980s than in the 1990s. Considering that Kia Motors had increased its production capacity through the establishment of new plants between 1987 and

1994, the relatively lower numbers of workers recruited annually reflects the company's change in employment strategy, which was to rely increasingly on contract labour.

Under LPS, education and training of employees is undertaken largely through OJT and off-the-job training (Off-JT). While OJT increases the scope of a worker's horizontal skills, Off-JT increases the depth of horizontal skills. Off-JT also provides 'work morale' education for workers and supervisors. The combination of these two systematic training programs seeks to achieve the development of a high level of quality of an organisation's human resources, particularly in the long-term. The 'ability'-based wage component and performance appraisal components of the wage structure under LPS are designed to motivate workers to actively participate in training and education. The employment system under LPS seeks to achieve a higher level of commitment by workers and thereby to improve their performance.

The use of OJT at Kia Motors was not systematic and was conducted at the discretion of managers in each department. It was used mainly as induction training for new recruits. A relatively high level of multi-skilling of workers at Kia was achieved through regular job rotation and less regular work replacement. However, such practices were conducted in an ad hoc fashion and were usually caused by unplanned absences rather than through strategic planning.

The most important difference between the education and training system at Kia Motors and the LPS practised at Toyota is that it did not have consistency and broad-based support in the former. The essence of the LPS is that skill upgrading of workers by the education and training programs is rewarded through monetary incentives using the wage system. This is achieved through worker evaluations under a performance appraisal system. In the case of Kia Motors, there was a lack of skill-oriented education and training.

Table 2 Comparison of employment relations between Toyota and Kia Motors

	Toyota	Kia Motors
Employment relations	Co-operative	Antagonistic
Remuneration	Merit-based wage system	Seniority-based wage system
Performance appraisal	Integrated with the wage system	Eliminated after union resistance
Employment system and job security	Dual labour market for the protection of core workers	Dual labour market since 1994 in response to unstable union-management relations
Education and training	Systematic on-the-job training (OJT) and off-the-job training (Off-JT)	Unsystematic on-the-job training (OJT) and off-the-job training (Off-JT)

The adversarial relationship that developed between management and the union at Kia Motors, particularly during the second half of the 1990s, was a major impediment to the effective implementation of LPS. A union survey of workers' attitudes at Kia Motors in 1996 revealed that what they regarded as the most important factor contributing to the rise in industrial disputes was the intensification of work caused by increased cycle time on the production line and reduction in the number of workers (see table 3). The workers' other major concerns were the number of industrial accidents caused by dangerous facilities and working conditions, unfair job rotations and transfers, and oppressive attitudes of managers and supervisors. Management claimed that the unions used the 'line stoppage' system as a negotiating tactic. In fact, the union did order workers to intentionally produce faulty products so that the production was stopped until negotiations with management were successfully concluded.

Table 3 Factors contributing to industrial disputes at Kia Motors

What is the major cause of industrial disputes at your workplace?	
Oppressive attitude of managers and supervisors	12.5%
Unfair job rotation and job transfer	12.7%
Industrial accident and dangerous facilities and working conditions	22.1%
Intensified workload by changes in cycle time and reduction of workers	46.8%
Others	

Source: Kia Motors Trade Union (1996: 73), Workplace Survey

Conclusion

This paper has highlighted the interrelationship between production systems, human resources and employment relations in the Korean auto industry, using the case of Kia Motors. The management of Kia Motors sought to introduce new production methods to increase efficiency and competitiveness. While their intention was to introduce a lean production system similar to that which was pioneered by Toyota in Japan, the case-study revealed that various internal factors prevented the company from achieving its objectives. Indeed, at each of the two plants studied, a hybrid production system emerged which combined elements of both the traditional mass production system and some elements of the lean production system. The S1 plant remained more of a traditional mass production operation, while the A3 plant introduced elements of the lean production approach in the body and assembly shops.

The findings of the case-study showed that there were limits to the introduction of new production systems in existing plants. These limits included space constraints, inefficient linkages between old and new machines, and difficulties in changing production layouts. Also, the nature of work in some shops was more conducive to the introduction of LPS than others. For example, structure of the press and body shops at

the S1 plant was more easily adapted to LPS. By contrast, the nature of work undertaken in the assembly shop at S1 plant was more complex and less suited to elements of LPS. LPS was more easily introduced at a new production site, as the lean nature of the production structure in the newly established body and assembly shops at the A3 plant clearly demonstrated.

The single most important factor which underpinned the inefficiency and undermined the implementation of LPS at Kia Motors was the antagonistic relations between management and the union. Especially since 1993, the emergence of strong radical unionism caused relations to worsen. The union interfered in management's trial of elements of the LPS particularly labour intensification and in the introduction of flexible cycle times, and brought about the elimination of a time and motion study at the workplace. Management regarded workplace trials as essential for the development of further production balancing and work standardisation, which are key elements of LPS.

Other elements inhibited the effective utilisation of human resources. For example, the rigid seniority-based wage system and the absence of performance appraisal were regarded by management as reducing the motivation of workers to improve their performance. The union's strong opposition to the education and training of workers increased worker insecurity due to the emergence of a dual labour market. Likewise, unstable employment relations, which was deepened by intra-labour conflict, resulted in the relatively lower performance of the company.

The production system and employment relations both play vital roles in achieving the efficient utilisation of human resources and work practices. An appropriate employment relations strategy is a prerequisite to commitment to the company on the part of workers as well as to its production activities. This is the essence of the employment relationship under LPS. In light of the findings outlined in this paper, such goals were difficult to achieve at Kia Motors given the existing working environment.

The findings of this case-study have implications not only for future development of the Korean auto industry but also for the broader economy. While Korea has experienced significant economic growth and prosperity in recent years, and is showing positive signs of recovery from the 1997 Asian crisis, its future development will be influenced by its success in developing a more effective system of employment relations. The failure of Kia Motors to make a successful transition from mass production to lean production was partially based on the inadequacy of its employment relations practices and its failure to develop an appropriate human resource management system. The effective integration of production systems, human resources and employment relations remained an elusive goal for Kia Motors before it was ultimately absorbed by the Hyundai Motor Company. It remains a significant challenge for the recently merged organisations of Kia and HMC.

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