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NEW TECHNOLOGIES AND WOMEN'S LABOUR

Case Studies of Two Electronics Firms in Malaysia

Maznah Mohamad
&
Cecilia Ng

Institut Kajian Malaysia dan Antarabangsa
Universiti Kebangsaan Malaysia
Bangi, Malaysia

Dr. Maznah Mohamad is associate professor in development studies at Universiti Sains Malaysia, Penang and Dr. Cecilia Ng Choon Sim is associate professor at the Faculty of Education, Universiti Putra Malaysia, Serdang and research fellow at INTECH of the United Nations University. The original version of this paper was presented as a research report at the "SAREC Final Workshop Meeting", held in Penang on 24-26 November 1994.

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NEW TECHNOLOGIES AND WOMEN'S LABOUR
CASE STUDIES OF TWO ELECTRONICS FIRMS IN MALAYSIA

1. Introduction

IF the current frenzy in Malaysia is to move up towards an era of information and new technology will it have skilled human resources to cope and to respond positively to such changes?[1] Moreover, how will Malaysian workers benefit from all these rapid transformations? These are the issues of concern in this study in which findings have been drawn out from case studies of two electronics firms, and a survey conducted among their women production workers. In this article, an understanding of technological change in industry will be explored; firstly, by assessing and questioning some of the more current theories about the relationship of labour processes to skills and technology, especially in newly industrializing countries like Malaysia. Secondly, by trying to provide an insight as to the disparity that exists within and among the different sectors of industries with regards to management styles and labour polices. Thirdly, by describing the current perceptions of female workers and personnel managers as to their roles and expectations in delivering the process of technological change.

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[1]In 1991, more than half of the manufactured exports in Malaysia, which consisted 65 per cent of total exports, were "electrical and electronic machinery and appliances" (Jomo, 1993 Chapter 1). In terms of employment the electric/electronics industry generated about 31 per cent of manufacturing employment. This sector has grown by 45 percent per year, with exports also growing at 43 percent per year. The significance of this sector can also be seen in terms of changes it will experience, by way of output structure and value-added production. Technological innovations and intensification of its R&D will play a large part in this sector's transformation (Star, April, 1994).

The above issues are explored through looking at evidence of changing technology at the workplace and by documenting management strategies that are currently being employed to *control, contain, empower* or to *self-enhance* labour. We surveyed women production workers' perception about their work in relation to their responsiveness towards new human resource management strategies, affinity towards the adoption of new abilities to complement new technologies in the workplace, knowledge of work processes, openness towards training and re-tooling, sense of workplace safety and reasons for staying on in their jobs.

Such baseline information would be able to provide policy makers, social activists as well as industrial relations managers some inkling as to the characteristics and needs of the female workforce in order to further enhance their human resource potential and project their future placement in the *new* industrialization phases. Throughout this article, the term "new technologies" is used to refer to an industrialization phase which is moving towards a high degree of automation and a production process indentified as being of a flexible nature.

2. Background: Electronics Industry in Malaysia in the Context of Globalisation

AT the onset of Malaysia's export-oriented industrialization policy, the sudden creation of a formerly rural or pre-capitalist female labour force into becoming an industrial urban proletariat was a subject of much concern to many quarters. The subservience of Third World women as mass production workers to international capital was the perspective which determined the intellectual paradigm of several researchers during the late 1970s

(Grossman, 1979; Linda Lim, 1978; Ong Aihwa, 1987). Some were wary of the "cultural and social shock" which befell these women who were previously unexposed to the new work regime. Others, like those belonging to the dependency school expressed their objection to the whole industrialization programme, which, not only exacerbated more dependence but was also creating wealth for the developed world at the expense of women and the poor. Given the oppressive nature under which these women were employed, there were parties who were hopeful that these women would be potentially able to liberate themselves as an organised working class. Overall, observers were convinced that capital was benefitting from the assumed social characteristics which these women possessed (nimble fingers, dexterity, etc.), thereby strengthening the argument that capitalism as a system was thriving on sexist structures and that one or the other must give way in order to bring about a genuine transformation of the system. In addition, there was speculation that these multinational companies would not stay long in their host countries and would soon be re-located to seek even cheaper labour sources and a government more favourably biased towards foreign or capitalist interests. All of these views fuelled the idea that the export-oriented manufacturing phase adopted by developing countries may not survive long.

However, the prediction that the female labour force would someday be transformed into an organised proletariat class capable of overturning capitalism as well as patriarchy at the same time, did not materialise. By the late 1980's, multi-national companies that were set up during the first phase of the export-led industrialization programme also showed no signs of leaving and re-locating elsewhere. Up till today, women workers have continued to form the bulk of the low-skilled manufacturing labour force in the electronics industry.

Nevertheless, despite the unchanging position of labour, which seemingly remained docile, and foreign capital, which continued to enjoy returns, there were many aspects of the production process which had been transformed. In the more established electronics and semi-conductor companies, the advancement in the use of production technologies have basically changed human resource management and control techniques, and restructured shop-floor activities.

To interpret the seemingly unmoved female workforce in playing any role at all at overturning the system, some writers talk about *cultural struggles*, in which conditions such as "silences, subterfuges, interpretations and goals", were the very conditions in which subaltern women make local histories in their own way, using individual and covet acts to go against enforced control (Aihwa Ong, 1992: 280, 305). This is a revision of the earlier conceptions of these 'proletarianized' women seen as potentially capable of becoming an organised labour force. In accordance with this new perspective, they were restricted from unionising not only by legislation, but were themselves, culturally not inclined towards mass organisations. Whatever interests they defended or the solidarity arising therefrom were often determined by kinship and gender links, rather than class (ibid; 280). Besides, the belief that women workers in the export-manufacturing sectors were being exploited economically, socially and ideologically is also proven to be rather inaccurate when measuring their relative material prosperity (Foo and Lim, 1989). The new perspective today is that whatever their conditions are, and inspite of the unevenness of employment situations for women the world over, the fact that they are being employed at all should be considered as a progressive development in their evolution (Lim, 1990). How can all these shifts be explained?

In the semi-conductor industry, the global trend is to move out of low value-added high volume commodity chips into lower volume high-value added integrated circuits such as ASICs (application specific integrated circuits). This trend reflects what is happening at the global level where international competitiveness is the name of the game. Thus industrial strategies are changing to meet new market demands and to deal with competition from other countries. Countries have to diversify their products by a strategy of identifying and targetting niche markets characterised by flexible and volatile demand (Ng and Mitter, 1994).

From the 1980s, the assembly process worldwide and particularly in the newly industrialising countries has since been automated and flexible production techniques have been introduced. As a result workers are said to be participating collectively in production, are now more skilled and have more mobility and control over machinery compared to the industrialization period of the 1970s.

In the same mould, the electronics industry of Malaysia, has also shifted from being a labour-intensive industry to one whose production technology has become more automated, incorporating flexible production techniques. This is particularly evident in the components subsector with the introduction of, for example, JIT (Just-in-time) and QCC (Quality Control Circles) methods (Rasiah, 1994).

The question is, are worker's perceptions of themselves, of technology and their work satisfaction in tandem with the overall transformation experienced by the industries? In the past, women manufacturing workers were subjected to work which was unskilled, alienating and somewhat of a dead-end as far as career prospects were concerned. This was especially since a lot of the young women workers were considered to be a temporal labour force. They

were hardly recognised as the bulwark of the technological revolution but instead considered to be a necessary but at the same time dispensable mass of workers. A description of the nature of work which went on inside these companies, during the 1970s would aptly be the following:

> ... in wire-bonding operations, the job classification of an operator limited her tasks to a single machinery. Each die-pad was wire-bonded manually with the lead frames, gold wires and other materials supplied by material handlers, and quality inspection was undertaken by different workers. The person-machine ratio in this operation was 3:1. Such tasks were not only highly monotonous, but also narrowly dexterous in skill terms. The importance of dexterity also meant that workers were disciplined from talking and visiting wash-rooms (R. Rasiah, "Changing organisation of work in Malaysia's Electronics Industry", p. 13.).

In contrast the same writer noted that there were significant changes during the 1985-86 period:

> In wire-bonding for instance, each worker now performs the horizontal tasks of material handling, wire-bonding and quality inspection. In addition, vertically the operator now reasons, solves problems, maintains machinery used (including simple machinery repair), sets up machinery (including the use of software programmes), uses statistical process control to monitor yield and inventory flow, and attempts process improvements (Rasiah, ibid., p. 22).

There is a tremendous concern now over defects in manufacturing; and that defects of parts per billion (such as 100 units out of 1.3 billion produced, in the case of one company) are already considered "out of control" (Jerry Lee, 44; n.d). According to industry leaders, the task of minimising defects need to be shared by all employees of any one company, thus necessitating production

organisation that will have to be flat and flexible, management-employees relations imbued with trust and dependence on team players. The new Human Resource Management principle promotes the idea that vertical structures in the organisation will have to give way to horizontal arrangements, with problems to be solved in an integrative fashion (Jerry Lee, n.d; 46 -49).

Other reasons to explain the basis for these transformations is that product cycles have become increasingly shortened thus leading to the extreme state of competitiveness among the electronics firms themselves, rather than them being in competition with the "Third World" or companies with lower-end technology (Lim, 1990: 104). The indicators for success in these firms today, to be always ahead in technology and minimising defects, are: (1) low labour turnover rate, (2) lowered absenteeism, (3) higher production output, (4) reduction of their supervisory or "policing" work-force and (5) management excellence (Jerry Lee; ibid). Going by these, it is clear that the organisation of their human resources would have to be drastically re-structured, to reflect this new state of competitiveness.

3. The Conceptual Questions: From Fordist to Flexible Accumulation?

WHAT is the significance of the purported shift from the Fordist work regime to one of a flexible character? Why should this issue be of such importance in this research? To answer these questions one has to appreciate the historical context in the evolution of the industrialization process, especially the role which women workers played, and the social transformations expected of them. As has been stressed, the debate about whether this group of manufacturing workers would endure, or overturn the system which created them, became of moot concern to scholars, activists

and policy makers during the 1980s. It has however, become obvious today that the export-led industrialization phase has not been overturned and that neither have working women been eschewed out from reaping the benefits of such a process. In appraising the present state of industrialization, it would then be timely to focus on the issue of "new technologies" as this set of variables has been purported to be propelling the export-led phase into a transformed industrialization era, with human resource management techniques taking on centre-stage and workers becoming more attached than at-odds with their companies.

Today we ask whether, with changes in management orientation and production technology, women have become more empowered at the workplace and over their lives. Has the sophistication of management techniques succeeded in giving workers a genuine sense of belonging? Has there been a democratisation of the workplace or, in another perspective, could it be that there is simply a perfect coercion of the labouring class into realising the aims of capital?

What would be the role of changing technology as a mediating factor in decreasing or increasing the conflict? Is Braverman's hypothesis about the impending deskilling of the working class as the basis for overturning capitalism becoming a reality? On the other hand, as the fordist production regime is now in the process of becoming archaic and being replaced by the new flexible accumulation, would this speculation become totally mythified?

Flexible labour regimes in the present context can be understood as a condition in which there is a mix of mass production, sub-contracting and family-type firms; new micro-electronic technologies, small-batch production, sub-contracting, outsourcing, and 'just-in-time' systems which increases the

speed of production and yet at the same time is associated with decentralised organisational forms. As noted by an observer, in the world of work, flexibility has become the metaphor of our new technology age. Futurologists, as well as academics and policy makers prepare us for a new economic order where flexible workers of flexi-firms in flexible locations will be producing goods on a flexi-hour basis with the help of flexible manufacturing systems (Mitter, 1991).

Some scholars doubt that this change in production will necessarily result in a more worker-oriented or democratized working process, since the conditions of flexibility are already pre-dictated by a centralized management. Such a critical view is expressed by Michael Burawoy (1983) who sees this flexible phase as yet another regime in which capital accumulation is going through; moving from a regime which was despotic during its earlier phases to one which he terms hegemonic, "where consent of labour prevails, rather than its coercion into submission." Burawoy claims that in yet another advanced phase, both hegemony and despotism will be at work given that collective labour in advanced economies will be more vulnerable to competition because of the international re-location of capital (Burawoy, 1983: 590).

At this stage of global industrial development, very few observers will deny that industries are undergoing this transition to 'neo-Fordism' or a more flexible form of capital accumulation involving significant transformations in the spatial and temporal dimensions of social life. To an extent, production must inevitably become more decentralised when large unwieldy structures give way to smaller more flexible forms (Smart, 1992: 52). However, this change may not necessarily result in a more worker-oriented or democratized working process. The increase in communication and information resources, will also result in the parameters within which choice and flexibility are exercised to be largely predetermined by the "delivery system" -- a system which is designed

Our study generally confirms that workers we spoke to have experienced change along the lines of the discussion above, especially their appreciation of change associated with technology. However, the study is less optimistic in concluding that production operators are now able to perform tasks that require such high levels of cognitive skills such as reasoning and statistical abilities to the extent that the knowledge base has become decentralized. What the study shows is that workers have certainly become more confident, have a high sense of pride in their company and a positive perception of themselves as part of the company they work for. It is the aura of "high-tech" in the workplace and more "labour-sensitive" human resource management stategies that have contributed to their morale and their characteristics as a socially stable workforce for the company. All these have been crucial in productivity improvement which will, in turn, render innovation and change more easily achievable by management. Changes in technology and its acceptance and adoption is thus largely mediated by the human element. In the case of the electronics industry today, rapid changes in technology demand that management depend more on the ability of production floor workers to control and monitor that technology. Hence, it is also appropriate that the social relations between labour and capital be adjusted to suit these new requirements; i.e., from a more despotic stance to one which is hegemonic. The key, correctly, is to make workers compliant without ever having to resort to despotic measures.

4. The Case Studies

4.1 Company A (An American Multinational Company)

Company A which started operations in Malaysia in 1972 manufactures about 140 different types of semi-conductor components for the world market. It is

linked to its parent company in North America which, according to its 1992 Annual report, is the world's leading semiconductor supplier to the automotive market. At the present moment the firm hires about 5,000 workers, four-fifths of whom are predominantly female production operators. The majority of these daily-rated operators are Malays (87 per cent), the remaining being Indians (11 per cent) and Chinese (2 per cent). Wages start from RM450, minus allowances, and are purported to be one of the highest in the electronics industry.

According to the Human Resources Manager, the firm is in the process of shifting gear. In the 1970s production was manual and of the assembly type, products were of low value and labour was unskilled. The 1990s saw a move to testing their products which demand high technology using semi-automatic equipment. By the year 2000 and beyond there will be a high level of factory automation with the firm being capital intensive and the workers being operators-cum technicians at the factory floor.

The 1970s state of affairs with characteristics such as, emphasis on cost and low skill levels, would be the typical Taylorist/Fordist regime with despotism as the basis for control. In the words of one of the women workers who started with the company in 1978, "During the first five years that I worked there, there was 'cruelty'; supervisors and managers will be harassing you. There was hysteria and a lot of tension among the workers. There was a lot of scolding."

In comparison, the 1980s offerings emphasised qualilty, multi-skilled operators, Participative Problem Solving teams, Technical Supervisors, and greater responsibility to operators. The same worker who decribed her first five years as full of 'cruelty' said that during her recent five years with the company, all the scolding, harassing, and tension had stopped. In our assessment, this was

the period when the 'humanization' of management took shape due to the realisation about the human resource potential of these workers.

In the rhetoric of Company A representatives, the 1990s is a decade of the following: "emphasis on speed/time, workers' empowerment, highly technical skills, R & D, educated and skilled workforce, high value complex products, operators becoming technicians, technicians becoming engineers." The present managers are still concerned about achieving higher productivity, but not necessarily through the sheer exploitation of cheap human labour, but through the combination of high technology and high quality human resource. There is concern that there be a right, or optimum fit and balance between the deployment of physical (technological) capital, and human capital.

The vision of the company is to be and be recognised as the finest integrated manufacturing organisation in the best semiconductor company in the world. This company has clearly charted its goals to be in step with leading-edge management and business strategies.

4.2 Company B (A Japanese Multinational Company)

Company B was established in 1980, producing various television components such as deflection yokes, flyback transformers and electronic tuners, 90 per cent of which are exported worldwide. There are 2,100 employers, 1,800 of whom are direct production operators. Eighty per cent of the workers in this factory are women production operators, the majority of whom are Malays. Due to the current tight labour market and the anticipated introduction of new technology, it is expected that the company will trim the existing staff by 20 per cent in the near future. When this happens the company will sub-contract more of their

production processes. The starting wage is RM360, excluding other allowances making it one of the highest paying firms in this industrial estate in Selangor.

At the present time, 30 percent of the components are still imported. However, this is much improved from 15 years ago, whereby 99 percent of the components used in manufacturing were brought in from outside the country. In the early years, the operation involved almost wholly assembly. Today, the main labour processes that go on in the factory are preparation work (making plastic moulds), winding, printed circuit board (PCB) mounting, assembling, soldering, checking, and packing. The more preparatory work such as making plastic moulds and 'unproductive' jobs such as trimming off the plastic edges from these moulds will eventually be sub-contracted.

Skills upgrading that go on in this company will mainly involve training the workers to operate new machines. To the engineers at the company, skilled jobs are those that require the use of human judgement, such as manual soldering. Being able to operate a sophisticated machine does not make one a skilled worker, as the process may be so fully automated to the extent that the exercise of human judgement may be made redundant.

Although Company B is also gearing up for future changes and re-structuring, their goals are couched in less grandiose terms. If one were to juxtapose Company B's development with that of Company A, Company B is right now in the late 1970s and early 1980s phase of Company A. The priority is still on cost-cutting measures, such as sub-contracting out certain 'unproductive' work, trimming the number of staff and doing 'time-motion' study as a way of finding solutions to speed up production and inventing rotating turntables to replace conveyor-belt assembly-line so as to enable operators to do multi-level processes in one spot. In contrast to Company A, Company B is not

pursuing and innovating its human resource management strategy in quite an intense or upbeat way.

5. The Survey

THE section below discusses the responses of the workers in two separate surveys conducted in May 1995. The researchers distributed 200 pre-tested survey questionnaires to each firm for their workers to complete. The respondents selected were to represent various sections/departments in the companies. Company A returned 125 completed questionnaires while company B returned 176. In addition, separate discussions were also held with management and in-depth interviews were conducted with several women workers from both companies.

5.1 Profile of the Woman Electronics Worker in the 1990s

In terms of age the women workers in the semi-conductor company (Company A) seem to be a much older cohort compared to the consumer elecronics firm (Company B). Fifteen per cent of the respondents in Company A were between the ages of 17-24 years compared to 38 per cent of Company B. In addition, 22 per cent of Company A respondents were between the ages of 35-44 years compared to only 5 per cent in Company B. This could partly be because Company A had a longer operations history compared to Company B.

The younger group in the consumer electronics firm was reflected in their marital status whereby 51 per cent were single compared to only 34 per cent in the component firm. However, in terms of educational level both factories hired their workers who had similar educational qualification, with the

workers in the component firm only a little more highly educated than in the consumer firm. Indeed a little less than two-thirds of the women workers had 11 years of schooling (SPM level), making these workers a rather well-educated work force (Tables 6 and 7).

It can be seen that contrary to the existing literature or even popular imagination, women electronics factory workers today are no longer young, single, nubile, mobile and relatively uneducated. Rather more and more they would be married, have a decent educational background and be a rather stable if not permanent workforce in the industry. The survey reported that more than half of the respondents had served the semi-conductor factory for at least 11 years with 19 per cent of them having worked between 16-20 years.

Nonetheless, despite their long service, there does not seem to be much upward mobility for them. The majority of them have remained stuck to their original designation as production operators and do not seem to have many opportunities to move up the occupational hierarchy. They might rotate within the operator ranks doing different jobs and in different sections but chances for promotion appear to be very limited for these women workers. The higher skilled, and better paying jobs are still male dominated, for example jobs such as technicians, engineers, managers, trainers are still very much the domain of men.

5.2 *Workers' Response to Automation and Perception of Skills*

The component firm is more highly automated compared to the consumer electronics factory. Sixty eight per cent of the former stated they handled machines compared to only 31 per cent of the latter firm, which is still based on manual assembly line work. At least half of the respondents handle more than

one machine while less than 10 per cent in both cases handle between 4-8 machines at a time. This trend is also observable in another study (Kamal and Young, 1988) in which it is noted that the person/machine ratio has increased through the years and depending on the process, person/machine ratios may vary between 1:3 and 1:10. It is no doubt that when a factory automates, workers must learn how to read operating instructions. Some machines require quick visual and motor coordination. In Company A, workers' opinions about changes tally with management's version.

Does this mean that these women workers are being upgraded in terms of their skills and technological competence? It is not known for sure, since, these 'new' skills do not seem to be recognised in terms of occupational designation nor job advancement. However, some companies do adopt a different term for their production workers, calling them 'manufacturing specialists' instead of 'operators'. The workers studied did indeed have a high perception of themeselves as being skilled. Half of those surveyed (in both firms) thought of themselves as being skilled workers while the other half answered that they were semi-skilled workers. Only a miniscule, less than 2 per cent, stated that they were unskilled (Table 1). Is this an indication that there is a shift of worker characteristic from being a cheap unskilled labour force to being a cheap skilled labour force in the electronics industry?

Company A being an electronics component company manufacturing semi-conductor chips uses more sophisticated high-end technologies than company B. It is thus not surprising that more of its workers consider themselves to be a skilled workforce. Nevertheless, the identification of skills is often associated with literacy and language, "... to read shop-orders and specifications", ".English speaking workers are taken for training on how to programme a machine", " to visit another sister plant, workers need to know

English". More specific skills are identified as ability to do 'repairs' on the automated machines, which can now be done by all workers and not only by the technicians.

Table 1: Worker's perception of own skills

Think of themselves as	Company A (%)	Company B (%)
Unskilled	1.6	1.7
Semi-skilled	44.7	50.6
Skilled	53.6	46.0

Competency in mathematics and science seems to be more of a selection criteria rather than the actual skills picked up through training. For example, the training programme conducted by Company A requires that each worker possess a Form 5 certificate with good grades in the two subjects. Those with a lower paper qualification are not allowed to apply even with their many years of experience in the company.

Of those who handled machines, 45 per cent in the component firm and 35 per cent in the consumer firm replied that they faced problems in handling their machines. This is quite a high percentage and further work should be undertaken as to the cause of their problems. At the same time the majority of them (85 per cent in Company A and 78 per cent in Company B) stated that the speed of the machines was 'alright' compared to about 11 per cent saying that the machines were too fast for them.

Workers' responses to their own and the firm's technological upgrading were very positive indeed. Nearly all the respondents (97 per cent) pointed out

that their firms should use more advanced/sophisticated technology and that they were prepared to undergo training to manage the new technology. Moreover, if they could not manage the new technology introduced then they would try to obtain more training.

In their own words, automation is considered easier by the workers themselves, as they only "need to programme the machines, making work better, easier and not much rejects too". However, despite the 'ease' which these computer-aided machines provide, workers also feel that they are more pressured in another sense. They have to be permanently attentive, as "these machines can have a breakdown at any time, thus, we also have to work for eight hours as the machines do." With automation, "work is less tiring" and team work becomes more important, "... now there is empowerment. When there are less materials to work on and when another line leader ask for extra hands that are needed in her department, 2-3 girls are asked to go to that department. The line leaders cooperate with each other in work."

5.3 Feelings About Work Environment

This section discusses findings in relation to conditions of the working environment. Generally, very few workers from both companies express extreme dissatisfaction with their workplaces. However, it can be said that workers largely tolerate their working situations although they are bothered by various effects. A majority of them are bothered by factors which include high levels of noise, chemicals, dust, furniture and equipment layout, and special garments, but said that they are able to tolerate all the consequent adversities associated with those factors. This may be a healthy sign for management. However, a high degree of tolerance also indicates that there may be a thin line between acceptance of and resistance against adverse occupational side effects.

As such, it may be imperative for management to be responsive to problems associated with occupational comfort and safety.

Table 2: Responses towards factors around work environment in Company A (Percent of workers)

Factors	1	2	3	4
Noise	20.8	71.2	5.6	0.8
Bunny suit	20.0	20.0	23.4	23.2
Dust	20.0	42.0	17.6	18.4
Chemicals	14.4	38.4	20.0	24.8
Temperature	10.4	60.0	22.4	5.6
Furniture and fittings	8.8	34.4	43.2	10.4
Smock	8.0	31.2	56.0	3.2

Note: 1 = extremely bothered, 2 = bothered but able to tolerate, 3 = not bothered, 4 = unsure.

Table 3: Responses towards factors around work environment in Company B (Percent of workers)

Factors	1	2	3	4
Noise	13.6	60.2	17.0	7.4
Bunny suit	n.a.	n.a.	n.a.	n.a.
Dust	19.9	36.9	25.0	17.0
Chemicals	18.2	35.2	21.6	23.9
Temperature	13.1	65.9	13.6	7.4
Furniture and fittings	13.1	31.3	40.3	14.2
Smock	n.a.	n.a.	n.a.	n.a.

Note: 1 = extremely bothered, 2 = bothered but able to tolerate, 3 = not bothered, 4 = unsure.

In both companies the majority of respondents say that they are bothered by the impact of noise and temperature though able to endure them. It would be useful to note here that as more sophisticated technology is used on the production floor, noise decibels will go up, and a lowering of temperature will occur. In Company A, high precision wafer cutting and die attachment machines emit high levels of noise. Temperature is also controlled to be colder than normal to be in accordance with the specifications of the production process in the "yellow-lines" boundary area. There was a feeling that health and safety measures are carried out well in the company, with complaints taken seriously. For instance when there were complaints that the rubber shoes were "uncomfortable, warm, itchy and gave allergies", management carried out a survey and as a result of the survey, workers were given a new type of shoes. At the same time, there are also allegations that are very serious although difficult to verify. In the words of one of the workers, "This is the acid area which is the most smelly area. Workers working here suffer from skin rashes, anaemia, difficulty in breathing, accidents, skin burns, coughing, giddiness, etc.," and further alleging that, "workers have died of leukemia in this department." One said that, "Shift work for 12 years had caused sleeping problems." According to some workers in Company A, the concern for safety has only occurred during the last four years. Today, workers in this company are needed to wear boots, spectacles, aprons, face shields, black pants, smocks and rubber gloves.

5.4 Decision Making and Empowerment at the Workplace

In line with the transformation of the electronics component and consumer electronics industries as they enter their new phase of high-value added production, a distinct change in management style and outlook is being observed. The key word today is that human resource is an asset in production. Workers are no longer considered adversaries but rather partners in the

company's operations. In our study of the two companies, the American semi-conductor company (Company A) seems to be having the leading edge in this field. Company B, which is a Japanese MNC, is less strident in its exhortation of this new management trend. The findings confirm that the new management strategy adopted by Company A has indeed received favourable approval among its workers. In contrast, the "empowerment" programmes available in Company B has seen only moderate participation among its workers (Tables 4 and 5).

Table 4: Support for "empowerment" programmes in Company A (Percent of workers)

Name of Programme	1	2	3	4	5
I Recommend	33.6	56.0	4.8	4.0	1.6
Participative Problem Solving	31.2	53.6	12.0	2.4	0.8
Participative Management Process	38.4	52.8	4.8	1.6	2.4

Note: 1 = highly supportive; 2 = supportive; 3 = unsure; 4 = not supportive; 5 = extremely not supportive.

In this company, more than 90 percent of the sample believe that by participating in the above programmes they will be able to affect changes in the areas of production, working environment and the use of new technology within the company.

Table 5: Participation in "empowerment" programmes in Company B (Percent of workers)

Programme	Involved actively or as members	Infrequently involved	Not involved or not members of
I Recommend	15.9	43.2	32.9
Joint Konshin Kai	17.0	27.8	50.6
Small Group Activity	24.4	n.a.	75.6

In company B, a little over 80 percent believe that changes can be brought about in the areas of production and social benefits. A high 66 percent believe that wages can be affected; 74.4 percent believe that adoption of new technology can be affected, 89.2 percent believe that there can be a change in work place environment through participation in the above programmes. These aspects are discussed in the later section on "New Technologies and Human Resources".

5.5 Education, Training and Work Satisfaction

The area of training has been considered to be very important for the companies. This is understandable given the fast changing pace of production technologies and shortened product cycles. The argument is that employees can only be encouraged to contribute towards the profitability of the company through the existence of compensation or incentives. However, in order to expand the volume and quality of such contributions, workers have to undergo training and re-training (Jerry Lee, n.d; 51). The notion that training, rather than incentives that will ultimately be the determinant of how much one can contribute to the organisation is often linked to Maslow's theory of the hierarchy of needs, which says that in the final analysis the realisation of self-esteem and personal gratification would be more important than material rewards. This emphasis on training probably explains why companies with higher-end technologies prefer to hire workers with higher education although educational levels are not necessarily linked to their placement. It is rather their ability to be re-trained that determines at which section or level they will be employed in (Lim, 1990:107).

Were these training programmes effective? Yes, according to a majority of those surveyed in both companies. The results seem to be similar from both companies. Most of the respondents agreed that the training was effective and upgraded their skills. About 25 percent of workers felt that the training was not totally effective, while less than six percent thought that they were ineffective (Table 9).

Table 9: Effectiveness of Training (Percent of workers)

Responses	Company A	Company B
Satisfactory and upgraded their skills	62.0	59.0
Average value and did not significantly enhance their skills	24.8	26.7
Not effective	4.0	5.7

Such a revelation does prove that continuous training of workers is profitable since there is a strong sense among workers that skills upgrading is the direct outcome of these training programmes. However, there is an ambivalence or a confusion as to whether monetary rewards should come after they have been trained, expressing disappointment that, "... there is no pay increase after finishing the training." or that, " ... there is no salary increment because of new technlogy."

5.6 Work Satisfaction

In Company A, 64.8 percent of workers said that they were satisfied with their present job, 20.8 percent were not sure while 13.6 percent were dissatisfied. In Company B, 50 percent of workers are satisfied with their job, 33.5 percent were unsure, while 15.3 percent said that they were dissatisfied (Table 10).

Table 10: Degree of satisfaction towards job (Percent of workers)

Degree of satisfaction	Company A	Company B
Satisfied	64.8	50.0
Not sure	20.8	33.5
Dissatisfied	13.6	15.3

Table 11: Reasons for continuing with present work (Percent of workers who agree strongly)

Reasons	Company A	Company B
Finance	88.8	84.1
Comraderie	60.8	45.5
Proximity of home to work place	52.8	57.4
Loyalty to company	76.0	52.3
Love of job in itself	75.2	59.7
Love working with machines	76.0	41.5
Lack of choice in employment	52.0	26.7
Work place environment	91.2	60.2

In both companies there are more workers who are satisfied with their present jobs than those who are dissatisfied. This leads to the question of what would be the reasons for these respondents staying on at their jobs. Table 11 lists some of those reasons.

In ranking the above reasons, more people in both companies agreed that financial needs and work place environment are the two reasons for staying on in their jobs. Third in rank is loyalty to their company, as well as love of working with machines in company A. The third most popular reason in company B is the love of job in itself.

This finding shows that workers are generally satisfied with their job because of identification with the companies they work with. The aura of automation, modernity and organised work spaces might be the probable attraction of workers to the manufacturing job. The fact that more than 70 percent of the workers in company A profess loyalty to the company may also be the consequence of the 'empowerment', 'team spirit' or 'participative' strategies fostered by the management.

6. New Technologies and Human Resources

IN this section we discuss and compare the human resource development and management strategies used by the two companies in an atmosphere of technological shifts:

6.1 Is Human Resource Management in Company A (An American Multinational Company) keeping up with new technologies?

According to the Training Manager of Company A, the "days of control in the Company are over". His role is to teach the workers to challenge the existing paradigm, to empower them and to encourage their hearts and minds. The firm is moving from a controlled organisation to a learning organisation whereby the top management allows people to learn, grow and expand their capacities.

Management is now more people sensitive. The importance of being creative and critical is in fact crucially needed to support the new technologies that are being introduced whereby production relations have become more inter-dependent and workers have to work as a team to achieve 'zero-defect' quality and to sustain high productivity.

With the above goals in mind management has made compulsory that every worker be given 40 hours of paid training per year towards 'problem solving'. Some of these sessions are formalised and incorporated into activities which will assist the firm to achieve better quality products as well as increased efficiency and productivity. Towards this end, management has devised various human resource development strategies and training programmes, or what others see as more sophisticated forms of labour control couched in corporate familial language and metaphors, to get what they want. Some of these strategies designed to obtain worker participation are:

a) Participative Problem Solving;
b) Participative Management Process; and
c) I recommend.

6.2 Participative Problem Solving

The participative problem solving process started in 1985 whereby workers in a particular working area form a group, pick a problem in the line and discuss how to solve it together. This group meets twice a month and are paid four hours overtime. There is a leader who leads the group -- known as the empowerment leader. The various teams also compete with each other and the best team obtains a reward, for example in the form of extra wages, a prize, holiday in

Langkawi, etc. This method is extremely useful to cut down costs and increase efficiency, and it provides workers a sense of participation in the production process. They are the ones who now monitor each other rather than the supervisor who is fast disappearing as an occupational group in the firm.

An extension or advancement of this strategy is the *Participative Management Programme* which combines operators and management in solving problems at the work place. Again competition among groups is held with the best team heading to the United States to visit the company headquarters.

6.3 I Recommend

These are suggestions in writing to improve the line, two of which which must be sent in before the middle of every month. Every suggestion is evaluated and the operator with a good suggestion wins RM2. If the suggestion is implemented then the worker earns another RM5. Those who do not suggest or recommend will be reminded, in that their names will appear on the bulletin board. According to one of the workers an operator in her section sends in 150 suggestions per month. The owners of the top 200 suggestions will receive prizes such as bedsheets, umbrellas, clocks, etc.

6.4 Training Programmes

The **Mahsuri** programme, started two years ago aims at training operators become technicians. About 25 operators are selected to undergo a two year training programme after which they are promoted to the position of junior technicians. Although theoretically all can apply, and many do, there seems to be certain restrictions to being accepted. For example those who have a Form

Five qualification, can speak English and have credits in Maths and Science are preferred over others. Nonetheless despite the rhetoric, in the final analysis out of the 3,900 operators in the Company, only 3 percent of them can be technicians, thus probihiting others to climb up the occupational ladder.

The firm has also signed MOUs with local universities to train and upgrade their professional staff. For example a Masters course in Failure Analysis, fully funded by the Firm, is being conducted at Universiti Teknologi Malaysia; while other MOUs are being set up with relevant local universities on engineering and related stated-of-the-art courses.

Besides the above projects there are also other incentives drawn up to obtain worker participation and "empowerment". Some of these smack of the 70s era while others have been improved upon. Some examples of the incentive schemes used are:

- For full attendance at work (evaluated as having no medical leave for a year), workers receive a few gifts e.g. a rice cooker, fan, rice, dispenser, mini-radio, coffee percolator;

- To compensate for their hard work, activities such family day, sports activities, and celebrations of every festive season are organised. In addition an annual dinner is organised which is usually held in a prestigious hotel in the city, where the firm sometimes forks out up to RM120 per head for its 5,000 employees;

- Several types of subsides are provided, for e.g. transport and food. Workers are ferried to and from their houses to their place of work by

buses. Recently a head of bus (ketua bus) scheme was started whereby an operator is put in charge of the girls in the bus she travels in. As a reward she gets free transport and also receives a gift (cenderamata) for her responsibilities.

As a result of all these efforts by management, rejects of products have decreased tremendously. Ten years ago the number of rejects were 50,000 parts per million; it has now been reduced to 3 parts per million.

6.5 *Workers' Responses to Human Resource Management Practices in Company A*

We conducted some in-depth interviews with workers, particularly those who had worked in this company for a long time. Here are some of their responses to the changes in the company.

- *"empowerment strategies"*

Susie has joined the firm since 1976, starting as an operator and is now a Quality Assurance worker. Susie is extremely sharp and knowledgeble of the production processes having worked in most of the lines. Through the years she observes that management has become more open and workers do get a sense of being "empowered". There are less supervisors now as the workers can motivate themselves and each other to be more efficient and productive. They encourage each other not to have rejects. However she is quick to point out that "underlying all this, they (management) get what they want. They give you good machines but the target has to be met... in the long run the company gains".

to settle your problems? We have an open door policy. What you want we will give. The management brainwashed the workers against forming a trade union. If the workers have a problem they can see the supervisor, then the personnel officer, then the GM. They talk as if it is so easy to go through with a problem. But I feel it is good to form a union to be able to ask what we want and what we think".

For Maureen, she does not think that they need a union as, "There is freedom of speech. Now we have empowerment. The company has good psychology as part of their business plan. We have a "Speak Out" programme where we can air our problems to the Personnel department. A paper with four columns is given and all you have to do is to tick one of the four ways you would like to settle your problems. Four to five years ago workers were given a paper asking if they needed a union. The response was negative. The workers felt they do not need a union as whatever they had asked for they have always got. Even the GM (General Manager), when he meets workers, would greet them first before any one of the workers would think of greeting him".

Yet this same Maureen who started work in 1982 wants to quit her job in three years time as she is tired after so many years of working. "Shift work is tiring. Now I suffer from insomnia and heart problems; the doctor has prescribed sleeping pills for me". Her husband, who is unemployed, quips in "The company runs for profit at the expenses of the workers". It is ironic that Maureen's husband maintains this antagonistic picture of the company while his wife have such supportive views of her company. Maureen was especially apologetic to the company perhaps because she had just been promoted to being a line leader recently.

Could it be that in flexible labour arrangements, women no longer, "construct their identities or organize themselves around collective or global interests?" (Ong, Aihwa, 1991;296).

6.6 *Is Company B (A Japanese Multinational Company) Responsive To New Technologies And The Human Resource Issue?:*

In this company, shop floor production system is of the conventional type, in which the whole floor is open and not divided into walled sections. All production processes are undertaken together in one big space, and assembly-line work is the standard arrangement. The reason, according to the senior engineer, being easy supervision and surveillance.

The shopfloor atmosphere in Company B is very different from Company A. In the latter the conventional set-up as in Company B is no longer used and assembly-line work is largely absent. Unlike Company B, in Company A, different production processes are done in different physical locations. Semi-conductor production processes such as die-cutting, die-bonding and plating have all been automated. Enormous machines are placed on the production floor, and the operators move around the several machines under their charge to ensure that the pre-programmed machines are running smoothly. Some production operators have been re-trained as technicians to enable them to understand the workings of the machine as well as make basic repairs. The overall surveillance of production is physically impossible in a company like Company A, which is aggressively automating.

In Company A, machines are especially sensitive to dust and temperature, thus they cannot be sited at an open space. Workers have to dress

in bunny suits which are sanitized. While the responsibility of the ordinary production operator is now multiplied, movement is greatly restricted. They cannot move about freely on the shop floor, as getting from one room to another involves an elaborated process of getting in and out of their suits, of going through air showers and special entrances and exits. Even if these workers would want to talk to each other they will not be able to as the deafening noise of some of the machines would make this impossible.

In contrast to all of the above, the atmosphere at Company B is very different. The machines are not excessively environmentally or temperature-sensitive and the factory has no specific requirements in terms of clothing and accessories, besides the standard uniforms and white canvass shoes. Noise levels are low and in contrast to the environment in Company A, there exists a relative sense of 'slowness' in the production process.

In Company B, despite assembly-line work, there is more freedom of movement and social interaction on its production floor than in Company A. In the latter, there is a 'guise' of freedom and flexibility, since workers handle more sophisticated machines, and are not confined to their specific assembly-line position. In some sense, workers in Company A are no better than the conventional production operators who do repetitive assembly-line work. Instead of manually executing the operations, the worker in Company A takes on the supervisory function over the machines. Ironically, the worker in Company B uses more of her manual dexterity than her counterpart in Company A; yet, the specific relationship of the worker in Company A to the machines makes her the more 'skilled' worker.

In Company B, skills upgrading also generally mean "learning to operate new machines" (according to a senior production engineer at the plant). In the

company only one female engineer had been sent for training overseas while the plan to automate fully has not been implemented. The more immediate plan is to sub-contract more of its production processes out solving its labour recruitment problems. Skilled workers such as those working as "convergence operators", or those doing work which require some level of mathematical skills are given free hostel stay as an added incentive.

Nevertheless, in Company B, it is claimed that there are no serious problems of labour shortage yet. This is because of its wider source of recruitment areas (personnel officers go as far as the FELDA schemes and to the east coast states of Kelantan and Terengganu). Personnel officers will try to win the confidence of parents, especially in the states of Terengganu and Pahang where it is claimed that parents there are more possessive of their daughters. What are the incentives and attractions of the company that they try to sell? "It gives out one of the highest salaries for production workers in Bangi, it has a hostel, sports complex and shows great concern for workers' welfare", claims one of the recruitment officers.

Company B, unlike company A does provide hostel accomodation for its new workers. At the time of the visit, there were 330 workers in their three hostels. These hostels are really several adjoining units of terrace houses leased by the company. These hostels are being administered by male caretakers who are retired army officers. Their own families will stay in one of the housing units at the hostel, thus giving a homely air to the place, with the presence of the father and mother-figure. The caretakers stress that they go all out to ensure the physical, social as well as moral well-being of the girls. The idea is to impress the families that the company is a responsible employer and that traditional mores are not neglected. These kinds of concern were the selling points which allowed the girls parents in the villages to release their daughters for

employment outside. Company A does not use such methods as most of their workers are in the older age groups, married and settled with their families in the vicinity. Labour recruitment for Company A is less problematic as it claims to pay one of the highest wages around. While hegemonic despotic management seems to be the pattern in Company A, Company B employs traditional-patriarchal strategies to keep their workers satisfied.

In this Japanese company, it is said that "commands are very decentralized. Japanese management stresses on good human relations, so much so that even bad workers are tolerated". There in the company, "women will still obey male technicians, rather than females". Worker participation schemes that company B has are the Small Group Activities (SGA), Suggestion Scheme and the Joint Konshin-Kai (a Japanese version of the Participative Management Programme). The Quality Control Circle (QCC) is at present only participated by executive level officers. The Suggestion Scheme is for a group of workers (with 4 to 10 members per group) to make suggestions regarding improvement and productivity. The company has an evaluation team to assess the suggestions. Through the Joint Konshin-Kai programme, every production line is represented. The representative of the group will then be invited regularly to a dialogue with department managers. Minutes of the meeting will be forwarded to the personnel department which will then take up the important matters to the JKK level. Selected representatives who make up members of the JKK will meet every three months during which the general manager and managing director will also be present.

In the Small Group Activity (SGA), only 24 percent of the workers in this company support this scheme being also members. 70 percent of those surveyed are not even members. Under the suggestion scheme, only 15 percent ever gave suggestions while 33 percent have never done so. Under the Joint

Konshin-kai scheme, half of those surveyed ever participated in this. This is in contrast to worker's reactions in Company A in which more than 80 percent of the workers support and participate in the 'empowerment' programmes.

Overall, the human resource management strategy in Company B is more laid-back and understated than Company A. Managers in Company B do not project themselves as being aggressively pushing for new strategies. Instead, the concern for basic welfare (in their workers' context) such as cultural appropriateness is more stressed.

7. Management Techniques Through Coercion and Consent

IN the two companies studied, it is obvious that different techniques in managing the use and utilisation of human resources are being applied. In company A (high-end technology), the transformation of production technology has changed work organisation with skills more dependent on the exercise of judgement. Production processes maximize productivity and seemingly decrease conflict between management and workers. This change has made it difficult for a third party to organize or unionize workers. Nevertheless, a coercive labour force is maintained through the specific restrictive nature of new technologies. While on the one hand these new technologies are being employed through a de-centralized arrangement, on the other, management control of workers are being made more centralized through their "participative" and "empowerment" programmes. Besides, these programmes are very carefully administered to steer attention away from issues that are related to the questioning of workers' social benefits, wages and terms of employment. Workers are given the sense that they are participating in production improvements and productivity increase. In Company B (consumer

electronics manufacturer), the handling of the labour force is done differently. As workers in this company are considered to be less skilled and on the average are of a much younger age group, the stress on flexible management is less apparent. On the whole, management style of Company B is more of the traditional-patriarchal nature.

More than 90 percent of Company A's workers stated that by participating in empowerment programmes they will be able to affect changes in the production process, in the work environment and in the use of new machines. In Company B, only 84 percent believed that the production process can change through their participation in similar programmes. Fewer, that is 66 percent of Company B's workers, believe that there can be a change in the determination of wages, bonuses or promotion. In Company A, we were told to strike off any questions in the questionnaire that referred to wages or welfare issues. Clearly, in Company A, 'empowerment' programmes are promoted to coincide with the needs for production innovation and productivity or turnover increases, rather than for the enhancement of worker's social benefits. The techniques employed in Company A fit in quite well with Burawoy's analysis of factory regimes under advanced capitalism:

> Recent fads such as Quality of Work Life and Quality Circles signify management's attempt to invade the spaces workers created under the pre-existing regime and mobilize consent for increased productivity. There have been concerted attempts to decertify unions and fire workers for trade union activities (Burawoy, 1983: 603).

8. Conclusion

A major finding from this study indicates that workers have a positive attitude towards their job, are willing to be trained and re-trained, are not averse to technology and machines and have a high self-esteem of themselves as being skilled. However, the notion of being 'skilled' is somewhat fuzzy and subject to a lot of mythification. The identification of 'skills' with the use of sophisticated machines and automated processes is often mistakenly used by workers and managers as the indicator for 'skilling'. No doubt automation would have a tremendous impact on productivity, by making workers more multi-skilled and also by freeing them to be engaged in activites of a "higher order" (Singh, 1995: 217). By automating, one type of skill would most likely be replaced by another, although the latter may not necessarily rank higher than the former in the skilling index ladder. In fact, as pointed out by one of the engineers at Company B, the manual process of soldering actually requires superior sense of human judgement, and may actually be a more skilled process if one were to consider the craft ability of the job.

In some ways, women workers have been de-skilled of their past attributes, such as having the qualities of nimbleness, dexterity and resilience. With the adoption of new technologies characterized by intensive and extensive automation, new attributes such as the ability to make judgements, to be literate, to be able to undertake multi-skilled tasks, to be logical, to have a sense of inventiveness and creativity as well as to be trainable and be motivated to learn, are more valued than those past or "lower order" qualities. Clearly then, the definition of skills is in itself an ideological prerogative. We have to question if the process of skilling is in fact also male-constructed and ultimately depends on whose interests its definition represents and benefits.

determine the parameters of general freedom, through the cultivation of employee commitment and attachment to the company.

At this juncture, we can say that to meaningfully enhance the status of women production workers in the drive towards an intensified technological era there should definitely be more provision for their training. Among other things, exposure to high level of automation will raise their self-esteem. Although the goals of "empowerment programmes" are more determined by the drive for profit, management should nevertheless intensify these programmes, as workers are highly supportive of them. A significantly large number of workers profess loyalty to their companies as one of the reasons for continuing work, thus contributing towards the success of the industrialization drive. This fact should be highlighted to encourage companies to award workers more social security benefits, especially to consider a policy of profit sharing, with workers equity. Ultimately, the success of "high-technology-driven" industrialization must hinge on a sound and mutually benefitting human resource development policy. This should not simply be unilaterally directed by management but also involve inputs from those entrusted to handle those technologies.

In today's state of Malaysia's industrialization, the issue of cultural and social stigmatization of women workers is no longer relevant. Their production activities have not only been deemed necessary but also crucial to the survival of these firms. However, women workers must be aware that they should continue to possess the 'trainability' quality if they are to remain in the workforce and not be edged out by newly recruited 'paper qualified' male technicians. The latter is fast becoming a pattern given the climate in which new technology is being applied in Malaysian industries.

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