AFTER THE REVOLUTION; (MICRO) CHIPS WITH EVERYTHING

Fordism, the era of the assembly line and the process-worker, is coming to an end. The shape of the future, however, is still unclear. Laurie Carmichael argues that it's up to the left to make the running.
It is now commonplace to say that the world is proceeding through a technological revolution. The big question for us is whether we share its benefits in Australia while effectively guarding against the dangers it can bring.

Technological change is always occurring but there are some comparatively brief periods where the pace of change is much more rapid than in the comparatively long periods in between. Modern industrial development has witnessed four such periods of very rapid change. The first was the origin of "commodity production and manufacture" - the breakdown of the "peasant" economy and the guilds in Europe between the fifteenth and eighteenth centuries. This created a narrower division of labor with still narrower forms of work being carried out in "putting out" systems or in "work houses".

Development of this technology was stimulated by the demand of increased levels of intra- and international trade, along with the sophisticated navigation and canal systems that made this greater trade possible.

The social relations created by these economic changes were crude and brutal: forced enclosure of the land, mass committals into the work houses, the convict system, enforced slavery from Africa, piracy, colonialism, population expropriation, and even genocide, were part and parcel of this stage of human history. Yet, in terms of wealth creation and cultural development, it was a major historical step forward, with achievements including the flowering of culture, painting, the arts and liberal philosophy.

The second and most recognised of all "industrial revolutions" came at the end of the eighteenth and beginning of the nineteenth century with the advent of steam power and an outbreak of a variety of mechanical inventions for production and transport. It led to a massive leap in productivity, trade and wealth accumulation on the one hand, and the "Dark Satanic Mills" on the other.

The division of labour at the base levels was intensified and its role in production studied by many, including Adam Smith and, most notably, Charles Babbage who, with a phenomenal degree of understanding, first saw as early as the 1830s the relationship between the division of labour in production and the emergence of digital computerisation. He did some very remarkable experiments with both, more than one hundred years before the first "workable" digital computer was created.

In a sense it is possible to say historically that the processes which intensified the division of labour in fact created the seeds of their own eventual reversal by also creating the precondition of computerisation and therefore replacement at the most finite level.

Yet a further more cruel and more technically thoroughgoing stage had to be traversed before that reversal could occur. This stage emerged with the internal combustion engine and electrical revolution at the end of the nineteenth and beginning of the twentieth century, along with the so-called "scientific management" theories and practices of Frederick Winslow Taylor.

**Taylorist modes of management will die hard**

Taylor's preoccupation was to create both a management system and a work process over which management could, so far as was humanly possible, exercise absolute control and, in doing so, created the basis upon which all production engineering was developed and engineers were educated and trained. This required the creation both of the division of labour and stratification of labour associated with authoritarian supervision in its modern production-line forms.

Harry Braverman described the process developed by Taylor and those who later took his "system" on board as the "degradation of labour in the twentieth century". At the most deprived end of this process came into industrial centres from the countryside, and by way of migration, maintained more than sufficient pressure to ensure acquiescence in the process.

The most notable application of Taylorism in his own time was in Henry Ford's automobile plants where Ford had his "Social Department" constantly survey every employee in their own home, and his "Security Department", based on thugs, ensure that trade unionism didn't gain any foothold to "interfere" with control of production.

Where resistance to further division of labour could not be overcome, the Taylorist system called for its stratification - so that each level became boxed in by impediments and "status symbols". For anyone at the lowest levels of industry to pursue any career objectives required titanic efforts and sacrifice.

It is little wonder that the nature of their work put its stamp upon the industrial organisations that employees created to defend themselves from the worst excesses of this exploitation. Divisions of labour and alienation from managerial prerogative in decision-making became part and parcel of trade union movement culture and philosophy, with positions of power and influence within the movement based only upon the ability to mitigate its worst manifestations. This led to defensive and reactive styles of trade unionism, fettered also by their "craft" origins.

In a number of instances, trade unions succeeded in reducing the worst characteristics of Taylorist practices such as "line speed up", use of the stopwatch, and even the "time and motion study" itself. But the very basis of the system of the infinite division and stratification of labour was unaffected except marginally until recent times.
Despite its callousness, Taylorism and the electrical revolution created another huge leap in productivity and wealth creation in human history. It was what colleagues from Sweden call the transition from a peasant "high competence low productive society" to "a low competence high productive society". And it represented a "stage" of development that all industrial societies adopted to varying degrees to maximise productivity and wealth creation, irrespective of social systems.

The computer revolution

By the mid-1960s, a number of new factors were emerging that predicated another major technological revolution in our time. The jet aeroplane, ship containerisation, heavy dieselisation, television and a wide range of other developments rapidly piled one upon the other. Digital computerisation emerged, flourished and rapidly became the heart of this new technology. There is hardly an area of industry now that has not been affected by it in one way or another.

From its creation in 1944, through the first "built-in" memory in 1949, and the first commercial product in 1954, it developed in a headlong rush that has overwhelmed almost everything.

This has been especially true since the advent of the first micro processor chip in 1972. In swift time it moved from a fairly crude "bit" chip to a very useful and sophisticated "8 bit" chip capable of being directly adapted to robotics as well as to wide-ranging functions in commerce, administration and science.

By now it has already moved through the "16 bit" stage to "32" and every effort is being exerted to create the "64 bit" micro processor. These, along with other ancillary developments in memory chips, interfaces, printers and the like threaten to create a situation where the power available to humanity from its technology substantially exceeds our capacity to utilise it fully.

From technology to social change

Software in particular has not kept pace, and I would argue that this substantially results from Taylorist hangovers which debar "mass involvement" in software development, especially harnessing the entire intellectual resources available from the experience and potential of the whole workforce.

From its origins in "setting by hand", software has so far advanced to three levels - the built in operating system, the programming languages, and applications systems for the most used requirements - each becoming more and more powerful by the day. In time, other technological developments such as print scanners and voice recognition will lay the foundations for anyone and everyone to readily "feed in" their thoughts, ideas and experience.

Even at this stage of development there is the capacity for vast numbers of people to be able to handle a computer keyboard as though it were the same as using a pen or pencil. The invasion by computerisation of machinery, process control and other industrial functions puts "residual" intelligence required for repetition, monitoring, communications and the like into the equipment itself, thus arresting and even reversing the "need" to turn people into robots.

Of course, while the reversal of this
"need" is immediate, the effect will only take place over time and with considerable difficulty - especially where the level of investment and work culture is not yet ready for it.

The new technology makes possible a different kind of workforce, comprising fewer and fewer human robots, with multi-skilling replacing the infinite division of labour in order to handle efficiently and service real robots and highly automated multi-staged machines, processes and administration. A more highly skilled workforce is required, with a greater sophistication and inter-activeness of functions and work processes.

While new technology makes all of this possible, the old Taylorist modes of management will die hard. Every attempt will be made to fit the new technology into the old "mould". The separation by management of functions into "design" and "planning" and other "departments" is a process which will hang on like grim death.

These management characteristics are at least as detrimental to modern industry as were the old "demarcations" and "work practices" in the workforce, implanted there in the first place by Taylorist management and then carried by the workforce into their trade unions.

The technology also makes it possible to be more flexible, adapt more readily to market and other changing conditions and to provide custom-built product and service. Over time the reflex from new market demand to market delivery will shorten quite dramatically. A further concomitant of the technology is its ability to deliver greater consistency, uniqueness of design, durability and warranty.

In short, quality and service have now been placed by history alongside of price as a principal market determinant. Smarter working rather than harder working, efficiency and quality are the order of the day in the world of advanced technology. Whereas, in the past, workforce alienation was "built into" production and was dealt with by authoritarian means, today's requirements are for an ever-increasing level of participation.

It will not be sufficient for management to denounce, complain and demand compliance. Today, to be competitive, genuine commitment has to be achieved by industry and this postulates as big a crisis for management as it does for the workforce.

New managerial theories have emerged calling for flatter management and the devolution of functions to a more highly skilled, competent and committed workforce. It is not for nothing that an OECD group of experts reporting this year to all member countries has recommended:

In enterprises and other productive organisations the effective implementation of technological change requires a strong commitment by management to deepen the involvement of those affected by new products, processes and systems. Broadly speaking this means in many instances a shift from "Tayloristic" patterns of organisation, with their fragmentation of work tasks and layers of supervising management, towards multi-skilling and the devolution of responsibility. Such change will require the retraining both of managers and of workers. It also means a trend towards the "horizontal" integration of departmental functions within the enterprise, and the interchange of information throughout the enterprise, from the earliest stages.

Work organisation

In a nutshell, it is the organisation of work that must change. This is what is meant by the OECD group saying that "their starting point was that technological change is a social process". Even the technology itself becomes adapted to work organisation and design. The character, form and ergonomics of the technology will reflect its social content, varying upon whether it was designed...
by a Taylorist management for a Taylorist workforce, or whether it was designed with or even by a participative workforce from its very beginning. But to achieve this level of commitment and participation, the skilling of the workforce has to be broadened in a number of principal dimensions.

There will have to be a "skilling synthesis" to work organisation as well as a functional synthesis. Or if you prefer - process operators will have a great deal to give in software development and in product and process innovation alike derived from their work experience, community experience and through the expansion of their skills individually and within a group context.

This "skilling synthesis" therefore means that the assessment of skill contributed cannot be a mere mechanical accumulation of "fixed" skills or a string of "like" skills.

Particular skills or horizontal strings of skills can only be assessed at appropriate levels of education and training where the convergence of general education and vocational education becomes the normal practice.

Vocational training will more and more have the characteristic of having been learnt as a "process", and will reflect a capacity for innovative application within a group decision making operation rather than separate specific "fixed skills".

In practice, participation in decision-making is mainly performed minute by minute in course of exercising skills in the workplace. The narrower the skill, the more limited the decision-making, the more limited the work satisfaction and the more limited is the commitment.

Henceforth, the aim of industry must be to enhance competitiveness by smarter working and not by being "directed". The pressures on enterprises today to win and hold onto a modern skilled and committed workforce are greater than at any time in industrial history.

Some countries have already gone part of the way down this road. In every case, though, this has been limited to some degree by management "prerogatives" that suddenly inhibit the degree of commitment that has been achieved (such as plant closure decisions arising from company takeovers or a multina-

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Industry itself will gain from an inter-relationship where income, work satisfaction, enterprise product and process and the community environment are changed by those directly involved exercising increased decision-making rights and responsibilities.

In this process, the dissemination of information by management concerning company objectives and strategies, and greater levels of consultation and involvement are vitally important components.

However, none of the positive potential of the new "post-Fordist" era can be taken for granted. There is no automatic cause and effect about these developments. The underlying objective pressures require positive and determined affirmative action to reinforce their effects and to realise their full potential.

Both the technology and the market will be inhibited to the extent that the social dimensions of the process are limited.

The Pacific Rim strategy or: Taylorism in the international division of labour.

Yet, hitherto, Australia has managed to insulate itself from these new developments in technology and in the world economy. The story of how it managed to do so is a sorry one.

The colonial and mendicant cringe that has affected much of Australia's history was only partially offset in the period following the Second World War when, as a reaction to being virtually "left for dead" by Britain during the war, we gave our industry the stimulus of a wall of protection in order to develop an independent manufacturing base.

However, by the late 1960s and the "American alliance" commitment, following the Japanese economic "miracle", the development of multinational corporations, and other related ingredients, the so-called "Pacific Rim Strategy" became increasingly adopted as the basis of the world economy.

In this scheme of things, Australia, Chile, Peru, Canada and others were to supply raw materials, Asia masses of cheap labour, and the US and Japan the capital and technology - creating, if you like, Taylorism in the international division of labour.

That the strategy was ill-conceived historically and was doomed to failure, did not deter the powerful forces that drove it to acceptance and implementation. For some it was immediately lucrative, and that was enough.

Yet at the very moment that the new technological revolution germinated in the world economy, the major political forces in Australia failed to see its social significance.

Australia's manufacturing industry went into decline. Almost all available investment was poured into two unprecedented resource booms, and Australia became committed to trade which, in terms of value, was the slowest growing area and the most price volatile.

World trade in high value-added manufacturing and service industries, especially high technology industries, was increasing at two-and-a-half to three-and-a-half times the rate of resources trade. We were importing high value-added high cost products and exporting the reverse.

It was this policy which virtually assured that a balance of payments crisis was inevitable. Indeed, at the time the new technological revolution was unfolding in the world, Australia, because of its industrial decay, was largely locked out of it other than for importing and using equipment for resource development. Even in this, despite a substantial favourable local market base, we deprived ourselves of the opportunities presented. The resource developers and the big companies wanted the cheapest possible equipment, and our resource
equipment industries declined more rapidly than the rest.

The result was a balance of payments crisis, within which living standards were seriously affected - especially for middle income earners, from whom wealth was effectively redistributed. Low income earners have been largely protected through the Accord processes and union intervention, while high income earners, because of their unequal preferential power in society, were quite able to look after themselves.

Borrowing to meet the "losses" piled debt on debt - a process made worse by public sector borrowing particularly at state level to meet infrastructure inputs into resource developments.

In Australia then, in addition to being driven by the level of technology available in the world and the nature of the quality assurance market, we are impelled to take on an even more rapid rate of development so as to extricate ourselves from the balance of payments crisis. I am not saying, as some others are, that the whole of the balance of payments problem is one of trade in goods and services. On the contrary, the negative "income payments" side of the ledger has been, and remains, the biggest single factor. Neither do I support the argument that we can (or even should) "trade" our way out of the whole problem.

Both arguments of "trading our way out" and "making public sector debt a selective scapegoat" are rationales of the "new guard" global, multinational corporate expansion.

Nevertheless, our industry and trade position is such that in order to survive as an economic entity, we require modern efficient quality output in not less than world class terms.

Unfortunately, much of Australia's industry is still far from world class both in its technology, its management and work organisation - or, if you like, we need micro-economic reform to effect structural adjustment in the macro economy. The modern technological revolution with its associated sociological dimensions has to be brought into Australia's industrial development.

But, in doing so, we have the opportunity to do it in a more fully developed fashion than other countries that have already shown the way, by:

1. increasing the share of trade devoted to high value-added manufacturing and service industries - especially in high technology industries;
2. associating this with maximum possible advantage to be gained through the most advanced forms of management, work organisation and skills formation;
3. generating the highest possible level of natural networking between our research and development, universities, TAFE institutions, with industry management and the trade unions;

**Domestic markets are nowadays more like local segments of the world market.**

1. developing a pro-active industrial relations system with an effective national framework and guidelines that promotes intense enterprise initiative around innovation in product and process, quality in all forms and reliability of delivery and service all infused with high skills and high value-added content.

**Changing attitudes**

Many of those who have experienced the very worst effects of Taylorism have understandable difficulty in facing the changes its dissolution now offers. They are expressing no more than the deprivation of education, narrowness of skills and alienation that was instilled into them.

For those at the rockface who carried the brunt of trade exposed competition it was a hateful system, despite the industrial growth and wealth it created (the great bulk of which was distributed elsewhere). Yet the fear of unemployment, learning new skills, making decisions and taking responsibility creates deep uncertainty about the future in the minds of ordinary working people.

Bringing these people into the new reality requires care and concern as well as urgency in Australian conditions.

Equally, the problems of middle management also need to be understood, without retreating from the fact that change is essential and urgent.

Debate, pressure, incentive, explanation and retraining are all ingredients in effecting the change.

We cannot concede to those who want to try to stop or delay it. Neither general historical nor specific Australian circumstances will allow it. It is a case of either managing the challenge effectively or having it fragmented by inadequate results.

Associated with the technological revolution and as an extension of it, the "world market" has become dominant.

Domestic markets are nowadays more like local segments of the world market.

In this new world order each country is entitled to its portion of the world market, but there is no apportioning body or apparatus to deliver it. Each country, even the US, is impelled to draft up its balance of payments with the world market - and especially the finance sector of the market.

Competitiveness drives each country to achieve its slice of the world market action while exercising limited and unequal influence in that world market - a legacy of our time with dilemmas for the people of all countries.

Certainly, it is not possible to win an appropriate slice without a mix of trade that has sufficient high technological value-added content in products or services.

Nobody can pretend even if fully carried through that the modern computerised technological revolution will produce a utopia. But the achievement of basic social adjustments will be a turning point in history equal (as I have suggested more than once) to the ending of serfdom in Europe in the fifteenth century following the great crisis of the Middle Ages in the fourteenth century.

Certainly, it is a step that is quite tangible and achievable in our time and one which can create the basis of much wider social change - as did the Renaissance that followed from the changes in the fifteenth century.

We have to seize this opportunity while we can, not simply because the changes it will bring are desirable, but far more importantly because history itself places it on our agenda right now.

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