Creating a Competitive Advantage for Australian Manufacturers

Generally, our whole economy is based upon low value added products whilst world trade is predominantly about high value added products. Commodity prices and the terms of trade have been high for the last two years. Australia's high value added infrastructure is very poor. Intimately woven with this is our poor industrial R&D effort. This is due to the high preponderance of small businesses and their focus on the short-term cash flow. This in turn is due to the low level of process control and innovation. It is not logical to push these firms into making new products, since their processes are very poor. They do, however, need to innovate and renew their business and manufacturing processes and then develop new products. They urgently need process innovation. They need to be taught how to innoivate and carry out sustainable R&D. As well as this climate change, whether it is anthropological or a natural consequence of the changes in the earths orbit around the sun, the changed angle of tilt or the SOHO effect, does create significant opportunities for innovative Australian manufacturers.

The Manufacturing Society of Australia and Blakemore Consulting International conducted a development program through the Federal Government's Innovation Access program called "The Creative Innovative Company Program". It is already clear from the very positive results obtained so far that small manufacturers (less than $50M turnover) need special help which is not covered by existing support programs. The last thing they need at this stage is a new product. In addition, it is now recognized that 70% of the nation's new investment comes from its existing industry base. Hence, this is a good reason to expand it.

Manufacturing generally is not well represented at the professional level and small manufacturers appear to have no group representing them at all. During a discussion with the National President of Engineers Australia last September I was told that "manufacturing is not really engineering". This is borne out by the fact that they do not even have a college of manufacturing. General industrial engineering and operational process methods and knowledge are absent from almost all small manufacturers. Attempts to successfully use the continuous flow techniques (Toyota Production System), have often failed because most companies, particularly SME's, cannot adapt the Toyota assembly systems to Australia's multi-product short run environment. American advisers cannot see past low variety long run supply and hence the methods that will be successful in Australia are significantly different from their perceptions. Australian innovations have already been developed and applied successfully.

Conventional manufacturing methods and planning systems in Australian SME's are highly inefficient but this problem can be rectified if the connection between process innovation and product development is made focusing on the creative flow techniques pioneered by Japanese car manufacturers. Process innovation is

a precursor to good product development. These techniques can be applied to SME's. The problem is not the immediate introduction of new products it is the creative innovation and development of the existing processes to manufacture all products. This includes the development process itself. At a recent forum in Sydney, Harvard Professors Sam Hayes and Warren McFarlan now recognize, belatedly, that the key to Japanese automotive success is process innovation and internal R&D and a strong link between process and product innovation, not acquisition, something not widely recognized.

One of the most significant development projects in Australian Industrial R&D was the development of Colorbond (Zincalume) by what is now Bluescope Steel. I was the Chief R&D Development Scientist leading much of this project. This achievement was a result of process innovation.

The secrets of the future development of manufacturing depend upon:

- Taking advantage of our natural comparative advantages (Natural Gas, Aluminium, energy, iron and steel. Food products, for example)
- Capitalizing on the opportunities created by climate change
- Increasing competition and exposure to the international market
- Removing restrictions to industrial productivity improvement by improving Industrial Relations (This is probably going to occur).
- Focusing on and utilizing industries (source and downstream) where we have a natural competitive advantage (energy, bauxite, iron ore, power, nuclear, agriculture etc)
- Completing the supply chain so that we add as much value to the raw materials as possible (consistent with demand and isolation)
- Concentrating on export.
- Continuous innovation of processes linked to products innovation.
- Utilization of patent know-how. (e.g. Colorbond).
- Process innovation by isolating the constraint and improving productivity and utilizing the appropriate technology.
- Introducing continuous flow techniques for all products.
- Rapid product and process development (R&D).
- Replacing Labour with capital.
- Concentrating on the Premium end of the market.

Some Examples of Process Innovation Achievements We can all learn from.

!. Pirelli Cables

Pirelli doubled output and reduced waste by 90% over three years and changed a loss making enterprise to the second most profitable Pirelli Cable manufacturer in the world (second to the main plant in Milan) in three years. All this was achieved without introducing new products. The company then floated and bought its main opposition, Metal Manufactures.

2. John Lysaght(Aust) now Bluescope Steel

John Lysaght (Aust) first licensed the Galvalume process from Bethlehem in the USA. The product was renamed Zincalume. Numerous patent investigations and plant trials established that the stripping process was the major constraint. JL(A) developed a new stripping process and eventually increased productivity by up to 50% and became the dominant supplier worldwide...a result of process innovation.

3. Innovation Access Program Tasmania 7 Companies. (All less than $50M turnover)

All the participants have common problems. They are under-capitalized, have difficulty raising money, and have a small market share, and very poor processes and higher than desirable manual handling and manufacturing costs.

In all cases the productivity gains so far achieved under this program are already significant but these gains are small compared with the potential improvements that can be made. In one case we can develop a process where one person can do the work of several.

Relationship Between Process Innovation and Product Development

New products must be developed more quickly but it is not sufficient to just develop a new product. The method of development and the processes used to manufacture them must be innovative as well. This is not currently recognized and as a result programs are supported by the R&D Board when they should not.

General

Many of the principles are well established in manufacturing plants in a wide range of industries, particularly in Japan for automotive manufacturers, and

electronic manufacturers, These principles can be introduced successfully into any manufacturing plant in Australia but unlike the USA environment, we need to modify the methodology to suit the fact that Australian plants most often must make a very large variety of products. This means that the production runs are often short and there is a lot of pressure put on the manufacturer to maintain high levels of finished goods inventory. In the USA often plants can be dedicated to low variety of products on very long production runs.

Good business practice aims for continuous and never-ending innovation and improvement. This means a continuous emphasis on new ideas in all parts of the business both in product and process but process innovation does not come naturally to all.

The methodology promoted has already been tried in a complex multi-product environment which is far more complicated (5500 products, 7 plants. 16 machine types, 20 different processes) than most plants.

Concept

The concept is to:

- Plan to eliminate the bottleneck and seamlessly link with suppliers and customers
- Create continuous flow and so increase value added time %.
- Link process and product development
- Transfer the measurements to the Profit and Loss account and the Balance Sheet using throughput accounting.
- Take the resultant working capital released and re-inject it into technology and new innovations to increase productivity and reduce labour.
- Continue the process by further increasing the value added time %.
- Continuously upgrade skills and learning of the workforce
- Aim for sustainability in all aspects of the business

Starting with the key principles of creative flow of products and services, operations research, the 14 Toyota Management Principles, the 14 Rules of Dr Deming and the key links between process and product innovation, a series of concepts have been developed and successfully applied. These need to be understood by all manufacturers, specifically those below $100M turnover. The concept introduced at Feltex with some principles applied at Pirelli and following the methods used on the Colorbond project, needs to be diffused quickly through Engineering schools at all levels. There has to be a continuous understanding that the value added percentage in all manufacturers must continuously increase.

The concept is to take these ideas and apply them through demonstration projects supported by Universities and TAFE following the basic scientific

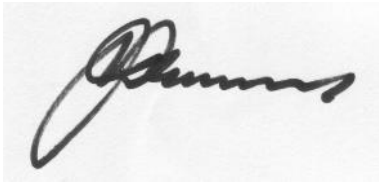
method, and transfer these measurements to all functions of the company, and measure them through the P&L and balance sheet.

The innovation Access program in place in Tasmania can be used as a showpiece. This includes the following companies who are all showing significant benefits. These benefits are most noticeable in those with turnovers greater than $5M. In all cases the lack of internal resources, particularly where the company has a turnover less than $5M per year, has hampered development. However the following have made significant development in a relatively short time. In the case of Muir Engineering, this program has significantly helped the company win the Austrade Export award for a company under $20M turnover.

- Muir Engineering Pty Limited
- Hazard Pty Limited
- Tasmanian Timber Engineering Pty Limited
- Novaris Pty Limited

Conclusion

SME's need help. Generally, the smaller the company, the greater the variety of products and the shorter the manufacturing run length. Simply thinking that the Toyota production System will work in the Australian manufacturing environment without significant innovations will lead to failure. However these problems have been solved. The current "Commercial Ready" program encourages these companies to develop new products but what is needed are new innovative processes. The guidelines for "Commercial Ready" need to be broadened so that maximum benefits can be obtained from the allocated funds or alternatively funds should be diverted from this program so that the maximum national benefit is obtained.



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