

Carclo's story symbolises the rise and decline of British manufacturing and the re-birth, of at least parts of it, over the last couple of decades. For most of the post-war years it's a story of high labour input and low value-added, of fierce financial control generating cash to fund generous dividends for shareholders – but little or no investment in the future. According to Treacy and Wiersema¹, winning strategies are built on unrivalled world class performance in one of three key 'value disciplines':

- Operational excellence
Delivering products/services to customers with optimum efficiency and minimum cost.
- Customer intimacy
Dedicating the business to meeting the complete needs of carefully targeted customers and building 'intimate' long term relationships with them.

- Product leadership
Providing products that continually re-define the state of the art.
- As well as leading their field in one of the value disciplines, companies must reach 'threshold' levels of performance in all three. It's no good understanding customers' requirements better than anyone else, for example, if you're not capable of meeting them efficiently or at a competitive price. ►



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 Can't really see the point of spending half my life tweeting, but do have a healthy texting circle with my Manchester United and running club friends (if that counts). I also use the telephone when absolutely necessary.



Case Study



Figure 1:
Threshold versus leadership in customer value

Like Leighs Paints (see Stakeholder Satisfaction June 2009, <http://stakeholdermagazine.com/articles/>), the story starts with undifferentiated products and commodity markets, and there are some similarities such as strong focus on quality and on targeting growth markets. But, Carclo's transformation has been almost totally driven by focus on one of Treacy and Wiersema's strategic disciplines – product leadership.

A traditional British manufacturer

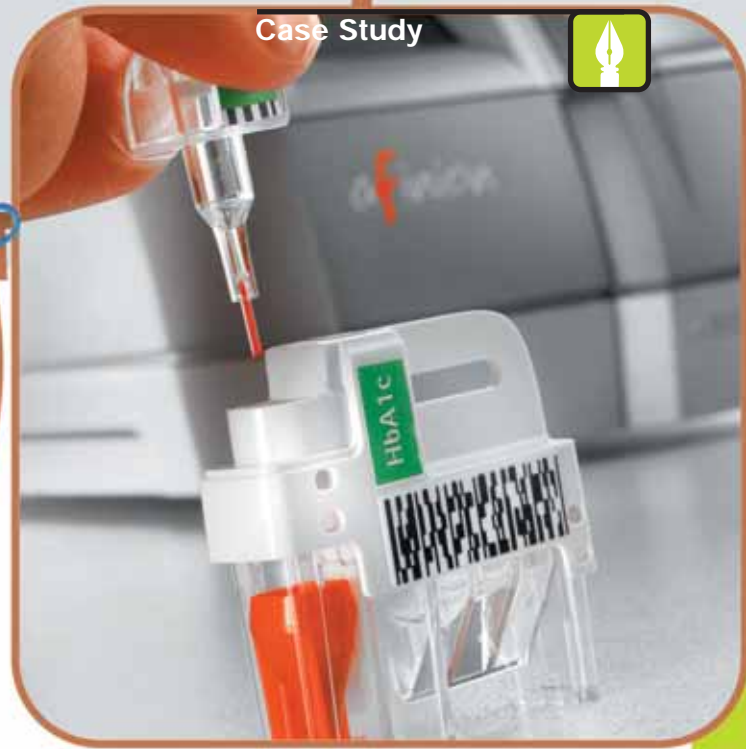
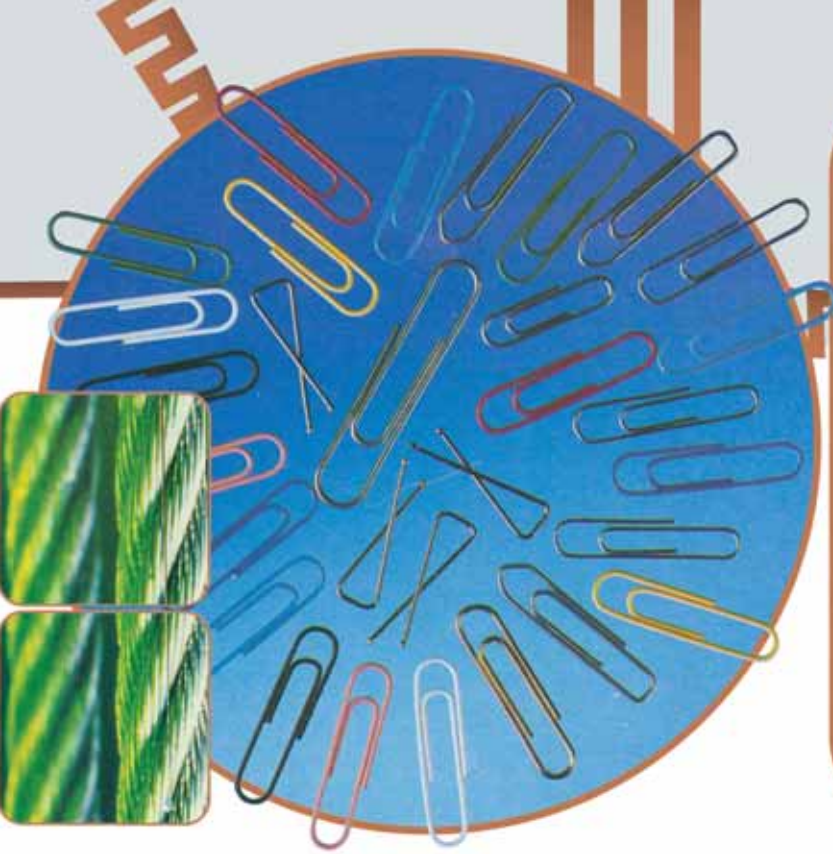
Carclo's origins date back to five family owned companies around Huddersfield and Halifax supplying wire and belting products to the textile industry. Some even pre-dated the industrial revolution – Carclo still having a ledger dating back to 1780 for Joseph Sykes, one of the Huddersfield companies! These businesses were immensely wealthy, often producing returns of 40% for their family owners in the 19th and early 20th centuries. In the early 1920's the family companies merged to form Card Clothing and Belting Ltd, and in 1959 the company was

listed on the London Stock Exchange allowing the families to realise capital. Like many asset-rich quoted companies, the company went largely unnoticed until the late 1960s when there was an upsurge of investors (e.g. Slater Walker) who built stakes in dozy family companies valued at less than their assets.

In 1973 John Ewart bought a significant stake, soon gaining management control with the support of Slater Walker amongst others, and renaming the company Carclo. He then used the cash flows to build a stake in Carclo's competitor, English Card Clothing (ECC), gaining control by 1979. This also landed him ECC's highly profitable Indian subsidiary – Indian Card Clothing (ICC) which dominated the Indian textile market and soon generated half of Carclo's profit. The problem for Ewart was the virtual impossibility of repatriating the profits from India thus making it increasingly difficult to fund a voracious appetite for dividends. So ICC was sold – breaking up a world leading position in textile technology. Ewart used the proceeds to again target old asset-rich

companies, often still run by the original family. With no synergy, the acquisitions did little to improve Carclo's profitability or future strategy. His last acquisition, however, was a Sheffield-based steel and wire business called Arthur Lee and Sons. Although still family managed, the Chief Executive, Peter Lee, was forward thinking, recognised the declining attractiveness of the steel market and had diversified by making three acquisitions in the high growth plastics industry, including a business in the attractive medical market.

Now over 70, Ewart stepped down and appointed Ian Williamson as CEO in 1995. Williamson took over a £150m steel and wire company comprising five divisions and 20 businesses, with an interesting GEC-like corporate culture that was very focused on financial control, making it highly risk- and investment-averse. Every business, however small, had a qualified chartered accountant who produced detailed monthly management accounts that were rigorously scrutinised at HQ. Every company was independently financed with its own bank overdraft and adhered to a strict corporate capital-debt ratio, which encouraged spending on capital items such as machinery but deterred investment in off-balance sheet assets such as new product development, marketing or staff training. Consequently, Carclo companies tended to have plenty of production capacity but insufficient skills to exploit it resulting in businesses with poor organic growth, weak market positions and declining profitability.



Cost base

The company was also top heavy with plenty of managers and controllers and a high wage – high benefits legacy. Carclo was just not geared up to fund the innovation and added value which are the essential elements of competitiveness.

Take Joseph Sykes. Much had happened since that 1780 ledger, including plenty of innovation. The company had pioneered nylon coated wire (remember those coloured paper clips?), had dominated its market and still had only one major competitor. Unfortunately, the competitor, Bekaert, was now 50 times its size. Sykes' market position and margins were declining with nothing in the pipeline to reverse this trend. English Card Clothing's technology was old, its margins eroding. At £32m, Lee Steel Strip had the highest group sales but was a minnow in a market dominated by world players. The wire rope businesses were loss making, and the automotive cable business was in a tough market. Only the medical plastics business (turning over £6m) was operating in an attractive market, growing at 10% p.a. From 1996 the pound started rocketing against the Deutschmark, and most of the businesses began to lose money.

From metals to plastics

To Williamson, the strategy was clear. Carclo had to target attractive growth

markets and invest to be competitive. The acquisition of the plastics division of EIS in 1997 gave Carclo a 10% market share of UK technical plastics and transformed its plastics business overnight. This was further boosted by some smaller acquisitions - Wipac (an attempt by Wolseley to penetrate the automotive market) Coil, a leader in optical plastics, and Carrera – a US based technical plastics group.

But acquisitions have to be paid for, so Carclo had to sell its past to fund its future. In quite a coup Joseph Sykes was sold to Bekaert for £14 million - equivalent to a p/e of 23 and £ per £ on turnover. Lee Steel Strip was sold for £21m but Williamson had to close some of the companies and sell the assets – a process that's only been completed fairly recently.

However, the strategy seemed to be working. By 2001 Carclo had a £100m technical plastics business plus a £25m automotive business and a further £35m in a collection of smaller companies including optical plastics and an aerospace cabling business.

Disaster and debt

It was now that disaster struck. Co-incident with 9/11, but not caused by it, the UK mobile phone handset industry collapsed. Over-payment for 3G licences devastated mobile operators' finances. No longer able to buy market share, they slashed handset subsidies. In 2000 the

UK manufactured 25% of the world's handsets. By 2002 we made none! Marconi was a casualty, 300,000 jobs were lost, but this annihilation of an entire industry went almost unreported.

By 2002, Carclo had lost one third of its sales, closed eight factories, had difficulty servicing its £49m debt and, like most companies was hit with a pension deficit. With a lot of managers and employees on generous benefits living longer, the fall in asset prices after 9/11 plus the more hostile legislative environment of the 1995 Pensions Act and the recently introduced tax on pension funds' dividend income, the deficit had suddenly ballooned to £34m by 2003. The combined debt was a big chunk of sales, and many years' profits.

Strategic response

Carclo had to do something radical. The Board's response was to make several excellent decisions.

1. They didn't sack the CEO!

Many public companies would have, but Carclo's shareholders were supportive, probably because Williamson had always been honest, open and prepared to meet them rather than communicate through the broker.

2. They resolved never to be so vulnerable to a single market in future.

3. To quickly halve debt, the last of the family silverware, English Card Clothing, was sold as well as cable business Gills and surplus property assets.



4. This helped with the fourth decision - to trade out of the crisis through organic growth, not acquisition.

5. The final decision was a very big one, and the main indicator of the Board's backing for Williamson. At a time when the debt was nearly as much as the turnover, the company would allocate 15% of capital expenditure into high risk but potentially transformational investments in real cutting edge IPR-type innovation. This last decision would shape the company's future.

The road to recovery

Ian Williamson's background was in electronics R&D. Looking for and developing new technology is what he was trained to do. So he appointed (internally), a Business Development Manager and sent two managers by Easyjet to the Czech Republic to look for new opportunities, followed shortly by similarly low cost expeditions to India and China. This resulted in the development of a global supply base and, more crucially, the identification of some new technologies that would be growth market-orientated and could, if successfully commercialised, transform Carclo. These included² the development of high power LED lighting for supercars

(where Carclo Precision Products' Wipac business is now market leader) and low cost point-of-care diagnostic devices for the medical market through Platform Diagnostics Ltd which Carclo owns jointly with Inverness Medical Innovations. Other new technology products successfully developed and commercialised include LED optics, active inhalers and RFID antennas, which combine an antenna and sensor and can be used for applications such as intelligent tags that monitor the temperature of goods in transit. But the real jewel in the crown was CIT (conductive inkjet technology).

Out of adversity....

Carclo's optical plastics business uses specialised coatings to create glass-like surfaces on plastic mouldings. Applying these coatings is expensive and difficult. One of the first R&D projects Carclo initiated was to use inkjet digital printing to apply the coatings. Motorola asked Carclo to investigate the feasibility of using the technology to print its logo onto mobile phone windows. Working with inkjet specialist Xenxia, they developed an innovative solution but when Motorola closed its UK factories, Carclo was left with an infant technology and no cus-

tomers. So far, Carclo had invested only £30k in 'conductive inkjet technology' and it might have ended there but Williamson recognised the technology's potential in applications such as RFID (radio-frequency identification) antennas. But Williamson realised that to fully exploit the technology's wide potential complete control was necessary, so by 2005 Williamson had bought Xenxia's share of the joint venture, appointed Chris Malley as CEO and tasked him to turn an R&D company (essentially little more than some promising intellectual property), into a successful commercial business.

Commercialisation of CIT

Malley, an accountant by training, who had joined the Carclo steel division in 1998, knew that British manufacturing had often failed to turn promising innovations into sustainable businesses. His strategy for avoiding this trap was:

1. Gain complete control of the technology

Carclo owned the company and the intellectual property, but the R&D was still based at Xenxia and Carclo was working with other partners to develop and manufacture the inks and the machinery. Malley realised you couldn't sell a technology if you didn't understand everything about it. To do that you have to use it so he moved CIT into its own premises with six employees and a production line for small runs, prototyping and development work.

2. Focus on delivery

Faced with the vast potential of CIT, you



Please note Carclo are in no way involved in the design and development of the Apple iPhone.

could get carried away with what it might do rather than focusing on what it already can do. Customers were identifying potential applications, but even if CIT received development and prototyping fees, they didn't cover the opportunity cost of neglecting more immediate opportunities for the technology. So Malley narrowed the company's potential to focus on delivering a defined technological output – a fully functioning 'Metaljet 6000' production line, which was achieved by the end of 2008.

3. Achieve six sigma reliability

Although Carclo had worked with the best inkjet printers and machinery manufacturers in the world, it was becoming clear that inkjet printing wasn't delivering enough reliability for the printing of electronic circuits. For graphics, occasional malfunction of a nozzle doesn't matter because the flaw isn't visible to the human eye. In electronics, it means a break in the circuit and a product that's not fit for purpose. Even if the system could print hundreds of flawless circuits before the lapse occurred, that level of quality wasn't adequate. In 2008, another Cambridge company, Xaar, developed a new print head with the reliability for single pass printing. CIT modified its equipment to incorporate the Xaar technology, but all this delayed the full commercialisation of the project until the latter months of 2009.

4. Go for the big prize

This might seem contradictory to the priority of focusing on delivery, but out of those hundreds of potentially exciting

applications, one or two really will offer a massive return. The supreme test of good management in technology-led companies is to achieve the deliverables whilst allowing a controlled amount of time and resource to pursue the blue sky possibilities and, from the many blue sky options to identify and focus on one big prize. The final step in Carclo's transformational journey from Victorian metal basher to the knowledge-led British manufacturer of the future is the story of this big prize.

Touch screens

Dating back to the 1960s and first commercialised in the 1980s, it's only in the last decade that touch screens have proliferated, mainly on high cost equipment such as kiosk and EPOS systems. More recently they've appeared on small electronic devices like tablets, PDAs and mobile phones. There are two problems with the 'projected capacitive touch' (PCT) technology used in these gadgets. First it's very expensive. Not an insurmountable problem for high margin innovators like Apple but potentially a show stopper for mass market competitors. Second, and a major negative for portable devices, it's very hungry for battery power.

CIT could revolutionise touch screens but since inkjet printing couldn't reliably print below 100 microns, (too visible for display applications), Carclo developed a way of using UV light to cure its inks, producing the much finer features that touch screens

need. It is currently installing the machinery to manufacture circuits on polymer film down to 5 microns, slashing the cost and power requirements of touch screens for mobile devices.

On December 8th, Carclo announced an agreement with NASDAQ quoted Atmel Corporation, a worldwide leader in capacitive touch screens. Under the terms of the agreement, Atmel is making a \$1 million payment to CIT to secure preferential access to CIT's production capacity and technology to develop and manufacture a product for use in mobile phones and other electronic devices. CIT will be installing a new production line at its Cambridge facility to produce touch screen sensors which will be operational in the second half of 2010 enabling volume production to commence in 2011. To preserve its preferential access to this capacity, Atmel has agreed to minimum annual volumes for 2011 and 2012.

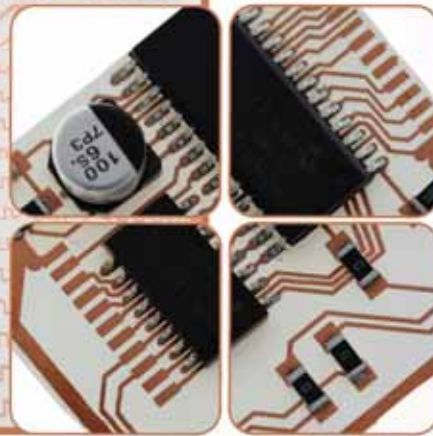
The next big growth market for touch screens is likely to be laptops. Rumours suggest that Apple is on the verge of launching a product. Windows 7 is touch screen enabled so the mass market Windows-operated manufacturers such as Dell will have to follow suit. But for laptop screens the problems of cost and battery consumption are multiplied many times over with the larger screen formats, making CIT's technology a potentially industry-changing solution.



On January 27th 2010, Steve Jobs launched Apple's new iPad, which he described as "so much more intimate than a laptop and so much more capable than a smartphone." With a 9.7 inch touch-screen it will be a strong driver for the adoption of the technology across a much wider range of personal computing devices. Watch this space.

You've probably seen this but here's the link to the Apple site

<http://www.apple.com/ipad/>



Managing innovation

Carclo has demonstrated that you can manufacture in the UK and that British companies can commercialise technology as well as invent it. Although they hadn't read the book, it's a text book example of using Treacy & Wiersema's product leadership strategy to transform a business. So what can we learn about product leadership from the Carclo story?

1. You have to invest

Since 2002 Carclo has invested considerable sums in potentially transformational innovation – recently around £1m per annum in CIT alone.

2. You have to pursue development and income

The £1m has to come from somewhere. Whilst the tendency of many British and American plc boards has been to pursue short term profits, the temptation for the innovation-led business is the opposite. Staffed by scientists (around half of CIT's staff have PhDs), they're inclined to focus on break-through innovation as an end in itself. What you have to do is find specific applications for it then a specific customer who's sufficiently interested to get involved and make a commitment.

3. You have to take risks

Because it is potentially ground-breaking, Carclo's innovation has also been risky, especially since the investment has been a significant percentage of its cash flow.

4. You have to have control

Partnerships may reduce risk but they

divert resources into managing the partnership rather than the innovation.

5. You have to have teamwork

Innovation works best in small units where staff take ownership, work as a team and live the dream. Top management has only 2 roles. First, lay down very clear objectives and boundaries - budgetary, time frames etc, and make sure staff adhere to them. Second, give help if they ask for it. Capable and motivated people thrive on maximum accountability and minimal interference.

6. You have to be ambitious

If the innovation is genuinely leading edge you must become an enabling rather than a substitute technology - the latter competes on price, the former on added value. Hence the change of emphasis at CIT to UV curing and touch screens.

7. You must protect IP

Despite the cost and time involved you must patent everything that might protect or enhance the commercial value of your innovation, track other people's IP and monitor infringements.

8. You must never compete on innovation alone

Back to where we started this article. You have to be the best in your industry at one thing. If that's product leadership all the above 7 rules apply, but they're not enough because you also have to achieve consistently high levels of performance on operational excellence and customer intimacy. At CIT they've built six sigma levels of operational excellence and not over-

looked customer intimacy. With such ground-breaking technology, CIT staff could easily see customers and especially potential customers, as an unwelcome distraction. Chris Malley ensures that they treat everyone as a valuable customer from the outset, because eventually that's exactly what they want them to be.

Ian Williamson points out that he's an unusual animal. An engineer leading an engineering company, and sees that as a big strength. But Chris Malley's an accountant. Harvard would place attitude ahead of skills and I agree. I think their success is down to two primary factors. First, having the guts to take the long term view, shifting the objective from a cash-rich present to a sustainable future. Second, transforming the culture from centralised command and control to a liberated collection of entrepreneurial business units, small enough to build motivated teams striving for clearly understood objectives. Whatever the answer, Carclo's share price has tripled in the last 12 months. **S**

References:

1. Treacy and Wiersema (1995), "The Discipline of Market Leaders", Perseus Books, New York
2. For more details of Carclo or CIT go to www.carclo.co.uk or www.conductiveinkjet.com