

The global manufacturing sector: current issues

The manufacturing sector in many countries is in a state of transition. Growing in emerging economies; shrinking but becoming more productive in advanced economies. The new manufacturing giants with low wage economies tend to compete on cost, the established players prefer to move up the manufacturing value chain to compete on technology and innovation. Lean manufacturing techniques which control costs and improve quality are pervasive.

CIMA sector report

Key messages

1. Many policy makers in western economies argue for the need to rebalance economies from an over reliance on services, particularly financial services. Manufacturing is seen as a source of stronger and more sustainable growth.

2. The manufacturing sector faces several significant challenges: a shortage of lending, currency volatility, fears over the sustainability of supply chains and downward pressure on prices.

3. There has been a global shift in manufacturing from west to east. The manufacturing sector is growing rapidly in India and China and has shrunk in most advanced economies.

4. Western companies have progressively downsized over the past decades, which has resulted in increases in manufacturing productivity. Lean manufacturing techniques are almost universally adopted.

5. Emerging markets concentrate on mass manufacturing and competing on price. The top three countries in the Global Competitiveness Index are Asian, and G7 countries are falling down this index.

6. Manufacturers in the west have moved up the value chain to concentrate on more technically advanced industries or products. They compete with low wage economies by competing on meeting customer needs, and on innovation and flexibility.

7. Innovation has been identified as one of the main drivers of growth.

8. Advanced economies concentrate on setting up the structure and systems for production and bundling products and services to provide a 'solution' to customers. They often outsource the purely productive element.

9. Management accounting started as a discipline to support better manufacturing decision making. Although the discipline has evolved to also support service industries and not-for-profit organisations, it has also evolved to keep pace with new developments in manufacturing technology and practices.

10. Competition will intensify for the territory at the top of the manufacturing value chain, which may lead to protectionist measures such as tariffs, subsidies and exchange rate manipulation. But this protectionism will not seriously impede the general trend for globalised manufacturing.

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A new focus on manufacturing

After decades of being the poor relation of economic growth, manufacturing is now seen as part of the solution to the trauma inflicted by the financial services sector. Policymakers in the west are talking about the need to rebalance their economies away from an over-reliance on services – and particularly financial services.

There has been a realisation that competitive manufacturing is the lifeblood of an economy because of the critical role it plays in a country's long-term prosperity. It creates skilled jobs and generates revenues for national treasuries in the form of exports and investment. It also has a strong beneficiary role in terms of its contribution to the physical infrastructure of an economy, and spill-over effects to other areas such as science, construction and logistics.

The effects of the financial crisis on manufacturing

The financial crisis delivered a body blow to the manufacturing sector from which it is still recovering. The seizure of world trade and credit financing in the wake of the collapse of Lehman Brothers in 2008 triggered a recession that led to a slump in orders, a rash of job losses and mass factory closures.

Since then conditions have improved although there are signs that the pace of recovery has slowed. A closely watched survey of manufacturing managers, the J.P. Morgan Manufacturing PMI, shows that activity in the sector slowed again over the summer of 2010 after returning to growth in late 2009.¹

Worries over the scale of national deficits, and the spending cuts needed to bring government finances back into balance hang over the sector. *'Growth of the global manufacturing sector is cooling from the red hot rates seen earlier in the year,'* says David Hensley, Director of Global Economics Coordination at J.P. Morgan. *'Mounting headwinds could temper growth later in the year'.*

As governments wrestle with how to sustain economic growth and bring the financial services sector to heel, cuts in public spending combined with uncertainty over the fragility of the private sector recovery will put manufacturers' confidence under pressure. At the same time firms need to consider a host of issues that manufacturers must always address, but which have been magnified by the credit crisis. These include currency volatility, fears over the sustainability of supply chains and downward pressure on prices.

Manufacturing in the east

While the crisis was a shock to manufacturing, it added to, rather than fundamentally changed the long-term structural changes and challenges that manufacturers face. One clear trend is the shift of manufacturing activities from west to east. The entrance of China and other Asian nations into the world trade system has greatly increased industrial capacity.

This has led to downward pressure on wage costs, particularly in labour intensive low skill manufacturing sub-sectors; which has in turn forced many western companies to close factories and move production from their home country to offshore locations.

The recession clearly exacerbated this trend as eastern economies have outperformed their western rivals. According to IHS Global Insight, an economic consultancy, US manufacturing shrank at a cumulative annual average rate of 1.4% a year between 2007 and 2009. Japan contracted by 8.5% and Germany by 5.4%.² In contrast Chinese manufacturing expanded by 14.3% while India grew by 1.5%.

Manufacturing in the west

Despite the contraction in manufacturing activity, it would be a mistake to conclude that manufacturing is dead or dying in the west.

1 J.P. Morgan Global PMI: Global report on manufacturing. July 2010

2 World Industry – Perspectives Article. IHS Global Insight. June 2010

IHS Global Insight points out that while China has a commanding lead in low tech areas such as textiles, apparel, and appliances, the US has a larger share in high tech areas such as aircraft, special industrial machinery, and medical and scientific equipment.

The challenge is to move up the value chain, as the returns are much higher. There are signs that Chinese manufacturers are attempting to do this, which will put pressure on western firms to keep one step ahead. This requires a clear strategy, an understanding of customers' needs demand and a workforce and facilities that are sufficiently skilled and flexible.

As manufacturers have moved up the value chain, they have tended to become leaner. While thousands of jobs were lost due to the recession, firms in the west have been downsizing their operations for several decades. As a result productivity has improved markedly as fewer workers have produced higher value-added goods in sectors such as aerospace and pharmaceuticals.

Between 1990 and 2002, manufacturing productivity grew at 3.9% per year in the US compared with 2.3% for businesses overall. Indeed US based technology industries consistently achieve higher productivity and wage levels than their counterparts do in China, according to IHS Global Insight.

The search for operational excellence is ongoing and many firms are moving towards lean manufacturing methodologies to achieve their best performance. This will require them to increase their focus on eliminating waste or non-value added processes within their production systems. It will also require them to invest more in innovation, even at a time when their revenue streams may come under pressure from public sector spending cuts and doubts over private sector recovery.

Case study – How Toyota lost its way

Management accountants are well placed to advise on the benefits of pursuing 'lean' manufacturing techniques, but some might argue that the credibility of those techniques has been undermined by Toyota's recent quality problems. Rather, the conclusion seems to be that commercial pressures diverted Toyota from the lean principles they formerly valued.

The lean manufacturing approach pioneered by Toyota concentrated on the identification and minimisation of waste in production, supply chains and management processes. Seven types of waste were targeted, including over processing, waiting times, and unnecessary transportation; so the approach was credited with improving quality, speeding up production and reducing costs. Strategies included getting suppliers to design cheaper and lighter components, and making productivity gains.

Toyota's recent growth has been significant. It has added 17 new manufacturing sites to the 58 it had in 2000, and expanded the product range significantly in a bid to rapidly increase market share. In 2000, Toyota produced 5.2m cars; by 2009 its capacity was 10m. Yet Toyota was able to cut more than \$10bn from global operating costs in the period 2000-2006.

The relentless pursuit of growth, the rapid expansion of supply chains, the pressure for ever-more productivity gains all combined to apparently undercut the commitment to quality which used to be part of the Toyota tradition. *'The company was hijacked by financially oriented pirates'* commented former top US executive Jim Press who left Toyota in 2007.

In 2009/2010 the quality problems came to a head when Toyota had to recall 5.3 million vehicles in the US, in relation to five separate issues affecting various models: accelerator entrapment by floor mats; unintended acceleration caused by 'sticky' pedals; issues with software relating to braking systems, power steering, and front drive shafts. US regulators linked the problems to 51 deaths, and had reports of unintended acceleration dating from 2003.

How could this happen in an organisation with a supposed quality oriented philosophy and an investigative approach which advocated going to the source of any issue? How did defective parts enter the supply chain? Why were quality problems not identified or actioned more promptly?

The consensus among commentators appears to be not that Toyota abandoned its lean approach; but that its rapid growth encouraged the company to follow the practices mechanically, rather than in the spirit of the principles. For example, the problem with the floor mats was not due to defective components from suppliers (as those met specifications); therefore it was not an engineering issue, but a design issue. This suggests that the suppliers were not working in the collaborative manner with Toyota assumed by a lean manufacturing approach, probably because the supplier network expanded so quickly. In a similar fashion, it seems likely that colleagues from the new plants did not benefit from Toyota's previous resource intensive policy of mentoring to share good practice and disseminate values.

Toyota's own assessment of where it went wrong was *'the pace at which we have grown may have been too quick... Toyota's priority has traditionally been first: safety; second: quality and third: volume. These priorities became confused... We pursued growth over the speed at which we were able to develop our products and our organisation'*. The company also felt it could have handled its response to the safety issues more effectively. *'We must think more from a customer first perspective rather than a technical perspective when investigating complaints..we must communicate faster, better and more effectively with customers and regulators'*.

Toyota's solutions include new regional quality officers to give regions more autonomy and decision making with regard to recalls and other safety issues. It also established a new special committee for global quality, and teams to investigate quickly reports of unintended acceleration. It reinforced its design capability by transferring one thousand engineers to focus on design of components and other quality issues. It lengthened product lifecycles by four weeks to give more time to address safety/quality issues and improved monitoring systems to better capture intelligence on quality/safety concerns from various sources (including web mentions, customer calls and government databases). It intends to equip more vehicles with the technology to diagnose problems and report faults ('black boxes') and has allowed external parties to review its technology.

Source: Testimonies of Akio Toyoda, President Toyota Motor Corp. and Yoshimi Inaba, President and COO Toyota North America to US Congress committee Feb 2010

'The Humbling of Toyota Bloomberg' Business Week, March 22 and 29

The importance of innovation

Just as price pressures will force manufacturers continually to seek cost cuts, so they need to keep one step ahead of the competition in what they offer. Innovation, whether it is through investing in R&D to develop new products or process technologies, improving back office or sales and marketing operations, must be in line with company strategy and ensure business needs are met.

According to Sir James Dyson, the inventor of the bagless vacuum cleaner, the west's future lies in ideas. *'The only way we'll compete internationally in the future is by owning ideas,'* he says. *'We can't manufacture everything here – certainly not consumer electronics. China and India are too dominant'*.³

A report by the Council on Competitiveness and the consultants Deloitte Touche Tohmatsu⁴ found that innovation was the pre-eminent driver of growth. Access to talented workers capable of supporting innovation was the key factor driving global competitiveness at manufacturing companies—well ahead of classic factors typically associated with success, such as labour, materials, and energy.

³ Britain: balance and power. Groom, B. *Financial Times*. 22 July 2010

⁴ 2010 Global Manufacturing Competitiveness Index. *Council on Competitiveness*. June 2010

Innovation around the world

INSEAD and India's Confederation of Indian Industry (CII) jointly produce a Global Innovation Index. Countries are scored on a combination of the conduciveness of their political and economic environment to innovation; output measures such as patents, productivity, and business performance; and some quality of life elements. The purpose of the index is to measure each countries' capacity to leverage innovation advances for development and competitiveness.

The top ten ranked countries, the UK and USA; the BRIC and CIVETS countries are shown below.

BRIC countries are Brazil, Russia, India and China - large, rapidly developing economies.

CIVETS countries are Columbia, Indonesia, Vietnam, Egypt, Turkey and South Africa - the next tier of countries to watch, with young and growing populations, political stability and relatively healthy economies.

Rank	Country	Score
1	Iceland	4.86
2	Sweden	4.85
3	Hong Kong	4.83
4	Switzerland	4.82
5	Denmark	4.72
6	Finland	4.66
7	Singapore	4.65
8	Netherlands	4.62
9	New Zealand	4.60
10	Norway	4.59
11	USA	4.57

Rank	Country	Score
14	UK	4.42
43	China	3.32
51	South Africa	3.24
56	India	3.10
64	Russian Federation	3.03
67	Turkey	2.99
68	Brazil	2.97
71	Vietnam	2.95
72	Indonesia	2.95
74	Egypt	2.91
90	Columbia	2.76

www.globalinnovationindex.org/gii/main/home.cfm

'The global competitive landscape for manufacturing is undergoing a transformational shift that will reshape the drivers of economic growth, high value job creation, national prosperity, and national security,' said Deborah Wince-Smith, the council's president.

Pulling these factors together, it is clear that while manufacturing has emerged from recession, the market in which firms must now operate will be more competitive than before the recession. Constant downward pressure on prices due to a combination of weak demand in the rich countries and lower wage costs in emerging markets will force manufacturers in both west and east to adapt the way they do business.

Emerging markets, especially those in Asia, will continue to play to their strength of price competitiveness. The Council on Competitiveness's Global Manufacturing Competitive Index (GMCI), rates China, India and Korea in the top three positions, not just for this year but also as its forecast for five years hence. These countries have moved to take over the mass manufacturing that western firms can no longer afford to carry out. *'It appears that China, India and Korea are aware of this and pressing their competitive advantage,'* the report said.

This withdrawal from mass manufacturing means that western nations will decline in terms of overall competitiveness. Only three G7 countries will be in the top ten of the GMCI by 2015. In fact over the next five years, the ten fastest rising countries in the GMCI are all emerging economies while eight of the ten fallers are from Europe or North America.

Firms will need to respond by focusing on the value added and innovation areas of manufacturing. This process has been underway already.

The shift away from the basic manufacturing towards technology based and value added production has encouraged manufacturers to reconsider how they operate and what they offer customers. Rather than performing all productive tasks in-house, companies are building the capabilities to design and integrate systems, while managing networks of component and subsystem suppliers.

Research published in the MIT Sloan Management Review⁵, shows companies such as IBM, General Electric, Rolls-Royce and EDS already compete aggressively on this basis. It highlights how Rolls-Royce provides airlines with 'power by the hour': selling engines along with the services to maintain and upgrade them over many years.

The long-term rise of consumerism in the west – now seen in the east – has prompted manufacturers and retailers of fast moving consumer goods (FMCG) to learn lessons from the traditional industrial sector. FMCG are products that are frequently purchased by consumers such as toiletries and cosmetics and non-durable items such as light bulbs and batteries.

While this includes a range of companies from supermarkets to pharmaceuticals all have had to respond to the changing trend in consumer spending. Consumers tend to switch from luxuries to necessities during tough economic times and FMCG firms have had to respond swiftly to change their stocks and cut costs in order to make prices competitive. As with heavy industry, this has exacerbated an existing trend. WalMart is renowned for its ability to lower prices by negotiating directly with each link in its supply chains to seek cost cuts, for example.

Faster recovery in emerging markets has also encouraged FMCG firms to shift their focus from west to east. Unilever recently said that the impressive demographics in the Middle East North Africa region gave it immense headroom for growth.⁶

Politics and protectionism

The overarching issue for western companies is that emerging markets will continually push them up the value chain in the knowledge that the highest returns are found at the top of the manufacturing process. The Council on Competitiveness highlights what it calls a 'competitive paradox'. Western nations with more democratic, social and environmental policies are in relative decline while emerging markets with their large government-funded infusions into manufacturing are on the rise. Instead of competing supply chain to supply chain, governments in emerging markets are competing with nations to get to the top of the manufacturing pyramid.

As competition for scarce orders increases, this is likely to lead to accusations of unfair trade practices between west and east. As unemployment rises in the crisis-hit industrialised economies, politicians will be under pressure to react by imposing tariffs and trade barriers on Asian countries. This in turn would put the recovery in world trade under threat as countries retaliated with increasingly high tariffs. Likewise, if politicians believe rival countries are using subsidies, state finance or bailouts to give their manufacturers a competitive advantage, they are likely to retaliate.

These 'beggar-thy-neighbour' policies are already being enacted. Global Trade Alert (GTA), an independent unit that tracks distorting measures, says the G20 group of rich and emerging economies has put up 650 trade barriers since November 2008.⁷ One specific feature of these disputes is often accusations of exchange rate manipulation as has frequently been seen between China and the US.

5 Charting a path towards integrated solutions. Davies, A. Brady, T. Hobday, M. *MIT Sloan Management Review*. Spring 2008. Vol 47. No 3

6 Unilever smiles all the way to the bank as FMCGs ride out the storm. *Zawya.com*. 28 May 2010

7 Unequal Compliance. The 6th GTA Report. Centre for Economic Policy Research. June 2010

Simon Evenett, a professor at St Gallen University in Switzerland who runs GTA, says that if trading partners are given grounds to suspect that a depreciation was deliberately induced or reinforced by a government, this may trigger retaliation in different forms. *'Depreciations had better appear to be market-driven or the potential for difficult commercial policy disputes will increase,'* he says. *'Public adherence to open, that is non-interference in, markets—including currency markets - will be important here'.*

Conclusion

The scale of the downturn and the outbreak of currency disputes have raised questions over the future for globalisation. There is little evidence, however, that supply chains have broken down or that countries are withdrawing from the global economy.

If anything global production systems have become more consolidated with a greater amount of value moving from west to east.

To fund sustainable growth essential to their survival, manufacturers must focus their technical, innovative and financial skills on the activities where they can add most value in an increasingly competitive environment.

How management accountants contribute to manufacturing success

A significant proportion of product costs (many commentators suggest 80%) are determined at the design stage. Therefore manufacturers will benefit from the management accountant modelling costs for the prototypes under development; or revisiting costs when feedback from testing becomes available. The management accountant can also provide non-financial performance measures for research and product development, measuring inputs such as staff time from various experts; processes such as time-to-market estimates and feedback from testing prototypes; and output measures. Management accounting information is a useful 'language' to enable better collaboration between engineers, designers, marketers and other parties involved in product development, including suppliers. Managing suppliers is an important element of controlling production costs, and there are significant benefits to involving them and sharing data and specifications at an early stage of product development.

One specific contribution that the management accountant can make to reducing costs during the product design stage is target costing. Working backwards from the required profit margin, and the price for the product determined by the market, a target cost is set within which the product must be manufactured. This approach focuses the development team to concentrate only on those product attributes that the customer values. It is an especially important technique for highly competitive markets, when manufacturers must compete on price and margins are thin. The management accountant can also initiate cost leadership strategies, stripping out costs from administrative, operational or productive processes whilst effectively meeting customer needs.

Management accountants can help development teams monitor and control project budgets; and measure the creation of value from R&D activities. Measures could include expected sales or market share from new products as a proportion of R&D investment; and predicted profits from R&D as an activity. Although calculating such return on investment is a challenge, the management accountant is used to analysing forward looking, uncertain and non-financial information. The management accountant can also advise on the entire R&D portfolio, to help plan capital requirements or to help management allocate resources to ensure that those projects with the best return on investment are prioritised.

For many products, even in competitive markets, cost is not the most important dimension. Time to market is a particularly important factor for fast moving industries, or those where the majority of sales occur in the Christmas season (for example, computer peripherals). Faster product development can lead to improved returns because of a temporary ability to charge premium prices before competitors enter the market; and the possibility of consolidating an early dominance of the market into a permanent market leader niche. The management accountant can contribute to faster product development by generating cost information which supports rapid decision making, not just about products but about improving the capacity of development or production processes. They can support effective project management by ensuring that projects are properly costed, that ROI assumptions are fair, and that appropriate key performance measures are established to ensure the project remains on track. They can also provide input on pricing strategies to maximise revenues based on competitive conditions; stock control; and information of changing demographics and consumer trends.

The management accountant can break down profit and cost data to identify the contribution of each profit centre, taking account of variable and controllable costs. This can inform strategies such as modularisation or standardisation, in which management seek to reduce the number of parts used by making as many components as possible common to more than one model or variant of the product. Customisation of the product for different markets happens as late as possible in the production process. Both these approaches simplify supply chains and therefore reduce costs and improve time to market.

Advanced manufacturing techniques (both production technologies such as robotics and management tools such as just-in-time) have led to a reducing proportion of costs being accounted for by direct materials and direct labour. Other parts of the value chain therefore become more important than the production line, for example, relationships with suppliers and customers. Globalisation has increased the importance of supply chain management, as risk and costs increase with complexity (see Toyota case above). Management accountants can help develop a strategy to manage suppliers so that they fit in with the company's own lean production methods and pursuit of value added.

Management accountants can help companies analyse their value chain in order to understand better where the most value is created; and where costs arise. Using techniques such as whole of life costing, this analysis can extend beyond point of sale to the customer.

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