
Global restructuring and the auto industry

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It is a time of economic restructuring in the world's car industry and the implication for individual nations and regions is profound. In the rapidly expanding markets of Brazil, India and China, there is expansion of capacity with new plants being opened as local markets grow on the back of rising domestic incomes. The pattern in the traditional markets of the West is the reverse, with significant contraction and even plant closures by the traditional volume producers.

Data provided by the International Organization of Motor Vehicle Manufacturers (OICA)¹ shows that total world auto production increased by some 16% over the period 1997–2009 to 61.7 million vehicles. Vehicle production in the USA, Japan and Europe represented 77% of global production in 1997 but this had declined to around 50% by 2009 whilst production in China had risen from 3% of the total in 1997 to over 22% in 2009. Other evidence provided by OICA indicates that the global turnover of the world auto industry was close to 2 trillion euros in 2005 and that worldwide over 50 million people were in employment either directly or indirectly as a result of the auto industry (OICA, 2010).

Climate change and the need to reduce carbon emissions is having an impact, leading to the demise

of the 'gas guzzlers' which have been such an entrenched feature of the US domestic market, but also creating a whole new breed of cars based on alternative energy sources and leading-edge R&D.

The worst economic impacts of the Credit Crunch may now be over but there is little doubt that the effects on the big car producers in the west have been transformative as reflected in the mergers and restructuring that has taken place. It is also significant that some of the most famous and established top-of-the-range brands in the industry like Jaguar are now owned by companies based in emerging markets.

This editorial begins with a brief review of the changes that are now underway in the auto industry and the nature of their regional impacts. It then moves to outline what leading researchers writing in this Special Edition see as the likely shape of things to come and the possible impacts on people and places around the globe.

A time of change

Looking back over the 20th century, we may regard the auto industry as a metaphor for capitalist development. The 20th century was dominated by the development and roll-out globally of mass production and consumption (described as the 'first

revolution' in auto production; Womack et al., 1990), with large factories and Taylorist regulation of assembly-line speeds and techniques. That whole era—covering the first 80 years of the century, at least—was often referred to as the era of 'Fordism', after Henry Ford's first production-line factory (Womack et al., 1990).

Many of the major developments in the economy took place in the auto industry. Ford's factory used assembly-line technology to an unprecedented degree, and his \$5 per day wage introduced/acknowledged the idea of a high wage, high-productivity economy making sense at the micro level as high productivity could deliver low unit costs despite (or rather via)—relatively—high wages. Relatively high wages—for large workforces within these factories and therefore communities—also played a macroeconomic role in sustaining the growing consumer demand which underpinned the mass consumption which formed a part of the Fordist 'regulation' of the economy, as discussed explicitly by Aglietta (1979) and others of the French regulation school.

In the UK, the industrial sociologist Benyon captured the social aspects of this era in his *Working for Ford*. Again in the UK, the historic strike for equal pay for women was at Ford's Dagenham plant in the 1960s (at one time the largest factory in Europe, along with the nearby largest housing estate in Europe).

However, the auto industry has undergone significant change since the introduction of assembly-line production and the so-called 'Golden Age' of capitalism. Over the past 40 or so years, shifts have affected the industry's value chain, from manufacturers and suppliers through to service providers and dealers.

A shift from Fordism to post-Fordism?

In the industrialized economies, there was much talk from the late 1980s onwards of capitalism having moved beyond 'Fordism' to an era of flexible specialization, niche production and services, often depicted as 'post-Fordism'. Again, analogies from the production methods from the car industry were used to depict the organization of the whole econ-

omy and indeed society: post-Fordism was also presented as a move from mass consumption to niche markets and more individualistic lifestyle choices.

Much of this 'post-Fordist' literature was rather superficial, not least in its parochial view that developments in the industrialized economies typified a global development, whereas if anything the opposite was the case—to the extent that the large factories in Western Europe and North America were giving way to smaller scale facilities and service provision, this was mirrored by the rise of mass production in the less developed countries (Costello et al., 1989). This was not just global outsourcing but also represented the industrialization of these countries. Thus, post-Fordism in Western Europe was sometimes depicted as signifying the end of the massed proletarian ranks that Marx had envisaged would overthrow capitalism—the 'forward march of Labour halted'. However, there are more such factory-based proletarians today in South Korea alone than there were in the whole world when Marx was writing, so reports of the death of Marx's concept in this regard are somewhat exaggerated.

In terms of production technologies, post-Fordism refers to the sort of lean production, just in time processes applied in Japanese industry—and in particular, Toyota: again, it was indeed an auto company that appeared to exemplify this socio-historical-geographic shift, or 'second revolution' (Womack et al., 1990). Since the mid-1990s, a so-called 'third revolution' has centred on improvements in flexibility, with implications for product creation, design, manufacturing and life cycle.

Globalization: but a particularly regional form—so far

Meanwhile, reductions in trade barriers have led to waves of investment in emerging markets. Thus, one key change since Ford's first plant has been the continued globalization of economic processes, as signified firstly by the appearance of Ford production plants across the world and more recently by the emergence of independent auto companies

across the world, including now from the BRICs (Brazil, Russia, India and China). Hence the UK's Jaguar Land Rover is now owned by the Indian manufacturing firm Tata, while Sweden's Volvo at the time of writing [August 2010] is being sold to the Chinese company Geely.

However, one needs to be cautious about some of the generalized claims made regarding 'globalization' (see Sutcliffe and Glyn, 2003). Firstly, globalization was well established prior to Henry Ford's original assembly-line-based factory—indeed, how else would such a factory have come to be established in North America, had it not been for the large-scale movement of people globally prior to that date? The pre-World War I era also witnessed high degrees of 'globalization' as measured by global movements of capital and trade, prior to a retreat from globalization during the great depression of the 1930s.

The 10-fold expansion of production in China over the last decade and the rapid growth seen in Brazil and India has so far been associated with domestic consumption, from both domestic manufacturers and foreign firms operating there. Chinese industrial policy is meanwhile encouraging the rapid consolidation of China's auto producers. Chinese firms are developing capacity to undertake more complex assembly functions and research and development, including in electric cars. Whilst China is not as yet perceived by US and European producers as an import threat, it may well do so in the not-too-distant future. Similarly, small car exports from India by manufacturers such as Tata to Europe are just beginning.

Recent experience in Brazil is highlighted by Cruz and Rolim (2010) in this issue. A combination of factors has provided an attractive opportunity to foreign investment by major auto manufacturers. Rollim and Cruz look at the impact of this on one region (Curitiba) that has seen rapid growth. The authors note that key factors that played an important role in attracting auto investments outside of old core regions (such as fiscal incentives, low labour costs) have been largely exhausted; further expansion in such regions will depend on developing competitive advantages based on agglomeration economies, labour skills and general expansion of the economy.

Overall, what can be seen in the industry so far is not so much *globalization*, as really *regionalization* within a global pattern, whereby the original equipment manufacturers (OEMs) assemble and design vehicles locally, close to the customer (witness major OEMs setting up design studios in China and India for example). A key question then centres on whether the emergence of China and India as major producers and exporters will challenge this pattern, given the possibility of low labour costs and economies of scale overcoming transportation costs to major markets. Whilst the OEMs currently prefer to locate near the final market, they have shifted assembly operations towards low-cost locations within major trade blocs—towards central and Eastern Europe for example, within the EU.

Similarly, in the USA, there has been a shift southwards and to Mexico, with auto production now located primarily in an 'auto-valley', as Klier and Rubenstein (2010) detail in their paper looking at the changing geography of US production. This was driven by the restructuring of the 'Big Three' producers and the setting up of transplant plants by foreign firms. The end result has been a division of auto-valley into two subareas—a northern area dominated by the Big Three and a southern area dominated by foreign-owned carmakers.

As a result, the 'old' mature auto-manufacturing regions have been through a painful adjustment; recent plant closures in the UK (such as Jaguar and Peugeot-Citroen) will be followed by others across Western Europe, notably in connection with the downsizing of GM but also possibly at Fiat. In the US industry, as noted, the adjustment is even more marked, and the Big Three are undertaking dramatic downsizing, in part linked to US government support (in effect, nationalization) during and after Chapter 11 insolvency for GM and Chrysler.

Changes in the global value chain

Other trends in the industry add to the challenges for suppliers as well as OEMs. The industry is seen by many as a producer-driven value chain where the big OEMs play a central role in coordinating the production network (Dicken, 2003). Under the

'lean manufacturing' model manufacturers demand quality, cost and delivery performance and prefer to deal with fewer suppliers so as to reduce costs in overseeing the value chain. The net effect is to pass some of these roles on to first-tier suppliers who act as 'systems integrators' and are forced to become 'world class', leading to a wave of consolidation in the value chain. Those first-tier suppliers that survive in turn wield greater power over lower tier suppliers.

As a result of such trends, first-tier suppliers have taken on greater R&D roles and, increasingly responsibility through 'modularization' for the supply of complete modules (for example doors or 'front ends'), whole subsystems (for example steering), or even specialist assembly work. A supposed 'post-Japanization' era characterized as 'at supplier cost' emerged in the 1990s, with innovative capability required throughout the value chain (Wells and Rawlinson, 1994).

Modularization outsourcing by OEMs has led to major suppliers setting up in close geographic proximity to the OEMs' plants. Yet more international component sourcing by these suppliers enables low-cost component imports to penetrate mature producing regions, as first-tier suppliers may have little incentive to source components locally for the modules they actually prepare for the OEMs. This in turn adds to the pressure on suppliers in mature markets. As Klier and Rubenstein stress in this issue, over 25% of all parts attached to new vehicles assembled in the USA are now imported. Whilst Mexico and Canada account for half of the total, followed by Japan, China is emerging: during the first decade of this century, China's share of imported new vehicle parts in the USA increased from 2 to 10%.

The precise configuration of particular supply networks is influenced by the strategies of auto assemblers in different markets, as well as the socio-political, cultural and institutional environment in which they operate (Coe et al., 2004). These differences induce varying degrees of 'embeddedness' of the car assemblers in regions, with differing impacts on development and hence firms' positions within global production networks

(GPNs) and global value chains (GVCs). Such issues are explored in this issue by Pavlínek and Ženka (2010) in the case of auto suppliers in the Czech Republic (Czechia). They explore whether Czech regions hosting firms positioned at the bottom of the value chain were more threatened than those hosting better-positioned firms during the crisis.

Despite heavy job losses in the Czech auto industry during the downturn, they find that most auto firms shed workers because of downsizing rather than closures, suggesting relatively strong local embeddedness. They also challenge the assertion of a simple dichotomy in the central European auto supplier industry, in which foreign suppliers exclusively occupy high value-added positions and domestic firms low value-added positions. This raises questions as to whether such locations are moving 'up the ladder' in terms of shifting their peripheral status to intermediate level, and/or whether the growth of assembly and supply in other peripheral locations (for example south-eastern Europe) endangers this position in central Europe in the context of labour shortages, rising wages and currency factors (Domański and Lung, 2009).

The challenge of cost recovery

Related to the above has been the pressure of cost recovery that, along with intense competition, has led automakers to search for economies of scale and outsource 'non-core' activities. Secondly, increasing regulatory pressures combined with consumer demands continue to lead to new technological developments in terms of greater efficiency, the development of hybrid/electric vehicles and new fuel sources (Deloitte, 2009). This is despite the industry being dominated by large firms, with incremental and process-oriented innovation. Thirdly, increased market pressures have led manufacturers to seek new segments, with the consequent fragmentation of markets, with auto manufacturers offering a higher number of body style variations underpinned by standardized 'under-skin' platforms.

One outcome of these drivers of change has been the increasing cost of genuinely new model

development, in contrast with what was expected under the ‘life cycle’ model of industry development. Rather, the ‘crisis of cost recovery’ facing automakers has intensified over time. In today’s prices, the cost of bringing a genuinely new model can be of the order of \$1 billion (Bailey et al., 2008). As a result, large-scale production over different models and brands using a platform sharing approach is seen as vital to generate the cash for future model development and is set to be pushed further by the big players.

The net effect has been a step change in the underlying economics of the automotive industry; in earlier times economies of scale were linked to individual models, and production of some 250,000 units per year could be enough for that model to break even for a producer. Today, however, economies of scale in the industry are rather linked to the underlying platforms and shared modules and components. This creates opportunities for firms to find ways to spread costs across models but also brings dangers in terms of confused ‘brand’ signals and risks to a whole range of models if a key component fails. This trend has also created a ‘two-space’ market, with one set of manufacturers ‘leveraging’ their brand portfolio and achieving economies of scale by platform-sharing platforms and another set occupying the low-volume premium end of the market (Holweg et al., 2009).

Firms ‘stuck in the middle’ (Saab could be seen as one such firm today, and also as experience of the now defunct MG Rover testifies) find it increasingly difficult to generate the cash for new model development and hence to survive. Whether and how a possible shift to more specialized ‘short-run’ production will impact on development costs, economies of scale and the nature of players involved in the industry, remains an open question. The MG Rover case highlights issues of cash flow and hence the increasing role of private equity in the industry. The ‘Private Equity Business Model’ (PEBM) in the MG Rover case is explored by Bailey et al. (2010) in this issue. They argue that the emergence of the PEBM changes the basis of competitive rules in organizations in the industry and the running of previously going concerns, thereby necessitating a need for further regulation.

Excess capacity and a flawed business model?

A further outcome of such trends has been the build-up of excess assembly capacity worldwide, with 25% under-utilization in Western Europe, for example (even before the current financial crisis unfolded). This overcapacity of the auto industry is related to a deep-seated inability to match supply and demand in terms of actually linking production to orders from consumers. Whilst some manufacturers have belatedly begun ‘build-to-order’ programmes, the business model of many automakers seems obsolete to some observers (Holweg et al., 2009; Maxton and Wormald, 2005).

The sustainability of ‘business as usual’ is picked up by Wells in this issue, in the context of the development of the Tata Nano. He argues that the auto industry in Europe focused on achieving cost reduction (lean production) and developing new technologies for environmental and safety performance. With India, Russia and others becoming exporting nations, he argues that it is not clear that the European automotive industry can survive with this strategy, unless linked to continued non-price competition (going up-market) or more stringent environmental regulation. He argues that despite the industry’s long-held emphasis on cost reduction, without the sort of strategic realignment achieved by Tata with its Nano, “it is now clear that the industry has reached some fundamental limits within the existing business model and design philosophy”. In this sense, the European industry has been locked into a particular trajectory, and the Nano should motivate policy to identify viable alternative business models for the automotive industry.

Before and after the financial crisis

The challenges facing the auto industry were vividly exposed by the 2007–2009 global financial crisis, which led to a severe drop in auto output in many countries, to high-profile bankruptcies and takeovers, and to a raft of temporary policy interventions across states to support the industry, such as through demand stimulus measures—with a later fall off in demand when such support ended.

In this sense, the financial crisis can be seen as laying bare a range of pre-existing vulnerabilities in the auto industry. Indeed, even before the global financial crisis unfolded, the Big Three North American OEMs ran up total net losses of over \$100 billion between 2005 and 2008, exhausting their equity base and questioning their viability, as Stanford (2010) details in this issue. In addition, the Big Three's efforts at generating profits before the crisis through 'financialization' strategies—in effect 'auto banks' financing sales, leasing and derivatives operations (Freysenet and Jetin, 2009)—exposed them to an additional set of risks when faced with a 'double whammy' of shocks on both the financial and industrial side.

The impact of the support offered by governments at national and regional levels has yet to play out. The US rescue effort was, Stanford argues in this issue, uniquely tied to an attack on the compensation and conditions of autoworkers and to a challenge to the legitimacy and power of automotive trade unions. Whether the 'bail out' of GM and Chrysler by the US government has really 'solved' the underlying weaknesses of these firms remains to be seen, he suggests.

The shape of things to come

The discussion in previous sections has outlined how the industry has undergone significant (and severe in many cases) change. Along with changes in production techniques/technology and the continued globalization of the economy, there has been the impact of the global financial crisis and continued excess capacity in the sector. However, the other great development of the current epoch is climate change and here the auto industry takes centre stage. In this section, we outline how future developments concerning the viability of the sector will indeed be intrinsically linked to its ability to 'go green' and a consequent shift to new consumption patterns.

Greening the industry: can the auto industry save the planet?

The motor car has been and remains a major contributor to the release of CO₂ into the atmosphere.

The continued production of gas-guzzling sports utility vehicles in the USA up to the 2009 global recession, for example, was little short of immoral. A vital question is whether the election of a President, in Barack Obama, with a more responsible approach to the environment than his predecessor, George W. Bush, will result in a more ecologically sustainable transport system and auto industry in the USA—with increased reliance on public transport and less polluting makes of car.

Indeed, any analysis of trends in the auto industry needs to stress that the industry faces a major—but long-run—transition to new fuels, driven by both the need to shift to low-carbon systems so as reduce greenhouse gas emissions and likelihood of high energy prices linked to supply constraints (peak oil) and growing demand from emerging economies. Mikler (2010) in this issue notes the possibility for radical/disruptive change in terms of environmental emissions in the industry. However, he provides substantial empirical support to suggest that change will continue to come incrementally: within distinct national/regional institutional contexts that are not easily altered and within the path dependence of existing production profiles and market conditions.

These supply-side path dependencies are amplified by potential demand side and behavioural 'lock-ins' (see Whitmarsh and Köhler 2010 in this issue). Any new technology such as electric vehicles will have to compete on a number of dimensions (availability, cost, safety, usability, reliability) with internal combustion engine and hybrid technologies. Add-in issues around consumer perceptions such as on range and reliability, plus typically high costs of new technology as manufacturers struggle to move down their learning curves, and take up of low-carbon technologies may be slow to develop unless a range of measures are used to speed it up—for example tax breaks—suggesting the need for a greening of policy itself.

The need for sophistication in policy mixes is highlighted by Whitmarsh and Kohler in this issue, in addressing supply and demand side barriers to behaviour change in relation to environmental innovation. In so doing, they emphasize the psychological,

cultural and infrastructural dimensions of consumer demand, which can limit the effectiveness of low-carbon transport measures, while highlighting the impact of current global and sector-specific economic conditions as critical drivers of change within the automotive sector.

A knock-on effect of the need to green the industry is that the pressures of cost recovery are intensifying as OEMs invest in new technologies. This has led to a wave of joint ventures and alliances (for example Renault–Nissan–Daimler) as firms look to share costs and expertise. Longer term, further mergers and acquisitions are likely. Some commentators even suggest that by 2020, as few as 6- to 10-volume OEM groups based in six major markets (Western Europe, Japan, Korea, the USA, China and India) will account for 90% of global automotive sales (for example Deloitte, 2009). At the same time, existing firms may have to look to others, in what may be a shift to more ‘open innovation’ models in the industry (MacNeill and Bailey, 2010). Despite such possibilities, there are the limits to ‘openness’; conventional production modes will persist for some years to come—because of scale, resources and the fact that OEMs still control in a top-down manner GPNs and GVCs.

There were great hopes during the global responses to the 2007–2008 credit crunch that the threat of recession would lead to the launch of a ‘Green New Deal’—an environmentally sustainable version of Roosevelt’s New Deal of the 1930s, this time with an emphasis on developing new green technologies, as well as undertaking public works that would reduce CO₂ emissions. At the time of writing (August 2010), the success of government Keynesian policies in 2008 in limiting the scale and length of the global downturn appears to be laying the basis for a return during 2010 and beyond of business as usual, so hopes that a new era of sustainable production would be developed appear likely to be dashed.

Another question is how the growing demand for cars amongst the rest of the world’s population—most obviously within China and India—will be met; again, the question is what role public transport might play as against private cars, and how

polluting (or otherwise) the cars produced will be. Other important issues are how much commuting will be undertaken and to what extent urban development will take more sustainable forms, thus reducing the amount of CO₂-producing commuting that is undertaken.

New consumption patterns?

Hence, alongside the importance of demand side issues such as consumer perceptions and willingness to pay in greening the industry, other key challenges arise on the demand side going forward. These include, but are not limited to questions such as:

- i. Will recent trends in major markets towards more conscious value-orientated consumption continue? A recent combination of recession, high oil prices and the effect of ‘cash for clunkers’ schemes saw a shift towards more value-orientated and less conspicuous consumption, but as Whitmarsh and Köhler note in this issue, it will be interesting to see whether habits formed now continue in the future.
- ii. How will demand from emerging markets affect the industry? On the one hand, new wealth in emerging markets is seeing a growth of premium brands in such markets. Premium producers have already set-up operations in India and China or are planning to do so. At the same time, rising living standards in emerging economies will see an explosion in first-time purchases of new basic cars like the Tata Nano, as discussed in this issue by Wells (2010).
- iii. In addition, there are challenges over whether and how producers and dealers capitalize on the desire of consumers to ‘stay connected’ in terms of being networked, how consumers shop for and design the cars they buy, and how demographics and increased urban living will impact on demand. On the latter, with more people living in urban spaces, trends like car sharing may develop, as a quasi-public transport mode, making manufacturers think about what they offer consumers in terms of mobility services rather than car ownership per se.

Conclusion

The auto industry will continue to play a role in the various developments discussed above. But if ecologically sustainable transport systems are to be developed, it is going to require massive infrastructure investment. And if aspects, at least, of the new auto production are to remain in Western Europe and North America—even if only at the higher value added end—this is going to require investment in R&D, including in the green technologies of the future. There is, therefore, all to play for, nationally and internationally. The auto industry is going to remain important, for local, regional and national economies, as well as for the future of the planet. It will, no doubt, remain an important topic in the academic literature.

Endnotes

¹ See <http://www.oica.net/category/production-statistics/>.

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