

Research Project: Towards Sustainable Automobility – Micro-Factory Retailing.

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Background: The sustainability impacts of the automotive industry are partly a function of the specific technologies within vehicles and their relative performance in fuel efficiency and emissions generation. They are also partly determined by how a vehicle is manufactured, and the nature of the systems of production and distribution that deliver personal mobility. The two are also related in that different types of vehicle technology may require, or may allow, the development of different types of production and distribution system to be commercially viable. BRASS has done considerable work on alternative production and consumption systems for passenger cars with the concept of Micro-Factory Retailing (MFR) representing the largest and most longstanding element.

Aims & objectives: This project was based around a simple question – “*What would a sustainable automotive industry look like if it were designed from a fresh start today?*” The research project that emerged sought to:

- Develop an alternative model of vehicle production and consumption that was economically viable, socially relevant and environmentally optimised.
- Understand the opportunities for, and constraints to, the development of such an approach in the context of an existing automotive industry organised along very different lines, and in a culture of automobility that might find it difficult to accept environmentally optimised vehicles.

About the research:

The core element of this project concerned the potential application of MFR in which the traditional large-scale, centralised and capital intensive vehicle manufacturing sites and their associated long logistic lines to distribute cars to dispersed franchised dealers are replaced by a network of combined factory-retail outlets that also serve as the main point of contact for aftersales, service, maintenance, repair and even end-of-life vehicle recycling. Each MFR unit would be able to produce around 5,000 units per annum compared with a typical car manufacturing operation making 250,000 to 350,000 per annum. Usually, low volumes mean high per unit costs in the automotive industry. However, the MFR approach recovers some of this extra cost by not having an expensive distribution system (typically accounting for 35-40% of the price of a car in the traditional system), by having much lower capital costs in production and model design, and by securing a much higher proportion of the lifetime earnings stream from a car. Meanwhile, consumers actually pay a lower lifetime cost on a per-mile basis compared with the traditional system of buying a car outright as new.

When the work began there was no fully-formed MFR taking place within the industry, but the researchers sought to learn from the operational practices and business models of existing small-scale car manufacturers to create a comprehensive new business model for vehicle manufacturers that would have the effect of redesigning the structure and value-creation practices of the entire automotive industry. In this respect, the MFR project therefore originated as a purely idealised or hypothetical idea, a way of breaking the institutional impasse and organisational conventions that apparently made it impossible for the mainstream industry to achieve a transition to sustainability within any meaningful timeframe. The main approach to the research process was through interviewing key players within automotive industry supply chains and small-scale producers, but also interacting with some of them over a longer period using the Engaged Scholarship model.

Results and outputs:

The research demonstrated the potential viability of the MFR model to build environmentally optimised vehicles, and the range of benefits that adopting it could bring. These included social benefits linked to more community-based enterprises and the ability to improve the spread of wealth; to improve the resilience of local economies by reducing the threat of low-wage competition and the damage caused by car plant closures; to link to other more localised initiatives such as zero emissions city centre; and to allow other types of business (e.g. social enterprises) to compete realistically in the automotive sector. It could also allow consumers to ‘buy local’, thereby increasing the circulation of wealth within the local economy, and reinforcing the co-identity of interests between MFR facilities and consumers. Economically MFR is a potentially advantageous strategy for producers because the low capital investment reduces fixed costs, increases flexibility and helps to avoid over-production and the erosion of margins; by adding several, potentially higher margin service elements: retail, lease management, and aftermarket servicing and building closer relationships with the customer.

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Impacts achieved/potential for impact:

This theoretical approach to restructuring the car industry began as a very “alternative” concept, but has since been reported on and praised in leading business journals such as *The Economist* and *The Wall Street Journal*. The underlying methodology has been used in several international workshops and presentations and in individual corporate cases to inform the creation of innovative strategies for sustainable business. Other parties have begun to promote and work with the concept including ATKearney (leading automotive industry consultants), Martin Leach (ex-CEO, Ford of Europe) and Cranfield University. It has also been a key into the OSCar Automotive concepts (including the DTI-funded LIFEcar which involves Morgan sports cars, Cranfield, and Oxford University), and is used as a key example within the development of the ‘organic capitalism’ concept at INSEAD. The MFR concepts for car production pioneered by BRASS Researchers are now being taken into practical production by several firms (Gordon Murray Design, Axon Automotive and RiverSimple), demonstrating that BRASS research has shaped both thinking and practice relating to the automotive industry and sustainability.