

The evolution of today's brewery supply chain

Some design considerations and what the future may hold

The evolution of the drinks industry supply chain has been rapid over the last 20 years. Changes have primarily been driven by customer and consumer needs together with the obvious pressure to drive out costs. Whilst the practices within warehousing and transport have changed, in many ways the considerations in designing a fit for purpose supply chain have remained the same.



When I joined the brewing industry in 1980 it was essentially a very straightforward model for delivery to end customer that had not changed much for the previous fifty years. Horses had been replaced by lorries, but the core model remained a warehouse tacked onto the side of the brewery, or close by, delivering to public houses within the local area. In many respects this model can still hold true for small brewers with local delivery areas servicing the on trade only.

In the subsequent thirty years the changes have been increasingly rapid, with limited sign of a slowdown in the pace of change. These changes are mirrored within the logistics industry generally, as increasingly sophisticated supply chain thinking and systems have become widespread. The changes have been driven by a variety of factors that are outlined below including:

- Consumer trends
- Customer pressure
- Industry consolidation and re-structuring
- The growth of third-party logistics providers
- Technological developments

Consumer trends

Probably every article that reviews the brewing industry makes reference to the move from on trade consumption to off trade. Off-trade sales by volume will shortly overtake on-trade. For anybody wishing to supply the major retailers, this means a national as opposed to a local supply chain becomes a necessity. Many of the regional brewers have listings with the major supermarkets and as a result face the challenge of delivering economically into a nationwide network of regional distribution centres (RDCs).

It is not just the move from pub to home consumption that poses challenges for the supply chain – in addition, consumers trends are resulting in brand and package proliferation owing to the increasing interest in world beers, different pack formats for different occasions etc.

As an example of the growth of world beers, Tesco sales of Tyskie, Lech and Zywiec from Poland are reported to have grown by 250% in six months last year(1). If you wish to purchase Stella Artois you will have a choice of well over 30 package formats. The growth of world beers expands national supply chains into international ones, resulting in attendant extended lead times for supply and potential forecasting issues in growing/ shrinking market sectors. Other consumer trends leading to increasing supply chain complexity include 'premiumisation', as customers trade up to premium products, standard products continue to be supplied leading to an increase in stock keeping units (SKUs).

Customer pressure

Arguably the biggest changes in supply chain practices have been driven by the some of the largest customers of the brewers. The major supermarket groups have been at the forefront of supply chain developments and have sought to leverage both their technical expertise and their buying power to drive changes in warehousing, transport and systems for the brewing companies.



Voice directed picking in progress

The most significant changes include:

- The separate identification of production from logistics costs, often leading to factory gate collections by the customer
- Shorter lead times – these have been compressed from a standard 48 hour order cycle to, for some customers, same day delivery
- Supermarkets have reduced stock within their own supply chains (2), leading to a requirement for greater responsiveness upon the part of suppliers to unexpected demand – the sun does occasionally shine! If the brewers are to maintain supply without increasing inventory within their own warehouses, a combination of agile manufacturing and collaborative forecasting has to exist
- Increasing expectation of service. The brewers are not just benchmarked against each other by the supermarket groups, but also against all leading FMCG suppliers.
- Electronic order capture via EDI
- Requirements for bar code formatted pallet labels
- Electronic transfer of orders and confirmation of order details in advance of shipping

Customer driven changes have been just as evident in the on trade, with many of the pub companies taking control of their own supply chain as opposed to leaving it to the brewer.

Industry consolidation and restructuring

These two trends have happened amongst the brewers and their customers, both have had consequences for supply chain practice. The mergers of the brewers to form global business such as Heineken and A-B InBev have led to brewery and distribution site closures, facilitated the spreading of best practice, given the opportunity to leverage their scale and to take an international view of sourcing product if this is cost effective, or required from a marketing perspective.

The change, at least for the large brewers from a vertically integrated business to a supplier-customer relationship with the pub companies was driven by a succession of regulatory reviews of the industry. This has had a number of impacts upon supply chain practice within the industry.

Initially the newly-formed pub companies were happy to leave their supply chain in the hands of the (usually one) brewer, but this has changed over the last ten years or so as the major pub companies became more interested in managing their own supply chains. Two other factors have played a part:

1. The uncertainty generated by both beer and logistics supply contracts of limited duration, led the brewers to review whether they should continue to directly manage a large logistics cost base in a fluid market

2. The growth of the third-party logistics providers (3PLs) in the sector, described below enabled both brewers and suppliers to find an alternative route to market with an element of cost risk removed.

This industry trend really took off in the 1980s, the first significant move being the formation of Tradeteam (now DHL Tradeteam) as a joint venture between Bass and Exel Logistics in 1995.

Other agreements followed including InBev outsourcing its secondary logistics to Tradeteam in 2002 and the formation of KN Drinks Logistics as another joint venture between Kuehne and Nagel and Scottish & Newcastle in 2006, building on a longer established relationship between the two businesses.

As described above the decisions to outsource were driven by a number of factors including a desire to reduce future risk caused by market uncertainty, as well as promises of cost reductions resulting from introducing a shared user environment.

Technological developments

The impact of Moore's law holding that computing power doubles approximately every two years has had a significant impact upon the industry. The development of sophisticated tools for the management of supply chains has been significant; ranging from the development of strategic and tactical design tools for networks and warehouse layouts, to warehouse management systems (WMS) combined with enterprise resource planning (ERP) systems such as SAP and Oracle, vehicle telematics; the list is extremely long!

Alongside the development of IT, the developments in mechanical handling equipment from basic fork lift truck technology to fully automated 'lights out' warehouses has been a feature. The costs of introducing these new technologies as well as the need for technical expertise to manage them has been a further influencing factor in the trend to outsourcing.

What does good look like?

In trying to answer the question of what an effective and economic operation should look like, the only possible answer is: 'It depends'. So what are the contingencies that should be considered? In trying to answer this question I have selected a few imaginary scenarios in order to illustrate the factors that should be considered these are:

- a) A small cask producer with a defined local area
- b) A small producer with ambitions to trade more widely, possibly producing some small pack beer for national distribution
- c) A large brewer with logistics outsourced from the end of the production line

d) A medium or large brewer managing and running its own supply chain across the UK and possibly beyond.

a) The small local brewer

Nothing revolutionary to think about here, if you have ‘a man with a van’ you have probably got it right! Simple technological aids such as route-planner and satellite navigation are about the extent of your considerations. The possibility exists to share transport costs by partnering a fellow local brewer and sharing costs, or even setting up a small co-operative. Co-operative upstream and downstream processes such as sharing selling and invoicing arrangements should also be considered.

b) A small brewer, with a large distribution area, and or off trade customers

The model above would still hold in this scenario, for local deliveries.

The primary consideration when moving from a locally based distribution area, to a wider geographical territory is essentially a marketing one, based around deciding what products and markets are to be targeted. For the purposes of this article I will not look at how difficult it is to trade via the various routes to market described, but assume that a listing can be achieved.

For on-trade sales the most frequently used route to market is via the wholesaler network using either companies with significant national coverage such as Beer Seller, or a wholesaler with more local coverage who is a member of a network. Considerations for cask supply include how to get product to the wholesaler site and managing returns of empty casks. For more distant sales it is possible to hire casks on a ‘per fill’ cost basis from the likes of Close Brewery Rentals so the repatriation of casks is not your problem. The simplest delivery solution is the wholesaler collecting from the brewery, and using its network to move product around the country. A similar route to market in the on trade involves supply agreements with either the major brewers or pub companies and using their networks to deliver to customer. A benefit of this supply mechanic is that the two ends of the purchase to pay cycle can be effectively outsourced – namely capturing and processing orders and collecting cash.

Supply into the off-trade is much less straightforward, starting with managing product ex-production line. When packaging is outsourced, the production run is potentially of such a size and frequency that significant quantity of product will have to be stored. Factors such as whether the brewery has storage space, the distance of the packager from the brewer and the packager from the distributor, will all play a part in deciding the most cost effective way of working.

Similarly to the on-trade model, the most straightforward way of trading is to sell into major national retailers such as the supermarkets. A straightforward model would

include a 3PL collecting product from packager and delivering into the customer RDC network in full pallets. For other channels the decisions become more complex. If targeting independent retailers, the options include delivered wholesalers such as Palmer and Harvey, and the cash and carry sector.

Finally, if the option to sell direct to consumers is desired, for example via internet sales, then a suitable means of supply such as an arrangement with a parcel-based business becomes an option, albeit expensive.

c) A larger brewer with logistics outsourced from the point of production

Once the decision is made to outsource, (or preferably prior to making the decision) an understanding of the type of relationship one requires with the supplier is needed. This is illustrated in Figure 1. If the decision is at the transactional level, with limited notion of partnership or alliance, the prime driver is likely to be price based; contracts may be of relatively short duration.

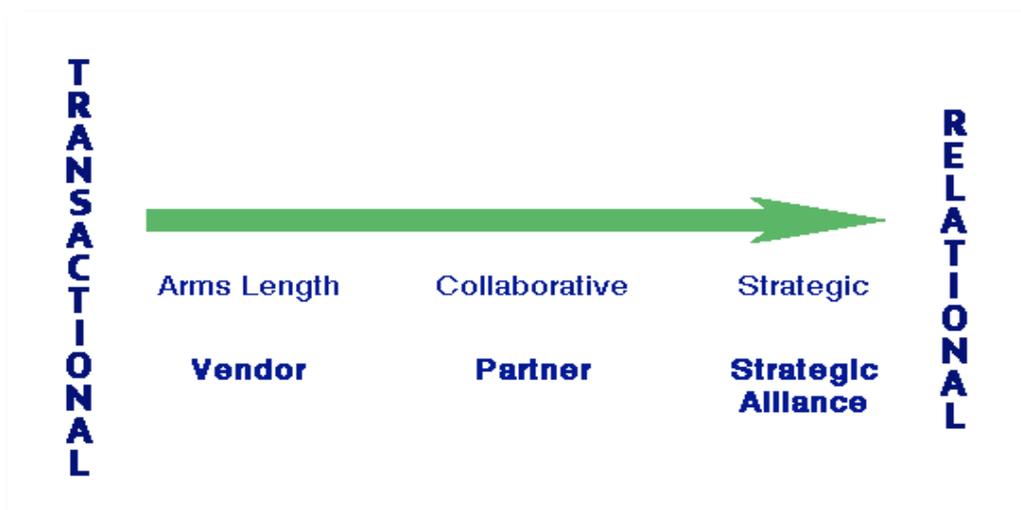


Figure 1: What sort of relationship do you want with your supplier?

As one moves towards the right of the diagram, the relationship whilst still cost focused may be set up with consideration of areas such as strategic fit. Contracts are likely to be longer in this scenario.

Other considerations when setting up a contract includes the payment mechanic e.g. charge per unit, or “cost plus” arrangements. The degree to which the contract will be managed and how is also relevant. Do you wish to manage the contract intensively yourself, trust the vendor or contract the management out – Fourth party logistics (4PL)? If you wish to be actively involved in a partnership many of the considerations listed later will be relevant.

d) A medium or large brewer managing and running its own supply chain across the UK and possibly beyond

If the decision is made to directly manage your own supply chain, or to retain a significant contract management infrastructure with a 3PL provider, what are the areas to review?

Firstly the upstream processes need to be fit for purpose (Sales and Operational Planning) these include forecasting, demand planning and supply planning. In addition order capture methods across a range of trade channels need to be efficient and customer-focused.

Turning to the more recognisable features of the supply chain, warehousing and distribution or the 'trucks and sheds' as they are often affectionately known as, areas for consideration include:

- Warehousing

For most brewers in this category, warehousing consists of a primary warehouse (one attached to or close to production site), and a secondary network for delivering to on and off trade customers. Alternative models are also used such as the setting up of National Distribution Centres, particularly for supplying the off-trade or slow moving products.

Software tools, such as CAST, are available to evaluate different network solutions. This is a vital exercise in arriving at the lowest cost solution, identifying the sites for warehouses etc. Having optimised the network the considerations for primary and secondary warehouse include:

Primary

The following analysis assumes product is despatched mainly in full pallets/handling units. If significant amounts of case picking are needed, then the considerations relevant to a secondary warehouse should be reviewed.

For large pack products it is unusual to see a solution other than block storage of product on pallets or layer pads. The storage density that can be achieved this way, low cost, ease of operation and flexibility mean that racking based solutions or warehouse automation do not provide a good enough return on capital or indeed much benefit. The largest fork lift trucks (FLT) can pick up several tonnes a lift, allowing some 48 × 50L containers to be loaded with a single lift. The most significant investment beyond the buildings and mechanical handling equipment (MHE) may be a warehouse management system (WMS), although the benefits within a large pack environment may not be enough to justify the investment.

For small pack products the situation in primary warehouses is more complex. Block stacking is generally only possible two or three pallets high and so the storage density is lower, this is exacerbated by SKU proliferation resulting in average aisle utilisation often in the region of 70% or less. The volume fill of the available cube can thus be very low. As for large pack, block storage has the advantage of flexibility, with layouts able to be changed relatively easily, and additional throughput handled by flexing the workforce and MHE levels.

The case for investing in a WMS is better for small pack operations as the intelligence designed into the system can result in manpower savings and improved accuracy. Technology used in support of a WMS system may include scanning bar codes to confirm movements and/or interfacing with a voice directed system. Voice directed picking can produce productivity savings of 20% or more and high levels of operator accuracy.

Two examples of investing in warehouse infrastructure are considered next namely options for racking and automation. Space does not permit a full examination of the myriad types of racking but the prime reason for installing racking in significant quantities in primary warehouse is the need to increase storage density. To enable this only very narrow aisle, push back or drive in racking gives a significant enough boost to capacity to be considered.

Automation can take a variety of forms from fully automated warehouse that look after product from the end of the line to vehicle loading; through to the use of automated guide vehicles (AGVs) to move product from one point to another. Carlsberg in Denmark has invested in the latter technology.

If the building height is sufficient storage up to 15m and beyond is possible, allowing by far the highest storage density of any available option and clearly very low labour costs. A fully automated warehouse has the disadvantage of high capital high cost, and more significant running costs than might be expected (maintenance costs can be very high), but offers a flexible solution to full pallet handling and allows expansion of capacity if space to expand is problematic.



High Density Warehouse Racking

The investment costs are high and flexibility can be low in that output capacity is to all intents fixed, which explains why many primary small pack warehouses are still block stacked.

Secondary

Various designs of supply chain can be seen in the UK and so there is no one size fits all model, which could be described as best practice. Modelling the supply chain to deliver the lowest cost solution is essential. Warehouses will vary for example, in whether they are fully stocked or supplied from an NDC or RDC with some products, either in bulk to pick locally, or with customer picked product that is simply cross docked.

The following section assumes a warehouse holding stock of several hundred SKUs. The same considerations apply to large pack storage in a secondary network as in primary. Kegs and casks are usually block stacked. For small pack product the requirement to case pick results in a common configuration being racking with a pick face at ground level containing say a pallet of product. Replenishment is most often from the reserve stock held above the pick face.

As for the overall supply chain, excellent modelling tools exist for evaluating various design options. CLASS for example allows both the layout to be redrawn quickly and also a simulation of people and equipment flows. Options such as changing racking types, operating times etc. can thus be reviewed without making expensive layout changes and finding that you have got it wrong!

The proportion of costs in a typical secondary warehouse is shown in Figure 2, with the three areas indicated accounting for circa 80–90% of costs. The high cost of labour means that cost--- saving initiatives have focused on increasing labour productivity. Areas that should be considered include WMS, voice and bar code scanning technology, multi---order picking, and double FLT attachments.

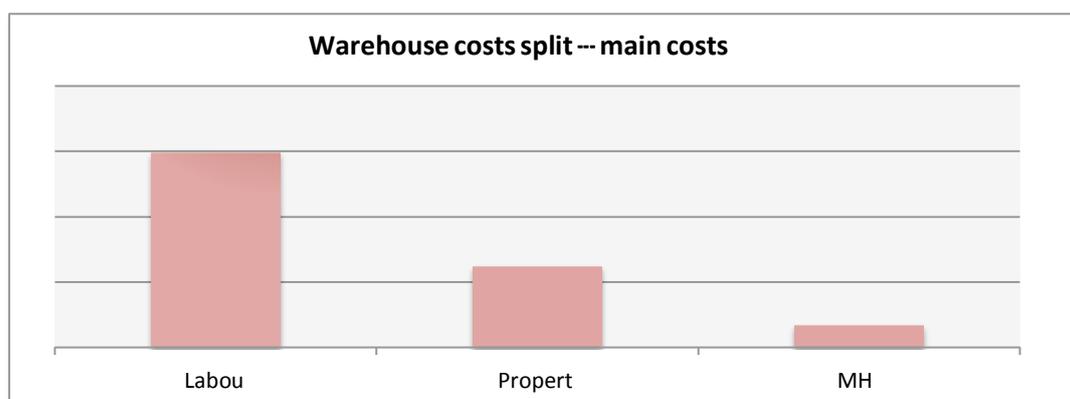


Figure 2

- Transport

Turning to transport operations and the split between primary and secondary transport operations

Primary

The major problem facing a brewery wishing to run its own primary fleet is the potential amount of empty running. When the industry was predominantly returnable packaging (large and small pack) the debate was largely about whether the fleet could be operated at a lower cost than a third party, including the margin the supplier would add. The growth of non-returnable packaging makes the economics of running 100% of movements in house largely uncompetitive. An option remains to have a mix of own fleet, 3PL partnership and customer back haul. The size of fleet retained will drive decisions such as whether vehicle maintenance can be done in house or contracted out. The cost drivers and investment possibilities for transport will be considered along with secondary distribution, as many of the options are common.

Secondary

The costs of managing a secondary distribution operation are dominated by the three areas shown in Figure 3. These areas account for >80 % of costs in most secondary transport operations.

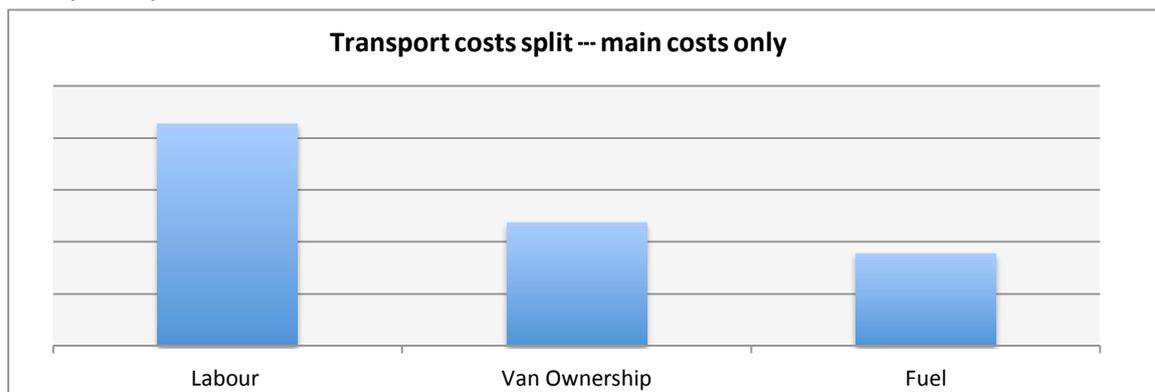


Figure 3

Labour and van productivity is supported by route and load planning packages such as Paragon, Optrak or DiPS. When used effectively, these deliver high vehicle fill, lowest mileage run and least hours worked. Where access to delivery points allows, increasing vehicle size can increase labour productivity and reduce fleet costs.

There have been limited changes to vehicle body design over the last 30 years; innovation in this area has been rare and often not sustained. Examples of innovation have included dropping the body to allow easier and safer manual handling and the

fitting of gull wing doors. Fuel efficiency has also been supported by design features such as wind deflectors (now pretty much standard) and aerodynamic trailer design.



Aerodynamic 'Teardrop' Trailer

The most significant advances have been in the management of fuel spending. Route and load planning described above has been supported by GPS based telematics either via vehicle based systems such as Isotrak or by hand held Personal Digital Assistant (PDA) technology used to manage a range of tasks such as proof of delivery. This technology allows confirmation that the route planned was actually followed by the driver.

Perhaps the biggest advance in managing fuel is the growth of engine telematics. These allow the monitoring of the key success factors in driver performance such as the degree of harsh acceleration, harsh braking, driving in the optimum RPM band etc. These systems can be purchased or leased with the vehicle or supplied by a third party. The purchase of sophisticated systems is no guarantee of success; it is the sustained skilled application of them that brings cost reduction and service enhancement.

What does the future hold?

As described, a range of factors has driven the changes in brewery logistics. Most of these pressures are likely to remain for the foreseeable future. If I had to look into a crystal ball I would predict the following:

1. The development of technology will continue apace, prices of both software and hardware will come down, and systems that are now only available to the largest players will become more widely used; examples include forecasting systems and WMS. The use of PDAs will become the norm, vehicle telematics likewise. One area where technology is reaching limits, driven by the laws of physics, is FLT design. The possibility of bigger, higher...etc is becoming constrained. Clever combinations of technology such as using an AGV to assist order picking, probably combined with voice recognition technology will become more common. Other technological changes that are likely to have an impact upon the industry in the future include RFID tagging, the price of which has fallen to that which makes it viable.
2. 3PL management of physical logistics (warehousing and transport) will continue and grow. Whether this built on the transactional or relational model described above will depend upon the strategic position a business adopts. Many brewing companies simply no longer see the day-to-day management of these supply chain tasks as part of their core activities.
3. Green issues will increase their impact upon logistics practice, lorry bans and emission controls for example already impact upon Transport operations. Pressure to reduce the environmental impact of brewery logistics will grow, with noise, whether from warehouse or delivery operations becoming unacceptable to neighbours, even those of long standing! Resource consumption, primarily oil, will be impacted by both projected increases in price and the need to reduce emissions driven by environmental legislation.

In summary then brewing logistics is likely to remain highly contingent upon the specific route to market chosen, this in turn will be driven by the types of product and markets in which a brewer wishes to operate.

Solutions chosen will range from extremely simple, to complicated and difficult to manage, depending upon what choices are made.

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call us now on +44 (0) 1543 466835
email enquiries@springtideprocurement.com
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