HMLV — What Is It?

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Welcome.

What follows is the first in a series of articles that will explore a particular sector of the manufacturing industry that, though a key driver of the global economy, flies under the radar in terms of its visibility and understanding. This lightly publicized sector is best known in its ecosystem by the acronym, HMLV. It stands for “High-Mix, Low-Volume” manufacturing. There is also its counterpoint, known as LMHV, which stands for “Low-Mix, High-Volume” manufacturing, which is more commonly known by such terms as mass production or high-volume production. This designation is, in point of fact, an artifact that likely traces back to Henry Ford’s first moving assembly line, possibly dating from 1913. The term “mass production” first appeared in print in a New York Times headline of unknown date.

In 1926, “mass production” first appeared in the Encyclopedia Britannica, marking the 100th anniversary of that specific attribution. Both appearances included acknowledgments of Ford and/or his company as examples of mass production.

High-Mix, Low Volume’s (HMLV) roots as a term are a bit murkier, but it seems to have been associated with the semiconductor and electronics manufacturing industry in the 1990s–2000s. At its core, then, HMLV was very likely coined to distinguish itself from the by-then century-old term “mass production.”

At the most practical level, HMLV is employed in manufacturing when a relatively large number of SKUs are sold as finished products rather than as subassemblies or replacement parts. Established numbers do not fully reflect the quantities of these specific SKUs produced; rather, on an individual basis, they generally represent a small percentage of the manufacturer’s total production. Additionally, it is quite common for an HMLV manufacturer to have very large numbers of active SKUs in its catalog that are sold as finished products. However, there is often some cyclicality or seasonality in the prevalence of SKUs in production at any given time during a year, or even across years. Quite often, the nature of incoming production purchase orders to HMLV manufacturers is stochastic with respect to the specific SKUs ordered. Variable elements can include the mix of customers ordering products, as well as the quantities and delivery requirements for individual purchase orders.

Ever since Henry Ford introduced the moving assembly line for automobiles, it has remained the ultimate and enduring example of mass production. Ironically, the very example of mass production, the automobile assembly plant, is also largely made possible by HMLV manufacturers. The individual parts that flow into assembly plants are themselves often the output of other mass-production facilities. However, without the HMLV sector to provide all the equipment and tools used in the assembly plant to assemble the finished automobiles, there would be no “mass” in mass production. Whether considering the highly specialized assembly systems, robots, or paint and finishing systems in the plant, or the hand tools used by the maintenance crews in those plants, all represent HMLV manufacturing and manufacturers.

An automotive assembly plant, for instance, is designed and built to assemble a very limited number of automobile models. You will not, for example, find a GM plant building Chevrolet Suburban SUVs on the same assembly line or in the same plant as the Chevrolet Trax, which is roughly 4 feet shorter and weighs about half of the Suburban. They are both SUVs broadly speaking, but it would never be economically feasible to build them on the same production line.

Looking now at all the production equipment in each automotive assembly plant, this specialized equipment is often supplied by low-volume, even custom equipment manufacturers. The common hand tools used may not seem like the products of HMLV manufacturing, but if you look at the catalogs of the manufacturers of those tools, you will find hundreds, if not thousands, of individual SKUs. What an HMLV manufacturer may produce is often within a relatively narrow scope or to meet the requirements of a specific customer, or both. The business model, however, is typically designed to supply all of a given customer’s needs economically within the manufacturer’s capabilities, regardless of the number of SKUs required, down to lower unit volumes relative to SKUs.

The HMLV sector then remains a critical but largely background manufacturing sector. In future editions of this series, we will explore other HMLV-related topics, such as its importance in economic and employment terms, why it is a challenging technical and managerial business model, and how it differs from conventional “mass-production” manufacturing.

COMING NEXT IN THIS SERIES

Given the unique characteristics of HMLV manufacturing, there are a number of technological and knowledge gaps in the HMLV ecosystem that are currently creating opportunities for providers. We will also be addressing these solutions in subsequent whitepapers covering HMLV.

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