



Potential Energy and the Retail Supply Chain

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Introduction

The retail supply chain spans the globe, and reaches deep into many diverse regions of the world. This was true when the Hudson Bay Company first set up shop in North America, and it was true when the Agora served the customers of ancient Greece. The products found on modern store shelves are produced in countless factories in myriad nations. The options and alternatives in retail sourcing are bounded only by the constraints of vision and means, and measured in degree of return on expenditure.

Potential energy, introduced into the retail supply chain through intelligent sourcing, strategic positioning, tactical postponement, logical processing and active management, increases business capacity and creates quantifiable economic value.

Potential Energy

At its heart, physics is the study of the interaction between *matter*, everything possessing mass, and *energy*, the capacity to perform work. One of the more interesting forms that energy can take is that of *potential energy*. Essentially, an object can store energy based upon its position.

By way of example, consider a ball. Place it on the ground, and a significant amount of force is required to accelerate it. Place it on a precipice and even the slightest nudge will send it hurtling. The difference lies in the stored energy of position created by the ball's placement.

Potential energy is measured in degree of ability to perform work, to displace some quantity of mass. A spring gains potential energy the farther it is pulled from zero-point, up until it reaches its elastic limit. Pulling a spring past its elastic limit can nullify its ability to store energy. A straightened spring is, after all, no longer a spring at all.

These same forces exist within the supply chain, particularly within the extended global supply chain underpinning retail procurement. Here, too, stress is directly proportional to strain, and the further goods are offset from zero-point, the greater the business value that can be realized with reduced expenditures. This energizing is effected through careful coordination of location, timing, and mode.

Location

Since potential energy is created and maintained by position, certain locations produce greater than average power and efficiency. Drawing product from these areas of opportunity is analogous to leveraging a modern compound bow, rather than its historical counterpart. More elastic potential energy is created with less effort.

A retail goods sourcing example of such an area of opportunity is found in Southern China. The province of Guangdong has become the de facto manufacturing sector in southern China, initially due to its proximity to Hong Kong. This region produces commodities ranging from toys, to apparel, to footwear, to consumer electronics. In the past nearly all of these products were purchased in Hong Kong on a Free On-Board (FOB) basis. Goods ordered in full container loads (FCL) would be loaded at the factory, and drayed or moved by barge to the port of Kwai Chung in Hong Kong.

Less than container loads (LCL) were most often transported to a designated Hong Kong consolidated freight station (CFS) and consolidated with other cargo to form full container load shipments.

There are a number of conditions affecting sourcing in this manner. The congestion encountered by shipments can be significant, affecting both customs clearance at border crossings and the capacity of CFS facilities. This is compounded during the peak-shipping season, a critical timeframe for North American retailers. It can result in transit delay and a loss of freight management.

Perhaps more importantly, retailers increasingly need much more than traditional cargo consolidation. Every link in the supply chain must provide more value to remain viable. Importers of retail goods increasingly rely upon value-creating services such as seasonal pre-distribution programs, inspection and quality assurance services, bar-code and label applications, pick and pack operations, stock and reorder replenishment, and other business-enhancing services. This can add a layer of complexity that adversely burdens the previous FOB shipment process.

Recently, several factors have intersected to create the potential for supply chain energy of position in southern China. An increasingly competitive global marketplace has forced merchandisers to negotiate per-unit costs down to minimal levels to support shrinking margins. Logistics expertise and infrastructure has emerged to enable importers to convert terms of sale from FOB Hong Kong to FOB China, allowing them to assume control of the international shipment process at an earlier stage, thereby avoiding many of the 'hidden costs' previously incurred.

Timing

Time is also a key factor in harnessing energy of position. The potential energy inherent in a raised golf club is wasted unless delivered in accord with a well-timed swing and follow-through. Timing is equally critical in the retail supply chain, and for similar reasons.

Reduced to common elements, all supply chains are amalgamations of goods, funds and information, both held and in motion. *When* these elements are set into motion is every bit as critical as *how* they are put into play. Lack of proper timing can result in swollen inventories at one extreme, and dire shortage at the other. Both push the supply chain past its elastic limit.

It is not coincidental that the oft-cited '4-R's' of retail logistics success includes timing. Perhaps more than any other industry retailing is dependent upon having the Right Product, at the Right Place, in the Right Condition, at the Right Time to satisfy a potential customer's needs. With the vast majority of retail sales meeting the classical marketing definition of an impulse buy, lack of discipline to any of these requirements will quickly lead to missed sales, and lost customers.

Understanding of, and focus on, supply chain timing can not only ensure that consumer demand is reliably met, it can increase efficiencies, and contain, and frequently reduce, costs. All conduits, be they physical pipelines, global supply chains, or retail sales channels, are bounded by their capacity. A store's shelves can only viably contain a set quantity of goods before the laws of diminishing returns and inventory depreciation constrain the ability to turn a profit. Pushing goods to the storefront out of synch with season, fashion, or demand incurs a significant opportunity cost, and does not drive sales.

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For this reason retailers have increasingly sought out pull-based solutions, in which the capacities of both the supply chain and the selling space are brought into equilibrium, with demand providing the impetus for the movement of goods, information, and funds. The tools used to achieve the underlying supply chain transformation may include bypassing of traditional impediments and bottlenecks, time-definite distribution, and both direct to store and direct to consumer order fulfillment.

With an integrated multi-modal distribution network and cohesive supporting technology it becomes possible to consolidate packaged and labeled store-specific parcel shipments into economy producing full container loads at the port of origin, and enter them directly into the delivery network at the first possible port of discharge. This creates shipment efficiency, parcel level visibility, and retail capacity.

Mode

Mode is the third leg of the tripod that makes intelligent sourcing possible. Potential energy may be harnessed through a variety of mechanisms. The tool deployed is best selected by identifying the resource that creates the greatest possible benefit, while incurring the least possible opportunity cost.

The mode in which goods, information, and funds transit the extended retail supply chain should ideally be designated in exactly the same manner. The key, frequently overlooked, is to quantify the *total derived benefit*, weighed against the *aggregate opportunity cost*.

Focusing exclusively upon individual elements of a supply chain without regard for larger systemic ramifications can often result in unintended consequences. Initiatives undertaken to save money can have an inverse effect, which may go undetected initially.

The fact is that goods, information, and funds are fungible commodities, and quantities of one can always be exchanged for the other two. Whether this conversion is effected at a discount or a premium is directly impacted by the configuration of the supply chain through which they flow. Or fail to flow.

It is important to note from the outset that there is no universal ‘right answer.’ The specific solution that creates the most supply chain value for a given retailer is a function of a range of factors, including store distribution, business model, and product and customer characteristics. The expertise required involves understanding of potential interactions.

For example, is it more effective to utilize a mini-landbridge intermodal routing strategy, or to route cargo to a US East Coast port of discharge? Always? Under what circumstances is it more efficient to rely upon air cargo in terms of actual total cost? What is the best way of moving less than container load volumes? How about less than pallet load quantities?

How long is a piece of string? Without a holistic view and detailed understanding any answer is, at best, an approximation. With the application of logistics expertise and operational discipline, however, energy can be generated and directed. Intelligent sourcing becomes possible, and the supply chain can be charged with power.

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Strategic Positioning

Where goods are drawn from, and when and how they are set in motion is only the beginning. How they are placed is equally critical. As noted earlier, potential energy is energy of position; the capacity to perform work increased by strategic situation.

The nature of retailing, particularly on a national or international scale, creates the need for a multi-dimensional product positioning strategy. An effective strategy will entail multiple nested logistics considerations, including, but not limited to:

- Geographic channel distribution – where are sales effected?
- High opportunity demographic population distribution – where will retail business growth come from?
- Transportation conduit co-location – does it make more sense to be closer to the population centers, or closer to the means of reaching the population centers?
- Product pipeline – where does it make the most sense to take possession of goods?

Frequently, positioning is regarded as a stopping place, a point of suspended momentum in the supply chain. This need not be the case, unless the particular retail model employed most benefits from paused inertia. Alternatives include cross-dock and flow-through services, shared resources, and Just-in-Time solutions.

Through strategic positioning it is possible to configure effective and efficient distribution as the path of least resistance.

Tactical Postponement

Potential energy is energy stored by virtue of position. If it is allowed to dissipate prematurely it cannot be leveraged. This principle has strong corollary in the retail supply chain.

Supply chain postponement does not imply a deliberate transit slowdown, though there are scenarios in which this can be productively utilized as a valuable alternative. Rather, it addresses the postponement of inventory, holding less of it in common pool in an unfinished state to avoid having to hold more of it in wider dispersal.

Every discrete item a retailer sells represents a single stock-keeping unit (SKU). Every variation, if sold uniquely, represents an additional SKU. Bring enough variety to the marketplace and a retailer may well increase sales, but they can easily increase held inventory as well. And, just as matter is energy, inventory is money.

It is easy to overlook potential energy, which lacks the obvious force of its kinetic equivalent. This is also true in the retail supply chain, which is primarily seen as a conduit for moving goods, and not always fully recognized as a powerful medium for adding value to them as well. This is the essence of tactical postponement.

Postponement strategies entail completing the production of a product to a state just short of its salable ‘finished’ condition. The level of completion is held at a branch point, from which the product can be quickly completed to form one of a number of consumer-facing SKUs. Completion typically requires easily effected configuration, kitting, or, at most, light assembly.

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The end result is a pool of reduced inventory that can be quickly translated into one of many salable items in response to demand. The cost of excess inventory is contained, and variety is not sacrificed.

Logical Processing

Precise practical application of potential energy can also be a powerful transformative force in the retail supply chain. Application of holistic logistics expertise can serve to both derive maximum utility from all resources, and minimize and eliminate value-extracting redundancies.

Retail is an increasingly competitive sector of the global economy. Much of this competition is now coming from outside of traditional quarters. It takes the form of brand extensions from leaders in other segments, alternative channels reaching into the retail consumer base, and direct to consumer sales effected by producers and distributors. The convergence of competition in the retail market has made it imperative that retailers derive maximum utility from each and every resource.

The key is to define and execute logical supply chain processes, which increase holistic supply chain value as well as derive the most possible utility from individual elements, units, and commodities. Each transaction within a retail supply chain should ideally be accorded to the component that produces the greatest possible return value, while incurring the lowest possible opportunity cost.

As noted earlier, all supply chains are defined by the interaction of goods, information, and funds. Inefficiencies in the deployment and utilization of any one of these fundamentals will always result in penalties drawn against the other two. Conversely, an integrated solution choreographing the flow and interaction of these essentials will enable agile beneficial translation at parity or better.

Consider the example of retail inventory rotation. With the amazing breadth, width, and scope of products sold today via the retail channel, it is not possible to define a single universal rotation strategy of mechanism that serves all needs. Some products are ideally suited to a first-in, first-out (FIFO) selection strategy. Other goods require the less arbitrary adherence to first-expiring, first-out rotation. Still others may require more custom strategies dictated by unique material identification sequences, product identifiers, and lot control considerations.

The common element is disciplined enforcement. It is not that the science of logistics is inherently difficult or arcane. Rather, like all true sciences, it is absolutely unforgiving of lack of process and attention to detail. Adherence to carefully refined process, conversely, unlocks a geometric progression of opportunities for cost containment and, frequently, reduction.

Rotation is a classic example of elastic potential energy in the retail supply chain. In all of the above rotation strategies, adherence to logistics discipline is the line of utility demarcation separating salable goods from disposal stock. Rotating out the goods with current viability, but the least remaining utility, enables the retailer to retain the goods with the greatest forward utility, to enable future sales. This is the equivalent to drawing a spring back to its elastic element for maximum power.

In many retail supply chains the greatest opportunities to increase resource utilization are created by minimizing and eliminating redundancies. This can be illustrated by considering an all too frequent cargo drayage phenomena.

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With a substantial proportion of goods sold in US retail stores originating in Asia, US West Coast ports are an essential gateway. Goods are typically discharged in full container loads onto intermodal double-stack train cars for drayage to an inland retail distribution center (DC). In many cases, this DC is *significantly* inland; it is not uncommon for these containers to cross the country under in-transit bond, to reach a DC.

Once there, the goods are broken out into store-level quantities for regional distribution. Ironically, this ‘breaking out’, expressed in French as *retailier*, is the derivation of our word retail. Even more ironically, many of these deconsolidated goods are then sent back the way they came.

In these cases, a sizeable percentage of the US population is often found *between* the West Coast ports of discharge and the inland retail distribution center. Whether they are reached en mass by local stores, or individually through catalog or e-commerce sales, the end result is the same. Product must be shipped unnecessarily. Twice.

There are many avenues for improved utilization in this example. They include cross-docking, optimized fulfillment, and even the aforementioned aggregation and pre-labeling of store-level shipments into full maritime container loads. Again, the solution deployed should ideally be the one that returns the most value, with the lowest opportunity cost and constraint on total resources.

Crafting an extended global supply chain from logical processes produces an engine in which the utility of all component parts can be greatly expanded, harnessing business enhancing energy.

Active Management

With active management guiding the application of logistics expertise and infrastructure, the retail supply chain has the potential to be a key competitive advantage, an engine of business growth, and a producer of both customer and shareholder satisfaction. It can deliver far more than a consignment of consumer products.

It can deliver velocity, putting goods on store shelves and in the hands of customers at the most lucrative moment. It can deliver versatility, enabling a retailer to meet changing customer demands and demographics as opportunities, not challenges. It can deliver visibility, the insight essential to making informed retailing decisions.

It can deliver **value**, which is, after all, the truest definition of retail success.

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A UPS Supply Chain Solutions White Paper

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