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Lean and Agile Supply Chains: Jargon or Action?

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1. BACKGROUND
Development of an understanding of supply chain management (SCM) and its role in improving business performance is often complicated by the terminology which has evolved over the years. In a series of articles in this year's Logistics Solutions, various authors will attempt to demystify SCM by explaining some of the words and phrases which have come into relatively widespread use in both commercial and academic circles. This article explores the words lean and agile with specific reference to their respective meanings and potential role in improving supply chain performance.

2. LEAN SUPPLY CHAINS
Concept and Definition
A cursory glance at a dictionary or thesaurus indicates that possible synonyms for “lean” might include thin, trim or slim. The most widely quoted antonyms of these words (i.e. words with the opposite meaning) include fat, messy and out of shape. In the context of a business or a supply chain, lean was originally used to describe the situation where many of the non-value adding activities (NVAs) had been identified and eliminated. NVAs are activities which add cost without necessarily adding value. Value in this context can best be described as something which a customer is willing to pay for. Another perspective on NVAs is that they are activities which add time to supply chain processes without necessarily adding value from a customer point of view. The latter is important in two respects. Firstly, time is money and, therefore, taking unnecessary or wasteful time out of processes should lead directly to cost reductions. Secondly, taking wasteful time out of processes should result in faster product supply and, as a result, improve this important aspect of customer service. From a financial perspective, going lean should reduce operating costs and facilitate more effective use of working capital and fixed assets, thus contributing significantly to overall profitability. This approach suggests that in going lean the major benefits are derived directly from efficiency improvements.

There is another element of lean worth referring to by way of introduction. Just-in-Time (JIT), with its origins in the Japanese automotive industry, is essentially a philosophy aimed at the elimination of waste (or muda in Japanese). Implementing JIT involves identifying the various forms of muda and endeavouring to eliminate them as far as possible. While they may differ in terms of the detail of their respective constituent elements, the similarity in approach between lean thinking (eliminate NVAs) and JIT thinking (eliminate muda) is evident. Indeed, lean thinking can be regarded as having its origins in the Toyota Production System back in the 1970s.

Principles and Characteristics
Lean thinking was popularised by the 1990 book “The Machine that Changed the World” (Womack, Jones and Roos). This book illustrated the significant performance gap between Japanese and western companies in the automotive sector and attributed the main reasons for this gap to the fact that Japanese approaches tended to use less of everything (e.g., less human effort, less stock and less time) across supply chain processes. In other words, Japanese supply chains tended to be leaner. It is not uncommon in production operations for as a few as 5% of activities to be classified as “value-adding.” Value in this context needs to be considered from the customer’s viewpoint. The potential exists to eliminate the majority of the NVA, thus providing great potential for bottom-line improvement. The process of eliminating waste needs to go beyond the boundaries of individual companies and take a “Value Stream” or supply chain perspective. The key is to re-
organise activities so that higher levels of synchronisation are achieved between supply and demand, with product being pulled through the supply chain based on customer requirements. Improved flow makes the various forms of waste more visible thus giving the potential to achieve sustained levels of waste reduction. The quest for perfection is also a characteristic of lean thinking. Perfection in this context is where every resource and every activity is adding value. Whilst lean thinking has its origins in the automotive sector it has been successfully applied in other industries. An extensive toolkit has been developed which helps companies with the analysis, planning and implementation of lean supply chains. The Lean Enterprise Research Centre (LERC), under the direction of Professor Peter Hines at Cardiff University is the leading academic authority in the field of lean SCM (see http://www.cf.ac.uk/carbs/lom/lerc for more information).

3. AGILE SUPPLY CHAINS
Concept and Definition
In the case of the word "agile," a dictionary or thesaurus indicates that possible synonyms might include swift, responsive or nimble. The most widely quoted antonyms of these words include clumsy, and (as with "lean") out of shape. This suggests that the concepts of speed of response and flexibility are the keys to distinguishing between lean and agile. The need for agility in SCM is based on increasingly volatile market demand patterns and shortening product life cycles. The leading academic authority on agility, Professor Martin Christopher of Cranfield School of Management, states that:

‘Whilst “leaness” may be an element of “agility” in certain circumstances, by itself it will not enable the organisation to meet the precise needs of the customer more rapidly’

This implies that lean is effectively a subset of agile. Furthermore, the emphasis on speed is evident in Christopher's use of the word “rapidly.” The implication here is that time is a key competitive weapon, with reduced new product introduction (NPI) and order fulfilment times, for example, providing the potential for significant performance improvement.

Principles and Characteristics
Martin Christopher describes agility in terms of four characteristics.

1. Market sensitive: A truly agile supply chain must be capable of delivering based on real demand in the market. This often requires a shift from forecast-driven planning to demand-driven planning. It also means moving from traditional make-to-stock towards make-to-order approaches.

2. Virtual: Agile supply chains share real time data across companies boundaries. These virtual supply chains aim to reduce inventory levels through the more effective use of information, particularly information about customer demand. Recent developments in ICT (as discussed elsewhere in this edition of Logistics Solutions) have facilitated this.
\textbf{leagile supply chains}

The desirability to be both lean and agile has resulted in a rather contrived term, leagile, being coined. A leagile supply chain is defined as one which is both lean and agile. In technical terms, leagility involves the strategic use of a decoupling point (Naylor et al.). This decoupling point aims to achieve responsiveness to volatile demand downstream (i.e., in the market) while providing level scheduling upstream from the decoupling point. In essence it is an attempt to get the best of both worlds. A more detailed discussion of leagility and the creation of the decoupling point is beyond the scope of this article but will be provided in a subsequent edition of Logistics Solutions. Lean, agile and leagile philosophies are summarised in Table 1, in terms of focus, characteristic (as defined by the synonyms), overall orientation and the most commonly used objectives and metrics.

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|}
\hline
& \textbf{LEAN} & \textbf{AGILE} & \textbf{LEAGILE} \\
\hline
\textbf{FOCUS} & EFFICIENCY & EFFECTIVENESS & EFFICIENCY \& EFFECTIVENESS \\
\hline
\textbf{CHARACTERISTIC} & TRIM & RESPONSIVE & TRIM \& RESPONSIVE \\
\hline
\textbf{ORIENTATION} & REDUCE WASTE & INCREASE SPEED & DELIVER VALUE \\
\hline
\textbf{OBJECTIVES/METRICS} & COST & SERVICE & COST \& SERVICE \\
\hline
\end{tabular}
\caption{Lean, agile and leagile comparison}
\end{table}

\textbf{REFERENCES}

