Logical steps to logistics optimization
Preparing for smart metering mass deployment
What is supply chain in the context of an asset-intensive industry? Supply chain is the integration of procurement, logistics and operational functions to ensure the right materials are delivered from point of supply through to point of installation (along with management of used / returned assets).

Smart metering deployments are very different to traditional metering activities. They introduce the challenges of new metering technologies, increased workloads to support accelerated deployments, new skill requirements for the field force and the need for more effective supply chains. Within the supply chain, the cost of assets being moved from suppliers to engineers in the field can be up to 10 times that of traditional metering equipment and cover more types of assets. The function has to respond to the unprecedented rate and pace of install.

This means that even the smallest stock loss can translate to a significant cost impact, both in terms of asset write-offs and lost field productivity. If the logistics infrastructure (warehouse and stores) does not match the deployment plan because, for example, stores are in the wrong location or have exceeded their stockholding capacity, engineers incur additional drive time and have less opportunity to engage with the end customer.

A poor performing logistics function adds program and business risk to an already complex transformation project. The impacts are potentially widespread, including cost overruns and underperformance of the utility compared to its business case, as well as customer dissatisfaction from cancelled appointments and the associated damage to reputation. Ultimately, utilities also face the risk of failing to meet regulatory commitments.

In this point of view, we look at the installation journey and opportunities afforded through optimization of the supply chain.

1 What is supply chain in the context of an asset-intensive industry? Supply chain is the integration of procurement, logistics and operational functions to ensure the right materials are delivered from point of supply through to point of installation (along with management of used / returned assets).
Smart metering mass deployment challenges

The scale, duration and cadence of a smart meter deployment places exceptional pressure on the logistics function of most utilities. Utilities have found themselves achieving weak returns on investment due to poorly planned processes and implemented systems that together fail to underpin a high performing supply chain. The team potentially loses time through inefficiencies, as well as through their efforts to rework and correct the situation. Poor productivity can be due to sub-optimal asset use or under-utilized engineers, as well as, high working capital due to inflated or insufficient inventory or stock loss. Typical stock loss within traditional metering operations (prespark) range from 0.3 to 3.5 percent, equating to approximately US $250,000 to $3 million losses per 1 million meters deployed (based on an average asset price of approximately $84).
Benefits of logistics and supply chain optimization

Optimizing supply chain performance can deliver positive business outcomes, with financial benefits achieved through greater workforce efficiency and improved cost management, as well as better return on invested capital.

Figure 1: Optimizing supply chain performance for increased shareholder value

<table>
<thead>
<tr>
<th>Shareholder Value Tree</th>
<th>Improvement Levers</th>
<th>Typical Financial Benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profitability</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Improved product availability</td>
<td>10 - 15% efficiency ↑</td>
</tr>
<tr>
<td></td>
<td>Improved time on tool</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Decreased mean time to repair</td>
<td></td>
</tr>
<tr>
<td>Costs</td>
<td>Reduced infrastructure costs</td>
<td>10 - 30% costs ↓</td>
</tr>
<tr>
<td></td>
<td>Reduced people costs</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Improved productivity in stores</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Improved rates from suppliers</td>
<td></td>
</tr>
<tr>
<td>Working Capital</td>
<td>Lower inventory levels</td>
<td>10 - 20% inventory ↓</td>
</tr>
<tr>
<td></td>
<td>Higher asset utilization</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reduced obsolescence</td>
<td></td>
</tr>
<tr>
<td>Fixed Capital</td>
<td>Fewer physical assets (i.e., stores, vehicles, material handling equipment, IT)</td>
<td>10 - 30% asset utilization ↑</td>
</tr>
</tbody>
</table>

Typical Financial Benefits:
- 10 - 15% efficiency: Improved product availability, improved time on tool, decreased mean time to repair
- 10 - 30% costs: Reduced infrastructure costs, reduced people costs
- 10 - 20% inventory: Lower inventory levels, higher asset utilization
- 10 - 30% asset utilization: Fewer physical assets
More broadly, optimization of the smart meter supply chain function can drive towards better management of cost and risk, as well as a more efficient and effective deployment.

Figure 2: Quality, cost and risk benefits can be generated through a logistics optimization strategy

| Better cost management                                                                 | Greater risk control                                                                 || Improved solution quality                                                                 |
|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| - Cost to serve associated with deploying materials to engineers and the installation thereof, improved by reducing warehousing and stores and optimizing the time and frequency of material replenishments | - Failed appointment risk reduced by having the correct materials available for installation through good inventory management processes | - Improved flexibility and scalability to meet challenging and changing demands with the installation profiles, provided through the implementation of a robust logistics network aligned to meet the needs of the master deployment plan |
| - Working capital minimized through good stock management processes                   | - Idle engineer risk limited by ensuring a minimum inventory and having the right stock | - Eradication of stock losses by tracking and tracing assets throughout the supply chain |
| - Waste and returned assets removed from the field for recycling or re-use in line with scrap value | - Reduce liability by minimising investment in capital and equipment, and people-count by using third party logistics infrastructure, systems and resources on a transactional basis | - Quality problems during manufacturing detected by properly tracking each device through its life-cycle and being able to determine if detected errors come from a common manufacturing batch |
| - Weight on vans reduced, improving vehicle performance through fuel savings, as well as potentially improved driver behaviour leading to improvements in safety |                                                                                      |                                                                                         |
| - Reduced drive time for engineers replenishing stocks by optimizing the network of warehouses and stores |                                                                                      |                                                                                         |

A major European energy provider conducted an assessment of their logistics function against future requirements, identifying insufficiencies in the supply chain and a potential stock loss of 3-4 percent.

A major US telecommunications provider outsourced their logistics provisioning involving Fourth-party Logistics (4PL) operations in transport planning and network optimization through an onshore (planning) and offshore team (for supply chain optimization and analytics), generating significant benefits in asset (vehicle) utilization.
The smart meter installation journey

1 Develop a clear supply chain strategy

There are several key operational dependencies that underpin a successful smart meter installation journey. Utilities should ideally manage, optimize and integrate the entire supply chain in order to deliver effective field operations and ultimately a successful smart metering deployment. At the outset utilities should carefully undertake deployment planning, including forward and reverse supply chain planning and asset and inventory management.

**Figure 3: Supply chain design and execution**

<table>
<thead>
<tr>
<th>Deployment planning</th>
<th>Forward supply chain</th>
<th>Reverse supply chain</th>
<th>Asset and inventory management</th>
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<tr>
<td>Understand the demand profile including annual, monthly and daily meter installs, varying different housing types, potential access restrictions, and assets and consumables required per property through site intelligence.</td>
<td>Have adequate supply chain infrastructure to serve engineers; skilled logistics professionals to pick and ship assets; and asset tracking capability from supplier through to installation.</td>
<td>Run fault management, quality assurance, warranty management and meter triage processes (e.g., sorting, testing and refurbishment) to manage large volumes of redundant and faulty assets back through the supply chain to manufacturers and recycling agents.</td>
<td>Understand where assets are in the supply chain from suppliers to warehouses, stores, vans and through to installation, and minimize working capital while maximizing the number of jobs per day from available stock.</td>
</tr>
</tbody>
</table>
Determine which supply chain functions are fit for purpose

A high performing supply chain for smart meter deployments should bring together processes and systems across deployment planning, procurement, logistics—including asset and inventory management—with field operations. Utilities designing the optimal solution should map the supply chain from end-to-end and make an informed strategic decision about which functions are core and non-core to the business. This will drive a decision process around parts of the supply chain that should be retained in-house, versus outsourced or partially outsourced, allowing the utility to potentially benefit from lower cost, innovative third party solutions.
Practical recommendations for improved logistics optimization

Manufacturer
Develop an integrated approach for greater surety of supply from key suppliers, through effective category management and supplier relationship management capabilities.

Warehouse
Assure robust warehouse inventory management procedures and capabilities, linked to the master deployment plan and to the product manufacturer through effective supplier relationship management.

Vans/vehicles
Design a logistics network to ensure minimal drive time and number of replenishments. Consider geographic context and meter install types. Manage van stock in the field with regular audits to remove unnecessary stock and weight.

Meters
Track and trace assets through the supply chain through robust asset and inventory management capabilities. Focus on returns management, as much as on deployment. Implement a robust returns supply chain, with triage processes to sort, test, repair and recycle assets.

Engineers
Secure effective management information for better decision making around asset levels and location, in order to manage engineer resource levels.

Asset owner

Customer
3 Execute on your supply chain strategy

Utilities can integrate key functions across procurement, logistics, asset and inventory management and field operations to gain control and visibility of all supply chain activities through implementation of a supply chain control tower, linking overall deployment planning with supply chain execution. The degree of interdependency between the various involved processes make it essential to have a centralized view of different Key Performance Indicators (KPIs).

Regular monitoring of these KPIs, as well as any trend changes, will allow utilities to take proactive and reactive measures and also to better understand the root causes of issues among different links along the supply chain.

Figure 5: Supply chain control tower model driving greater integration and visibility across the supply chain

In the context of a smart metering rollout, utilities have the opportunity, through the implementation of logical steps to logistics optimization, to reduce program and business risks as well as to improve customer satisfaction and enhance their business reputation.

1 Develop a clear supply chain strategy to link procurement (supply), field operations and the integrated deployment plan (demand) with logistics and consider operationalizing this through an operations control tower.

2 Determine which supply chain functions are fit for purpose: undertake a capability assessment to quantify and measure the current logistics function and its ability to scale and meet future business requirements.

3 Execute on your supply chain strategy and determine whether an in-house, outsourced or blended model best suits the business requirements. Set up an operations control tower, for greater integration and visibility across the supply chain. When demand subsides, work through the impact to your supply chain strategy in order to adjust to usual maintenance activities.

Conclusion

In the context of a smart metering rollout, utilities have the opportunity, through the implementation of logical steps to logistics optimization, to reduce program and business risks as well as to improve customer satisfaction and enhance their business reputation.
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