Best Practice in Implementing VMI
A recommendation by ECR Europe
Best Practice in Implementing VMI

A recommendation by ECR Europe

ECR Europe

ECR Europe gathers together all value chain partners: retailers, manufacturers and service providers, who share a common belief that by working together on non-competitive matters we can bring transformational change to our industry that benefits our shoppers and consumers.

A shared vision: Working together to create value for consumers in a sustainable way – Better, faster and at less cost with a shared business process leading to shared benefits across the Value Chain.

Managing the Supply Chain Efficiently

ECR Practice Requires Both Trading Partners

- To adhere to supply chain management standards and protocols recommended by ECR Europe,
- To jointly define a set of objectives and processes for optimizing product planning, forecasting and replenishment as well as in-store logistics,
- To achieve full visibility of product flow along the supply chain so that consumer demand is always met,
- To jointly make efforts to move to paperless transactions (e.g. using data flow to clear deliveries and invoices),
- To jointly define a set of objectives and processes for optimizing on-shelf availability,
- To apply a commonly agreed method in order to evaluate total costs and benefits related to supply chain changes,
- To share benefits and risks whilst adopting a total supply chain view,
- To jointly define a set of business Key Performance Indicators to measure results against these objectives.

Generating Demand

ECR Practice Requires Both Trading Partners:

- To jointly analyse consumer and shopper data in order to mutually understand and respect one’s consumer/shopper marketing objectives when developing and reviewing the category,
- To focus on delivering cost effectively the most relevant set of products and services that truly add choice and value to consumers,
- To jointly define a set of business Key Performance Indicators (e.g. consumer, market, productivity and financial), to measure the results against these objectives.

Making Information-Based Decisions

ECR Practice Requires Both Trading Partners:

- To exchange information in order to support business decisions,
- To agree on a common process, cost effective for both partners, to systematically gather and/or exchange the best possible information in a structured way,
- To establish a non-discriminatory and transparent process for evaluating the information leading to any business decision (e.g. KPI’s, scorecards),
- All information exchange between trading partners should happen in strict accordance with the applicable competition laws.

This handbook is primarily aimed at supply chain professionals in retail industry—for Supply Chain, Logistics and IT professionals. The manual is partly based on GS1 Switzerland “Merchandise Planning Models Guidebook”, published in 2013 and was completely reworked in 2014 under ECR Europe initiative by group of experts lead by Hele Hammer, Associate Professor at Tallinn University of Technology.
Contents

Executive Summary ..................................................................................................................... 4
1. What is VMI .............................................................................................................................. 5
  1.1. VMI principles .................................................................................................................... 5
  1.2. VMI usage in Europe ......................................................................................................... 6
  1.3. VMI Models: Distribution Center versus Direct Store Delivery ....................................... 6
2. VMI setup project steps .......................................................................................................... 8
  2.1. Evaluate VMI Business Case ........................................................................................... 10
      2.1.1. Benefits of VMI ........................................................................................................ 10
      2.1.2. Cost-Benefit Analysis: VMI Savings Calculator .................................................... 11
      2.1.3. Risk analysis ........................................................................................................... 14
  2.2. Plan VMI project: time and resources ............................................................................. 15
      2.2.1. VMI project schedule ............................................................................................ 16
      2.2.2. VMI project organisation ....................................................................................... 16
      2.2.3. Project team skills and responsibilities .................................................................... 17
  2.3. Select VMI target categories and products .................................................................... 18
      2.3.1. Which suppliers to include in VMI program? ......................................................... 19
      2.3.2. Min/Max stock levels for VMI products ................................................................. 20
      2.3.3. Determining delivery units /DC VMI full truck loads ........................................... 21
      2.3.4. Product Master Data ............................................................................................... 23
  2.4. Terms: Set Goals and Terms (VMI Contract) .................................................................. 25
      2.4.1. KPIs for measuring the success of VMI project ....................................................... 25
      2.4.2. VMI Contract between vendor and retailer ............................................................. 28
  2.5. Align IT and business ....................................................................................................... 29
      2.5.1. Internal and external business process changes ....................................................... 29
      2.5.2. VMI process and EDI documents ......................................................................... 30
      2.5.3. VMI technological solution .................................................................................... 32
      2.5.4. Set up and test the VMI solution ............................................................................. 34
  2.6. Rollout: Pilot and On-board Partners ............................................................................ 36
      2.6.1. Pilot your VMI program ......................................................................................... 36
      2.6.2. Train and go live ..................................................................................................... 36
      2.6.3. On-board additional trade partners ....................................................................... 38
  3. VMI performance and control ......................................................................................... 38
      3.1. Review and Adjust ....................................................................................................... 38
      3.2. Monitor ongoing VMI programs ................................................................................ 39
      3.3. IT solutions for KPI monitoring .................................................................................. 40
  4. Critical Success Factors for VMI projects .......................................................................... 42
      4.1. Business Relationship factors ..................................................................................... 42
      4.2. Company internal factors .......................................................................................... 43
      4.3. Technical and VMI specific factors ............................................................................ 43

APPENDICES .......................................................................................................................... 45
  Appendix 1. ECR thinking ..................................................................................................... 45
  Appendix 2. VMI Sample Contract ...................................................................................... 46
  Appendix 4. Master Data Management: Background ......................................................... 49
  Appendix 5. Glossary ............................................................................................................ 51
  Appendix 6. Demos overview / VMI service providers .................................................... 54
Executive Summary

Vendor Managed Inventory (VMI) is a replenishment strategy where the traditional ordering process is eliminated and the supplier has the right and responsibility to make stock replenishment decisions based on regular automatic inventory and/or sales data from buyer. This handbook on VMI contains instructions for practitioners, explaining automated replenishment processes and providing support for project managers in implementing VMI replenishment processes.

The decision to implement VMI is a strategic decision impacting many departments (logistics, procurement, planning, sales and marketing) and strengthening cooperation between supplier and buyer. The aim of this collaboration is to make the replenishment process more efficient at less cost.

Business case for VMI

VMI programs offer the potential for dramatic improvements in supply chain and financial performance. Replenishment decisions are made by the supplier based on agreed key performance indicators (KPIs), including availability and stock turnover. Quantitative performance improvements that customers using VMI have achieved include:

- Increase in availability of 2-5%, (and related increase in sales revenues)
- Reduction in inventory levels of 15 to 40% (and related decrease in capital costs)

Additional benefits include less OOS, more efficient production scheduling, improved responsiveness to customer needs and changing market conditions and better relationships with partners.

The following rule of thumb applies: the bigger the shipping volume with the business partner is the greater are the percentage-based potential savings. **It is estimated that savings up to 2-3% of total turnover can be achieved with VMI program, if applied correctly.**

VMI setup project steps

In first chapter, the 6 major steps in a VMI implementation project are explained in detail.

1. Evaluate  
2. Plan  
3. Target  
4. Terms  
5. Align  
6. Rollout

Critical Success Factors in VMI Project Implementation

Successful VMI projects are based on a number of key factors: the commitment of senior management—from both buyer and vendor organizations; well-defined agreements on goals, service levels, and risks; and tight integration with systems. With these elements in place, good communication and change management practices can help you over the finish line.

Conclusions from a 2014 master thesis defended at Tallinn University of Technology, asking for expert opinions from the ECR member companies in Europe about what are the critical success factors for VMI Projects, are presented in chapter 4.

Lot of Practical Tips and Tricks in Appendices

Tips for project organisation and implementation and various checklists as well as a sample VMI contract are included.
1. What is VMI

1.1. VMI principles

Supply chains must be managed to ensure that all supply chain participants are aligned regarding demand and agreed inventory levels, and there is a reliable replenishment process to secure product availability through the entire supply chain at the lowest possible logistics costs.

**Vendor Managed Inventory (VMI)** is an alternative to the traditional order-based replenishment practice, being a more efficient supply chain integration strategy and collaboration concept. In a VMI relationship, the supplier is empowered to manage customer’s inventory and replenish the goods at customer site automatically under agreed conditions and rules. Instead of sending the purchase orders, retailers send inventory and sales information electronically to supplier. Based on this demand data, supplier makes periodic resupply decisions regarding order quantities, shipping, and timing (see Figure 1). The information about real demand will be transparent to the vendor, reducing uncertainty for its production and operational planning.

![Figure 1. Replenishment process with VMI](image)

Electronic Data Interchange (EDI) is used for exchanging relevant trade documents to ensure completely automated order processing. This is associated with investment on one hand and savings and efficiency gains on the other.

VMI is a tool which facilitates efficient processes in inventory management. The aim of VMI is to ensure availability and freshness at the point of sale with the lowest possible logistics costs and maintaining the lowest possible inventory level across the entire purchasing chain.

This is only possible if all parties speak the same language, share an understanding, apply the same standards and methods and work together on a constructive basis. In any case, commercial pressure in the consumer goods industry will force companies to further streamline their purchasing processes, in order to achieve a sustained increase in efficiency and profits.

**VMI gives the supplier both responsibility and authority to manage the entire replenishment process.**

The change is fundamental by making the availability and inventory turnover the new primary measures of the supplier’s performance instead of delivery time and preciseness.

The nature and extent of VMI implementation is not an IT project or top management prerogative imposing on the rest of the organisation. A VMI project is in fact a major effort that will require participation from most departments of the organisation and will influence and change all of the dimensions. Therefore, it is necessary to employ a holistic view of strategy, structure, people, and technology.
1.2. VMI usage in Europe

<table>
<thead>
<tr>
<th>ECR NI</th>
<th>Established</th>
<th>Local ECR members</th>
<th>Market share</th>
<th>VMI penetration</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Retailers</td>
<td>Suppliers</td>
<td>Total</td>
</tr>
<tr>
<td>ECR Switzerland</td>
<td>1999</td>
<td>15</td>
<td>120</td>
<td>135</td>
</tr>
<tr>
<td>ECR France</td>
<td>1997</td>
<td>17</td>
<td>45</td>
<td>59</td>
</tr>
<tr>
<td>ECR Austria</td>
<td>1996</td>
<td>12</td>
<td>63</td>
<td>75</td>
</tr>
<tr>
<td>ECR Italy</td>
<td>1993</td>
<td>14</td>
<td>46</td>
<td>60</td>
</tr>
<tr>
<td>ECR Baltics</td>
<td>2007</td>
<td>4</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>ECR Ireland</td>
<td>1985</td>
<td>6</td>
<td>40</td>
<td>46</td>
</tr>
<tr>
<td>ECR Poland</td>
<td>1998</td>
<td>11</td>
<td>19</td>
<td>30</td>
</tr>
<tr>
<td>ECR Russia</td>
<td>2004</td>
<td>15</td>
<td>38</td>
<td>53</td>
</tr>
<tr>
<td>ECR Spain</td>
<td>1997</td>
<td>15</td>
<td>50</td>
<td>65</td>
</tr>
<tr>
<td>ECR UK</td>
<td>1996</td>
<td>9</td>
<td>14</td>
<td>23</td>
</tr>
<tr>
<td>ECR Portugal</td>
<td>2002</td>
<td>3</td>
<td>20</td>
<td>23</td>
</tr>
<tr>
<td>TOTAL</td>
<td>121</td>
<td>467</td>
<td>588</td>
<td></td>
</tr>
</tbody>
</table>

1 Market share of ECR members on their respective markets (FMCG retail), a rough estimation by the local ECR

1.3. VMI Models: Distribution Center versus Direct Store Delivery

In big countries of central and western Europe, large mature retailers are using retailer distribution centers (DC) in their operations as a rule. In Eastern Europe and smaller countries, direct-to-store (DSD) delivery is prevailing. According to the ECR Europe survey carried out in fall 2014, the experts estimate the share of DC delivery to increase in next 5 to 10 years to become the dominant model of operation1. Regarding VMI, there are some differences based on whether the supplier is delivering to DC or direct to stores.

**VMI between Vendor and Buyer DC**

The majority of VMI programs are focused on managing inventory at the distribution centre level (see Figure 2). Vendors will get regular (usually daily) product inventory and sales data from the Buyer. For each item, there is information about how many units are in warehouse, how many were delivered to stores, how many are in transit. Based on agreed minimum and maximum stock levels, the Vendor will make product replenishment decisions, aiming to ensure availability and at the same time optimizing transportation (benefiting from full truck loads).

---

1 Nuala’s survey
VMI between Vendor and Buyer individual stores (DSD)

While most of the VMI relationships are between Vendor and Buyer DC, there are agreements where vendors are managing their products at the retail store level (see Figure 3). In DSD VMI, individual shops send daily POS (point-of-sales) data and regular inventory data to Vendors. Similarly to DC VMI, Vendor and Buyer have to agree min and max stock levels for each item in each store. Using dynamic min and max stock levels (in DSO rather than units, read more in chapter 2.4), this agreement is manageable. Based on POS data, Vendor makes replenishment decisions and delivers products to shops, ensuring availability and optimizing inventory levels.

VMI versus CMI (Co-Managed Inventory)

In contrary to DC VMI, instead of potential savings in transportation costs, DSD VMI will more likely increase transportation costs for the supplier—deliveries are smaller and more frequent. However, increase in availability, freshness and therefore, sales, usually more than offset the cost increases. DSD VMI model also requires much more sophisticated systems on both Buyer and Vendor side and high level capabilities on Vendor side.

In addition to differences in operating model (DC versus DSD), there are variations of VMI depending on where the right and responsibility of replenishment decisions lay.

In DSD VMI, usually retailers have defined product assortments and plan-o-grams and allow vendors to make replenishment decisions in that framework. Some VMI programs go even further: retailers allocate shelf space
and allow manufacturers to plan also product assortments and facings in addition to replenishment quantities. This represents the ultimate in VMI, giving manufacturers control over all merchandising decisions in individual stores.

On the other hand, in between BMI (Buyer Managed Inventory)—the traditional way of product replenishment and VMI, there is also CMI (Co-managed Inventory). The key difference is that order placed by the supplier is still a recommendation and is not a firm order until approved by the customer (see Figure 4). In a VMI process, the order generated by the supplier on the customer's behalf is a firm order to deliver product and bill the customer. We can also distinguish between VRI (Vendor Replenished Inventory) and VMI, where the latter would then include also ability to decide on assortment, not just mecanically replenishing what has been decided.

![Figure 4. Inventory management models overview](image)

(BMI-Buyer Managed Inventory, CMI- Co-Managed Inventory, VRI- Vendor Replenished Inventory, VMI- Vendor Managed Inventory)

2. VMI setup project steps

While employing VMI in a trade relationship in general is a process and not a project, the first time the VMI is implemented, it should be managed as a project in order to be succesful. A VMI project can be divided into six basic phases (see

![Figure 5](image)

1. **Evaluate**: Business case
2. **Plan**: Project definition and planning
3. **Target**: Choose categories and suppliers
4. **Terms**: Set goals and terms (contract)
5. **Align**: Align IT and business
6. **Onboard**: pilot and on-board suppliers
Figure 5. The six steps in a VMI project

**Evaluate VMI business case**

- Determine the gains of VMI (decreased inventory costs, increased revenues, etc.)
- Determine the costs of VMI (one-time investment and running costs)
- Use a savings calculator to calculate the net benefits of VMI, payback time and ROI.
- Present the business case to top management and obtain clear support and commitment.

**Plan: team, schedule and resources**

- Appoint a strong project manager and determine project organization.
- Compose the project time schedule: define clearly who, when and what should do.
- Allocate the required resources: finances, time, and personnel.

**Target categories and products**

- Determine which suppliers and products are suitable for VMI (depending on shelf life, delivery frequency, seasonality, origin, etc).
- Determine Min/Max quantities for each product and delivery units (full pallets?).
- Update and correct product master data if needed.

**Set terms and goals, VMI contract**

- Specify common goals (e.g., decrease in DOS by 20%) and rules for the joint project.
- Agree on VMI product range, set Min/Max quantities, delivery rules, EDI messages and channels.
- Sign a VMI contract appendix specifying rights and responsibilities.

**Align IT with business**

- Analyse the need for changes in business processes, modify the business processes, adjust communication and ensure cooperation.
- Map your new process, determine EDI messages to be used and channels to be built.
- Change your IT system so that it supports the new processes, choose, set up and test the VMI solution.

**Rollout: pilot and onboard partners**

- Choose a suitable pilot partner. Plan and execute VMI implementation well, make it your success story.
- Communicate the project in both companies. Emphasise the objectives and benefits to gain full support from all stakeholders.
- Involve key users, train all parties and go live.
- To get the most out of the VMI project, select and implement additional VMI partnerships.
2.1. Evaluate VMI Business Case

An idea for a project should be carefully examined to determine whether or not it benefits the organization. During this phase, a decision making team will identify if the project can realistically be completed.

**Evaluate VMI business case**

- Determine the gains of VMI (decreased inventory costs, increased revenues, etc.)
- Determine the costs of VMI (one-time investment and running costs)
- Use a savings calculator to calculate the net benefits of VMI, payback time and ROI.
- Present the business case to top management and obtain clear support and commitment.

In VMI model, short-term demand forecasting on retailer side and flow of purchase orders are removed from the supply chain. Absence of these elements eliminates delays in information and product flows, and significantly decreases the impact of uncertainty and distortion in supply chain decision-making.

### 2.1.1. Benefits of VMI

The benefits of VMI are mainly related to cost reductions, service improvements and greater transparency in the supply chain. Quantitative performance improvements that customers using VMI have achieved include:

- Increase in availability of 2-5%, (and related increase in sales revenues)
- Reduction in inventory levels of 15 to 40 % (and related decrease in capital costs)

**Better availability and less out-of-stock (OOS): higher revenues**

VMI makes it possible to deliver right products at the right time to the right place. The availability of stock and sales data at shop level helps suppliers to make better replenishment decisions, avoiding OOS and increasing OSA. Additionally, visibility at buyer level is useful with promotions, as those products that have run out can be quickly replenished.

**Lower inventory levels: released working capital**

Faster inventory turns mean that inventory levels can be reduced. As real demand is shared with supply chain partners, also the reserve stock can be smaller. Lower inventory levels mean savings in cost of capital, as less capital is tied up in the inventories.

**Faster inventory turns: fresher products and less markdowns**

As stock is replenished more often, the products are less likely to become obsolete. This decreases the need to sell leftover stock with reduced prices.

Fred Meyer, the 131-unit supercenters chain in America, reduced its inventories 30%, while sales rose and service levels increased to 98%. This was due to a VMI program implemented with two key food vendors.

Oshawa Foods, a $6 billion Canadian food distributor and retailer, had tremendous success with Pillsbury, Quaker and H.J. Heinz with turns improving from 3 to 9 times, while achieving customer service levels of 99%. This, however, came after some initial adjustments in the program because of the hasty nature of initial implementation.
All those numerous benefits described on Figure 7 formulate the set of the reasons why VMI concept should be implemented. As specific benefits depend on particular business case, it is crucial for all parties involved to analyse and understand the possible benefits, and have a “buy-in” into the idea. Only then could VMI be implemented successfully.

### 2.1.2. Cost-Benefit Analysis: VMI Savings Calculator

In order to calculate return on investment (ROI), in addition to revenues also costs should be estimated. Implementing VMI requires investments like executing any other project in the company. The costs of implementing VMI vary to a large extent and depend on different characteristics of the company such as the size of the company, the ERP systems used in the company, the role of the company in the supply chain (vendor/buyer) and so on.

The costs can be divided into two groups: 1. Initial investments, 2. Operational (ongoing) costs.

<table>
<thead>
<tr>
<th>1. VMI project initial investments</th>
<th>2. VMI operational costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial costs include investments into business process</td>
<td>The costs which continue with the use of VMI after</td>
</tr>
</tbody>
</table>
change, new software systems, and personnel training:
- VMI software and hardware
- Cost of changing business processes
- IT support - in house and external
- Personnel training costs
- Project management costs

GS1 Switzerland’s (2011) estimation of total costs for a vendor company setting up VMI were about €75 to €130 thousand. These estimations were done for companies setting up VMI for the first time. The cost for setting up an additional VMI partnership (with another retailer) should be considerably less, amounting to 20% of the initial costs.

The costs for a buyer company are 2/3 less, considering that the VMI technological solution will be set up at vendor, not buyer side.

implementation are the following:
- **VMI process manager/team costs.** The extent of personnel used in VMI process depends on one hand which VMI level is chosen—is it pure VMI or is it co-managed inventory (in latter case, there is a VMI manager on buyer side as well). On the other hand, the amount of work on vendor side depends on which VMI model is chosen, DC or DSD VMI. In DSD VMI, at least 1 FTE should be planned for the work.
- **VMI operational costs.** Operational costs include running costs of new equipment and new software (a VMI solution for vendor, and potential adjustments in buyer system), IT support for VMI solution, and electronic data interchange (EDI) costs to service provider.

In addition, if consignment is part of the deal\(^2\), running costs also include inventory carrying costs for suppliers.

---

**VENDOR**

**VMI savings calculator for Vendor**

One handy tool to estimate the net benefits (all potential savings minus all potential costs) from switching to VMI is to use a VMI savings calculator. This is a strategic level tool for defending the business case to your partners or your management board. For example, a simple Excel-based calculator created by Telema can be used. The **Telema VMI Savings Calculator** includes separate models for buyers and vendors.

In Telema VMI Savings Calculator for the Vendor, all cells in blue are cells that should be filled with relevant data for the specific company (the numbers there are just an example). For Vendor, the following should be entered as inputs:

- VMI share of all business,
- total sales and sales margin,
- accounts receivable,
- transportation costs, and
- weighted average cost of capital.

For calculator to work, the user should estimate the extent of VMI benefits. For vendor, these are in three categories: Accounts receivable (AR) reduction, reduced transportation costs and increased sales.

Next, both initial investment and ongoing average annual operational costs should be estimated. As explained in previous chapter, vendor bears bigger initial setup costs than buyer, as the technological solution will be set up at the supplier. The resulting savings calculation for Vendor is depicted on Figure 8.

---

\(^2\) **Large retailers may rely on their leverage to pressure the vendor into consignment deals. These customers own the current inventory at their locations. Once the consignment agreement has been settled, customers still have inventory at their locations but the capital of the inventory is disengaged. By entering into consignment agreements with supplier, customers are effectively transferring their inventory carrying cost and capital opportunity cost to that supplier.**
Figure 8. Sample Vendor VMI calculations using Telema VMI Calculator

Just like for vendors, it is useful to have a handy tool to estimate the net benefits (all potential savings minus all potential costs) from switching to VMI for buyers. The Telema VMI Saving Calculator is a strategic level tool for defending the business case to your partners or your management board.

As in Vendor calculator, all cells in blue are cells that should be filled with relevant data for the specific company (the numbers there are just an example). For Buyer, the following should be entered as inputs:

- VMI share of all business,
- current inventory on hand,
- annual sales and sales margin,
- number of purchase orders and order processing cost per order
- weighted average cost of capital.

For calculator to work, the user should estimate the extent of VMI benefits. For buyer, these are in three categories: inventory reduction, reduced order processing costs and increased sales.

Next, both initial investment and ongoing average annual operational costs should be estimated. As explained in previous chapter, buyer bears less costs than vendor in setting up the VMI system, as the technological solution will be set up at the supplier. The resulting savings calculation is depicted on Figure 9.
2.1.3. Risk analysis

While there are numerous benefits of VMI (see Figure 7), some concerns have to be taken into account. Out of ten VMI implementations, only three or four achieve great success, three or four reap some benefits but not as much as anticipated, and two or three fail. The confidentiality of information sharing between retailer and supplier, the risk of loss of control by the retailer, the potential increase in vendor’s administrative cost and less than expected benefits for supplier are the major potential shortfalls of VMI.

[Carlo said he will improve this chapter]
Figure 10. Risk and mitigation plan during VMI implementanation

*Figure under construction, input welcome.*

**Business Case chapter needs conclusion, something like:**

After having the financial feasibility and operational feasibility as well as risk analysis covered, the project manager is ready to present the case to top management.

### 2.2. Plan VMI project: time and resources

Very important for the success of a project is its well-planned communication. For that, it is advisable to choose a name for the project, determine the time frame (start and end dates), write a short business overview, clearly define the goals of the project, divide roles and duties of project, and plan for communication (who is informed when about what).

**Plan: team, schedule and resources**

- Appoint a strong project manager and determine project organization.
- Compose the project time schedule: define clearly who, when and what should do.
- Allocate the required resources: finances, time, and personnel.

In early stages, it is appropriate to advise two to three members of the management team before officially presenting the business case. This lobbying work is very important for the further project stages. It results in relevant feedback, which may be helpful in both the decision-making meeting and subsequent meetings with the partner.

A project plan should be put in writing, outlining the work to be performed. During planning phase, a team should prioritize the project, calculate a budget and schedule, and determine what resources are needed. Resources’ tasks are distributed and teams are informed of responsibilities. The project plan should also describe which questions will be answered in what stages of the project. Table 1 describes the factors important for successful change project execution.

**Table 1. Success factors for change projects**

<table>
<thead>
<tr>
<th>SUCCESS FACTORS IN CHANGE PROJECTS</th>
<th>SUCCESS FACTORS IN CHANGE PROJECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong and consistent support and commitment from top management is provided</td>
<td>Adequate composition of the change team (in both breadth and knowledge)</td>
</tr>
<tr>
<td>Strategic alignment with company strategic direction – objectives for the project is defined</td>
<td>Availability of resources (establishing resource base on front end), including the finances</td>
</tr>
<tr>
<td>Compelling business case for change with measurable objectives, i.e. clear cost/benefit analysis is available</td>
<td>Employee involvement (through communicating and empowering), i.e. users of the VMI solution are involved in the implementation stage</td>
</tr>
</tbody>
</table>
2.2.1. VMI project schedule

The **project schedule** is the tool that communicates what work needs to be performed, which resources of the organization will perform the work and the timeframes in which that work needs to be performed. The project schedule should reflect all of the work associated with delivering the project on time. Without a full and complete schedule, the project manager will be unable to communicate the complete effort, in terms of cost and resources, necessary to deliver the project.

For VMI, it is estimated that it can take 6-8 months elapse from the initial idea to the review. The actual planning phase can be completed in just a few weeks.

*A graph with steps and appropriate time periods would be nice here, like this:*

<table>
<thead>
<tr>
<th>Evaluate</th>
<th>Plan</th>
<th>Agree terms</th>
<th>Align processes, set up system</th>
<th>Test system</th>
<th>Pilot/train/modify</th>
<th>Onboard partners</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>2nd</td>
<td>3rd</td>
<td>4th</td>
<td>5th</td>
<td>6th</td>
<td>7th</td>
</tr>
<tr>
<td>8th</td>
<td>9th</td>
<td>10th</td>
<td>11th</td>
<td>12th</td>
<td>13th</td>
<td>14th</td>
</tr>
<tr>
<td>15th</td>
<td>16th</td>
<td>17th</td>
<td>18th</td>
<td>19th</td>
<td>20th</td>
<td>21st</td>
</tr>
<tr>
<td>22nd</td>
<td>23rd</td>
<td>24th</td>
<td>25th</td>
<td>26th</td>
<td>27th</td>
<td>28th</td>
</tr>
<tr>
<td>29th</td>
<td>30th</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 11. VMI setup project approximate timeline**

*(explain the figure, make it bigger)*

It is recommended that the project stages be coordinated and implemented jointly. Prior to the actual 6-stage process, the commitment of both management teams to joint clarification of any issues related to VMI implementation is required. Without such commitment, the chances of the project being on time, commercially advantageous and delivering sustainable success for both parties are small.

2.2.2. VMI project organisation

Implementing VMI involves many departments across both vendor’s and retailer’s organisations. For VMI project, a possible organisational structure is as depicted on Figure 12. In this case, the vendor and retailer determine the project team after jointly deciding in favour of a VMI solution. The project team includes employees responsible for implementation. After implementation, vendor’s customer services department is in charge for the day to day operation.
The **VMI project manager** has overall responsibility for the project. He reports to the project committee and / or project sponsor, who in turn informs the clients. The individual employees involved in project from various departments both on the vendor’s and retailer’s side, are given their tasks and deadlines by the project manager. They in turn report back to the project manager on the status of their work.

Due to the fact that two parties (vendor and buyer) are involved in the project, it is recommended that a project sponsor be elected. He reports to the management and the project committee and coordinates the project team. Although all parties have responsibility for the success of the project, the role of the project sponsor is of particular importance. He is not only at the top of the project hierarchy, but must also ensure that one of the most frequent reasons for projects failing is avoided, namely lack of support from the top management of the participating companies. More about key success factors in VMI projects can be found in Chapter 4.

### 2.2.3. Project team skills and responsibilities

Responsibilities for each activity in a VMI project should be assigned to specific team members. The RACI model brings structure and clarity to describing the roles that project team members play in a project. RACI model is a matrix that clarifies responsibilities and ensures that all activities will be done.

To apply the RACI model, all activities should be listed, and for each activity then specified who is **Responsible**, who is **Accountable**, and where appropriate, who needs to be **Consulted** or **Informed** (see panel on the right for explanations).

Using a RACI model promotes common understanding of processes related to implementing VMI. A sample RACI chart describing implementing VMI is shown in Table 2.

As a rule, only one person (role) should be accountable for each process. However, several persons may be responsible for, consulted on or informed about an activity. It may also happen that a person is at the same time accountable and responsible for an activity.

---

**Figure 12. Suggested Project organisation for an VMI project**

RACI chart uses the following definitions:

- **Responsible** – for the actual implementation. The person who takes the initiative for implementation (by others) or who himself implements the activity. This is also interpreted as responsibility in the disciplinary sense.

- **Accountable** – for costs with responsibility in the sense of «approval», «granting» or «signing». The person who is responsible in the legal or commercial sense. This is also interpreted as responsibility from a cost centre point of view.

- **Consulted** – advisory role (specialist responsibility). A person who is consulted for advice. This is also interpreted as responsibility from a technical standpoint.

- **Informed** – to be informed (right to be given information). A person who receives information about progress and / or the outcome of an activity, or who has the right to be informed.
Table 2. RACI responsibilities chart for VMI project

<table>
<thead>
<tr>
<th>Task</th>
<th>Project manager</th>
<th>Customer manager</th>
<th>IT manager</th>
<th>Marketing</th>
<th>Sales</th>
<th>Customer services</th>
<th>Master data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Define target categories and suppliers</td>
<td>R / A</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>Compare master data with customer</td>
<td>R / I</td>
<td>A</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>A</td>
</tr>
<tr>
<td>Specify business processes</td>
<td>R / A</td>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specify technical processes</td>
<td>R / C</td>
<td>C</td>
<td>A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Visualise IT systems architecture</td>
<td>A</td>
<td>I</td>
<td>R</td>
<td></td>
<td></td>
<td>I</td>
<td>I</td>
</tr>
<tr>
<td>Error handling in goods delivery</td>
<td>R / I</td>
<td>R</td>
<td></td>
<td></td>
<td></td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>Specify KPIs and project review</td>
<td>R / A</td>
<td>C</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C</td>
</tr>
</tbody>
</table>

- **R** Responsible for execution
- **A** Accountable for implementation
- **C** Consulted for agreement and coordination
- **I** Informed about project progress

The main skills needed for the VMI project manager are:

- Deep process understanding regarding ordering process
- Understanding different approaches of planning process
- Understanding how promotions impact the regular business
- Interface management skills
- Skills do develop test procedures,
- Skills to develop exception reports to monitor the day to day operation and standard reports for internal and external use
- Listening skills
- Execution skills (make things happen)
- Delivery on time (to be a role model for the team)

In case those skills are not available, it is strongly advised to acquire external support. Many management consultancies, EDI service operators and VMI solution providers can help with professional VMI project management support. This will greatly mitigate the go-live risk.

2.3. Select VMI target categories and products
2.3.1. Which suppliers to include in VMI program?

Past experience with the implementation of various VMI projects highlights that any previous collaboration on optimization (efficient product introduction, efficient promotions and efficient placement) facilitates VMI implementation, as the parties already know and trust one another.

With what type of companies and products will VMI work? A popular belief is that VMI is valuable only for high-volume items with relatively stable, predictable and repetitive demand to justify the additional investment required for starting VMI (Cooke, 1998). WalMart and Procter&Gamble have had a VMI program together for over 25 years to manage the inventory and production of disposable diapers with great success. Inventory turns doubled, WalMarts' operating costs fell, and P&G’s market share grew.

Clark & Hammond (1997) and Deakins (2008) both show that VMI is more difficult to implement when demand is volatile or not reasonably predictable (fashions, seasonal foods, etc.). Disney & Towill (2003a) studied the effect of VMI on the bullwhip effect for both low- and high-volume production and showed that VMI has positive effect on both low-volume and high-volume products.

There are industries where the volatility of consumer demand, local conditions or market size dictate that the buyer should retain control of inventory replenishment. This was the case with K-Mart, which after reducing the number of vendors it worked with (from 300 to 50) and implementing VMI discovered that its own buyers could do a better job of forecasting consumer demand in certain circumstances. Some market conditions do not make VMI the best solution and tailored/hybrid approaches need to be explored.

Niranjan et al. (2012) have developed a toolkit for practitioners that enable managers to determine whether a company is ready for VMI. They list fifteen determinants divided in three different areas: 1) buyer specific, 1) product specific and 3) vendor specific prerequisites (see Figure 13).

![Target categories and products](image)

**Figure 13. The 15 features that affect an organization's readiness for VMI**

Source: Adopted from Niranjan, Wagner and Thakur-Weigold, 2011

For example, Niranjan et al state that a retailer for whom purchasing is the core competency would be reluctant to adopt VMI and may insist on retaining the traditional purchase orders. The criteria marked with stars on Figure 13 are those that can be improved/changed. For example, good information and
communication system may not yet be in place, but can be built over time. Willingness to share information is also a matter of decision.

The authors of the current manual believe that in addition to the 6 starred criteria, there are others than can be influenced. Eg, if “standard product identification” is not yet in place, this can be instituted. On vendor side, both “advantages evident to both vendor and buyer” and “vendors are willing to cooperate” are criteria that can be influenced through communication and enlightenment, through sharing VMI-related information. One potential tool for that communication is the manual at hand.

Franke has studied VMI adoption in X industries and carried out a survey about buyer choosing list suppliers for the VMI program. Although in another industry, the results are usable also in FMCG sector. When deciding on which partners to include in the VMI program, we suggest to look at the issues listed in Table 3

Table 3. Issues to consider when choosing trade partners for the VMI program

<table>
<thead>
<tr>
<th>If you are a BUYER, consider the following issues</th>
<th>If you are a VENDOR, consider the following issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location of the supplier</td>
<td>Location of the retailer</td>
</tr>
<tr>
<td>Category of products supplied (ie, milk vs clothes)</td>
<td>Volume of trade/margin with particular supplier</td>
</tr>
<tr>
<td>Volume of trade/margin with particular supplier</td>
<td>Volume of trade/margin with particular retailer</td>
</tr>
<tr>
<td>Past relationship experience (length, quality)</td>
<td>Past relationship experience (length, quality)</td>
</tr>
<tr>
<td>Past delivery reliability</td>
<td></td>
</tr>
<tr>
<td>Share of promotional sales vs regular sales</td>
<td></td>
</tr>
</tbody>
</table>

For VMI rollout, it might be useful to reduce the number of suppliers to get the critical volume. The purchasing department should evaluate and decide which vendor relationship should be strengthened to get more benefit out of it.

2.3.2. Min/Max stock levels for VMI products

For products included in the VMI program, the next step is to determine Min/Max stock levels for products. The Min/Max method was one of the earliest automated inventory replenishment methods used in enterprise software dedicated to inventory management. The “Min” value represents a stock level that triggers a reorder and the “Max” value represents a new targeted stock level following the reorder (see Figure 14).

For VMI rollout, it might be useful to reduce the number of suppliers to get the critical volume. The purchasing department should evaluate and decide which vendor relationship should be strengthened to get more benefit out of it.

2.3.2. Min/Max stock levels for VMI products

For products included in the VMI program, the next step is to determine Min/Max stock levels for products. The Min/Max method was one of the earliest automated inventory replenishment methods used in enterprise software dedicated to inventory management. The “Min” value represents a stock level that triggers a reorder and the “Max” value represents a new targeted stock level following the reorder (see Figure 14).

Figure 14. Min/Max inventory system

The Min/Max method tracks the current total stock level, which is typically the sum of the stock-on-hand plus the stock-on-order for every single SKU (product). When total stock reaches the Min value, a reorder is
triggered. The reorder quantity targets the Max value for the new total stock level, hence in simplest form, the reorder quantity is the difference between Max and Min (i.e. Max minus Min).

A number of approaches may be used to determine the size of Min and Max inventory levels. The Min/Max levels may be set manually or automatically (by a download from an ERP system).

There are many ways of calculating the min max levels for particular products. To calculate min max levels, most models need:

1. the replenishment lead time,
2. service level required,
3. order frequency, and
4. historical weekly demand.

**Dynamic Min/Max quantities.**

In its original form, Min/Max ordering was considered to be a fairly static method of inventory control where the Min/Max values were rarely changed, maybe a few times per year. Marquès et al. (2010) have proposed that the defined Min/Max quantities should be dynamic and follow the seasonality and sales of the products for better performance. This principle is supported also by Claassen, van Weele, & van Raaij (2008), who studied five cases in different industries, and Henningsson & Lindén (2005), who studied Ikea’s VMI approach, concluding that dynamic arrangement for minimum and maximum inventory levels should be preferred over static ones.

**Less wellknown fact:** the target Min/Max values may be expressed in addition to units also in days of sales (DOS). Having Min/Max values in days of sales rather than in units makes them automatically dynamic. However, not all systems are able to handle Min/Max values in DOS.

For DC VMI (Vendor to Buyer Distribution Center): It is advisable to use minimum and maximum targets in days of sales (DOS).

- It is not smart to set very low targets right away, instead, a 3-phase project with gradually lower stock levels is recommended in order to not risk product availability.

For DSD VMI (Vendor to Buyer individual shops): It is advisable to use minimum and maximum targets in units.

- Smaller shops have lower target stock levels than bigger (or better located) shops. In case the demand of the better selling shops is higher than one trade unit (TU) per week, it is recommended to increase the frequency of delivery to ensure product availability.

**2.3.3. Determining delivery units /DC VMI full truck loads**

Once Min/Max levels are set for products, next step is to define the ideal replenishment quantity for each product, taking into account existing stock levels and availability requirements. Ideally, full pallets are shipped to the customer and delivered together with other products as a full truck load. Unfortunately, this is not always possible, so the aim must be to optimise the ratio of logistics handling costs and the average inventory level in transportation units or money.

As a rule, the volume of promotions is underestimated. In many business relationships, promotions account for a big share and have also a direct impact on sales of standard products. Figure 15 illustrates how sales of the standard product fall during a promotional campaign. Such massive fluctuations in sales must be analysed prior to technological implementation. It is advisable to use 26 weeks of information. Based on the results, the correct inventory Min/Max settings must then be aligned with the sales and planning department and programmed.
To determine weekly replenishment quantities and units, an analysis based on historical data should be carried out. Weekly consumption (in cases) is compared with the standard pallet size. If the weekly requirement is a multiple of the standard pallet size, the conditions for sustainable and successful VMI process optimisation for both business partners are in place. In Table 4, items marked in green are obvious candidates for full pallet deliveries due to the high weekly demand. Some items, which have also been defined as suitable for VMI (marked in amber) are delivered in individual cases to ensure freshness. Items highlighted in red are also part of the defined VMI product range, but will be replenished as display or layer.

Table 4. Determining weekly replenishment needs and delivery units

<table>
<thead>
<tr>
<th>Vendor item no.</th>
<th>Item description</th>
<th>Cases per pallet</th>
<th>Average weekly consumption in cases</th>
<th>Pallets per week</th>
<th>Optimal delivery unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>10103</td>
<td>Pluto 58g</td>
<td>72</td>
<td>324</td>
<td>4.5</td>
<td>Full pallet</td>
</tr>
<tr>
<td>10104</td>
<td>Pluto minis 1kg</td>
<td>125</td>
<td>185</td>
<td>1.5</td>
<td>Full pallet</td>
</tr>
<tr>
<td>10120</td>
<td>Pluto miniatures 75g</td>
<td>125</td>
<td>325</td>
<td>2.6</td>
<td>Full pallet</td>
</tr>
<tr>
<td>10121</td>
<td>Pluto miniatures 150g</td>
<td>125</td>
<td>23</td>
<td>0.2</td>
<td>Case</td>
</tr>
<tr>
<td>10125</td>
<td>Pluto miniatures disp. 1,500g</td>
<td>4</td>
<td>480</td>
<td>120.0</td>
<td>Display</td>
</tr>
<tr>
<td>32120</td>
<td>Long grain rice 1,800g</td>
<td>72</td>
<td>36</td>
<td>0.5</td>
<td>Case</td>
</tr>
<tr>
<td>32200</td>
<td>Long grain rice 900g</td>
<td>144</td>
<td>933</td>
<td>6.5</td>
<td>Full pallet</td>
</tr>
<tr>
<td>42321</td>
<td>pro.activ.milk</td>
<td>72</td>
<td>133</td>
<td>1.9</td>
<td>Full pallet</td>
</tr>
</tbody>
</table>

On the basis of this evaluation, the decision can be made which delivery unit (e.g. full pallet, display, unit or case per item) is triggered to ensure that the target DOS (days of sales) is not exceeded. Minimum stock or reserve stock is assumed, which covers the average requirement for X days. If the response time is short, i.e. the products in demand are regularly supplied; the reserve stock may cover two to four days. If replenishment takes longer, or occasional delivery interruptions are expected, the minimum stock should cover at least one week.

This calculation also facilitates the calculation of the weekly delivery volume. In addition, an optimised order / delivery rhythm is derived, which must then be discussed in detail with the partner. These parameters, which have been optimised in transport terms, can be stored in the VMI solution or the company’s own ERP system and fixed settlement prices (e.g. shuttle tariff & express surcharge) defined together with the logistics service provider. By managing full truckloads, transport costs are cut where too many partial deliveries were previously triggered by the retailer.
Automatic exchanges of up-to-date stock data and sales figures make it possible to optimise the order date in the continuous replenishment process. This results in sensible order volumes, i.e. full pallets, which are delivered daily together with other products of the vendor as full truck load deliveries. (However, it is mandatory for these to be coordinated with the retailer in advance (specify in VMI contract), so that unnecessary stock is not increased on the retailer’s side or the best-before-date problem exacerbated.)

<table>
<thead>
<tr>
<th>Type</th>
<th>Full truck load (FTL)</th>
<th>Weekly requirement in pallets</th>
<th>No. of pallets / truck</th>
<th>Maximum weight</th>
<th>Leadtime for repl.</th>
<th>Combination options</th>
<th>FTL tariff in EUR</th>
<th>Express surcharge in EUR</th>
<th>No. of loads per week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road</td>
<td>Confectionery</td>
<td>52</td>
<td>34</td>
<td>18t</td>
<td>12hrs</td>
<td>Non-</td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Road</td>
<td>Non-perishables /</td>
<td>128</td>
<td>34</td>
<td>18t</td>
<td>12hrs</td>
<td>Non-</td>
<td></td>
<td></td>
<td>3 plus</td>
</tr>
<tr>
<td>Rail</td>
<td>Non-perishables /</td>
<td>54</td>
<td>64</td>
<td>28t</td>
<td>24hrs</td>
<td>Non-</td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Road</td>
<td>Promotions</td>
<td>Ad hoc</td>
<td>34</td>
<td>18t</td>
<td>48hrs</td>
<td>Non-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>Weekly</td>
<td>234</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Now that the consignment volume and consignment frequency (order/delivery rhythm) have been defined, the optimum weekly delivery schedule can be prepared with the customer. A distinction may be made between delivery by rail or road, depending on the product range.

**Table 5. Sample delivery schedule**

<table>
<thead>
<tr>
<th>Type</th>
<th>Product range</th>
<th>Mon</th>
<th>Tues</th>
<th>Wed</th>
<th>Thurs</th>
<th>Fri</th>
<th>Sat</th>
<th>Sun</th>
</tr>
</thead>
<tbody>
<tr>
<td>Road</td>
<td>Confectionery, chilled</td>
<td>10.30</td>
<td></td>
<td>10.30</td>
<td></td>
<td>10.30</td>
<td></td>
<td>10.30**</td>
</tr>
<tr>
<td>Road</td>
<td>Confectionery, chilled</td>
<td>15.30*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>Non-perishables</td>
<td>9.00</td>
<td>11.00</td>
<td>9.00</td>
<td>11.00</td>
<td>9.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>Non-perishables</td>
<td>23.00***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>Promotions</td>
<td></td>
<td>23.00***</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Road</td>
<td>Promotions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Reserve delivery slot for additional quantities

** Reserve delivery slot after discussion with goods-in department

*** Reserve delivery slot for rail transport

**** After discussion with goods-receipt department

Explanation: an additional reserve delivery slot is defined for each day to ensure that ramp capacity is not overextended if additional quantities are required and other suppliers do not face delays as a result. With regard to promotion quantities, separate delivery slots should ideally be defined.

### 2.3.4. Product Master Data

Accurate master data management is a prerequisite for vendor managed inventory. In master data management
(MDM), business and IT work together to ensure the uniformity, accuracy, stewardship, semantic consistency and accountability of the enterprise’s official shared master data.

Master data relevant to VMI includes product related master data and location related master data. It is important that vendor and buyer are able to exchange product-related master data accurately and timely.

All retailers need product master data (product attributes like codes, sizes, colors, units, prices etc) from vendors. Most retailers have established a certain form (often in Excel) on which all required data about all products needs to be sent. Often these requirements are more extensive than vendors’s ERPs can provide.

Regarding VMI, there are a few product master data attributes that will be additional to those required without VMI, most importantly, the Min/Max stock levels for each product.

**Table 6. Product Master Data relevant in VMI program, on trade unit level**

<table>
<thead>
<tr>
<th>Field</th>
<th>Explanation</th>
<th>Sample value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GTIN</td>
<td>Global Trade Item Number</td>
</tr>
<tr>
<td>2</td>
<td>Description</td>
<td>Item description</td>
</tr>
<tr>
<td>3</td>
<td>CU</td>
<td>Consumer Unit</td>
</tr>
<tr>
<td>4</td>
<td>TU</td>
<td>Trade Unit</td>
</tr>
<tr>
<td>5</td>
<td>LU</td>
<td>Logistics Unit</td>
</tr>
<tr>
<td>6</td>
<td>CU / TU</td>
<td>CU’s per one TU</td>
</tr>
<tr>
<td>7</td>
<td>TU / LU</td>
<td>TU’s per one LU</td>
</tr>
<tr>
<td>8</td>
<td>Rep. unit</td>
<td>In which units will the item be ordered</td>
</tr>
<tr>
<td>9</td>
<td>Promo</td>
<td>Item in promo or not</td>
</tr>
</tbody>
</table>

**Product Master Data** needs to be synced with vendor and buyer accurately and timely to ensure the success of the VMI program.

Product master data is one of the complex data to manage. There are many providers offering solutions to manage master data effectively. Organizations have to choose right PDM product which is easy to configure, is highly customizable, extensible and at the same time upgradable. A sophisticated PDM implementation can have dramatic effects on revenue and increasing profit. The leading 15 PDM software solutions are listed here: [http://www.cpcstrategy.com/blog/2015/02/15-pim-software-retailers/](http://www.cpcstrategy.com/blog/2015/02/15-pim-software-retailers/)

**Table 7. Location master data needed in VMI process**

<table>
<thead>
<tr>
<th>Field</th>
<th>Explanation / Sample value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Ship to address GLN</td>
<td></td>
</tr>
</tbody>
</table>
2.4. Terms: Set Goals and Terms (VMI Contract)

When product range for VMI identified, volumes and delivery schedules determined, these should be agreed in writing. A VMI contract or a VMI appendix to existing trade contract should be prepared, discussed and signed. A VMI agreement should include six major chapters (see Figure 16).

Figure 16. Main chapters in VMI contract

Here a couple of paragraphs are needed, referring to appendix where the sample contract is.

A comprehensive sample VMI contract can be found in Appendix X.

2.4.1. KPI-s for measuring the success of VMI project

For the VMI project to work, it is necessary to set common goals and use clear key performance indicators (KPIs) from the start of the project. KPIs are a set of measures focusing on those aspects of performance that are the most critical for the current and future success of the project. The benefits of the VMI program are normally evaluated against a set of performance measures such as shown on Figure 17.
A special survey about which KPIs should be used in VMI projects was carried out in 2014 among the ECR member companies in Europe by Tallinn University of Technology. 33 experts answered, identifying two major VMI project KPI groups:

1. **Inventory level**, measured in days of supply (DOS)
2. **Availability**, measured by on-shelf availability (OSA)* and out-of-stock (OOS).

*For central warehouse VMI programs, the warehouse availability (fill rate) is often used.

### 1. VMI KPI: Inventory level

Inventory efficiency is often measured by inventory turnover (ITO). ITO is a ratio showing how many times a company’s inventory is sold and replaced over a period. The **Inventory Turnover** is calculated as

\[
\text{Inventory turnover ITO} = \frac{\text{Cost of Goods Sold}}{\text{Average Inventory}}
\]

The higher the inventory turnover, the fresher the products and the lower the current inventory. Fresher products mean fewer discounts and fewer write-offs because of obsolescence. Lower inventories mean less capital invested into stock and therefore significant savings in cost of capital. Higher turnover and lower inventories also mean potential to widen the assortment and earn more revenues.

**Days of supply (DOS)** could be calculated by inverting the inventory turnover figure and adjusting for units of measure. For example, a turnover of 30 (thirty times per year) would be equivalent to a time-supply of 1/30 year or 365/30 = 12 days of supply. However, the turnover ratio is based on the cost of sales for the past period and on the average inventory investment in euros. Aggregate euros and a historical view are not useful to operations, which needs to match supply and demand of specific items in the future.

Thus, it is more useful to calculate Days of Supply on item level using units, rather than money:
Generally, smaller days of supply figures are indicative of a leaner, more efficient inventory usage, but this can be carried too far. fragile systems have crashed because of a lack of supply, so the target values should be set carefully.

2. VMI KPI: Availability

Availability is the measure of a product being available for sale to a shopper, in the place he expects it and at the time he wants to buy it. There are different levels of availability:

- **On-Shelf Availability (OSA).** This is the measure which shows that the item is on the store shelf. This measure is used in direct-to-store VMI programs.

- **Warehouse Availability.** The product is available to order from central warehouse to stores. This is the most often used measure in central warehouse VMI programs. A synonym used in industry is **fill rate**.

It is also wise to distinguish between **Product Availability** (measured by product fill rate)—whether a product can be supplied from (store) inventory and **Order Availability** (measured by order fill rate)—whether all products in the order (shopping basket) can be supplied from the (store) inventory.

An **Out of Stock (OOS) event** occurs when, for some continuous time, an item is not available for sale as intended. If the retailer intends an item to be for sale, but there is no physical presence of a saleable unit on the shelf, then the item is deemed to be OOS. The OOS event begins when the final saleable unit of a SKU is removed from the shelf and it ends when the presence of a saleable unit on the shelf is replenished.

There are also various OOS rates calculated in industry, referring to statistical descriptions of collections of OOS events expressed as an **OOS rate**. These attributes include: 1) number of occurrences over time, 2) number of simultaneous occurrences, 3) duration, 4) shelf availability, 5) lost unit sales, 6) lost monetary sales, and 7) number of customers impacted.

However, often the OOS is not measured, as this is considered expensive. The traditional method is to perform a manual audit of the store and manually look for “gaps” on the shelves. A second method makes use of point-of-sale (POS) data or, more specifically, scanner data. Based upon historical sales data, an algorithm is applied to sales patterns to determine whether an item is on the shelf. There are many practical papers written on both OSA and OOS reduction, for example, an ECR Whitepaper as well as the P&G funded study.

**Setting common goals for the VMI project using KPIs**

It is beneficial to agree on common target values of KPIs to be achieved by switching to VMI. There can be many performance indicators that could have agreed target values, but it is useful to include at least one inventory turnover measure and one availability measure (see definitions above). The target values of KPIs can be very motivating, especially if they are agreed in written form, preferably in VMI contract between vendor and buyer.

---


2.4.2. VMI Contract between vendor and retailer

VMI relationship is established usually between partners who have been doing business for some time already. This means that there already exists a trade contract covering terms and conditions of business, possibly a quality agreement and other supplementing agreements. When VMI is implemented, it is necessary to either replace the existing contract or produce a comprehensive VMI appendix to the current contract.

In the VMI agreement, common goals can be agreed, as well as responsibilities and rights clearly allocated. Both parties must be aware that organisational and IT adjustments are required in order to implement the new purchasing method. As VMI agreements are private contracts, they are not regulated by any legal code nor is there any codified structure to conform to. There is useful academic research about standard VMI agreements, the most notable by Zammori et al (2009). While their work focused mainly on supplier-manufacturer consignment VMI, it is still useful with modifications.

Based on research and practice, the topics to be covered in VMI contract can be divided into six major chapters:

1. **Objective and terms of agreement**. In first chapter, the scope of the agreement (Vendor Managed Inventory) and the willingness of both parties to undertake a relationship based on trust is underlined. The service performed by the supplier and the information released by the customer to support it are defined. Additionally, the start and duration of the agreement is specified.

2. **Service Level Agreement (SLA)**. In this chapter, goals of the VMI project are specified in terms of target values for specific performance metrics (KPIs). KPIs shall be tied in with penalties and/or benefits and parties must define the controlling system. Handling of service level problems, especially out-of-stock situations, is covered.

   Zammori: *The SLA is a characteristic section of any logistic agreement (i.e. performance based agreement) where the customer and the supplier commit themselves to attain a predetermined level of performance. This part defines the service which is expected to be supplied by both the customer and the supplier and includes a list of key performance indicators (KPIs) used to quantify and to assess the achieved level of performance. For this reason, KPIs have been tied in with penalties and/or benefits, in order to define congruent bonus-malus incentive system. Furthermore, a chapter has been included which gives the possibility of making periodic inspections to check the preservation of the operating conditions and/or of the quality standards defined in the agreement.*

3. **Agreed assortment and promotions**. Third chapter covers the frequency of assortment reviews, describes handling of changes in assortments and specifies promotions handling.

4. **Delivery terms**. In fourth chapter, delivery slots are defined. Delivery information exchange, emergency deliveries, handling of problems, and labelling standards covered.

5. **Information exchange**. In this chapter, the EDI channels as well as backup strategy described. All EDI messages are listed with their content, sender and frequency. Product master data attributes listed and explained. Necessary information given about VMI locations (warehouses, shops)

---

6. **Miscellaneous.** In the last chapter, most important is the list of contacts for important team members on both sides. Other important legal considerations are covered here: confidentiality, terms of termination of contract and solving of disputes.

It is important to study existing contracts in detail prior to signing the agreement and for the parties to discuss all aspects. Consensus is required on the most important points to avoid entering into additional obligations via the VMI agreement. If the wording of the same contractual points differs in the various agreements, it is advisable to adjust these points in the new agreement to be signed, or expressly stipulate this in an additional agreement to the VMI contract. This procedure provides clarity in terms of the legal basis and helps to focus on the amount of debt and damages in the event of a dispute. In particular, how to handle exceptions and solve problems in the new collaboration should be covered.

A comprehensive sample VMI contract can be found in Appendix X.

Points to consider (not in sample contract currently)

- **VMI trainings**
- **point of transfer of ownership**
- **reliability and shared risk**
- **transfer of services to a third party provider (e.g., transportation by a logistics service provider)**
- **Number of weeks of forecast demand used for planning replenishment levels**
- **Financial aspects of relationship (setup costs sharing, penalties/bonuses if any)**

### 2.5. Align IT and business

![Align IT with business](image)

**2.5.1. Internal and external business process changes**

When product range for VMI identified, volumes and delivery schedules determined, internal process should be reviewed and modified to support the new replenishment strategy. It is advisable to:

- Share experiences with other vendors and business partners who have implemented the vendor managed inventory model.
- Describe target processes and develop a process structure which meets future requirements.
- Identify the required process changes and IT investments in hardware / software.

A retailer implementing VMI will see that many processes have to be changed. There is a research by Reitner et al. (2012) describing those changes in detail. Here we show a simplified version of their work.

29
Table 8. VMI impact on retailer procurement processes.

<table>
<thead>
<tr>
<th>Process Description</th>
<th>Small impact on process</th>
<th>Big impact on process</th>
<th>Outsourced to vendor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition of Procurement Transport Strategy</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Definition of Material Stock Strategy</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Definition of Packaging Strategy</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Determination of Requirements</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purchase Order Processing</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transportation Procurement by Supplier</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Receipt of Goods</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Invoice Processing and Payment Settlement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procurement Market Research</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Evaluation of Suppliers</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Qualification of Suppliers</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Management of Material Stock</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Allocation of Goods</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*(needs to be reviewed. Perhaps a similar table for suppliers added)*

2.5.2. VMI process and EDI documents

A prerequisite for the efficient application of ECR process models is the use of the **globally defined GS1 standards**, which offer a basis for the electronic interchange of data between supply chain partners.

Also, **Electronic Data Interchange (EDI)** is a pre-requisite for successful VMI projects. For trade documents, there are globally many standards. ECR Europe suggests to adopt GS1 EANCOM standards for trade documents. However, even if your trade partner uses a different standard, it should not be an obstacle. Most companies are using EDI operators for connectivity, and conversion of document formats is usually part of EDI operators’ service offering.

Table 9 lists the various messages used in VMI, specifies whether they are optional or mandatory and also the frequency of transfer. The frequency of EDI document exchange differs for VMI DC (Vendor to Distribution Center) and VMI DSD (Vendor Direct Store Delivery). All messages have been explained in more detail in Appendix 3. Description of EDI messages used in VMI.

**Table 9. EDI messages used in VMI and their frequency**

<table>
<thead>
<tr>
<th>Message</th>
<th>Description</th>
<th>DC Delivery</th>
<th>DSD Delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>INVRPT</td>
<td>Inventory Report</td>
<td>daily</td>
<td>at least monthly*</td>
</tr>
<tr>
<td>SLSRPT</td>
<td>Sales report</td>
<td>weekly or monthly</td>
<td>daily</td>
</tr>
<tr>
<td>ORDER</td>
<td>Order</td>
<td>optional**</td>
<td>optional</td>
</tr>
<tr>
<td>DESADV</td>
<td>Despatch advice</td>
<td>with SSCC reference</td>
<td>when delivery occurs (daily, weekly etc.)</td>
</tr>
<tr>
<td>RECADV</td>
<td>Receipt advice</td>
<td>recommended</td>
<td>recommended</td>
</tr>
<tr>
<td>INVOIC</td>
<td>Invoice</td>
<td>with ORDER reference</td>
<td>with ORDER or RECADV reference, when agreed</td>
</tr>
</tbody>
</table>
* and always when stock has been taken
** sometimes mandatory, as retailer’s IT system requires opening an order line in its system

Companies using SAP often exploit message type PROACT (Product Activity). This message combines INVRPT and SLSRPT messages and is therefore well suited for VMI needs. The frequency of exchange in FMCG should be one day.

Not all of listed message types are required for successful VMI. For the DC VMI process, the daily inventory report (or product activity report) is mandatory. It must indicate additions to stock, usage, goods in transit, current stock level (date and time) and retailer orders outstanding. Other message types facilitate the automated replenishment process.

**EDI messages and VMI process**

The process of VMI is compared on Figure 18 to those of traditional (Buyer Managed inventory, BMI) and to Co-managed Inventory (CMI). Depending on model chosen—VMI or CMI, the process and EDI documents used differs somewhat. In both VMI and CMI cases, the buyer forwards sales and inventory data to Vendor, who will analyse the data and make a decision for replenishment.

**Figure 18. Process of replenishment in case of BMI, VMI and CMI**

1. **Buyer Managed Inventory (BMI).** In traditional product replenishment process, the buyer calculates and sends order (ORDER) to vendor. Vendor prepares the order and ships it. With the goods, despatch advice (DECADV) document is sent. The buyer accepts the goods with a receipt advice (RECADV) document. In ideal case, the invoice is based on received quantities so that the processing of invoice is really fast.

2. **Vendor Managed Inventory (VMI).** This revolutionary concept turns the ordering process upside down. The buyer does not need to order anymore, the right and responsibility is shifted to vendor. Buyer sends regularly sales and inventory data (SLSRPT and INVRPT). Sometimes those two are
combined into product activity report (PROACT), especially widespread with SAP users. Vendor calculates the order based on sales and inventory data, and agreed Min/Max levels, prepares the order and ships it. The rest of the process is similar to BMI, ie, in ideal case, there are both DESADV and RECADV documents in use, enabling invoices to reflect actually accepted quantities to make invoice processing efficient.

3. **Co-managed Inventory (CMI).** Co-managed inventory is in between BMI and VMI. It is often used in cases where buyer is not ready to give over the control of replenishment to vendor. Instead of fully deciding replenishment, vendors create order proposals (ORDER PROPOSAL) and do not start picking the orders without waiting for the confirmation from the buyer (in form of VMIORDER). The rest of the process, once again, is the same as in BMI and VMI.

In some countries (eg, Switzerland) there is a practice where products in regular assortment are covered by VMI process (as described on Figure 18) and promotional products by CMI process (on the same figure). For promotional products, the vendor sends an order proposal. Based on that proposal, the buyer sends the VMI order with the exact quantities and respected delivery days. Based on this order, production is scheduled and later the shipments will be combined with regular products’ shipments.

**Agree on EDI communication**

The foundation of a successful VMI program is automated connectivity with your trading partners. The technological interface must be discussed with your trade partners and agreed. In VMI contract (see more in chapter 2.5), EDI documents (and their format) used, transfer channels and protocols must be specified (unless the latter two are already specified in general trade agreement with the partner). In case an EDI operator is used, this should also be agreed in the contract. The connectivity is critical for enabling partner collaboration and for providing the visibility needed to monitor VMI program operations and results.

**Document numbering agreements**

Using VMI, orders will no longer originate in buyer’s system but in supplier’s system. This might create a challenge for the buyer, because corresponding numbers must be set up in its own system for the order (ORDERS). It is recommended that specifically defined number series are used for this purpose.

Where this is not possible, the retailer must generate his own order numbers on the basis of a reference table and enter these separately in the reference table. Retailers who implement a VMI relationship for the first time are strongly advised to allocate sufficient resources to solving this particular issue.

To ensure a smooth process, it is important that the order is entered in the retailer’s warehouse management system as early as possible. This guarantees that all parties involved in the process are aware of the next delivery, especially in the case of out-of-stock situations.

2.5.3. **VMI technological solution**

In order to set up and maintain an effective VMI program, companies should invest in a supply chain solution that offers visibility and control across all supply chain links. A good VMI solution should have the following features (see Figure 19):
1. **Provide inventory visibility.** Enable retailers to share both sales and demand data (forecasts) with suppliers. Provide near real-time inventory visibility across warehouses, shops, hubs, suppliers, and in-transit inventories.

2. **Enable automatic replenishment.** Calculate stock balances and create automatic replenishment orders, taking into account the agreed Min/Max levels and delivery frequencies.

3. **Provide audit trails.** Provide audit trails for visibility into transaction history for liability management and dispute resolution.

4. **Offer connectivity (EDI).** Offer connectivity options that allow partners to communicate with majority of their partners—from sophisticated multinational companies to small enterprises.

5. **Monitor and report.** Provide exception-based configurable alerts, so that all parties are notified of potential inventory problems. Offer monitoring logs and analytical reports that give an overview of the inventory management process.

When choosing a VMI technological solution, there are two options: 1) Integrated VMI/ERP Solution or 2) Standalone VMI Solution.

### INTEGRATED VMI SOLUTION

<table>
<thead>
<tr>
<th>POSITIVE ASPECTS</th>
<th>NEGATIVE ASPECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Changes to master data are immediately available for VMI functions.</td>
<td>Initially setting up a new process is very time-consuming.</td>
</tr>
<tr>
<td>Short-term sales fluctuations are immediately evident for demand planning.</td>
<td>A long project lead time is required for discussing any missing and additional functions with central IT teams in advance and installing them.</td>
</tr>
<tr>
<td>No separate system; key users and other users use the same system for warehouse management and order processing.</td>
<td>Higher initial investment required.</td>
</tr>
</tbody>
</table>

The integrated VMI/ERP solution has an automated replenishment functionality module that can handle multiple inventory locations. Order processing in warehouse management is part of the ERP system and does not require additional interfaces. The pros and cons of the integrated solution are listed on Figure 20.

The standalone VMI solution is recommended when the ERP solution has no automated replenishment functions or cannot handle multiple stock locations. The required functionality in that case is delivered in a stand-alone solution. Order processing is via interfaces to the ERP system and independent of warehouse management. The pros and cons of the integrated solution are listed on
The stand-alone option can be a pragmatic initial approach, followed by a subsequent switch to integrated solution. More issues to consider:

- **Frequency of assortment changes.** If product ranges are subject to seasonal changes (e.g. clothing) or products are quickly replaced by new products (e.g. computer industry), an integrated version is more advantageous.

- **S&OP structure/integrated demand planning.** If the organisation is geared to tight stock management, it is mandatory for the VMI solution to be directly linked to the purchasing or production system, as this will facilitate a swift response to increased demand or sluggish sales.

**E2Open: Stand-alone solution providers typically have extensive experience enabling B2B connectivity with suppliers, and are able to provide the relevant training and technologies needed to get them up and running quickly. As a result, the overall solution is less expensive to implement and maintain for both companies and their partners. Finally, on-demand solutions allow your organization to shift focus to inter-company collaboration (a cornerstone of effective VMI)—and away from procuring, installing, and maintaining hardware and software systems internally.**

**There are many VMI tools providers to choose from, see Appendix**

### 2.5.4. Set up and test the VMI solution

The VMI solution should be set up by the VMI project team: representatives from sales and logistics and together with the later key users. Actual implementation (technological realisation) can be completed in about one month.

Plan the VMI solution setup in two phases:

1. **Test** phase provides the opportunity for project members to learn how to handle the new system parameters for individual items.

2. After this learning phase, all items can then be entered on the system for the **live** environment.

**Develop data history**

- Upload at least 12 weeks of data to the management tool.
- Manually supplement missing weeks and OOS situations in the management tool.
- Highlight promotional products separately.
Map EDI messages, set up EDI connection

First, make sure you have agreed both on product master data (Min/Max levels, ordering and delivery units) and its communication (channels, frequency) with your partner.

Next, the individual EDI message types must be mapped and tested. Many retailers have described their VMI process in detail (for example, see figure x), this should be adapted to the company-specific requirements.

Back-up: Define and describe the back-up processes.

Finally, the back-up process is documented as a precaution in case the EDI communication between vendor and retailer should fail for several days. In this case, the minimum precautionary measure is for stock from the retailer’s warehouse to be transferred to the vendor, for example in an Excel file sent by e-mail. This makes it possible for the vendor to correct stock levels manually, generate the relevant order proposals and trigger the daily replenishment processes to prevent an OOS from occurring in the retailer’s warehouse.

Testing

The VMI system needs to be tested prior to real-life deploy. Sometimes test environments for VMI are available in ERP systems (e.g., SAP). It is recommended that the last 12 weeks of history be built up on the basis of the inventory report. This means that various aspects of the new processes are tested and at the same time, any errors (e.g. in EDI mapping, master data or transmission of incorrect stock levels) are eliminated between the parties. Figure 22 shows a sample test plan for VMI setup.

<table>
<thead>
<tr>
<th>Test activities</th>
<th>W1</th>
<th>W2</th>
<th>W3</th>
<th>W4</th>
<th>W5</th>
<th>W6</th>
<th>W7</th>
<th>W8</th>
<th>W9</th>
<th>W10</th>
<th>W11</th>
<th>W12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determine test case</td>
<td>t</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Make test data available</td>
<td>t</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prepare test script</td>
<td>t</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carry out test</td>
<td></td>
<td>t</td>
<td>t</td>
<td>t</td>
<td>t</td>
<td>t</td>
<td>ok</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test interface</td>
<td></td>
<td>t</td>
<td>t</td>
<td>t</td>
<td>t</td>
<td>t</td>
<td>t</td>
<td>ok</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test history</td>
<td></td>
<td>t</td>
<td>t</td>
<td>t</td>
<td>t</td>
<td>t</td>
<td>ok</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test ordering /invoicing</td>
<td></td>
<td>t</td>
<td>t</td>
<td>t</td>
<td>t</td>
<td>t</td>
<td>ok</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>System availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Development system</td>
</tr>
<tr>
<td>Test system</td>
</tr>
<tr>
<td>Production</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Availability of testers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tester 1, Ms Muller</td>
</tr>
<tr>
<td>Tester 2, Mr Jaggy</td>
</tr>
<tr>
<td>Tester 3, Mr Walther</td>
</tr>
</tbody>
</table>

Planned testing | t  |
Planned acceptance | ok |
Resource available | a  |
Resource not available | n  |

Figure 22. Sample test plan for VMI setup

On Figure 22, first test activities, then system availability and tester availability is described. Test activities include preparation (determine test case, make test data available and prepare test script) and actual testing. Carrying out the test includes also evaluation and correction of errors. The test steps are:

- Test interface (transfer inventory report, sales report, invoices)
- Test history
  - Is the history built up correctly based on the inventory report?
- Are stockouts processed according to the system settings
- What happens when quantities on inventory report are not reported in whole number?
  (one suggestion is to round those down to nearest integer)
- Test ordering / invoicing
  - Are the order proposals calculated sensibly?
  - Does the order proposal comply with the system settings defined (FTL or only full pallets)?
  - Are only items actually delivered invoiced?

System and personnel resources availability is shown on the same picture for better overview. Planned acceptance dates are colored in green and marked with “OK”.

2.6. Rollout: Pilot and On-board Partners

Rollout: pilot and onboard partners

- Choose a suitable pilot partner. Plan and execute VMI implementation well, make it your success story.
- Communicate the project in both companies. Emphasise the objectives and benefits to gain full support from all stakeholders.
- Involve key users, train all parties and go live.
- To get the most out of the VMI project, select and implement additional VMI partnerships.

2.6.1. Pilot your VMI program

Choosing the correct VMI pilot partner is of big importance for the success of the project. In case it goes well, you can use it as a success story to convince your other trade partners to switch to VMI as well. The best “sales” argument is a well-working partnership.

Before choosing your pilot VMI partner, you have already sorted all your suppliers into “VMI-suitable” and “non-VMI suitable” suppliers. The main criteria are listed in chapter 2.3.1. Criteria include both the product range a specific supplier is providing as well as on specifics of the supplier as a company. Additionally, the relationship between the companies is very important. Not only the volume of trade, but also the quality of the relationship. One of the prerequisites for successful VMI projects is trust.

Besides suitable product range and existing trustful relationship, it is also important to consider technical questions. Does your business partner have the right skills and technical base to implement needed changes to processes?

Implementation of VMI assumes that both partners have the basic skills relating to and Master Data Management (read more in chapter 2.3.4) and Electronic Data Interchange (read more in 2.5.2). In case those skills are missing, it is important that the partners will employ them as soon as possible.

Couple of paragraphs more needed here
2.6.2. Train and go live

Involving Key Users and Train

After the tests have successfully been completed, the key user should be in charge of further implementation. The key user will then make every effort to ensure that all errors are eliminated before going live and that the processes work. It is recommended that the key user and the other users write the user documentation themselves and are actively involved in the technical acceptance of the system.

This is the only way to ensure that they accept the new management method and are proud to take on this new responsibility. After completion of this phase, the key user is the person who knows all system settings and understands what information is reflected by the relevant mapping. It is high time to celebrate the achievements together with the partner!

Involvement of people and user training. Implementing VMI is a company-wide effort to redesign and intensify business processes with supporting technology. Therefore, everyone should be involved and driven by the same objectives to make this big change in the company (and in the supply chain) successfully work. By involving key people in the VMI implementation process, employees are given the opportunity to make a significant contribution, and to see the value of VMI as the supply chain becomes transparent. More importantly, employees are more likely to understand their roles and develop a high sense of task identification (Kuk, 2004).

Due to changes in processes, employees need to be trained to be able to act on very different level and in different context. Purchase people no more need to make orders; instead, they start to interact with their suppliers on a more meaningful level, and plan the inventory and promotions that really drive the sales and business. On supplier side, instead of simple order handling, people now need to obtain the skills of data analysis to be able to make right decisions for replenishment.

Going live

The date on which the system goes live must be coordinated with sales and marketing at an early stage to ensure that no above-average level of activities is expected or product range changes are scheduled on that date. If a consignment warehouse is installed at the same time as the VMI is implemented, the accounting department must also be involved. The taking over of stock impacts liquidity and must therefore be included in the financial planning as a non-recurring factor.

In go-live phase, good project management is necessary for the switch to work without major delivery disruption. A daily brief conference call will ensure that sufficient focus is placed on the implementation and all participants (and parties affected) are informed about project progress. The following preparations before the going-live date should be done:

- Old stock is liquidated and there is a formal protocol regarding the stock which will be managed by the vendor from the specified date onwards.
- All parties have been advised of the date of the switch, including staff in the retailer’s goods receipt department.
- IT support availability must be ensured, so that orders can be traced smoothly in the individual sub-systems at the start and troubleshooting support is guaranteed if required.

On the day of the switch, the first order should be followed in real time. This makes it possible to see the volume loaded on the first truck, and it is then easy to assess which of the system parameters need to be reset.

In many VMI cases, increasing the safety stock is advisable for the transition period. The actual optimisation of stock levels takes place at a later date when the daily replenishment processes are stable and run error-free.

For both sales and purchasing, it is important that the jointly defined goals availability and days of sales DOS are guaranteed in the long term. It is therefore advisable to focus on on-shelf availability at first and then gradually reduce stock over several weeks until the target DOS level is achieved. The risks associated with this procedure are minor, and it shows the buyer that responsibility for inventory is taken seriously.

37
If everything goes well, the fully automated inventory management systems are running smoothly within 6-8 weeks, any teething problems have been resolved and the key user and additional users are familiar with the daily VMI tasks.

2.6.3. On-board additional trade partners

Once a VMI strategy is chosen, we recommend engaging senior management support and making a formal managerial announcement as soon as practical. In many cases, progress in a pilot project is critical to securing this support. For your VMI program to be successful and maintain senior management support, it needs to be aligned with your corporate goals, skills and capabilities (you need the KPIs and targets). The message is this: it might be alright for a pilot to produce almost any measurable benefit, but a program needs to produce benefits that are core to the corporate mission. If the goals of the VMI program are increasing sales and customer satisfaction, your marketing and merchandising organizations will support it. In fact, our experience shows, these constituencies are likely to ask for the program rollout to be broadened and accelerated as much as possible.

The more partners you have to do VMI with, the bigger the gains

- Sell and market (using success stories)
- Have a good VMI contract covering everything important
- Train your employees and train your partners employees
- Measure success against goals
- Communicate both internally and externally

Couple of more paragraphs about expanding the program. Refer back to VMI savings Calculator—the bigger the share of your business with VMI, the more benefits you get.

3. VMI performance and control

Once the hard work of setting up the VMI project first time in company’s history is done, it is time for review and adjustments. Every program could be viewed in PIM (Planning, Implementing, and Monitoring) cycle (see Figure 23).

![Figure 3: PIM cycle](image)

**Figure 23. Planning, Implementing, Monitoring (PIM) cycle**

3.1. Review and Adjust

Approximately 20 weeks after going live, it is advisable to invite all parties to a project review meeting. The checklist in Table 10 indicates the topics which should be discussed in this meeting. Table 10 describes which documents are useful for specific review activities and which adjustments will immediately improve KPIs.
Users often already have concrete suggestions for improvements, which can jointly be reviewed.

Table 10. Project review checklist for VMI warehouse delivery

<table>
<thead>
<tr>
<th>Review activities</th>
<th>Yes/No</th>
<th>Base document</th>
<th>Action needed</th>
<th>Responsible</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>KPIs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delivery reliability of 98.8% achieved</td>
<td>No</td>
<td>Weekly availability report</td>
<td>Increase minimum stock of item X</td>
<td>User</td>
</tr>
<tr>
<td>DOS max 7 days achieved</td>
<td>No</td>
<td>Weekly stock report</td>
<td>Decrease target stock level for A items by 1 day</td>
<td>Key user</td>
</tr>
<tr>
<td>Truck load of over 19t achieved*</td>
<td>No</td>
<td>Transport statement</td>
<td>Increase truck load for each order</td>
<td>Key user</td>
</tr>
<tr>
<td>Number of full pallets delivered exceeds 90%*</td>
<td>No</td>
<td>Production order statement</td>
<td>Set individual B items to status scope of delivery</td>
<td>User</td>
</tr>
<tr>
<td><strong>Communication</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incorrect inventory reports (INVRPT) &lt;1%</td>
<td>No</td>
<td>EDI error report</td>
<td>Check master data</td>
<td>Retailer, customer</td>
</tr>
<tr>
<td>Incorrect orders (ORDERS) &lt;1%</td>
<td>No</td>
<td>EDI error report</td>
<td>Check master data</td>
<td>Vendor</td>
</tr>
<tr>
<td>Goods received late by the customer due to missing despatch advice (DESADV )</td>
<td>Yes</td>
<td>Customer’s Questions and Answers report</td>
<td>Increase EDI frequency</td>
<td>Key user</td>
</tr>
<tr>
<td><strong>Other aspects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emergency deliveries &gt; 2 per week</td>
<td>Yes</td>
<td>Transport statement</td>
<td>Review stock levels and increase by 1 day if necessary</td>
<td></td>
</tr>
<tr>
<td>Customer enquiries &gt; 4 per week</td>
<td>Yes</td>
<td>Customer support report</td>
<td>Discuss enquiries / incidents with customer support staff</td>
<td></td>
</tr>
<tr>
<td>Were there any problems with promotional orders?</td>
<td>Yes</td>
<td>Complaints</td>
<td>Analyse planning process</td>
<td></td>
</tr>
<tr>
<td>Are there specific products where the stock level is too high due to inaccurate historical data?</td>
<td>Yes</td>
<td>Inventory report</td>
<td>Review historical data and correct if necessary</td>
<td></td>
</tr>
<tr>
<td>Have the back-up processes been defined and described?</td>
<td>No</td>
<td>Back-up description</td>
<td>Arrange</td>
<td>Key user</td>
</tr>
<tr>
<td><strong>Agreement</strong></td>
<td></td>
<td>Agreement</td>
<td>Arrange</td>
<td>Project manager</td>
</tr>
</tbody>
</table>

* those measures/goals are relevant in case of central warehouse VMI program

The project review meeting is the ideal platform for illustrating the benefits of control. Visualisation aids are recommended to provide a better overview.

3.2. Monitor ongoing VMI programs

KPIs (Key Performance Indicators) are measures used to regulate and control business processes. In the planning and negotiation phase they are defined together with the VMI partner (see chapter 2.4.1). It is advisable to change and adopt commonly agreed KPIs over time, according to supply chain maturity.

If the agreed targets are not achieved in a reporting period, the reasons should be investigated together. For this purpose, monitoring at the retailer is required (see Table 11). In addition to known causes, reasons for a limited ability to deliver may include promotional sales measures which were not communicated to the vendor in advance or errors in the master data. Together, lessons can be learned from an incident and measures can be defined to optimise the business relationship.
Table 11 is an example of regular VMI assortment monitoring at retailers: delivered quantities and out-of-stock (OOS) situation. The OOS is shown in % of the total amount per item. This report enables the supplier to carry out a detailed OOS analysis. The table is supplemented with information about the current stock level in DOS. Accordingly, the current stock level amounts to 4.8 days – within the agreed minimum and maximum stock levels.

Table 11. Monitoring VMI project performance at retailer side

<table>
<thead>
<tr>
<th>Item description</th>
<th>Delivery</th>
<th>Out-of-Stock OOS</th>
<th>Current stock level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mon</td>
<td>Tues</td>
<td>Wed</td>
</tr>
<tr>
<td>Pluto 36g</td>
<td>171</td>
<td>75</td>
<td>65</td>
</tr>
<tr>
<td>Pluto mini 1kg</td>
<td>77</td>
<td>32</td>
<td>12</td>
</tr>
<tr>
<td>Pluto 54g</td>
<td>225</td>
<td>180</td>
<td>110</td>
</tr>
<tr>
<td>Pluto miniatures 75g</td>
<td>99</td>
<td>90</td>
<td>60</td>
</tr>
<tr>
<td>Pluto miniatures 150g</td>
<td>115</td>
<td>85</td>
<td>80</td>
</tr>
<tr>
<td>Pluto mini Disp 1500g</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Long grain rice 25kg</td>
<td>12</td>
<td>12</td>
<td>17</td>
</tr>
<tr>
<td>Long grain rice 50kg</td>
<td>13</td>
<td>13</td>
<td>23</td>
</tr>
<tr>
<td>Long grain rice 5kg</td>
<td>45</td>
<td>45</td>
<td>34</td>
</tr>
<tr>
<td>Long grain rice 1000g</td>
<td>45</td>
<td>40</td>
<td>35</td>
</tr>
<tr>
<td>Long grain rice 900g</td>
<td>175</td>
<td>125</td>
<td>80</td>
</tr>
<tr>
<td>Milk</td>
<td>130</td>
<td>110</td>
<td>90</td>
</tr>
</tbody>
</table>

3.3. IT solutions for KPI monitoring

Effective performance measurement and analytics are essential to both the current success of a VMI program and to a continuous improvement process. Performance management and analytics efforts require agreement among all participants on relevant measures, as well as systems capable of capturing and presenting the necessary data.

Many softwares offer powerful features for configuring and monitoring the KPIs of VMI program performance, such as forecast accuracy, service level, inventory turns, stock-outs, and days of supply.

Key reports

- **Execution versus plan reports**, which track how well actual pulls compare with forecasts
- **Trend reports**, which track inventory trends and calculate how closely they stay within defined min-max levels
- **Waterfall reports**, which show a clear record of forecast transactions and inventory positions, as well as identify liability with alerts for impending freshness
- **Performance metrics**, which track key metrics necessary for effective inventory management, including inventory turns, aging, and valuation

Personalized dashboards provide an at-a-glance summary report and exception alerts, while detailed worksheets offer full query and reporting capabilities. **VMI Dashboard** offers a single-screen interface for efficiently driving business, so users don’t need to comb through multiple reports. This dashboard presents up-to-date KPIs, and offers users an interface to manage alerts and workflow tasks and to access key reports. **Alerts** can be automatically generated when, for example, a KPI falls outside a user-defined performance range.

Dashboard content can be tailored to different roles and individual preferences. KPIs can be viewed at any level of granularity, such as for a DC, an entire account, an SKU, or an entire product line. Figure 24 shows a sample VMI Dashboard generated by Demantra VMI Software.
Many VMI solutions offer also flexible and powerful query and reporting capabilities. During the implementation process, a group of standardized reports, or worksheets, can be defined for different roles and users in the VMI process. After implementation, users can easily create new worksheets in a matter of minutes and save them for future use. The solution’s multidimensional capabilities support a flexible data hierarchy. This allows different users to slice and dice information at any level of aggregation and to tailor worksheets to individual user roles and needs. Color-coded visual alerts inform the user of exception conditions, based on user-defined business rules. For example, if the service level drops below 70 percent, this displays the alerts in red, as illustrated in Figure 25.
4. Critical Success Factors for VMI projects

In spring 2014, a pan-European survey was conducted among ECR member companies in Europe about the critical success factors for VMI projects. 50 eligible responses to the survey from 11 countries were received. All respondents were company representatives with previous experience in VMI projects.

From extensive literature research, 30 relevant factors important in VMI projects were identified. The factors were divided into: 1) Business Relationship Factors, 2) Company internal factors and 3) Technical success factors. Representatives from companies were asked to rate each factor on a scale from 1-not important to 5-very important. In the manual, a short overview of the survey result is presented7.

4.1. Business Relationship factors

There were nine business relationship factors studied. The results (see Figure 26) point out that while it is important to rationally conduct the VMI project (have a good team, agree on common KPIs, have a good and thorough contract, etc.), some “softer” aspects play an even bigger role in the success of the project. Namely, trust, relationship quality and commitment scored the highest of all factors in this group.

**Figure 26. The importance of business relationship factors (n=50, 1-not important, 5-very important)**

**Trust.** One of the most critical and important aspects in starting VMI that many VMI studies and articles unanimously agree on, is trust between the partners. According to Reitner et al. (2012) research, experts and companies see trust between the partners as a prerequisite for a successful collaboration as it ensures that each party will fulfil the requirements necessary to make the relationship work (Pohlen & Goldsby, 2003). Lack of trust between trading partners will doom the VMI initiative (Niranjan, et al, 2011). Kaipia et al. (2002) add that trust can be built when companies are able to demonstrate the benefits of VMI to their trading partners.

**Relationship quality** and **commitment.** Barratt (2004) stresses the importance of the relationship quality in his study, naming the qualities such as mutual interdependency, openness, trust, honesty, chemistry between both partners, the frequency of interaction, and commitment. Commitment was described by willingness of both partners to invest in a long-term relationship, which also includes the willingness to develop the business mutually and firmly toward success. Chin et al. (2004) claim that commitment is the basis for the partners to...

---

7 The basis of the survey, the questionnaire, and the results are explained at length in Sven Uustalu’s Master Thesis (supervised by Hele Hammer, PhD) at Tallinn University of Technology, where he defended his work and obtained the Master degree in Summer 2014. The entire thesis can be obtained by requesting it at hele.hammer@ttu.ee.
work together in solving problems and resolving conflicts as both recognise that they have an important business interest involved. Not only management commitment is important, but also commitment at multiple levels of the organisations involved.

4.2. Company internal factors

The second group, company internal factors incorporate ten intra-company factors that affect the success of VMI implementation. Figure 27 depicts the importance of those factors. While strong project manager getting top scores is expected, then somewhat surprising is the high ranking given by practitioners to importance of user training. Next two factors, alignment of internal processes and top management support are well-known areas to consider in VMI implementation.

![Figure 27. The importance of company internal factors (n=50), 1-not important, 5-very important](image)

Due to changes in processes, also employees need to be trained to be able to act on very different level and in different context. Purchase people no more need to conduct forecasts and make orders; instead, they start to interact with their suppliers on a more meaningful level, and plan the inventory and promotions that really drive the sales and business. On supplier side, instead of simply order handling, people now need to obtain the skills of data analysis to be able to make right decisions for replenishment.

4.3. Technical and VMI specific factors.

The third group of success factors was determined as technical and VMI specific factors, including any technical matters of the implementation project. Figure 28 shows the ratings given by practitioners to importance of technical factors in VMI projects.
VMI initiatives are information intensive and require effective database linkages among supply chain partners to facilitate information flows. Electronic and integrated means of data transmission is important to cut down on data transfer time and entry mistakes, resulting subsequently also in reduction of required safety stock, improved inventory turnover rates and reduced obsolescence. Inventory, production control and planning systems must be online, accurate and integrated to take advantage of additional information available.

It is clear that due to thefts, damages and other uncontrollable events in a shop, retailers are unable to guarantee that data provided to suppliers is 100% correct. This is why frequent stock-taking is necessary, correcting the balances in shops.

All this puts high requirements on quality and reliability of IS. Thus, a proper IT solution needs to be selected to enable VMI to function correctly. With such complex IT solutions that incorporate different software, inter-organisational IS integration, it is obvious that executing a pilot project before deploying and escalating the solution to all partners is necessary.
APPENDICES

Appendix 1. ECR thinking

Efficient consumer response describes intercompany cooperation whose primary aim is to achieve better, faster and more cost-effective fulfilment of consumer wishes.

Definition

Efficient consumer response (ECR) is defined as the overall company-related vision, strategy and pooling of sophisticated methods, which are aimed at removing inefficiencies along the output chain as part of partnership and trust-based cooperation between manufacturers, retail and services providers, taking into account consumer requirements, to achieve a benefit for all parties concerned that would not be achievable by each party alone. (Source: GS1 Switzerland, website)

Aims of ECR

ECR shows its members ways of implementing the ECR model. The aim is to generate cost savings and achieve sales growth in the supply chain. The approach is based on identifying potential and problem areas, which offer the relevant scope for optimisation. Retail trade partners on the one hand and suppliers and/or industry on the other work together to find a solution. This cooperation-based integration of all parties involved in the cycle means that advantageous and efficient solutions are quickly developed, which offer a certain level of investment protection through standardisation. Their implementation is a joint effort by all parties concerned. Such solutions have a positive impact on the parties directly affected as well as and above all consumers.

Efficient Assortment
Efficient Product Introduction
Efficient Promotions
Appendix 2. VMI Sample Contract

Can be found here:

http://links.telema.com/vmicontract
Appendix 3. Description of EDI Messages used in VMI

<table>
<thead>
<tr>
<th>Inventory report (INVRPT)</th>
<th>Sales Report (SLSRPT)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The exchanged information will relate to inventories of raw materials, manufactured articles, or other stock items, and can be exchanged between a manufacturer and distributor (wholesaler), or manufacturer and consignment holder, etc. The message includes functionality to differentiate classes of inventory, and to permit financial valuation of inventories facilitating price protection claims, auditing, statutory declarations, planning of production and deliveries, etc. The specified quantities relating to a product can indicate opening stock, closing stock, and goods movement (receipts or withdrawals) of held inventory, for a given time frame. The specified quantities can relate directly to a product or package, and may be sub-detailed within different groups or classes, e.g., batch, age, valuation, location, etc. For every specified quantity it is possible to indicate the relative package identifications of the physical units involved.</strong></td>
<td><strong>Sales report is one of the focal documents for DSD VMI processes. This message provides product activity related to the sale of products or service in two methods: 1) by line item within a specific location, e.g. reporting each product sold within a specific location, 2) by location within each line item, e.g. reporting each location and quantity sold for a particular product. The message may be sent from a buyer, seller, distributor, to their supplier, distributor, manufacturer, or other third party. It is assumed the recipient will perform analytical processing of the data in support of other business processes such as marketing, short term planning, or product development.</strong></td>
</tr>
</tbody>
</table>
| **From the point of view of industry, packaging might add complexity. There are some packaged items delivered by vendor which the retailer repacks into different units. For this purpose, specific system settings must be entered. It is recommended that the rules and responsibilities for mapping master data be discussed by the business partners.** | **This message provides the recipient with detailed information relative to a specific product such as:**
- Location of the activity, e.g. sale or product movement
- Specific parties involved, e.g. name of company sold to
- Date or period of the activity
- Activity price, e.g. selling price and activity quantity, e.g. quantity sold
- Promotion in effect, Value of the sales, Periodical turnover
- Additional product information, e.g. product groups or id numbers
- Identification of market segment or channel of distribution.
- Summarisation of information for various locations, e.g. sales for all locations in a region.** |

<table>
<thead>
<tr>
<th>Order, Order Response, Order Change</th>
<th>Invoice (INVOIC)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The Order message is transmitted by the customer to his supplier to order goods or services and to specify the relevant quantities, dates and locations of delivery. The message may refer to an earlier Quotation received from the supplier for the ordered goods or services. The message will refer to the location and product codes exchanged previously in the Party Information and Price/Sales Catalogue Messages. It is intended to be used for the day-to-day ordering transaction with, as a general rule, one Purchase Order per delivery, per location. However, it is possible to request deliveries at several locations and on different dates.</strong></td>
<td><strong>The Invoice message is sent by the supplier to the customer claiming payment for goods or services supplied under conditions agreed by the seller and the buyer. This same message with correct data qualification also covers the functions of pro-forma invoice, debit and credit note. The seller may invoice for one or more transactions referring to goods and services related to one or more order, delivery instruction, call off, etc. The invoice may contain references to payment terms, transport details and additional information for customs or statistical purposes in the case of cross-border transaction.</strong></td>
</tr>
<tr>
<td><strong>The Order Response is sent by the supplier to his customer in relation to one or more goods items or services to acknowledge the receipt of the Order, to confirm its acceptance, to propose any amendments, or to notify non-acceptance of all or part of the Order. The Order Response may also be used to respond to an Order Change Request Message. A buyer's Order may be responded to by one or more response messages according to business practice.</strong></td>
<td><strong>The Order Change Request is sent by the customer to the supplier to specify the details concerning modifications to a previously sent Order. The customer may request to change or cancel one or more goods items or services.</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Despatch Advice (DESADV)</th>
<th>Receive Advice (RECADADV)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>The Despatch Advice is a message specifying details for the goods despatched under conditions agreed between the buyer and the seller, with the function of advising the consignee of the detailed contents of a consignment. The message relates to a single despatch point and a single or multiple destination points, and it may cover a number of different items, packages or orders. The message allows the consignee to know what materials were despatched and when, allowing the consignee to prepare for receipt of the goods and to cross-check the delivery with the order.</strong></td>
<td><strong>The Receiving Advice is a message specifying details for the goods received under conditions agreed between the buyer and the seller, with the function of advising the consignor of the received contents of a consignment. The message relates to a single receiving point and a single despatch point and it may cover a number of different items, packages or orders. The message allows the consignor to know what materials were received/not received against the original order and what materials were accepted/not accepted. This information allows the consignor to prepare an invoice for the customer.</strong></td>
</tr>
</tbody>
</table>
delivery consignment of goods or the despatch of a return consignment of goods. Identification of transport packaging may be achieved through the use of the Serial Shipping Container Codes (SSCC).

<table>
<thead>
<tr>
<th>Remittance Advice (REMADV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Remittance Advice is a communication between buyer and seller which provides detailed accounting information relative to a payment, or other form of financial settlement, on a specified date for the provision of goods and/or services as detailed in the advice. The message may be initiated by either the buyer or seller. The Remittance Advice is a notice of payment to be made, both national and international, covering one or more transactions. Each Remittance Advice is calculated in only one currency and relates to only one settlement date. References to payment orders may be included.</td>
</tr>
</tbody>
</table>
Appendix 4. Master Data Management: Background

Draft! Needs review!

Anatomy of a Consumer Product
Kellogg Company (Kellogg) is a global, $13 billion consumer packaged goods company headquartered in Battle Creek, Michigan. A notable success for the company has been the Special K® line of products, which has expanded from breakfast cereals to breakfast bars, meal bars, crackers, chips, and beverages. With excellence in brand and supply chain management, Special K is now a $1 billion global brand, with numerous stock-keeping units (SKUs) and nearly 400 case configurations.

The participants of this study agreed to focus on a single item, the Kellogg’s® Special K® Strawberry Protein Meal Bar, because of its success in the foodservice and grocery channels. The bar is also sold successfully through mass merchandisers, drug, convenience, and club channels. The bar is marketed as a meal replacement item, high in protein and fiber. It weighs 1.59 ounces and is individually wrapped in a foil pouch. Typically, the bar is sold by Kellogg’s to foodservice distributors and operators in 48-pack cases. In turn, at operator establishments such as at cafeterias, the item is then sold to consumers in its individual foil package. In the grocery channel, the bar is typically sold in cases of six retail cartons. Shoppers buy a carton containing six to eight foil-wrapped bars.

Here are the eye-opening statistics uncovered by the study participants. Kellogg maintains a minimum of 340 pieces of attribute information describing the Special K Strawberry Meal Bar. Attributes provide a complete picture of a product that needs to be produced, marketed, sold, and distributed on a global scale. Most of these attributes are used for Kellogg’s internal operations, yet many are passed along to consumers and trade customers in the foodservice and grocery channels. These Kellogg customers in turn, pass along the information to their customers or shoppers.

Generally, the 340+ Strawberry Meal Bar attributes can be placed into nine categories containing the following information:

1. DESCRIPTION: information such as the GS1 Global Trade Item Number® (GTIN®) and short descriptions used for ordering and marketing.
2. MEASUREMENTS AND PACKAGE CONFIGURATIONS: packaging configurations, weights and measures, and logistic unit information such as the number of cases on a pallet.
3. INGREDIENTS AND NUTRITION: ingredient lists and nutrition information.
4. DIGITAL ASSETS: product images, nutrition labels, FAQs, recipes, and vendor contracts.
5. CONSUMER USAGE: serving size and storage temperature ranges.
6. PRICING AND COST: trade customer list and promotional pricing, as well as cost accounting.
7. ORDERING INFORMATION: ordering quantities and configurations provided for trade customers.
8. MATERIAL PURCHASING: vendor identification and material specifications.
9. MANUFACTURING, WAREHOUSING, AND LOGISTICS: manufacturing locations, and full truckload (FTL) and less-than-truckload (LTL) shipping specifications.

Product Master Data Management: Preparation for MD Management

1. Quantify or qualify the business problems resulting from product data problems. Organizations often recognize problems with their product information when they first appear as problems with key business processes. After a while you realize that the common denominator among these process

http://www.enterworks.com/preparing-for-pim/
problems is product information problems. Having identified these, it will be easier to quantify them in order to build the business case for correcting them.

2. Identify participants, champions and sponsors. An important point to remember is that yours isn’t an IT-driven or IT-sponsored undertaking. You’ll want to include IT personnel, but you and your business colleagues need to be the motive force. You need to identify the key executives who are most affected by inefficient business processes resulting from bad product data. Approach those with the most “pain” and diplomatically recruit them as a sponsor or champion of your PIM initiative.

3. Identify locations and sources of product data. You’ll also need to identify the attributes, descriptions, images, and other content associated with the data. Begin by creating an inventory of where the product content originates, for what purpose it was originally created, where it’s managed, which people and processes use it, and which media and channels consume it. Ideally the metadata for these assets are stored and managed in a registry or repository, which will help in identifying some of these aspects of the data.

4. Create a data quality framework. You need clean, standardized, rationalized, and normalized data as you start your PIM initiative. This means you also need to determine what constitutes quality data according to your requirements and establish a framework that defines and quantifies those metrics. These may include completeness, accuracy, consistency, continuity, timeliness, redundancy, and uniqueness, among others. It’s up to each organization to identify and define the metrics that matter most to the processes they’re addressing.

5. Perform a data quality audit. The exercise of creating your data quality framework should highlight a number of areas where data problems needs to be fixed. Having identified these, you need to audit your data to determine at which points they fail to live up to the metrics in your data quality framework. The report produced by this audit will help quantify the level of data quality work that needs to be done in advance of the actual PIM deployment.

6. Establish a data governance council. Your organization may not be ready for a formal data governance council with executive overseers and teams of data stewards. It may be best to simply “re-purpose” the existing team of process participants and sponsors into a data governance committee for data relating specifically to your PIM initiative. Note that over time, this group may expand into a more formal data governance council, especially as your efforts intersect and overlap with those of other like-minded people in your organization.
### Appendix 5. Glossary

#### Needs review

<table>
<thead>
<tr>
<th>Term</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABC analysis</td>
<td>Classification of items into sales categories. Example: A items account for the first 70% of sales, B items for the next 25% and C items for the remaining 5% of sales.</td>
</tr>
<tr>
<td>Unpacked goods</td>
<td>Items which are delivered to the retailer’s warehouse in trading units and are then forwarded to the retailer’s branches in consumer units. This produces started packages, which cause problems in the data exchange between vendor and retailer.</td>
</tr>
<tr>
<td>BBD</td>
<td>Best before date. Date which indicates by when a food product must be consumed if stored appropriately (in particular, ensuring that the product is stored at the temperature mentioned in connection with the best before date) to ensure there is no significant loss of flavour and quality as well as risk to health.</td>
</tr>
<tr>
<td>BMI</td>
<td>Retailer managed inventory. The technology of retailer managed inventory represents a second sub-form of CRP technology of vendor managed inventory (VMI) alongside co-managed inventory (CMI). In contrast with VMI and CMI, the retail company alone is responsible for its orders. The vendor can only assume a limited advisory role if at all. In the case of BMI, the retailer orientates himself using a high-performance IT-based inventory management system, since the strategic importance of ordering has been recognised.</td>
</tr>
<tr>
<td>Best Practice</td>
<td>Best practice describes proven, optimum and / or exemplary methods, practices and procedures used in companies. If a company adopts a best practice approach, it uses, for example, tried and tested cost-effective procedures, technological systems and business processes which make it a model company for others, at least in the key areas of operations.</td>
</tr>
<tr>
<td>Bulk goods</td>
<td>Bulk describes goods which have yet to be definitively packaged for selling.</td>
</tr>
<tr>
<td>CMI</td>
<td>Co-managed inventory. Together with retailer managed inventory (BMI), co-managed inventory represents a variant of the vendor managed inventory approach. This method relates to the basic strategy of efficient continuous replenishment and forms the link between retailer managed inventory (BMI) and pure vendor managed inventory (VMI). Similar to the BMI approach, the retailer has ultimate responsibility for order processing. However, the vendor is involved in the order process to a greater degree. Consequently, the retailer shares more information with the vendor and may also accept order proposals the vendor has prepared, which are forwarded to the retailer via EDI and / or e-mail. Unlike VMI, the retail company has a stronger control role with CMI.</td>
</tr>
<tr>
<td>CPFR</td>
<td>Collaborative planning forecasting and replenishment. Further development of the quick response or ECR concept, which takes particular account of improved planning / forecasting, especially in terms of promotions.</td>
</tr>
<tr>
<td>CRP</td>
<td>Continuous replenishment process. A programme which describes the activities and responsibilities of retailer and vendor, in order to ensure continuous replenishment of the distributor’s warehouses.</td>
</tr>
<tr>
<td>CU</td>
<td>Consumer unit</td>
</tr>
<tr>
<td>DC</td>
<td>Distribution centre</td>
</tr>
<tr>
<td>Term</td>
<td>Explanation</td>
</tr>
<tr>
<td>------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>DOS</td>
<td>Days of Supply</td>
</tr>
<tr>
<td>EANCOM</td>
<td>EAN and CDMunication: Standard for the electronic exchange of data, which is an official UN/EDIFACT subset and is made available by GS1 International for cross-sector utilisation. EANCOM® is the recommended EDI standard for ECR.</td>
</tr>
<tr>
<td>EBIT</td>
<td>Earnings before interest and taxes</td>
</tr>
<tr>
<td>ECR</td>
<td>Efficient consumer response Efficient Consumer Response [ECR] is a joint trade and industry body working towards making the grocery sector as a whole more responsive to consumer demand and promoting the removal of unnecessary costs from the supply chain.</td>
</tr>
<tr>
<td>EDI</td>
<td>Electronic data interchange</td>
</tr>
<tr>
<td>FMCG</td>
<td>Fast moving consumer goods Fast moving consumer goods are consumer goods for daily use, such as food products, personal hygiene items, cleaning products etc., which consumers buy frequently (e.g. weekly), spontaneously, generally routine items bought without giving the purchase much thought.</td>
</tr>
<tr>
<td>FTE</td>
<td>Full-time equivalent Full-time employee on a project lasting a limited period of time; 1.0 signifies 100%.</td>
</tr>
<tr>
<td>FTL</td>
<td>Full truck load A full truck load is the quantity of goods, which is collected for transport from a forwarder (consigner) and transported to the recipient without transhipment on a means of transport and which, unlike partial deliveries, alone fills the means of transport. The English term full truck load (FTL) is generally used in connection with truck traffic. With regard to container shipments, the term «full container load» (FCL) is used and in rail traffic, the term «waggon load».</td>
</tr>
<tr>
<td>GS1</td>
<td>Global Standard One GS1 (Global Standard One) is a worldwide organisation which develops and implements global standards for improving output chains and which is responsible worldwide for issuing global trade item numbers.</td>
</tr>
<tr>
<td>GTIN</td>
<td>Global trade item number The GTIN is an identification number managed and issued by GS1, which facilitates the reliable identification of products and packages worldwide. GTIN is a generic term for the code system of bar codes with EAN, the UCC code or EPC.</td>
</tr>
<tr>
<td>Ideal Message</td>
<td>Messages that simplify electronic data interchange via EANCOM messaging.</td>
</tr>
<tr>
<td>KPI</td>
<td>Key performance indicators In business administration, key performance indicators are generally ratios that relate to the success, performance and capacity utilisation of a company, its individual organisational units or that of a machine.</td>
</tr>
<tr>
<td>OOS</td>
<td>Out-of-stock Out-of-stock shelf gap In retail, the term «shelf gap» describes the part of a shelf which is no longer filled with the intended item.</td>
</tr>
<tr>
<td>OSA</td>
<td>On-shelf Availability</td>
</tr>
<tr>
<td>PULL</td>
<td>When using the pull principle, production processes are triggered by demand that leaves a gap in inventory which in turn is then closed by a production process.</td>
</tr>
<tr>
<td>PUSH</td>
<td>The push principle (delivery principle) is a production management system where, unlike the pull principle, orders are «pushed» through the logistics chain. A specified plan (e.g. production or distribution schedule) provides the trigger for the relevant activities.</td>
</tr>
<tr>
<td>RACI</td>
<td>Responsible, accountable, consulted, informed RACI describes a method for analysing and illustrating responsibilities.</td>
</tr>
<tr>
<td><strong>SAP R/3®</strong></td>
<td>SAP ERP is the main product of German software company SAP AG. ERP stands for enterprise resource planning. It is a corporate information system which facilitates an overview of all departments of a company that are relevant to the business as a whole.</td>
</tr>
<tr>
<td><strong>SC</strong></td>
<td>Supply chain</td>
</tr>
<tr>
<td><strong>Sourcing</strong></td>
<td>Sourcing is a purchasing strategy, or sub-division of strategic purchasing management and, unlike local purchasing, examines international strategic purchasing activities. Global sourcing describes more than simply cross-country purchasing and indicates comprehensive strategic purchasing with a worldwide focus.</td>
</tr>
<tr>
<td><strong>S&amp;OP</strong></td>
<td>Sales and operations planning This process supports the integration and coordination of various divisions of a company and their consistent alignment with corporate aims. It produces a greater benefit, strengthens competitiveness and increases profitability.</td>
</tr>
<tr>
<td><strong>TU</strong></td>
<td>Transport unit</td>
</tr>
<tr>
<td><strong>UN/EDIFACT</strong></td>
<td>United Nations Electronic Data Interchange For Administration, Commerce and Transport EDIFACT is a cross-sector international standard for the format of electronic data in business. EDIFACT is one of several international EDI standards. CEFACT, a UN organisation which is affiliated to UNECE, is responsible for the EDIFACT standard.</td>
</tr>
<tr>
<td><strong>VMI</strong></td>
<td>Vendor managed inventory Vendor managed inventory (VMI) is a logistics management tool which enhances performance along the supply chain. The vendor has access to the customer’s stock level and demand data.</td>
</tr>
</tbody>
</table>
Appendix 6. Demos overview / VMI service providers

**Figure 46: Links to VMI providers**

<table>
<thead>
<tr>
<th>Vendor</th>
<th>Link</th>
<th>Assessment – description of operation</th>
<th>Integrated solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Vendors and links not specified]</td>
<td></td>
<td>[Assessment details not specified]</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 47: List of IT providers**

<table>
<thead>
<tr>
<th>Company</th>
<th>Offering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Screw &amp; Fastener</td>
<td>Vendor inventory management</td>
</tr>
<tr>
<td>Arvato (Bertelsmann Group)</td>
<td>VMI software</td>
</tr>
<tr>
<td>Avercast LLC</td>
<td>VMI software</td>
</tr>
</tbody>
</table>