Best Practice in Implementing VMI

A recommendation by ECR Community

ECR COMMUNITY
EFFICIENT CONSUMER RESPONSE

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Introduction

Supply chain management is aimed at providing the end consumers with the products they need at the time and place they need. The links in supply chain all need to work together to achieve that goal.

Efficient Consumer Response (ECR) is a philosophy and a professional association that promotes collaboration between consumer goods retail supply chain partners - retailers, manufacturers and service providers. These trading partners share a common belief that by working together on non-competitive matters it is possible to increase value to all parties in the value chain including end consumers.

Vendor Managed Inventory (VMI) is a method which facilitates efficient processes in inventory management. The aim of VMI is to ensure product availability and freshness at the point of sale with the lowest possible logistics costs while maintaining the lowest possible inventory level across the entire supply chain.

> **VMI is an inventory management process where the traditional ordering model is eliminated and the vendor has the right and responsibility to make stock replenishment decisions based on agreed targets and regular automatic inventory and/or sales data from buyer.**

This handbook on VMI is primarily aimed at supply chain professionals in the European FMCG retail industry. It can be useful also in other industries. The manual is partly based on GS1 Switzerland "Merchandise Planning Models Guidebook" (2013), completely reworked under ECR Community initiative by a group of experts led by Hele Hammer, Associate Professor at the Tallinn University of Technology.

The handbook contains instructions for practitioners, explaining automated replenishment processes and providing support for project managers in implementing VMI. The handbook contains four chapters and appendices:

1. In the first chapter, a **short background of the VMI principle** is given, the various models discussed and the current status of VMI adoption in Europe reviewed.

2. In the second chapter, the six major steps in a VMI implementation project are explained in detail.

| 1. EVALUATE | 2. PLAN | 3. TARGET | 4. AGREE | 5. ALIGN | 6. ROLLOUT |

   VMI is a new discipline in many countries and companies. Consequently, significant emphasis is placed in providing a solid business case for VMI, including a **VMI savings calculator.**

3. The third chapter discusses **performance measurement and monitoring** in ongoing VMI programmes.

4. Successful VMI projects are based on a number of **key success factors:** the commitment of senior management—from both buyer and vendor organisations; 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 greatly contribute to the overall success of VMI implementation. Chapter 4 presents the key success factors in VMI projects based on a 2014 Tallinn University of Technology master thesis.

   In appendices, many practical resources are included, e.g. **a sample VMI contract**, description of EDI messages used in VMI, a list of VMI solution providers as well as a **"Quick guide to VMI".**

1. What is VMI?
1.1. VMI Principles

VMI is a process which facilitates efficient inventory management. The aim of VMI is to ensure availability and freshness at the point of sale with the lowest possible logistics costs and 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 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 vendor is empowered to manage a customer's inventory and replenish the goods at the customer's site automatically under agreed conditions and rules.

Instead of sending purchase orders, buyers send inventory and sales information electronically to the vendor. Based on this demand data, the vendor 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.

VMI gives the vendor 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 vendor's performance instead of delivery time and preciseness.

Collaboration is core to the success of VMI. Buyers and vendors must enter VMI with the objective of multi-disciplinary teams working together to discover the "win-win" solution to VMI. The individuals involved should be collaborators and understand the needs and requirements of their trading partners.

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, a **strategic decision** that will require participation from most departments of the organisation (logistics, procurement, planning, sales and marketing). Therefore, it is necessary to employ a holistic view of strategy, structure, people, and technology.
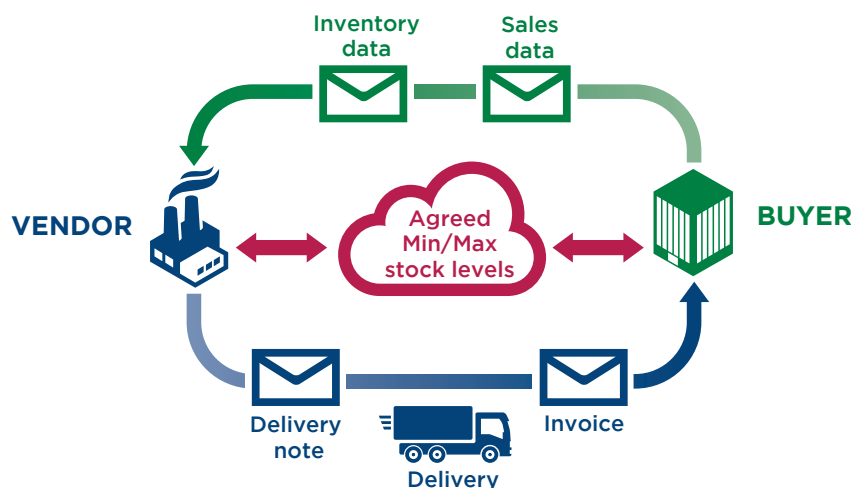
Figure 1. Replenishment process with VMI

1.2. VMI in Europe: Current Status

ECR Europe[1] carried out a survey about VMI diffusion in Europe in 2014. The results of the survey are shown on Figure 2. The absolute leader in terms of VMI adaption is Switzerland. VMI is the prevailing method of inventory management in FMCG retail in Switzerland (estimation over 75%). VMI is also widely used in Germany and France (estimated adoption rates close to 50%). However, other countries report much lower usage. Austria and Italy estimate the usage between 10-25% and all other countries even less than 10%.
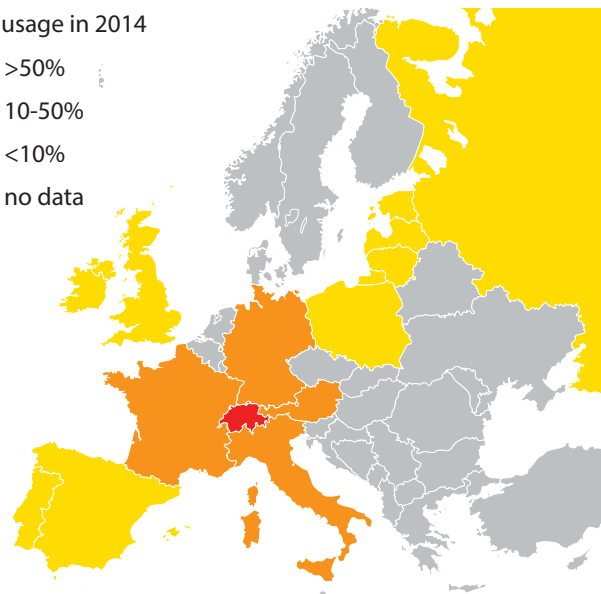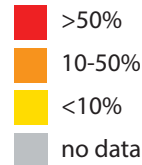
> **Over 75% of FMCG retail replenishment is conducted via VMI in Switzerland.**

The low diffusion rate of VMI is another reason for composing the current manual. It also defines the focus for the manual—helping companies to understand the **concept, "sell it" to trade partners and top management, as well as get started with their very first VMI projects.**

VMI usage in 2014

- >50%
- 10-50%
- <10%
- no data

Figure 2. VMI usage in Europe
Source: ECR Europe survey 2014

1.3. Distribution Centre VMI versus Direct Store Delivery VMI

In big countries of Central and Western Europe, large mature buyers are using buyer distribution centres (DC) in their operations as a rule. In Eastern Europe and smaller countries, Direct Store Delivery (DSD) is prevailing. According to another ECR Europe survey[2] carried out in 2014, experts estimate the share of DC delivery to increase in next five to ten years and become the dominant model of operation. Regarding VMI, there are some differences based on whether the vendor is delivering to DC or directly to stores.
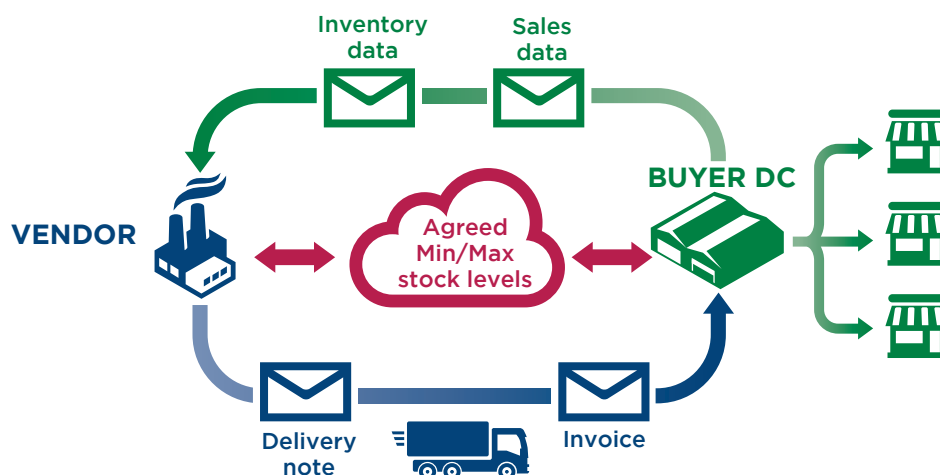
Figure 3. VMI to Buyer's Distribution Centre (warehouse delivery, DC)

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[1] With the help of Tallinn University of Technology supply chain master students. Experts from eleven national ECR organisations responded, representing thirteen countries (Switzerland, Austria, France, Italy, Estonia, Latvia, Lithuania, Ireland, Poland, Russia, Spain, UK, Portugal

[2] Survey conducted by Nuala O'Duffy, ECR Community National Initiatives Project Manager.

VMI between Vendor and Buyer DC

The majority of VMI programmes are focused on managing inventory at the Distribution Centre level (see Figure 3). 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 optimise transportation (benefiting from better usage of trucks, in ideal case full truck loads).
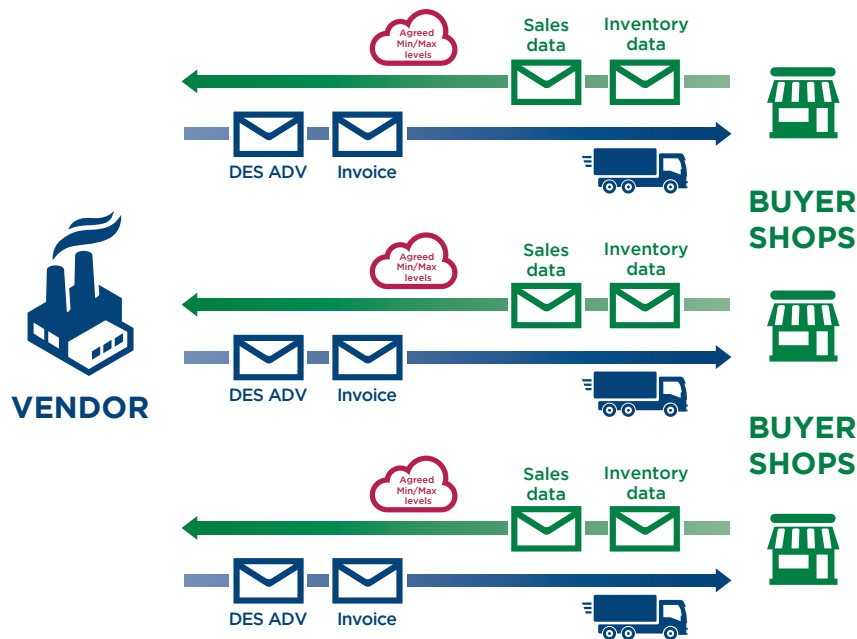
Figure 4. VMI direct to stores (direct store delivery, DSD)

VMI between Vendor and Buyer's 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 4). 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.

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

1.4. Inventory Management Models (BMI, CMI, VRI, VMI)

In addition to differences in operating models (DC versus DSD), there are also variations of VMI depending on where the right and responsibility of replenishment decision making resides.

In DSD VMI, usually buyers have defined product assortments and plan-o-grams and allow vendors to make replenishment decisions in that framework. Some VMI programmes go even further: buyers allocate shelf space and allow manufacturers to plan 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.

Figure 5 describes four inventory management models: BMI, CMI, VRI and VMI from the perspective of buyer ordering costs and decision making authority (buyer vs vendor). **BMI (Buyer Managed Inventory)** is the traditional way of product replenishment. **CMI (Co-Managed Inventory)** is a model where an order placed by the vendor is still a recommendation and not a firm order until approved by the customer.

In VMI process, the order generated by the vendor on the customer's behalf is a firm order to deliver product and bill the customer. We could distinguish between **VRI (Vendor Replenished Inventory)** and **VMI (Vendor Managed Inventory)**, where the latter would also include the ability to decide on assortment, not just mechanically replenishing what has been decided.

Today, the term VMI is sometimes used for models that are really CMI and very often for models that are really VRI. It is thus important to clarify, which agreements and practices are used in a certain relationship.
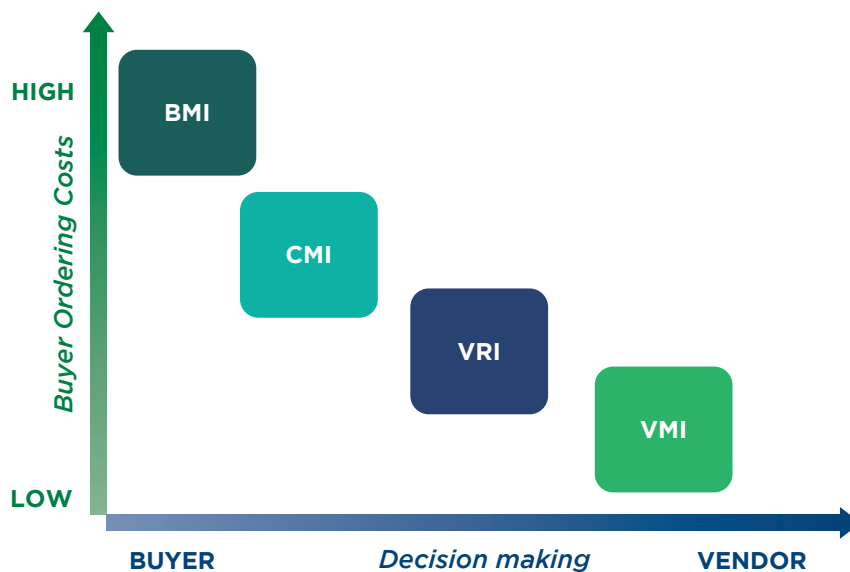
Figure 5. Inventory management models overview

2. VMI Setup Project Steps

While employing VMI in a trade relationship is a process and not a project, the first time VMI is implemented, it should be managed as a project in order to be successful. A VMI project can be divided into six basic phases (see Figure 6):

1. **EVALUATE:** Business case
2. **PLAN:** Project definition and planning
3. **TARGET:** Choose categories and vendors
4. **TERMS:** Set goals and terms (contract)
5. **ALIGN:** Align IT and business
6. **ONBOARD:** Pilot and on-board vendors

> VMI in general should be viewed as a process, not a project! However, when you first start VMI, the setup should be viewed as a project.

| 1. EVALUATE | 2. PLAN | 3. TARGET | 4. AGREE | 5. ALIGN | 6. ROLLOUT |

1. Evaluate VMI business case

- Be aware of VMI benefits that other companies have experienced.
- Define the gains and costs of the VMI for your company and use a VMI savings calculator.
- Carry out risk analysis for the VMI project and plan for risk mitigation.
- Present the business case to top management and obtain clear support and commitment.

2. Plan time schedule and team

- Compose a comprehensive project plan and prepare a time schedule.
- Appoint a strong project manager and determine project organisation. Make sure project team members have required skills. If not, involve external support.
- Use the RACI chart for defining clearly who, when and what should do.

3. Select target products and categories

- Determine which products are suitable for VMI (depending on shelf life, demand variability, etc.).
- Determine which partners to involve (depending on previous relationship experience, trade volume, origin, etc.).
- Determine Min/Max quantities for each product and delivery units (full pallets/truck loads).
- Update and correct product master data if needed.

4. Agree on goals and KPIs in VMI contract

- Specify common goals and KPIs for the VMI project with your partner—e.g., set a target to increase availability (OSA) by 3%, and decrease inventory levels (DOS) by 20%.
- Sign a VMI contract specifying KPIs, service level, EDI messages, rules and responsibilities.

5. Align IT with business

- Analyse changes in business processes, modify and adjust.
- Map your new process flow, determine EDI messages to be used and channels to be built.
- Select a suitable VMI solution, make sure it satisfies your company's needs.
- Modify your IT system to support the new processes, set up and test the VMI solution.

6. Rollout: pilot and onboard partners

- Communicate the project in both companies: involve key users, train all parties.
- Plan and execute go-live carefully.
- Pilot your VMI program well, make it a success story to "market" VMI internally and externally.
- To get the most out of the VMI project, select and implement additional VMI partnerships.

Figure 6. The six steps in a VMI project

2.1. Evaluate VMI Business Case

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1. Evaluate VMI business case

- Be aware of VMI benefits that other companies have experienced.
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- Carry out risk analysis for the VMI project and plan for risk mitigation.
- Present the business case to top management and obtain clear support and commitment.

Today, VMI is still a novel idea for most managers in many organisations. The enthusiasts believing in VMI often need to "sell the idea" to colleagues and/or top management. For that, a good and comprehensive business case is needed. This chapter lists the benefits of VMI, helps to determine the gains and costs of VMI, and presents a VMI savings calculator along with a sample risk analysis.

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

Figure 7 shows VMI benefits in three groups: 1) shared gains of VMI, 2) buyer-specific gains and 3) vendor-specific gains.

SHARED GAINS FROM VMI

VENDOR   BUYER

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 vendors 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 safety stock can be smaller. Lower inventory levels mean savings in cost of capital, as less capital is tied up in inventory.

Faster inventory turns: fresher products and less markdowns
As stock is replenished more often, products are less likely to become obsolete. This decreases the need to sell leftover stock with reduced prices.

Better collaborative relationships of vendor and buyer
One of the biggest advantages of VMI is creating long-term and trustworthy relationships between buyers and vendors, which results in vendors having loyal customers and hence assured sales of its product.

BUYER-SPECIFIC GAINS FROM VMI

BUYER

Reduction in ordering costs
Since ordering functions have been eliminated from the process, the buyers benefit from reduction in administrative expenses. As the number of backorders and returns reduce significantly, administration costs decrease even more.

Optimized retail space productivity
As both general inventory and safety stock levels are reduced with VMI, the possibility to increase the range of goods offered emerges.

WalMart and Procter & Gamble have had a VMI programme together for over 30 years to manage the inventory and production of disposable diapers with great success. Inventory turns doubled, WalMart's operating costs fell, and Procter & Gamble's market share grew.

VENDOR-SPECIFIC GAINS FROM VMI

VENDOR

Production aligned to customer demand
Automated and regular data exchange ensures continuous demand information. Upstream production receives consumption figures regularly. This enables the planning of the next optimum production date and produces a further reduction in the supply chain inventory levels and the associated cost of capital.

Optimisation of transportation costs
For central warehouse VMI, there is great potential for transportation costs optimisation. Transfer of stock and sales data using EDI results in sensible order volumes, i.e. full pallets, which can be delivered daily together with other products of the vendor as full truck load deliveries.

In 2014, Coca Cola Hellenic (CCH) successfully implemented VMI with Tesco for the Island of Ireland. CCH gained access to Tesco replenishment systems to control the flow of inventory into the two Tesco warehouses on the island. This resulted in improvement in service levels from 94% to 99%.

Figure 7. Benefits of VMI: Shared gains, vendor-specific gains and buyer-specific gains

All those benefits described on Figure 7 formulate the set of reasons why VMI concept should be implemented. As specific benefits depend on particular business situations, 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 chapter 2.1.1, many potential gains from VMI were listed. However, all projects involve also costs and so does VMI implementation. VMI project costs depend on various characteristics of the company such as company size, ERP systems used, the company role in the supply chain (vendor/buyer) and so on. It is useful to divide the costs into two groups: 1. Initial investments, 2. Operational (ongoing) costs (see Figure 8).

1. VMI Project Initial Investments	2. VMI Operational Costs
Initial costs include investments into business process 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 €75,000 to €130,000. This estimation was done for companies setting up VMI for the first time. The cost for setting up an additional VMI partnership (with another buyer) should be considerably less, amounting to 20% of the initial costs. The initial costs for a buyer company are 66% less, considering that the VMI technological solution will be set up at the vendor, not at the buyer side.	The running costs of a VMI programme consist of the following: • VMI manager/team costs. The extent of personnel used in VMI programme depends on which VMI level is chosen—is it pure VMI or is it co-managed inventory (in the latter case, there is a VMI manager on the buyer side as well). Additionally, the amount of work on the vendor side depends on which VMI model is chosen, DC or DSD VMI. In DSD VMI, at least one full time equivalent (FTE) should be planned for the work. • VMI operational costs. Operational costs include running costs of new equipment and new software (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[3], running costs also include inventory carrying costs for vendors.

Figure 8. VMI programme costs: initial investment and operational costs

One handy tool to estimate the net benefits (all potential savings minus all potential costs) when switching to VMI is to use a VMI savings calculator. For example, a simple Excel-based calculator created by Telema[4] can be used. This is a strategic level tool for defending the business case to your partners or your management board. While many benefits are similar to both buyers and vendors, the costs differ quite a lot. Therefore, the **Telema VMI savings calculator** includes separate versions for buyers and vendors.

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[3]Large buyers may rely on their market power to pressure the vendor into consignment deal. This means that the ownership of the inventory at the buyer's site will be transferred to the vendor. It also means that the inventory carrying cost and capital opportunity cost are transferred to vendor.

[4]Telema is an EDI and e-invoice operator in the Baltic States, uniting 4000 shops with 1000 suppliers. Among EDI based services, supply chain visibility and VMI solutions are offered. See more at www.telema.com

VMI savings calculator for vendor

Telema VMI savings calculator for the vendor is an Excel based model[5]. The calculator's version 201512 is shown on Figure 9. On the left-hand side are input cells for calculation of savings. On the right-hand side are input cells for investments and costs and the resulting total numbers. All blue cells should be filled with relevant data for your specific company (the numbers there are just an example).

VENDOR VMI CALCULATOR

Please estimate figures for YOUR company	INPUT
The numbers currently inserted are just an example	
VMI sales of total sales	25.0%
Annual sales (th euros)	70 000
Sales margin (percentage)	3.0%
Accounts Receivable AR (average, th euros)	11 700
Transportation costs (annual, th euros)	2 500
Cost of capital	12.7%

Benefit (average estimation)	Extent
Accounts Receivable reduction	20.0%
Reduced transportation costs	3.0%
Increased (VMI) sales	5.5%

* Please note that if "VMI sales of total sales" is 0%, there will be no savings.

INITIAL AND ANNUAL COSTS, €	INPUT
INITIAL INVESTMENT	
Business process changes/communication	10 000
Investment in VMI software/hardware	38 000
IT support (in-house and external)	46 000
Personnel training costs	15 000
TOTAL INITIAL INVESTMENT	**109 000**
AVERAGE ANNUAL ONGOING COSTS	
Process owner costs	48 000
Operational costs (EDI and other IT)	36 000
TOTAL ANNUAL ONGOING COSTS	**84 000**

OUTPUT	
ANNUAL SAVINGS	
Savings from AR reduction	74 295
Gains from increase in sales	28 875
Savings from reduced transportation costs	18 750
TOTAL ANNUAL SAVINGS	**121 920**
TOTAL ANNUAL CASHFLOW (COSTSAVINGS)	**37 920**
NPV (Net Present Value)	25 356
IRR (Internal Rate of Return)	22%
ROI (Return on Investment)	74%
Payback period, years	2.9

Source: links.telema.com/VMIcalculator

Figure 9. Sample Vendor VMI calculations using Telema VMI Calculator

For a Vendor, the following should be entered as inputs:

1. **VMI sales of total sales.** Enter 100%, if all sales is conducted using VMI. Enter 0%, if no VMI is used. If VMI is used with one retailer that amounts to 10% of all business, then enter 10%. If VMI is used with 10 retailers that together amount to 75% of all sales, then enter 75%. Changing the input in this cell allows for trying out scenarios—what is the impact of VMI in case we do it with one buyer versus if we do it with majority of our buyers?
2. **Annual sales.** Enter your total annual revenue, in thousands of euros.
3. **Sales margin.** Enter your average sales margin in percentages: net profit divided by revenues.
4. **Accounts receivable.** Enter the amount of your average accounts receivable (customer debt) from your balance sheet. (For example, add the balances at the end of last two months and divide by 2).
5. **Transportation costs.** Enter your average annual transportation costs related to delivery of products.
6. **Cost of capital.** Enter your weighted average cost of capital[6]. Do not forget that equity capital has an opportunity cost attached. The easiest is to ask from your financial department.

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[5]*Telema VMI savings calculator is freely available and can be found on the web: links.telema.com/VMIcalculator. All suggestions for improvement are welcome.*

[6] *From Investopedia: The cost of funds used for financing a business. Cost of capital depends on the mode of financing used – it refers to the cost of equity if the business is financed solely through equity, or to the cost of debt if it is financed solely through debt. Many companies use a combination of debt and equity to finance their businesses, and for such companies, their overall cost of capital is derived from a weighted average of all capital sources, widely known as the weighted average cost of capital (WACC).*

For the calculator to work, the vendor should now estimate the extent of VMI benefits. For vendors, these are in three categories:

1. **Accounts Receivable (AR)** reduction. It is widely believed and confirmed with research that VMI optimises inventory in the supply chain. Reported numbers range from 15% to 40% less inventory at the buyer side. Therefore, at any moment in time, the buyer will owe vendors less money (reducing accounts receivable). If buyers owe less money, vendor's capital is not tied up in buyer debt anymore and its financing costs will be reduced.

2. **Reduced transportation costs.** For DC delivery, VMI programmes have resulted in significant savings in transportation costs due to being able to work with full pallets and even full trucks. It has been estimated that savings from optimised transportation are between 3-6%. However, for DSD delivery, transportation costs might even increase—if you believe this is the case, you can enter percentages with a negative sign, for example, -2%. In summary, depending on cooperation mode (DC versus DSD), enter the percentage of savings you believe suitable to your company.

3. **Increased sales.** Practice and research has shown that VMI helps to reduce OOS and therefore, increase sales. While sometimes very high numbers are reported (up to 40%), the average improvements are from 2% to 5%. This is explained by the difference in starting points. In some industries and companies, the starting point availability is very low, while in some industries and/or companies it is already at a high level. Potential gains depend therefore on the starting point. Enter the percentage that will apply to your specific company.

Next on the right-hand side, both initial investment and on-going average annual operational costs should be estimated. As explained in Figure 8, the vendor bears bigger initial setup costs than the buyer as the technological solution will usually be set up at the vendor. The right-hand side gives the frame-work for thinking about the related investments and cost. The current numbers on Figure 9 are just an example and users should enter their own company-specific numbers.

On bottom right half, the resulting investment evaluation metrics are presented in orange cells.

VMI savings calculator for the buyer

Just like for vendors, there is a similar calculator developed for buyers. The Telema VMI savings calculator for buyer is a strategic level tool for defending the business case to your colleagues or your management board. **Telema VMI savings calculator for the buyer** is an Excel based model[5]. The calculator's version 201512 is shown on Figure 10. On left-hand side are input cells for calculation of savings. On right-hand side are input cells for investments and costs and the resulting total numbers. All blue cells should be filled with relevant data for your specific company (the numbers there are just an example).

BUYER VMI CALCULATOR

Please estimate figures for YOUR company	INPUT
The numbers currently inserted are just an example	
VMI purchases of total purchases	10%
Inventory on hand (average, in th €)	14 300
Annual sales, th euros	200 000
Sales margin (percentage)	2.6%
Number of purchase orders (annual, th)	250
Order (transaction) processing cost (per order),€	2.90
Weighted average cost of capital	11.8%

Benefit (average estimation)	Extent
Inventory reduction	16.0%
Reduced order processing costs	60.0%
Increased sales	5.5%

* Please note that if "VMI purchases of all purchases" is 0%, there will be no savings.

INITIAL AND ANNUAL COSTS, €	INPUT
INITIAL INVESTMENT	
Business process changes/communication	14 000
Settings and adjustments to software	10 000
Personnel training costs	4 000
TOTAL INITIAL INVESTMENT	**28 000**
AVERAGE ANNUAL ONGOING COSTS	
Process owner costs	36 000
Operational costs (EDI and other IT)	46 000
TOTAL ANNUAL ONGOING COSTS	**82 000**

OUTPUT	
ANNUAL SAVINGS	
Savings from inventory reduction	26 998
Gains from increase in sales	28 600
Savings from reduced ordering costs	43 500
TOTAL ANNUAL SAVINGS	**99 098**
TOTAL ANNUAL CASHFLOW (COSTSAVINGS)	**17 098**
NPV (Net Present Value)	24 153
IRR (Internal Rate of Return)	49%
ROI (Return on Investment)	144%
Payback period, years	1.64

Source: links.telema.com/VMIcalculator

Figure 10. Sample Buyer VMI calculations using Telema VMI calculator

For buyer, the following should be entered as inputs:

1. **VMI purchases of all purchases.** Enter 100%, if all purchases are conducted using VMI. Enter 0%, if no VMI is used. If VMI is used with one vendor from which purchases amount to 10% of all purchases, then enter 10%. If VMI is used with 10 vendors that supply 25% of all your purchases, enter 25%. Changing the input in this cell allows for trying out scenarios—what is the impact of VMI in case we do it with one vendor versus if we do it with majority of our vendors?
2. **Inventory on hand**. Enter the average value of your inventory in thousands of euros. (For example, add the balances at the end of last two months and divide by two).
3. **Annual sales.** Enter your total annual revenue, in thousands of euros.
4. **Sales margin.** Enter your average sales margin in percentages: net profit divided by revenues.
5. **Number of purchase orders.** Enter the annual number of purchase orders: for example, multiply the number of orders you generate every month to all of your suppliers by 12.
6. **Order processing cost per order.** If you do not know the average processing cost per one order, estimate it by summarizing the payroll costs and other costs of all people dealing with issuing orders and dividing the result by the number of orders.
7. **Cost of capital.** Enter your weighted average cost of capital[6]. Do not forget that equity capital has an opportunity cost attached. The easiest approach is to ask for assistance from your financial department.

For calculator to work, the buyer should now estimate the extent of VMI benefits. For buyer, these are in three categories:

1. **Inventory reduction.** It is widely believed and confirmed with research that VMI optimises inventory in the supply chain. Reported numbers range from 15% to 40% less inventory at the buyer side. Enter the percentage you feel applies in your company's case.

2. **Reduced order processing costs.** As VMI eliminates ordering on buyer side, in theory, this should be 100%. However, to be conservative, lesser percentages can be entered also. Note that this number applies to orders related to VMI partnership only (as the share of VMI business is already considered above). This means that if only 10% of business is over VMI, then a 100% reduction in ordering costs affects 10% of all ordering costs.

3. **Increased sales.** Practice and research has shown that VMI helps to reduce OOS and therefore, increase sales. While sometimes very high numbers are reported (up to 40%), the average improvements are from 2% to 5%. This is explained by the difference of starting points. In some industries and companies, the starting point availability is very low, while in some industries and/or companies it is already at high level. Potential gains depend therefore on the starting point. Enter the percentage that will apply to your specific company.

Next on right hand side, both initial investment and ongoing average annual operational costs should be estimated. As explained in Figure 8, the buyer bears less initial setup costs than vendor, as the technological solution will be usually set up by the vendor. On bottom right half, the resulting investment evaluation metrics are presented in orange cells.
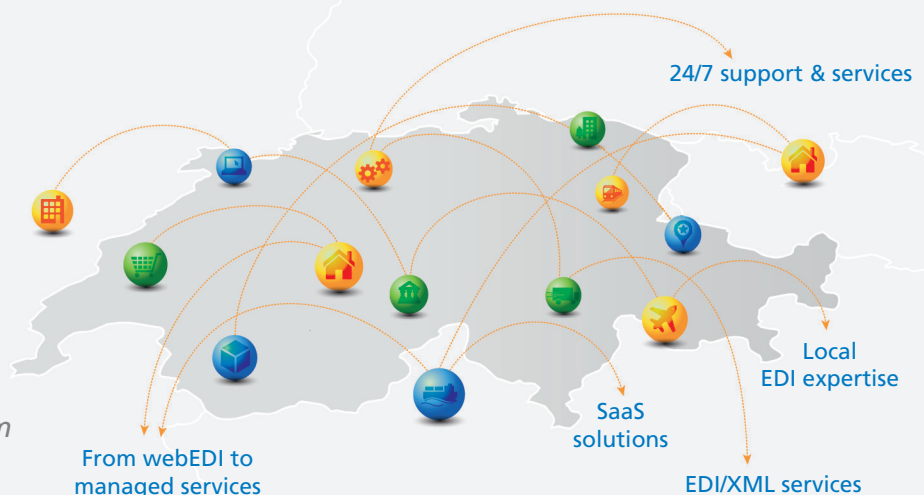
2.1.3. Risk Analysis

While there are numerous benefits to VMI, some concerns have to be taken into account as well. It has been estimated that out of every ten VMI implementations, only 3 achieve great success, 4 reap some benefits but not as much as anticipated, and three fail. The confidentiality of information sharing between buyer and vendor, the risk of loss of control by the buyer, the potential increase in vendor's administrative cost and less than expected benefits for vendor are the major potential shortfalls of VMI.

Project Phases	Project Risk	Action	Mitigation plan
EVALU-ATE	Target KPI's will not be met	Control/Transfer	Set KPI's in VMI contract, monitor performace
	Project will be not accepted	Control/Transfer	Use VMI savings calculator to prove business case
	Lack of trust	Prevent/Change	Pick another partner / Involve 3rd party
	Lack of resources due to other projects	Prevent/Change	Ensure top management support, make a project plan
PLAN	Project will be delayed	Monitor/ Improve	Plan project timeschedule carefully
	Project team is unable to manage project	Control/Transfer	Include people from key positions to team
	Project manager does not perform	Prevent/Change	Make sure needed skills are present, outsource if needed
TARGET	Unsuitable VMI Partner/products	Monitor/ Improve	Analyze your partners/products suitable for VMI
	Product Master Data is inaccurate	Control/Transfer	Agree on product master data exchange
	Min/max limits are incorrect	Monitor/ Improve	Review and adjust, communicate promotions
AGREE	Wrong KPIs are chosen	Control/Transfer	Use best practice to choose KPIs
	Agreed KPI targets will not be attained	Monitor/ Improve	Review and adjust process, roles and responsibilities
	MinMax levels chosen incorrectly	Monitor/ Improve	Change them when needed (gradually over time)
	VMI principles not clear	Prevent/Change	Agree on principles, and KPIs in a written VMI contract
ALIGN	Chosen VMI software not suitable	Control/Transfer	Before selection, weigh pros and cons
	Vulnerability for unanticipated breaks (eg. strikes)	Monitor/ Improve	Agree on backup procedure in the VMI contract
	Increase in vendor's costs	Monitor/ Improve	Improve process to optimise
	System settings are wrong	Control/Transfer	Testing period: each replenishment order is monitored
ROLL-OUT	Out of stock issues	Control/Transfer	Review and redesign process, increase min levels if needed
	Employees not ready for new process	Monitor/ Improve	Involve key users and train in all stakeholders
	Bad inv mgt leads to reputation damage	Control/Transfer	Review inventory process with partner
	Cost overrun	Prevent/Change	Manage project carefully, monitor costs

Figure 11. Sample risk mitigation plan in VMI project

Figure 11 lists sample risks in each VMI project phase. Every company should prepare their own risk assessment and mitigation plan. In the sample table, the first column specifies the project phase. Second describes the risk. In the third column, risks are grouped into three levels: green specifies lower risk, which should be monitored and improved, yellow specifies average risk that should be controlled and transferred, and red specifies high level risk that should be prevented/changed. For each risk, a mitigation plan should be devised.

2.1.4. Summary for VMI Business Case

As already mentioned, VMI is today still a novel idea for most managers in many organisations. The enthusiasts believing in VMI need help in order to "sell the idea" to colleagues and/or the top management. In chapter 2.1.1. the benefits of VMI were described in detail—vendor-specific benefits, buyer-specific benefits as well as joint benefits. Chapter 2.1.2. provided a simple VMI savings calculator that is useful for illustrating the potential gains on quite high-level abstraction. While this can be used for securing the general approval from stakeholders, in many organisations a more detailed project financial evaluation will be carried out later in the process. Chapter 2.1.3. focused on potential risks of a VMI project and provided sample actions to minimize those risks, completing the business case analysis framework.

2.2. Plan: Time Schedule and Team

| 1. EVALUATE | 2. PLAN | 3. TARGET | 4. AGREE | 5. ALIGN | 6. ROLLOUT |

2. Plan time schedule and team

- Compose a comprehensive project plan and prepare a time schedule.
- Appoint a strong project manager and determine project organisation. Make sure project team members have required skills. If not, involve external support.
- Use the RACI chart for defining clearly who, when and what should do.

Very important for the success of a project is 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).

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.

2.2.1. VMI Project Plan and Time Schedule

A project plan should be put in writing, outlining the work to be performed. During the planning phase, a team should prioritise the project, calculate a budget and schedule, and determine what resources are needed. The tasks are distributed and teams are informed of responsibilities. The project plan should also describe which questions will be answered at which stages of the project.

The project plan is the tool that communicates what work needs to be performed, which resources of the organisation will perform the work and the timeframes in which that work

needs to be performed. The project plan should reflect all of the work associated with delivering the project on time. Without a full and complete plan, 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 from the initial idea to the review (see Figure 12). The evaluation and planning phase can be completed in just a few weeks. Some of the phases may be overlapping and different specialists can work on those simultaneously.

Phase	Task	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
EVALUATE	Compose business plan	X	X	X	X																																		
	Get approval					X	X	X	X																														
PLAN	Compose team							X	X																														
	Make chedule							X	X																														
TARGET	Choose vendors/products							X	X																														
	Set min/max levels									X	X																												
	Align master data									X	X																												
AGREE	Specify goals with parntner										X	X																											
	Sign a written VMI contract											X	X	X																									
ALIGN	Map new business process						X	X	X																														
	Build EDI process for VMI									X	X	X																											
	Pick/build a VMI solution									X	X	X	X	X	X	X	X																						
	Build up test data													X	X	X	X	X																					
	Setup the VMI system																	X	X	X	X																		
	Test the system																					X	X	X	X														
ROLLOUT	Involve and train people																									X	X	X	X										
	Pilot and go -live																											X	X	X	X	X	X						
	Onboard new partners																																	X	X	X	X	X	X

Figure 12. Sample VMI project schedule

It is recommended that the project stages be agreed upon by representatives from both parties. Prior to the actual implementation, the commitment of both management teams to joint clarification of any issues related to the VMI project is required. Without such commitment, the chances of the project being on time, commercially advantageous and delivering sustainable success for parties are small. This requires a carefully composed VMI project organisation.

2.2.2. VMI Project Organisation

A decision of key importance for the success of the project is appointing a strong project manager. Skills needed for a VMI project manager are listed in the highlighted area. 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.

Regardless whether the project manager is from inside the company or outsourced, implementing VMI involves many departments across both vendor's and buyer's organisations. For a VMI project, a possible organisational structure is depicted on Figure 13. In this case, the vendor and buyer compose the project team after jointly deciding in favour of a VMI solution. The project team includes employees responsible for implementation.

VMI Project Manager main skills:
- **Deep order process understanding**
- **Understanding different approaches to the planning process**
- **Understanding how promotions impact the regular business**
- **User Interface management skills**
- **Developing exception reports to monitor the day to day operations**
- **Developing standard reports for internal and external use**
- **Good listening skills**
- **Execution skills (make things happen)**
- **Delivery on time (to be a role model for the team)**
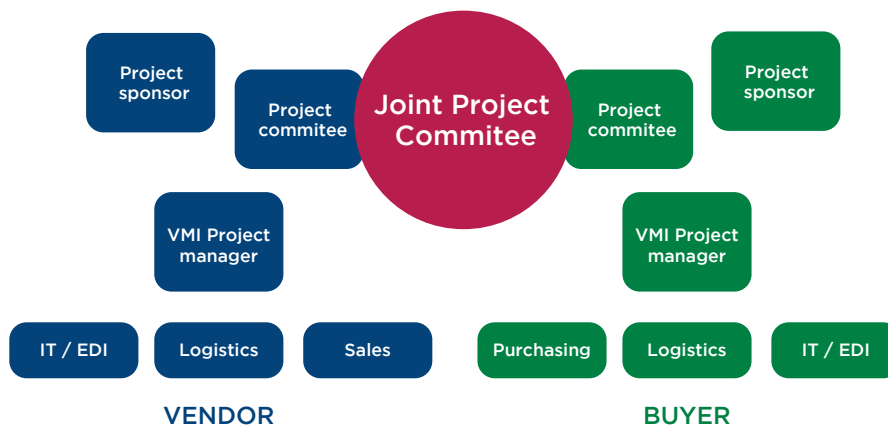
Figure 13. Suggested project organisation for a VMI project

The VMI Project Manager in each respective company has overall responsibility for the project. They report to the project committee and/or project sponsor, who in turn informs the joint committee. Usually, department managers are involved in VMI project. The managers involved in the project are given their tasks and deadlines by the project manager and report back to the project manager on the status of their work. Often the project sponsor on the vendor side is the Sales Director, and the project sponsor on the buyer side is the Purchasing Director.

Although all parties have responsibility for the success of the project, the role of the VMI project manager is of particular importance. The VMI project manager must ensure that there is clear support from the top management of the participating companies. More about key success factors in VMI projects can be found in Chapter 4.

In case of a very first VMI project for the parties, a **joint project committee** is strongly recommended. Local project teams report to the joint committee that coordinates the project team. In subsequent projects, when more experience and processes are in place, it is sufficient to have one general VMI project manager to run the projects.

2.2.3. Project Responsibilities and Resources

VMI is a major change project for any company. Therefore, best practice for managing change projects applies. Figure 14 lists some well-known factors for successful change project execution.

Responsibilities for each activity in a VMI project should be assigned to specific team members. For example, the RACI model can be used to bring structure and clarity to describing the roles that project team members play in the project. Figure 15 explains the logic behind the RACI model.

SUCCESS FACTORS IN CHANGE PROJECTS

- Strong support and commitment from top management
- Establish time limit on the project (plan the schedule on weekly basis)
- Compelling business case, i.e. clear cost/benefit analysis is available
- Strategic alignment with company strategy – objectives for the project are defined

- Proper composition of the project team (in both in quantity and quality)
- Availability of resources, including time and money
- Employee involvement through communication and empowerment
- Strong project manager. Roles and responsibilities clearly assigned to team members

Figure 14. Success factors in change projects

To apply the RACI model for a VMI project:

1. Identify all the tasks involved in delivering the VMI project and list them on the left-hand side of the table.
2. Identify departments involved in the VMI project and list them along the top of the table.
3. Complete the cells in the table defining who has responsibility, who accountability and who will be consulted and informed for each task.
4. Ensure every task has a role responsible and a role accountable for it. No tasks should have more than one role accountable. Resolve any conflicts where there is more than one for a particular task.
5. Share, discuss and agree on the RACI table with your team members before your VMI project starts.

Using a RACI model promotes common understanding of processes related to implementing VMI. A sample RACI chart describing implementing VMI is shown in Figure 16. In real pro-

R Responsible	Person responsible for the task to be completed.
A Accountable	Person who is accountable for the correct completion of the task.
C Consulted	People who provide information for the project (experts).
I Informed	People who are kept up-to-date on progress.

Figure 15. RACI model for assigning tasks to team members

jects, there are more stakeholders and not all tasks are listed in this sample RACI table.

As a rule, only one person should be accountable and one person responsible for each process. However, several people may be 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.

Task	Project manager	Buyer Purchasing	IT	Vendor Sales
Prepare a business case for VMI	R/A	C	C	C
Define target categories and products	R / A	C	C	C
Align master data with partner	A	C	R	
Specify business processes	R / A	C		C
Specify technical processes	R / C	C	A	C
Visualise IT systems architecture	A	I	R	I
Error handling in replenishment	A	R		C
Specify KPIs and project review	R / A	I		C

Figure 16. Sample RACI responsibilities chart for VMI project

2.3. Select VMI Target Products and Partners

| 1. EVALUATE | 2. PLAN | 3. TARGET | 4. AGREE | 5. ALIGN | 6. ROLLOUT |

3. Select target products and partners

- Determine which products are suitable for VMI (depending on shelf life, demand variability, etc.).
- Determine which partners to involve (depending on previous relationship experience, trade volume, origin, etc.).
- Determine Min/Max quantities for each product and delivery units (full pallets/truck loads).
- Update and correct product master data if needed.

2.3.1. Which Products and Partners to Include in VMI?

With what type of companies and products will VMI work? Niranjan et al. (2011)[6] developed a toolkit that enables managers to determine whether a company is ready for VMI. They list fifteen determinants in three groups: 1) buyer-related, 1) product-related and 3) vendor-related features (see Figure 17).

In order to evaluate their company's VMI readiness, respondents rate from 0 to 4 the applicability of these 15 features to their supply chains. The final score is the weighted sum of the 15 item scores. The range of possible overall score is from 0 to 400. A score below 200 suggests a "No Go", a score of 200–300 suggests a "Consider VMI" and a score of over 300 suggests a "Go" for VMI implementation.

Nirjanjan's toolkit supports the common belief that VMI is best suitable for high-volume items with relatively stable, predictable and repetitive demand. Products that are suitable to VMI are standardized and repeating. Standard product identification should be in use (e.g., barcodes), there should be low demand variance and product demand should be forecasted and stock levels monitored.

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 a positive effect on both low-volume and high-volume products.

BUYER-RELATED	PRODUCT-RELATED	VENDOR-RELATED
Stable growth	Standardized products	Supply chain trust / long-term relationships
High transaction costs	Repeating products	Advantages evident to both vendor/buyer
Good information and communication system	Standard product identification	Key vendors constitute a high percentage of purchase orders
Willingness to share information	Low demand variance	Vendorts are willing to cooperate
Purchasing is NOT the core competency	Demand is forecasted and stock levels monitored	Integrated information system

Figure 17. 15 prerequisites to VMI
Source: Adopted from Niranjan et al 2011

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[6] *Niranjan, Wagner, Nguyen (2011). Prerequisites to vendor-managed inventory. Industrial Engineer*

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2. VMI Setup Project Steps
2.3.1. Which Products and Partners to Include in VMI?

ECR COMMUNITY
EFFICIENT CONSUMER RESPONSE

Which partners to choose for the VMI programme?

A VMI programme is more often than not initiated on the buyer side. A major and inevitable prerequisite for VMI is buyer's willingness to share its sales data. So for vendors, the task of choosing partners for VMI is often quite easy—you mostly respond to your customers' requests. However, if you are a vendor located in areas where VMI is not well-known nor widely used, you can also be the initiator in the process. Start with picking out local buyers with whom you do a lot of trade and who are able and willing to share sales data. Communicate them your idea of initiating VMI along with the benefits it can bring them. Start from data visibility and move towards VMI over time.

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

For they buyer, picking suppliers for the VMI programme is somewhat easier as there is seldom any resistance to the idea on supplier side. Franke (2010) studied VMI adoption in manufacturing companies and carried out a survey about buyer choosing its vendors for the VMI programme[7]. Although in another industry, the results are relevant also for the FMCG sector. When deciding on which partners to include in the VMI programme, we suggest to look at the issues listed in Figure 18.

Before changing to VMI strategy, a buyer should re-evaluate its vendor base. It might be useful to reduce the number of vendors to transfer the critical volume of trade under VMI strategy. The purchasing department should evaluate and decide which vendor relationships should be strengthened and transferred to VMI and which relationships should perhaps be discontinued.

As a sidenote, 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. After reducing the number of vendors it worked with (from 300 to 50) and implementing VMI, K-Mart 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 in those cases, other approaches may need to be explored.

If you are a BUYER, consider the following issues	If you are a VENDOR, consider the following issues
Location of the vendor	Willingness and ability of buyer to share data
Volume of trade/margin with particular vendor	Volume of trade/margin with particular buyer
Category of products supplied (milk vs clothes)	Location of the buyer
Past relationship experience (length, quality)	Past relationship experience (length, quality)
Past delivery reliability	
Share of promotional sales vs regular sales	

Figure 18. Which partners to choose for the VMI programme

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[7] Peter Franke "Vendor-Managed Inventory for High Value Parts", Berlin Institute of Technology 2010

2.3.2. Min/Max Stock Levels for VMI Products

For products included in the VMI programme, 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. The "Min" value represents a stock level that triggers a reorder. The "Max" value represents a new targeted stock level following the reorder (see Figure 19).
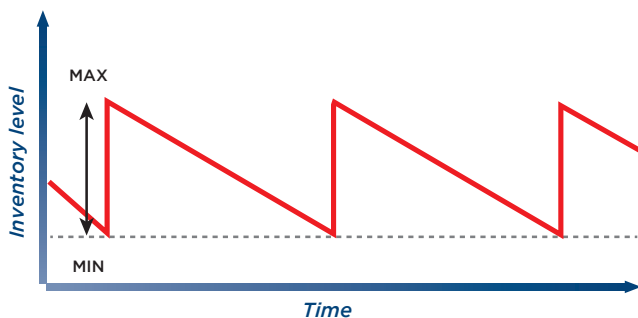
Figure 19. Min/Max inventory system

In some environments, physical appearance sets additional limits (layout of products on shelves). There is even a special term, "Nice Shelf Stocks" that are defined as the minimum shelf stocks to give shelves an attractive look. "Nice Shelf Stock"-levels are often larger than safety-stock levels, which are maintained to avoid out-of-stocks when turnover is extra high. All those considerations should be taken into account when setting Min/Max levels.

In order to achieve high levels of inventory turns and minimize stock outs, on-going reviews and changes to individual Min/Max targets are a must. The team needs to take time to analyze demand variations and be ready to anticipate them.

In some systems (often in case of warehouse VMI), the target Min/Max values are expressed in days of sales (DOS) instead of in units of stock. This is the preferred option, as it makes the targets automatically adjusted to demand changes. However, not all systems are able to handle Min/Max levels in DOS.

There are no universal formulas for setting the Min/Max levels in VMI systems. The original Min/Max method assumed irregular ordering, so that the minimum level signified the reordering point. However, in FMCG VMI projects, the deliveries are usually made regularly (every day, every week, twice a week, every month). The goal in that case is to have sufficient stock of each product between every delivery.

Thus, vendor and vuyer first agree on delivery frequency and then on general days of supply (DOS) targets. For example, in case of weekly deliveries, it is often agreed that the minimum supply is 7 days and maximum supply is 10 days. It is recommended to not set very low targets right away, instead, a 3-phase project with gradually lower stock levels is recommended in order to ensure product availability.

From the DOS targets, the quantities for each item are calculated based on average daily consumption. The following issues can all play a role in setting the Min/Max levels for individual items:

1. Service level required
2. Historical demand
3. Item shelf life
4. Order frequency
5. Historical weekly demand
6. Physical size and storage costs
7. Stockout costs (ease of substitution)

> **Keep your Min/Max levels dynamic! It is the responsibility of the VMI project manager to perform ongoing reviews that would identify which products Min/Max levels need to be adjusted.**

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 20 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.
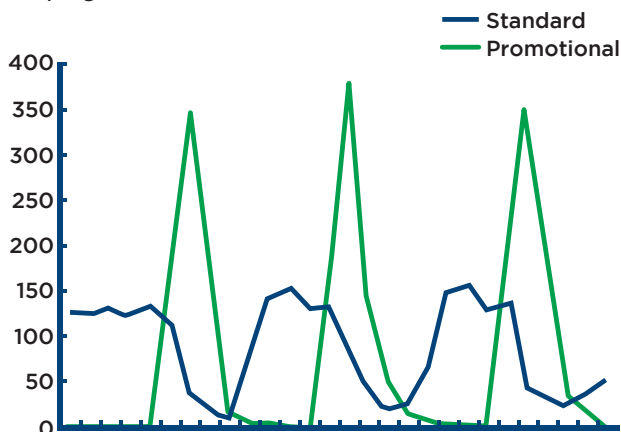
To determine weekly replenishment quantities and units, an analysis based on historical data should be carried out (see Figure 20). Weekly consumption (in cases) is compared with the standard pallet size. If the weekly requirement is a multiple of the standard pallet size, the conditions for sustainable and successful VMI process optimisation for both business partners are in place.

In Figure 20, 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 per display or layer.

On the basis of this analysis, the decision can be made which delivery unit (e.g. full pallet, display, unit or case) is used in replenishment orders to ensure that the target DOS (days of sales) is not exceeded. **The delivery unit should be clearly specified in product master data** (see chapter 2.3.4).

Automatic exchange of up-to-date stock data and sales figures may make it possible to optimise the order date in the continuous replenishment process. This results in optimal order volumes, i.e. full pallets, which are delivered daily together with other products of the vendor as **full truck load deliveries[8]**, allowing for cost optimisation.

Figure 21 shows an example of truck load optimisation. Based on an average weekly requirement of 234 pallets (excluding promotions), a number of truck and railway wagons are made available. The software application loads these on an optimised basis according to temperature and weight restrictions. The critical factor for a continuous flow of goods without additional costs is the general availability of products.

Figure 20. Impact of promotions on sales of standard products

Master data			Historical data, 26 weeks	Decision	
Vendor item no.	Item description	Cases per pallet	Average weekly consumption in cases	Pallets per week	Optimal delivery unit
10103	Pluto 58g	72	324	4.5	Full pallet
10104	Pluto minis 1kg	125	185	1.5	Full pallet
10120	Pluto miniatures 75g	125	325	2.6	Full pallet
10121	Pluto miniatures 150g	125	23	0.2	Case
10125	Pluto miniatures disp. 1,500g	4	480	120.0	Display
32120	Long grain rice 1,800g	72	36	0.5	Case
32200	Long grain rice 900g	144	933	6.5	Full pallet
42321	Pro.activ milk	72	133	1.9	Full pallet

Figure 21. Determining weekly replenishment needs and delivery units

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[8]*In cases of VMI in direct to store delivery, full truck load topic is often not relevant.*

Type	Full truck load (FTL)	Weekly qty in pallets	No. of pallets / truck	Max weight	Lead time, hrs	Combination options	FTL fees	Express surcharge	FTL per week
Road	Confectionery	52	34	18t	12	Non-perishables			2
Road	Non-perishables /	128	34	18t	12				3 plus
Rail	Non-perishables /	54	64	28t	28t				1
Road	Promotions	Ad hoc	34	18t	48	Non-perishables			
Total	Weekly quantity	234							

Figure 22. Full truck load planning

The resulting parameters for each product, which have been optimised in transport terms, can be stored in the VMI solution. Then, transportation costs (FTL fees and express delivery surcharge) can be agreed with the logistics service provider. By managing full truckloads, transport costs will be decreased where too many partial deliveries were previously triggered by the buyer.

Now that the shipping volume and frequency (order/delivery rhythm) have been defined, the optimum weekly delivery schedule can be prepared with the buyer (see Figure 23).

NB. It is mandatory for the full truck loads to be coordinated with the buyer in advance (i.e., specify in formal VMI contract). This Is to ensure that unnecessary stock will not increase on the buyer's side or the best-before-date problem intensified.

An additional reserve delivery slot should be defined for each day to ensure that ramp capacity is not overextended if additional quantities are required so that other vendors do not face delays as a result. For promotion quantities, separate delivery slots should ideally be defined.

Type	Product range	Mon	Tues	Wed	Thurs	Fri	Sat	Sun
…	Confectionery, chilled	10.30		10.30			10.30**	
Road	Confectionery, chilled	15.30*		16.30*				
Road	Non-perishables		9.00		9.00	9.00		
Rail	Non-perishables		11.00		11.00			
Rail	Non-perishables		23.00***		23.00***			
Road	Promotions					X****	X****	
Road	Promotions					X****	X****	
Rail	Non-perishables		11.00		11.00			
*	Reserve delivery slot for additional quantities							
**	Reserve delivery slot after discussion with goods-receipt department							
***	Reserve delivery slot for rail transport							
****	After discussion with goods-receipt department							

Figure 23. Sample delivery schedule

2.3.4. Product Master Data

Product master data is an important topic in relation to VMI, as accurate master data management is a prerequisite for a successful VMI programme.

All buyers need **product master data** (product attributes such as codes, sizes, colors, units, prices etc) from vendors. For example, the Kellogs Strawberry Meal Bar has over 340 different attributes[9]. These vary from the GTIN code, description, ordering units, best-before dates, and lot numbers to product images and recipes.

To help companies, many providers offer solutions to manage product master data effectively. Those solutions are called **Product Master Data (PDM) solutions** or **Product Information Management (PIM) solutions**. Organisations should choose a solution that is easy to configure, is customizable, extensible and at the same time upgradable[10].

> **Product master data is the consistent and uniform set of attributes that describe the products including identifiers, ordering and packaging info, ingredients, etc.**

Most buyers have different requirements regarding the number and sequence of attributes for each product. Often these requirements are more extensive than smaller vendors' ERPs can provide. That is the reason why today a lot of the product master data still travels on buyer-specific Excel forms. However, for optimal processes, it is very important that the product data is uniform and accurate, semantically consistent and accountable.

> **Product master data needs to be synced with vendor and buyer accurately and timely to ensure the success of the VMI programme.**

Instead of unreliable and error-prone Excel forms, more advanced methods of **sharing master data** should be used: either EDI master data documents sent via EDI operators or in an ideal case, global data syncronization datapools (GDSN) [11] adopted.

Product master data is not easy to manage even inside a corporation, sharing it across the supply chain adds to complexity manifold. However, best of the class product data management (internal and across the supply chain) can have considerable impact on revenue and increasing profit.

> **Up to four times faster product introductions can be achieved via succesful implementation of product master data solutions.**

Regarding VMI, there are a few product master data attributes that will be required in addition to those exchanged in the traditional replenishment process. New parameters needed are the Min/Max stock levels for each product. An example of required master data is listed in the sample VMI contract in Appendix 2.

In addition to product master data, also **location master data** is needed in the VMI process. It is important for efficient logistics that delivery points are uniquely identified. The GS1 organisation is responsible for issuing Global Location Numbers (GLN) for that purpose. In the VMI process, shipping address GLN, replenishment frequency and agreed delivery times should be agreed.

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[9] Read more from a good case study: http://www.1worldsync.com/documents/10192/10514/Kelloggs_Case_Study.pdf

[10] 15 leading Product Data Management solutions: http://www.cpcstrategy.com/blog/2015/02/15-pim-software-buyers

[11] The Global Data Synchronization Network (GDSN) is an interconnected network of interoperable data pools and a global registry known as the GS1 Global Registry that enables companies around the globe to exchange standardised and synchronised supply chain data with their trading partners using a standardised Global Product Classification

2.4. Agree Goals and KPIs in a VMI Contract

| 1. EVALUATE | 2. PLAN | 3. TARGET | 4. AGREE | 5. ALIGN | 6. ROLLOUT |

4. Agree on goals and KPIs in VMI contract

- Specify common goals and KPIs for the VMI project with your partner—e.g., set a target to increase availability (OSA) by 3%, and decrease inventory levels (DOS) by 20%.
- Sign a VMI contract specifying KPIs, service level, EDI messages, rules and responsibilities.

In this chapter, Key Performance Indicators (KPIs) for the VMI project and common goals for vendor and buyer are discussed. Most widely used performance metrics are discussed in chapter 2.4.1. Once the targets are agreed between the parties, these should be specified in a written agreement (often as an appendix to general trade agreement). To help the readers of the manual, chapter 2.4.2. gives an overview of issues that should be included in a VMI agreement. A sample VMI contract is presented in Appendix 2.

2.4.1. KPIs for Measuring the Success of a VMI Project

For the VMI project to work, it is necessary to set common goals and use 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 issues to consider in measuring the performance of VMI are listed on Figure 24.

A 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 participated and identified two major VMI project performance measure 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 programmes, the term "warehouse availability" or "fill rate" is often used.

VENDOR

BUYER

Production cost Manufacturer inventory	Inventory level	Purchase cost Retailer inventory
DC inventory turns Overall production efficiency	Efficiency	Retailer inventory turns Sales-inventory ratio
Distribution cost	Cost reduction	Ordering cost
Demand forecast accuracy Change in orders	Sale increase	Change in product sales
Distribution service level	Consumer satisfaction	Product availability

Figure 24. Issues to consider in VMI performance measurement

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 **ITO** is calculated as

> **Inventory Turnover (ITO) =** $\dfrac{\text{Cost of Goods Sold}}{\text{Average Inventory}}$

The higher the inventory turnover, the fresher the products and the lower the current inventory. Fresher products mean fewer discounts and fewer write-offs due to obsolescence[13]. 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.

Another well-known inventory metric, **Days of Sales (DOS)** could be calculated by inverting the inventory turnover figure. For example, an ITO of 30 (thirty times per year) would be 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. This is not useful to operations, which need to match supply and demand of specific items in the future.

Thus, it is more appropriate to calculate DOS on item level using units rather than money:

> **Days of Supply (DOS) =** $\dfrac{\text{Inventory at hand in units}}{\text{Average sales per day*}}$

* Based on history, in more advanced cases also considering forecasted demand

Smaller DOS figures are indicative of a leaner, more efficient inventory usage. However, this can be carried too far and stockouts might occur. Therefore, any target values for DOS metrics 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[13]. There are different levels of availability:

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

- **Warehouse availability.** The product is available to order from central warehouse to stores. This is the most often used measure in central warehouse VMI programmes. A synonym to warehouse availability 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 buyer 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.

> The global average of retail Out-Of-Stocks (OOS) is 8.3% at store level, leading to an estimated loss of total revenue of 4%.

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.

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[12] Avoiding waste and reducing shrinkage is one of ECR Europe focus areas. For over 15 years, a shrinkage workgroup has made great progress in the area. Read more at http://ecr-shrink-group.com/

[13] Mitchell, A. "Improving On-Shelf Availability: it Matters More", SymphonyIRI White Paper 2012

[14] Hausruckinger, G. "Approaches to measuring on-shelf availability at the point of sale" ECR Europe, 2006

[15] Gruen, T.W, Corsten, D. "A Comprehensive Guide To Retail Out-of-Stock Reduction In the Fast-Moving Consumer Goods Industry", 2007

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 look for "gaps" on the shelves. A second method makes use of Point-Of-Sale (POS) 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[14] as well as the P&G funded study[15].

Setting common goals for the VMI project using KPIs

Best practice is 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.

> **Common goals and KPIs should be agreed in written VMI contract. Pick at least one inventory metric and one availability metric.**

The target values of KPIs can be very motivating, especially if they are agreed inwritten form, preferably in VMI contract between the vendor and buyer.

2.4.2.　VMI Contract Between Vendor and Buyer

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.

When the product range for VMI is identified (chapter 2.3.1), volumes and delivery schedules are determined (chapter 2.3.3), and clear goals defined (chapter 2.4.1), these agreements should be put into a formal accord. 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.

Zammori et al[16] have researched standard VMI agreements. Their work focused mainly on vendor-manufacturer consignment VMI, which for FMCG sector can be used with slight adjustments. Based on their work and industry practice, a sample structure for a VMI agreement (usually as an appendix to existing trade contract) can be proposed. The VMI contract should include six major chapters (see Figure 25).

1. **Objective and terms of agreement**　☐
2. **Service level (SLA), including KPIs**　☐
3. **Agreed assortment and promotions**　☐
4. **Delivery terms**　☐
5. **Information exchange**　☐
6. **Miscellaneous**　☐

Figure 25. VMI contract between buyer and vendor

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[16]*Zammori, F, Braglia, M and Frosolini, M (2009). A Standard Agreement for VMI. Strategic Outsourcing.*

Explanation of VMI contract chapters

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

2. **Service Level Agreement (SLA) and KPIs.** In this chapter, the buyer and the vendor commit themselves to attain a predetermined level of performance. This chapter defines the service which is expected to be supplied by both the customer and the vendor and includes a list of KPIs used to quantify and to assess the achieved level of performance. 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.

3. **Agreed assortment and promotions.** Third chapter covers the frequency of assortment reviews, describes handling of changes in assortments (if those issues are not covered in main trade contract) and specifies VMI–related specifics in promotions handling.

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

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

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

A comprehensive sample VMI contract covering all mentioned six chapters can be found in Appendix 2.

Before preparing and signing the VMI contract, it is important to analyze existing contracts with the potential VMI partner in detail. 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 legal terms and provides guidance in the event of a dispute. In particular, how to handle exceptions and solve problems in the new collaboration should be covered.

2.5. Align IT and business

| 1. EVALUATE | 2. PLAN | 3. TARGET | 4. AGREE | 5. ALIGN | 6. ROLLOUT |

5. Align IT with business

- Analyse changes in business processes, modify and adjust.
- Map your new process flow, determine EDI messages to be used and channels to be built.
- Select a suitable VMI solution, make sure it satisfies your company's needs.
- Modify your IT system to support the new processes, set up and test the VMI solution.

2.5.1. Internal and External Business Process Changes

When product range for VMI is identified and volumes and delivery schedules determined, the 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 VMI 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 buyer implementing VMI will see that many processes have to be changed (see Figure 26). While some processes will change a little, some will change a lot, and some buyer processes will be totally outsourced to vendor (e.g. procurement logistics, order creation, inventory analysis and management).

VMI impact on Buyer processes	Small impact	Big impact	Outsourced to vendor
Procurement logistics			■
Material requirements planning			■
Order creation			■
Goods receipt		■	
Evaluation and qualification of vendors	■		
Inventory analysis and management			■
Allocation of goods	■		

Figure 26. VMI impact on buyer procurement processes.

A similar table can be created for vendors. Figure 27 points out that there are at least two new processes on the vendor side: 1) consumer sales and inventory data analysis and 2) order calculation.

VMI impact on Vendor processes	Small impact	Big impact	New
Item listing process	■		
Product master data exchange	■		
Transportation scheduling		■	
Consumer sales and inventory data analysis			■
Order calculation/creation			■
Goods picking process	■		
Invoice and payment	■		

Figure 27. VMI impact on vendor sales processes

These changes in processes on both buyer and vendor side mean that people need to be informed, trained and ready for their new roles on the date of go-live.

2.5.2. VMI Process and EDI Documents

As in any trade and logistics process, it is advisable to use **GS1 standards** in the VMI process.

> **GS1 standards create a common foundation for business by uniquely identifying, accurately capturing and automatically sharing vital information about products, locations and assets. GS1 standards include:**
> - **Trade item (GTIN)**
> - **Logistics unit (SSCC)**
> - **Physical location (GLN)**

Also, **EDI** is a pre-requisite for successful VMI projects. For trade documents, there are many standards globally. ECR Europe suggests to adopt GS1 EANCOM standards for trade documents. However, even if your trading 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.

> **Electronic Data Interchange (EDI) is the computer-to-computer exchange of trade documents in a standard electronic format between ERP systems of trade partners.**

Figure 28 lists the various EDI messages used in VMI, specifies whether they are optional or mandatory. The frequency of EDI document exchange differs for VMI DC (Vendor to Distribution Centre) and VMI DSD (Vendor Direct Store Delivery). All messages have been explained in more detail in Appendix 3.

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

Not all of the listed message types are required for successful VMI. However, 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 buyer orders outstanding. Other message types facilitate the automated replenishment process.

Message	Description	Frequency	
		DC Delivery	DSD Delivery
INVRPT	Inventory Report	Daily	At least monthly*
SLSRPT	Sales report	Weekly or monthly	Daily
ORDER	Order	Optional**	Optional
DESADV	Despatch advice	With SSCC reference	When delivery occurs (daily, weekly etc.)
RECADV	Receipt advice	Recommended	Recommended
INVOIC	Invoice	With ORDER reference	With ORDER or RECADV reference

and always when stock has been counted

** *sometimes mandatory, as some buyer's IT system might require opening an order line in its system*

Figure 28. EDI messages used in VMI and their frequency

The process of VMI is compared on Figure 29 to those of traditional BMI and to 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.
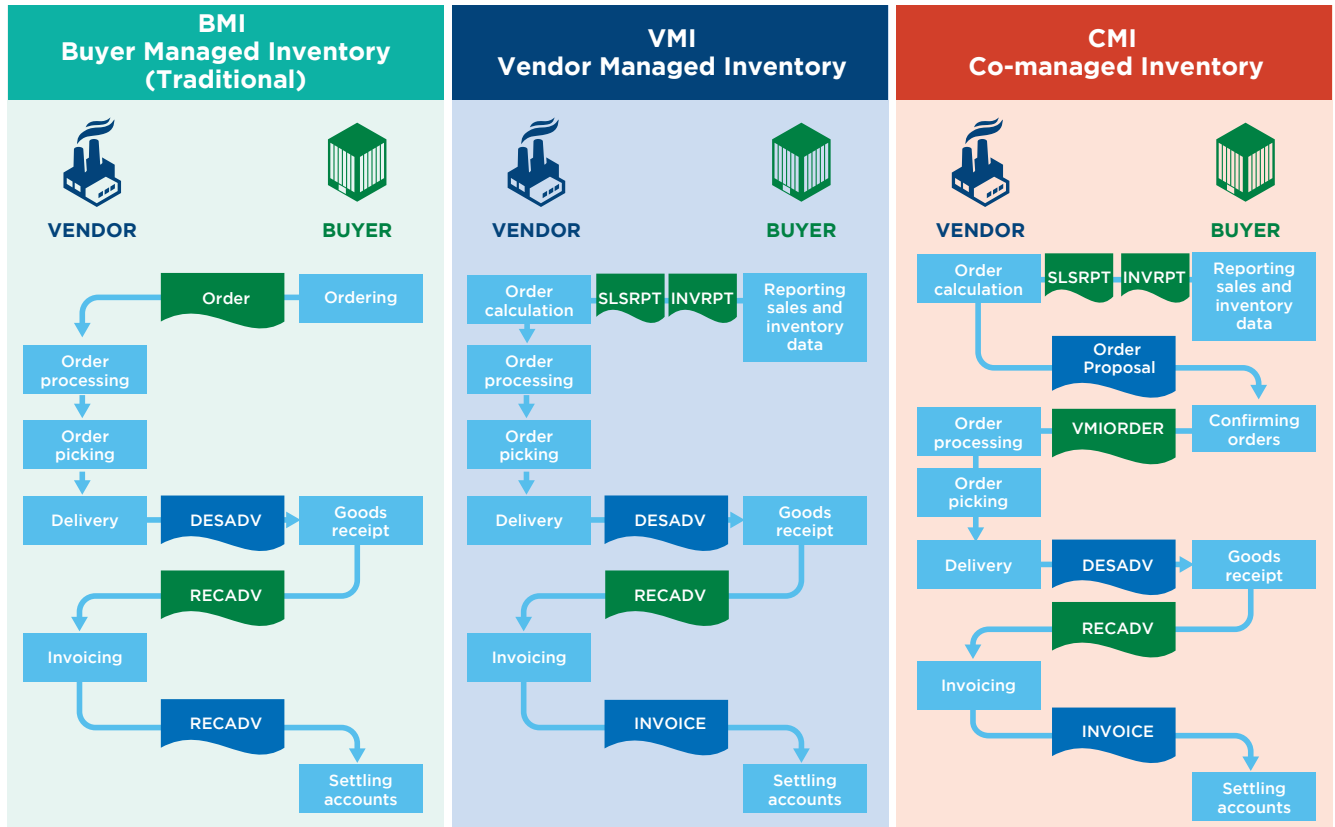
Figure 29. Process of replenishment in case of BMI, VMI and CMI

1. **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. **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 regular sales and inventory data (SLSRPT and INVRPT). Sometimes those two are combined into product activity report (PROACT), especially in case of SAP usage. 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. This means that in ideal case, there are both DESADV and RECADV documents in use, enabling invoices to reflect actually accepted quantities to make invoice processing efficient. VMI will also work without the RECADV document and in cases where one document represents both DESADV and INVOICE.

3. **CMI.** CMI 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 or for promotional replenishment. Instead of fully deciding replenishment, vendors create order proposals (ORDER PROPOSAL) and do not start picking the orders before receiving for the confirmation from the buyer (in form of VMIORDER or order proposal confirmation). The rest of the process, once again, is the same as in BMI and VMI.

In some countries (Switzerland) there is a practice where products in regular assortment are covered by VMI process and promotional products by CMI process (as described on Figure 29). For promotional products, the vendor sends an order proposal. Based on that proposal, the buyer sends the VMI order with the exact quantities and expected delivery dates. Based on this order, production is scheduled and later the shipments will be combined with regular product shipments.

EDI communication

The foundation of a successful VMI programme is automated connectivity with your trading partners. The technological interface must be discussed with your trade partners and agreed. In VMI contract (as discussed in chapter 2.5), EDI documents and their format, 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 programme operations and results.

Document numbering agreements

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

Where this is not possible, the buyer must generate his own order numbers on the basis of a reference table and enter these separately in the reference table. Buyers who implement a VMI relationship for the first time are 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 buyer'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 programme, 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 30):

1. Provide inventory visibility

2. Enable automatic replenishment

3. Support connectivity (EDI)

4. Provide audit trails

5. Offer monitoring and reporting

Figure 30. Functionality of VMI technological solution

1. **Provide inventory visibility.** Enable buyers to share sales and inventory data. In advanced cases, also demand data (forecasts). Provide near real-time inventory visibility across multiple locations: warehouses, shops, hubs, vendors, 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. In advanced cases, consider shared demand forecasts, and external data like weather.

3. **Support connectivity (EDI).** A VMI solution should either provide or at least support EDI connectivity. The goal is to allow VMI users to communicate with majority of their partners—from sophisticated multinational companies to small enterprises.
4. **Provide audit trails.** Provide audit trails for visibility into transaction history for liability management and dispute resolution.
5. **Offer monitoring and reporting.** Provide exception-based configurable alerts, so that all parties are notified of potential inventory problems. Present monitoring logs and analytical reports that give an overview of the inventory management process.

> When choosing a VMI technological solution, there are two main options: 1) In-house VMI/ERP solution or 2) Off-the-shelf VMI solution. The latter also includes VMI software offered as SaaS.

1. In-house VMI/ERP solution. Some ERPs have an inbuilt automated replenishment functionality module that can handle multiple locations. Order processing in warehouse management is part of the ERP system and does not require additional interfaces. In this case, the module should be taken into use and set up for VMI. Some companies prefer to develop the system themselves. The pros and cons of the in-house solution are listed on Figure 31.

2. Off-the-shelf VMI solution. This is recommended when the ERP solution has no automated replenishment functions or cannot handle multiple stock locations. The automated

IN-HOUSE VMI SOLUTION	
POSITIVE ASPECTS	NEGATIVE ASPECTS
• Changes in master data are immediately available for VMI functions. • Short-term sales fluctuations are immediately evident for demand planning. • No separate system; key users and other users use the same system for warehouse management and order processing.	• Initially setting up a new process is very time-consuming. • A long project lead time is required for discussing any missing and additional functions with central IT teams in advance and installing them. • Higher initial investment required. • Need to employ IT experts in-house.

Figure 31. Positive and negative aspects of integrated VMI solution

replenishment functionality in that case is delivered in the special VMI solution. Order processing is done via interfaces to the ERP system and is independent of warehouse management. The pros and cons of the off-the-shelf VMI solution are listed on Figure 32.

The off-the-shelf option can be a pragmatic initial approach, followed by a subsequent switch to in-house 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 in-house version could be more advantageous (unless master data exchange is solved alternatively).

• 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.

However, most stand-alone solution providers typically provide connectivity with existing systems, eliminating the biggest concern in deciding for stand-alone VMI solution. Solution providers usually have extensive experience in getting the technology up and running quickly.

As a result, the overall solution is less expensive to implement and maintain for both companies and their partners. Finally, off-the-shelf VMI solutions allow your company to focus on supply chain collaboration (a cornerstone of effective VMI)—instead of focusing on buying, installing, and running hardware and software systems internally.

OFF-THE-SHELF VMI SOLUTION	
POSITIVE ASPECTS	NEGATIVE ASPECTS
• Simple, tried and tested VMI tools can be used. • Centralised support by the tool provider. • Favourable licence agreement • Tool will be further developed by the provider. Release capability is guaranteed. • VMI project will be up and running much more quickly.	• Master data transfer must be solved • Not as customized as in-house solution. • Short-term changes in sales are not automatically reflected in the general demand planning. Hence, there is a need to exchange demand fluctuation periodically with the factory planner or with the relevant Key Account Manager.

Figure 32. Positive and negative aspects of off-the-shelf VMI solution

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 close involvement from key users. Actual implementation (technological realisation) can be completed in about one month.

Plan the VMI application setup in two phases:
1. The 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 application.
- Manually supplement missing weeks and OOS situations in the application.
- Highlight promotional products separately.

Map EDI messages, set up EDI connection
First, make sure you have agreed both on product master data settings (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. Depending on the VMI type chosen (as was explained on 29 on page 35), different EDI documents will be needed.

> **The specification of the information exchange:**
> 1. **Which EDI documents**
> 2. **Which formats**
> 3. **Which channel**
> 4. **Frequency**
> **should be agreed between parties in their VMI contract (see Appendix 2).**

More detailed descriptions of overview of EDI documents is given in Appendix 3.

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 buyer should fail for several days. In this case, the minimum precautionary measure is for stock balance from the buyer'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 buyer's warehouse.

Testing

The VMI system needs to be tested prior to real-life deployment. Sometimes test environments for VMI are available in ERP systems (e.g. SAP). It is recommended that the last twelve 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 33 shows a sample test plan for VMI setup.

On Figure 33, 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 also includes evaluation and correction of errors. The test steps are:

1. Test interface
- transfer inventory report
- transfer sales report
- transfer invoices/delivery notes

2. 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 the inventory report are not reported in whole numbers? (one suggestion is to round those down to nearest integer)

3. Test ordering /invoicing
- Are the order proposals calculated sensibly?
- Does the order proposal comply with the system settings defined (FTL or only full pallets)?
- Is invoicing based on delivered items? (Is RECADV document used[18]?)

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".

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[18]*RECADV is a receipt advice document, specifying the amount of goods accepted. GS1 in Europe has recently released guidelines for a harmonized EDI receiving advice in 2015.*

	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12
Test activities												
Determine test case	T											
Make test data available	T											
Prepare test script	T											
Carry out test												
Test interface		T	T	T	T	OK						
Test history				T	T	T	T	OK				
Test ordering / invoicing						T	T	T	T	T	OK	

	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12
System availability												
Development system	A	A	A	A	A	A	A	A	A	A	A	A
Test system	N	N	N	N	N	N	N	N	A	A	A	A
Production	N	N	N	N	N	N	N	N	N	N	N	A

	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12
Availability of testers												
Tester 1, Ms Muller	A	A	A	A	A	A	A	A	A	A	A	A
Tester 2, Mr Jaggy	N	N	N	N	N	N	A	A	A	A	A	A
Tester 3, Mr Walther	N	N	N	N	N	N	N	N	N	A	A	A

Planned testing	T
Planned acceptance	OK
Recource available	A
Recource not available	N

Figure 33. Sample test plan for VMI setup

2.6. Rollout: Pilot and On-Board Partners

1. EVALUATE	2. PLAN	3. TARGET	4. AGREE	5. ALIGN	6. ROLLOUT

6. Rollout: pilot and onboard partners

- Communicate the project in both companies: involve key users, train all parties.
- Plan and execute go-live carefully.
- Pilot your VMI program well, make it a success story to "market" VMI internally and externally.
- To get the most out of the VMI project, select and implement additional VMI partnerships.

2.6.1. Involve Stakeholders and Train All Parties

Involve stakeholders. Implementing VMI is a company-wide effort requiring changes to business processes with supporting technology. In order to ensure success, the project team needs to communicate the project in both organisations. It is recommended to engage senior management support and make a **formal managerial announcement** as soon as practical. In many cases, progress in a pilot project is critical to securing this support. All stakeholders should be involved and driven by shared objectives.

By involving key people in the VMI implementation process, employees are given the opportunity to make a significant contribution and to experience the value of VMI.

Training. Due to changes in processes, employees need to be trained to be able to act on a very different level and in a different context. Purchasing executives no longer need to just place orders. Instead, they start to interact with their vendors on a more meaningful level, and plan the inventory and promotions that really drive sales. On the vendor side, instead of simple order handling, employees now need to obtain data analysis skills in order to make accurate decisions on replenishment.

> By **involving key employees** in early stages of the VMI project, they are more likely to understand their roles and develop high sense of project ownership.

2.6.2. Plan and Execute "Go-Live"

After the tests have successfully been completed (chapter 2.5.4), 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 other users write the user documentation themselves and are actively involved in the technical acceptance of the system.

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 assortment 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 buyer'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 whether any system parameters need to be adjusted. 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.

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

Involving key people is a proven way to ensure that they accept the new management method and are proud to take on this new responsibility. After completion of the go-live 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!

For both sales and purchasing, it is important that the jointly defined goals, **availability (OSA) and days of sales (DOS)**, are guaranteed in the long term.

> It is advisable to first prioritise on-shelf availability 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.

2.6.3. Pilot Your VMI Programme

It is recommended to start your VMI programme with a pilot project and not start it full-scale. There are numerous reasons:

- A pilot project will help confirm if you are ready for full-scale implementation: it will give you a chance to adjust your processes and IT solution if needed without causing major upheavals.
- A pilot project is an opportunity to gauge your partner's and employees' reaction to the programme: again, timely changes and adjustments can be made.
- A pilot project can help ensure that you are well prepared to measure the success of your programme. A pilot project can highlight any adjustments to your agreed targets or measuring tools to ensure that you are measuring the desired outcomes in the best way possible.

> **The most important reason for a pilot project is that a well executed pilot project can be used as a success story for convincing new partners to switch to VMI.**

Choosing the correct VMI pilot partner is of big importance for the success of the project. Which criteria to consider when choosing partners for VMI was explained in chapter 2.3.1. The obvious factors are location, product range and volume of trade of specific partner. Additionally, the relationship between the companies is very important. 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 your partner has the basic skills relating to **Product Master Data Management** (chapter 2.3.4) and **EDI** (chapter 2.5.2).

During the pilot project:

1. **Gather feedback.** Have a system in place to monitor and capture information about how well the programme is working. Set up daily/weekly briefing meetings with your first partner. Since your pilot test is the best opportunity to learn what goes well and what does not before full-scale implementation, it is important to have a plan for soliciting feedback, tracking the activities and outcomes and recording needed adjustments.
2. **Constantly improve and adjust your plan.** Once you have piloted the programme as it was planned, things may come to light about implementation you may not have considered. Think about creative ways to address issues that need more attention before full-scale implementation.

2.6.4. On-board additional trade partners

For your VMI programme to be successful and maintain senior management support, it needs to be aligned with your corporate goals: that is why you need the KPIs and targets (see chapter 2.4.1). If your goals for the VMI programme involve increasing sales and customer satisfaction, your marketing and sales organisations will support it. In fact, experience shows that these divisions are likely to ask for the programme rollout to be broadened and accelerated as much as possible.

Both research and practice show that the more partners you have in your VMI programme, the bigger the gains. This is quite logical if you refer back to the VMI savings calculator (see chapter 2.1.2). Investments into IT solution and changing your business process are mainly one-time expenses and adding another VMI partner to the programme does not affect them. However, every additional partner will bring additional savings.

As a side note, in most circumstances it is not possible to include all your partners in a VMI programme. Not all of your partners are suitable for a VMI programme, for whatever reason. You should either leave them out or replace them with new partners (for example, switching from an overseas provider to local distributor).

Advice from companies having implemented VMI is:
* Sell and market the idea (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

The more VMI partners you have, the greater the gain from the programme:
Additional investments are marginal, while gains are proportional to trade volume.

3. VMI Performance and Control

Once the hard work of setting up the VMI project for the first time is complete, it is time for review and adjustments. Every programme could be viewed in PIM (Planning, Implementing, and Monitoring) cycle (see Figure 34).
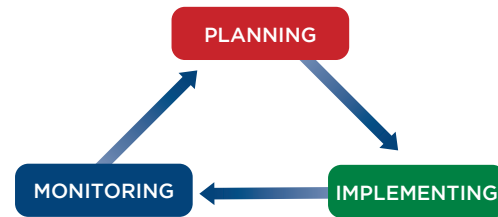
Figure 34. Planning, Implementing, Monitoring (PIM) cycle

3.1 Review and Adjust

Approximately twenty weeks after going live, it is advisable to invite both parties to a project review meeting. Figure 35 lists the topics which should be discussed in this meeting. It also describes which documents are useful for specific review activities and which adjustments will immediately improve KPIs. Users often have concrete suggestions for improvements, which can jointly be reviewed.

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

> **The motivation behind a VMI system is that both the buyer and vendor work together to maximise the competitiveness of the supply chain.**

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

•*Those measures/goals are relevant in case of central warehouse VMI programme*

Figure 35. Sample VMI project review checklist

3.2. Monitor on-going VMI programmes

In the planning and negotiation phase, key performance indicators (KPIs) 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 the 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 buyer is requiredt. 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 incidents and measures taken to optimise the business relationship.

Figure 36 is an example of regular VMI product range monitoring on buyer side. Delivered quantities and out-of-stock (OOS) situation is recorded daily. The table is supplemented with information about the current stock level in DOS. The report enables the vendor to carry out a detailed OOS analysis. In this sample table, DOS of total stock is 4.8 days – this is within the agreed minimum and maximum stock levels.

Item description		Delivery							Out-of-Stock OOS							Current stock level		
Item no		Mon	Tues	Wed	Thur	Fri	Sat	Total week	Mon	Tues	Wed	Thur	Fri	Sat	Total OOS	Availability in %	Stock in TU	Stock in DOS
10103	Pluto 58g	125	75	65	34	65	15	379		12			2		14	96%	412	6.5
10104	Pluto minis 1kg	77	33	12	5	15	2	144							0	100%	132	5.5
10105	Pluto 54g	225	180		110	75	25	615	2			5			7	99%	545	5.3
10120	Pluto miniatures 75g	99	90	70	60	50	40	409							0	100%	325	4.8
10121	Pluto miniatures 150g	115	85	80	80	70	60	490							0	100%	320	3.9
10125	Pluto min Disp. 1500g	0	0	0	0	0	0	0							0	0%	5	>99
30300	Long grain rice 25kg	12	12	11	10	10	8	63					2		2	97%	55	5.2
30400	Long grain rice 10kg	53	43	33	23	13	3	168							0	100%	180	6.4
30500	Long grain rice 5kg	85	65	55	45	34	22	306		15					15	95%	267	5.2
32120	Long grain rice 1800g	45	40	35	30	25	10	185							0	100%	195	6.3
32200	Long grain rice 900g	175	325	80	220	75	55	930				25			25	97%	485	3.1
42321	pro. activ milk	130	110	90	80	75	65	550							0	100%	480	5.2
	Total	**1,141**	**1.058**	**531**	**697**	**507**	**305**	**4,239**	**2**	**27**	**0**	**30**	**4**		**63**	**99%**	**3,401**	**4.8**

Figure 36. Monitoring VMI project performance on buyer side

3.3. IT Solutions for KPI Monitoring

Effective performance measurement and analytics are essential to both the current success of a VMI programme 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 VMI software offer powerful features for configuring and monitoring the KPIs of VMI programme performance, such as availability, inventory turns, OOS, and DOS. Ideally, the system will report the same information to both the vendor and buyer so that the process is highly transparent.

VMI dashboards offer a single-screen summary for efficiently managing VMI. The dashboard enables users to manage ex-

ception alerts and workflow tasks and to review KPI values. Dashboard content can usually be tailored to different roles and individual preferences. KPIs can be viewed from preferred angle and at any level of granularity, such as for a DC, an entire account, an SKU, or an entire product line. Figure 37 on next page shows a sample VMI dashboard generated by Demantra VMI Software.

Many VMI solutions also offer flexible and powerful query and reporting capabilities. During the implementation process, reports can be defined for different roles and users in the VMI process. A flexible data hierarchy will allow different users to slice and dice information at any level of aggregation and to tailor reports to individual user roles and needs.

Alerts can be automatically generated when, for example, a KPI value falls outside a user-defined performance range. Many VMI reporting solutions work based on **"management by exception"** idea. These solutions allow users to define threshold points and events, upon which users will receive notifications. This way, users will know when something critical occurs, thereby shortening the delay between event and resolution. Color-coded visual alerts inform the user of exception conditions, based on user-defined business rules. For example, if the service level drops below 80 per cent, this displays the alerts in red, and below 85 in yellow as illustrated on Figure 38.

Monitoring KPIs and handling exceptions is necessary in order for the VMI project to create value to both parties. When targets are not achieved, the reasons for failure should jointly be investigated and improvement measures taken. Monitoring results and using exceptions and alerts will allow companies to deal with and solve problems faster.
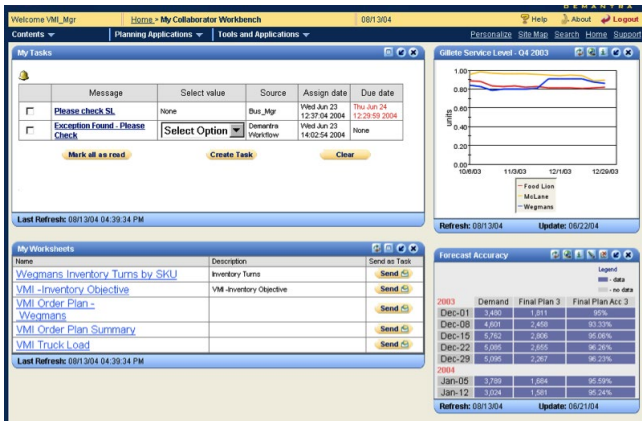
Figure 37. Demantra VMI Dashboard

VMI reporting solutions should include management by exception capability. This will shorten the delay between event and resolution.

VMi Service level

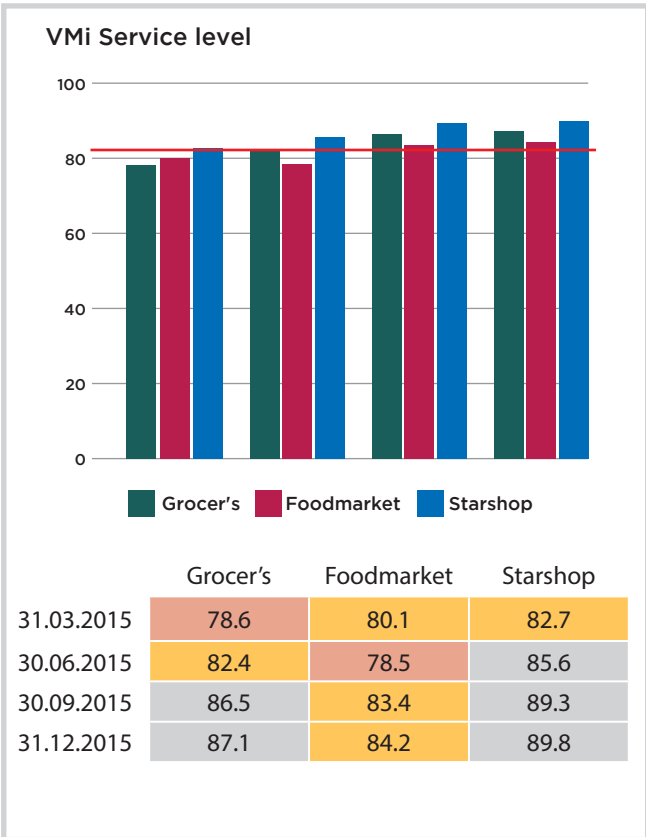|	Grocer's	Foodmarket	Starshop
31.03.2015	78.6	80.1	82.7
30.06.2015	82.4	78.5	85.6
30.09.2015	86.5	83.4	89.3
31.12.2015	87.1	84.2	89.8

Figure 38. KPI monitoring and color-coded alerts

4. Critical Success Factors for VMI Projects

In spring 2014, a pan-European survey[19] was conducted among ECR member companies in Europe about the critical success factors for VMI projects. 50 responses to the survey from 11 countries were received. All respondents were industry representatives with previous experience in VMI projects.

Before composing the survey, thirty factors important in VMi projects were identified from extensive literature research. 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".

4.1. Business Relationship Factors

There were 9 business relationship factors studied. The results (see Figure 39) point out that while it is important to rationally conduct the VMI project (have a good team, agree on common KPIs, have a detailed 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.

Trust. One of the most important aspects that many VMI studies and articles 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. 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.** Commitment can be described by willingness of both partners to invest in a long-term relationship, and to work together in solving problems as both recognise that they have an important business interest involved. Not only is management commitment important, but also commitment at multiple levels of the organisations involved.

Many sources and case studies have pointed out **existing collaboration** as the prerequisite to starting VMI and basis for choosing your VMI partners (see chapter 2.3.1).

Belief in VMI is needed for communicating the idea to both management, colleagues as well as to the trade partner. S**etting mutual goals and agreeing on KPIs** is one of the six steps in the VMI setup project (see chapter 2.4.1). **Cross-functional team** is needed as VMI project spans multiple departments and multiple companies.

Alignment of external processes is inevitable for the VMI to happen. Chapter 2.4.2 is devoted to the topic of **VMI contract** between buyer and vendor, another pillar for a succesful project. Appendix 2 includes a whole sample VMI contract.

> **NB! All listed factors were rated important by experts. Some factors were rated higher than others, but none of them was considered unimportant.**

Factor	Mean
Trust	4,58
Relationship quality	4,52
Commitment	4,30
Existing collaboration	4,29
Belief in VMI	4,20
Mutual objectives, metrics and KPIs	4,18
Cross-functional team	3,92
Alignment of external process	3,62
VMI contract	3,58

■ Mean ■ Group mean =4,13

Figure 39. The importance of business relationship factors (n=50, 1-not important, 5-very important)

[19] Details of the survey are explained at length in Sven Uustalu's Master Thesis (supervised by Hele Hammer, PhD) at Tallinn University of Technology.

4.2. Company Internal Factors

The second group, company internal factors incorporate 10 intra-company factors that affect the success of VMI implementation. Figure 40 depicts the importance of those factors. **Strong project manager** getting high rating was expected. The composition of VMI team **(roles and responsibilities assigned)** as well as the skills needed for a VMI project manager are discussed chapter 2.2.2.

Figure 40. The importance of company internal factors (n=50, 1-not important, 5-very important)

A high rating was given by experts to **user training.** Due to changes in processes, employees need to be trained to be able to act on a very different level and in a different context. Purchasing executives no more need to conduct forecasts and make orders. Instead, they start to interact with their vendors on a more meaningful level, and plan the inventory and promotions that really drive the sales and business.

On the vendor 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. Chapter 2.6.1 discusses stakeholders and training users.

Alignment of internal processes to the new reality is a big effort and needs to be planned and executed carefully. Chapter 2.5.1 describes processes that will change both on buyer and vendor side and chapter 2.5.2 gives an overview of how EDI documents are used in the VMI process. **Top management support** is a well-known prerequisite to any major change project, and is so also in VMI implementation.

Cost/benefit analysis is considered an important factor for VMI project to get approval from decisionmakers. Evaluating VMI business case is the first step in the six-step process and is covered in chapter 2.1.

Clear **internal objectives** and **VMI as a strategic approach** were both confirmed as important factors by the experts. **Users involved in implementation** ties back to the importance of user training and stakeholder involvement discussed in chapter 2.6.1.

Interestingly enough, **financial resources** did not receive very high rating. On the other hand, it can be well explained with common understanding that a company will find resources once it has a compelling investment case.

4.3. Technical and VMI Specific Factors

The third group of success factors was determined as technical and VMI specific factors. Figure 41 shows the ratings given by practitioners to the importance of the 11 technical factors in VMI projects.
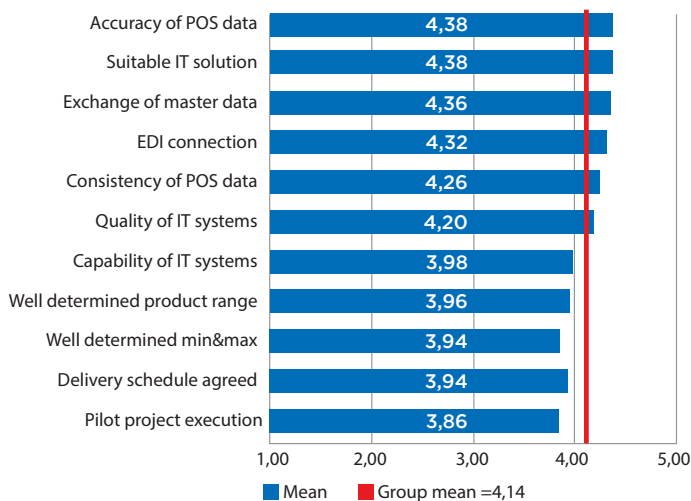

Figure 41. The importance of technical and VMI specific factors (n=50, 1-not important, 5-very important)

The most important factor named by respondents was **accuracy of POS data[20]**, and later also **consistency of POS data**. This is logical as all the replenishment decisions are based on that data and errors in that input will lead to errors in delivery. Due to thefts, damages and other uncontrollable events, buyers are unable to guarantee that data provided to vendors is 100% correct. This is why frequent stock-taking is necessary, correcting the stock balances in software.

Criteria for choosing a **suitable IT solution** are discussed in chapter 2.5.3. Importance and **exchange of product master data** is covered in chapter 2.3.4.

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 are essential in decreasing data transfer time and eliminating entry mistakes. **EDI connection** and document flows in VMI are covered in chapter 2.5.2 and the short descriptions of the EDI documents given in Appendix 3.

Inventory, production control and planning systems must be online, accurate and integrated to take advantage of additional information available. All this puts a high requirement on **quality and capability of IT systems** and reliability of information systems. The systems need to be compatible with trade partners and more often than not, this is done via a VMI service provider.

W**ell-determined product range** (see chapter 2.3.1), **well set-up Min/Max levels** (see chapter 2.3.2) and **delivery schedules agreed** (see chapter 2.3.3) are all confirmed by experts to be of strong importance in VMI projects.

Although pilot project execution does not have the highest ranking in this group of factors, all experts agree it is useful and necessary (as discussed in chapter 2.6.3). The most useful outcome of a well executed pilot project is the chance to use it as a success story for convincing new partners to switch to VMI.

The respondents gave also general comments regarding "Do's" and "Don't Do's" in VMI implementation projects based on their real-life experience. The most often mentioned tips and tricks are presented in the Quick Guide of the manual (Appendix 5).

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[20]*The question used the term "POS data", meaning sales and inventory data from the Point of Sales. In case of warehouse VMI, the equivalent would be warehouse inventory reports and delivery reports.*

Summary

The goal of the ECR Community handbook on VMI implementation projects is to widen the usage of VMI practice. VMI enables dramatic improvements in the supply chain as well as in financial performance. The vendor and buyer agree on improving KPIs, usually availability and stock turnover, through using VMI. Quantitative results that VMI practicing companies have achieved include:

- Increase in availability of 2% to 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 greater the trade volume with the business partner, the greater the potential savings. **It is estimated that savings up to 2% to 3% of total turnover can be achieved with VMI programme, if applied correctly.**

The decision to implement VMI is a **strategic decision** impacting many departments (logistics, procurement, planning, sales and marketing) and **involves strengthening the collaboration between vendor and buyer.**

The manual gives companies an overview of VMI concepts (chapter 1), provides a very detailed and practical guidance in setting up the VMI project (chapter 2), discusses VMI performance measures (chapter 3) and presents key success factors based on a recent special survey (chapter 4).

The Quick Guide in Appendix 5 is a convenient tool that allows experienced project managers to review the VMI Guidelines at a glance.

Appendix 1. What is ECR?

ECR Community[21] purpose is to promote collaborative processes as fundamental business principle in the consumer goods value chain in Europe to fulfil consumer wishes better, faster and at less cost in a more sustainable way.

There are 22 National ECR Initiatives (NIs) in Europe who work closely together, uniting over 1800 FMCG companies. This massive network allows the ECR NIs to develop relevant output, create widespread awareness and encourage European-wide adoption.

The working together concept is as relative to company inter-departmental relationships as to those relationships with external trading partners.

A truly integrated strategy must involve a retailer's Purchasing and Supply Chain Departments working together with a supplier's Sales and Production teams.

At the heart of ECR is **people development**. Developing the skill-set of the sector's employees is crucial and promotes the need for education and improved knowledge.

Ultimately, ECR develops better collaborators - individuals with multi-disciplinary competencies and an ability to negotiate with trading partners to unlock the "win-win" scenario and provide best-in-class service for consumers and shoppers.

Supporting the business standards to facilitate widespread collaboration is essential as is the need for ECR to be as relevant as possible by identifying emerging trends and defining better approaches for their adoption.

ECR Community has issued many useful retail process guidelines and manuals, for example:

* Efficient Assortment Best Practices Report (1998)
* Efficient Production Introduction (1999)
* How to layout a retail store (2012)
* OSA- Optimal Shelf Availability (2003)
* Collaborative POS Data Management (2001)
* Shrinkage: A Collaborative Approach To Reducing Stock Loss In The Supply CHain (2003)
* A Guide to CPFR Implementation (2001)

Those publications are available at the GS1 Switzerland webpage at **https://www.gs1.ch/en/prozesse/studies/ecr-europe**

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[21] *ECR Community is the successor of ECR Europe*

Appendix 2. VMI Sample Contract

VMI sample contract

In the sample contract, words that are highlighted in yellow designate those terms that your company should either adapt or modify according to your needs.

(as an Appendix to Regular Supplier Contract)
Side note: All terms likely to be settled in regular trade/supply agreement, have been left out to make it lean
between
name of Buyer, address, code, town   (hereinafter referred to as «Buyer»)
and
name of Vendor, address, code, town   (hereinafter referred to as «Vendor»)

1. **Object and term of the agreement**
    1.1.   The object of this agreement is to regulate a VMI process between Buyer and Vendor. It is agreed that under VMI:
    - The customer gives the supplier full responsibility to replenish nventories within agreed limits.
    - Both the customer and the supplier agree to share all the information which is necessary for VMI.
    - The supplier assures the customer the level of performance specified in the SLA.
    1.2.   This agreement comes into force on (date), and the Vendor will operate the VMI from calendar week XX
            (order date) onwards. The agreement is concluded for an indefinite period of time.
    1.3.   Unless otherwise specified in this agreement, the provisions of the main trade agreement (date), the general
            terms and conditions of business as well as the Buyer's logistics guidelines apply.

2. **Service Level Agreement (SLA)**
    2.1.   Parties agree to share all the information needed to support VMI over electronic data interchange (EDI), as
            specified in chapter 4. They commit themselves to adapt their information systems to new business processes.
    2.2.   Goals for performance, KPIs.
        2.2.1.   Parties agree that the goal of VMi programme is to increase availability while optimizing inventory.
                  The following metrics and their target values are agreed upon:
            - Availability increase by 2%.
            - Average days of sales (DOS) decrease by 4 days.
        2.2.2.   The relevant KPI report is issued monthly and discussed in detail in a review meeting. In case the
                  targets have not been reached (take specific action)
    2.3.   Handling of out-of-stock problems:
        2.3.1.   The parties undertake to inform each other immediately if signs of an OOS become evident and
                  together find a solution.
        2.3.2.   When a longer OOS (more than 7 days) occurs for the first time, the parties undertake to have a
                  meeting within X days, in which the further steps are jointly specified in a form that is binding to the parties.
        2.3.3.   In the event of recurring longer or shorter OOS, the Buyer may advise the Vendor by means of official
                  notice that in the event of another OOS, he will invoice the margin lost in relation to the lost sales including
                  a flat rate administrative fee of the mutually agreed amount. The lost sales are calculated on the basis of
                  the average daily revenue of the Buyer's points of sale in the previous month multiplied by the number
                  of OOS days from the date of the notice.
        2.3.4.   Force majeure. Where proof is provided that the OOS was due to force majeure, any liability to pay
                  compensation is waived. Typical traffic congestion does not constitute force majeure.
    2.4.   Delivery terms.
        2.4.1.   Delivery times by Buyer locations are specified in chapter 4.4
        2.4.2.   The parties agree to inform the other party X days in advance if there will not be a delivery for a valid reason.
                  During such period exceeding max quantities and OOS are allowed temporarily until the next expected
                  delivery.
        2.4.3.   Emergency deliveries, which allow to react to unexpected demand changes (e.g. due to weather changes
                  for seasonal products), can be done (list of occasions).

3. **Agreed Assortment and Promotions**
    3.1.   Assortment.
        3.1.1.   Assortment will be agreed for (x) months.
        3.1.2.   Target minimum and maximum stock levels and delivery units are specified in the Assortment File.
                  The minimum and maximum stock levels of each item will be reviewed (how often).

3.1.3. Updates to assortment (new products, replacements and delisting of products) will be done as previously. New introductions, replacements and delistings are planned mutually.

3.2.   Handling of promotions.

3.2.1. Vendor promotions are managed by Buyer/Vendor.

3.2.2. The Buyer must order the promotional volume from the Vendor no later than X weeks prior to delivery. Separate orders (EDI orders) are generated by the Buyer's inventory management system for this purpose. Any additional deliveries during the promotion are initiated and/or confirmed by Buyer.

Or

The Buyer discusses the rolling promotion schedule with the Vendor and determines the promotional volume to be sold jointly with the Vendor. No ordering from Buyer, and VMI is used to replenish also promotional items.

3.2.3. Buyer promotions. In case the Buyer plans measures to increase sales, such as longer opening hours, coupons or nationwide special offer days, the Buyer undertakes to advise the Vendor X weeks prior to the activity, so as to enable the Vendor to ensure general product availability.

4. Information Exchange

4.1.   Information sharing over electronic data interchange (EDI)

4.1.1. EDI services of (name of EDI operators) are used to exchange all data and documents between the parties. All documents will be forwarded in (XML, EDIFACT, Ideal Message, etc) format.

4.1.2. If the Buyer receives an EDI transmission regarding an imminent delivery too late, or the transmission is incorrect or the Buyer does not receive it at all, the resultant costs are charged to the Vendor, unless he proves that he cannot be held responsible for the circumstance.

4.1.3. Back-up process. If the electronic data interchange cannot be guaranteed for several days, the Vendor is authorised to trigger the order process on the basis of the available data (extrapolation). In such circumstances, the Buyer undertakes to send daily inventory reports to the Vendor by e-mail.

4.2.   Data quality

4.2.1. Data quality is a key requirement for a successful VMI process. For this reason, sensibility checks and rigorous detection and elimination of the root causes of false alerts are fundamental and need to be established in the work procedures.

4.2.2. Each partner is responsible for keeping their data updated and ensuring a defined level of data accuracy, e.g. there is a responsible person for system performance and helpdesk assigned.

4.2.3. If there is ambiguous information, the receiver of information is responsible for clarifying the situation with the sender.

4.2.4. Standardised EDI documents that are exchanged between Buyer and Vendor are (pick from list):

Code	Description	Responsible for sending	Frequency
INVRPT	Inventory Report	BUYER	Daily
SLSRPT	Sales Report	BUYER	Daily
PROACT	Product Activity Report	BUYER	Daily
ORDRSP	Order Response	VENDOR	For each transaction
DESADV	Despatch Advice	VENDOR	Before each delivery
RECADV	Receipt Advice	BUYER	On each receipt

4.2.5. Product master data syncronization. For each product, the following attributes need to be shared (on top of regularly exchanged master data):

Field	Explanation	Sample value
GTIN	Global Trade Item Number	120788734657
Minimum target stock	Replenishment point, safety stock	4 CU / 6 DOS
Maximum target stock	Level of stock that should not be exceeded	8 CU / 10 DOS
Order processing time		1 day
In transit time		2 days

4.2.6.   Locations, Buyer warehouses/locations. The following elements should be detailed:

	Field	Explanation / Sample value
1	Ship to address GLN	
2	Invoice to address GLN	
3	Replenishment frequency	Daily / weekly or Mo and Thu
4	Agreed delivery time	10:00 a.m.

5. Miscellaneous

5.1.   The parties undertake to treat as confidential vis-à-vis third parties all information which is marked as confidential or which obviously is confidential and which they receive from each other as part of the VMI cooperation.
They ensure that their employees and contractual partners also comply with this obligation. This duty to maintain secrecy continues after the end of the agreement for as long as there is an interest in maintaining confidentiality.

5.2.   The contacts at both contractual parties for Operations, Sales, Management and Technical Support are listed in Contacts list below:

	Vendor	Buyer
VMI Project Owner		
Operations		
Sales		
Technical Support		
…		

If specific responsibilities are reassigned in the course of business, the relevant adjustments must be made within X weeks, taking into account the formal requirements agreed.

5.3.   Amendments and supplements to this agreement and its appendices must be in writing and by mutual agreement of the parties.

5.4.   Termination of contract

5.4.1.   The present agreement will automatically end when the underlying main agreement ends, without requiring separate notice of termination. VMI cooperation may be terminated by either party to the end of each month, subject to a notice period of X months, whereby the validity of the main agreement may continue independently.

5.4.2.   Contract can be ended upon Vendor's continuous failure to replenish goods, and achieve the target KPIs.

5.4.3.   In addition, each party has the right to terminate this agreement without notice for good cause at any time. Any circumstance which makes it unacceptable for the party terminating the agreement to adhere to the agreement until the next possible ordinary date of termination is deemed to be good cause. This includes, for example: the opening of bankruptcy proceedings or composition proceedings relating to the counterparty.

5.5.   This agreement is governed by (your country) law. Any disputes arising during the performance of the agreement shall be resolved by way of negotiations. Upon failure to reach an agreement, the disputes shall be settled in Some Court. The arbitral tribunal shall be composed of a sole arbitrator and the language used in the arbitral p roceedings shall be English.

Place, date
Name and signature of the Vendor; Supply Chain Manager and Key Account Manager
Name and signature of the Buyer; Supply Chain Manager and Purchasing Managers

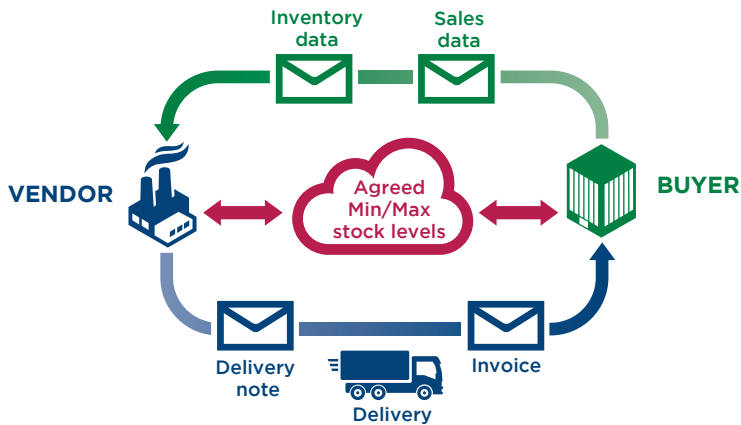# Appendix 3. Description of EDI Messages Used in VMI

Order, Order Response, Order Change

The **Order** message is transmitted by the customer to his vendor 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 vendor 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.

The **Order Response** is sent by the vendor 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.

The **Order Change Request** is sent by the customer to the vendor 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.

Invoice (INVOIC)

The Invoice message is sent by the vendor 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.

GS1 in Europe has issued harmonised guidelines for orders, invoices and despatch advices. GS1 in Europe has issued harmonised guidelines for orders (ORDERS), invoices (INVOIC) and despatch advices (DESADV). Find them here: **http://www.gs1.eu/index.php?tudasbazis=60&lister=190.** See the GS1 in Europe guidelines for a harmonized EDI receiving advice at **http://www.gs1.eu/docs/news/RECADV_in_the_FMCG_sector.pdf**

Despatch Advice (DESADV)

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.

The Despatch Advice may be sent for either the despatch of a 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).

Receive Advice (RECADV)

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.

Inventory Report (INVRPT)

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.

From the point of view of industry, packaging might add complexity. There are some packaged items delivered by vendor which the buyer 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.

Sales Report (SLSRPT)

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 vendor, 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.

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.

Remittance Advice (REMADV)

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.

Appendix 4. Service Providers

Vendor	Link	Company overview	Offered solution
araneo GmbH	www.araneo.ch	araneo GmbH is competence leader for VMI (Vendor Managed Inventory) implementation in Switzerland since 2007. Our success is based on a centralized platform, which we have especially designed for small and medium-sized businesses. Our solution supports customers to streamline their business and gain a competitive advantage in a fast changing marketplace.	Our Supply Chain Center is an inventory management tool with standardized integration of customer inventory reports. It automatically generates order proposals using various calculation methods. The easy to maintain Web-based interface allows versatile reporting. We individually customize the detailed message flows depending on the customers and their needs.
Descartes Systems Group (Compudata)	www.descartes.com	The Descartes Global Logistics Network™ (Descartes GLN™) is the standard for multimodal, inter-enterprise electronic data and document exchange. It gives you the flexibility to connect and collaborate your way. The Descartes GLN gives you the ability to create logistics business processes to operate or to differentiate yourself from the competition. Descartes Connectivity Services include: Trading Partner Implementation Services, Mapping & Translation Services and Data Integrity Services.	Descartes has implemented VMI for many of its customers on B2Bnet; the Swiss leading B2B platform. On top of that, B2Bnet offers: Orders to Cash integration, electronic invoice processing in all variants, digital archiving of electronic documents subject to a storage obligation such as EIDI-V (electronic documents) or GeBüV (scanned paper documents).
EDICOM	www.edicomgroup.com	EDICOM is an international company, founded in 1995 with headquarters in Spain, but also with offices in France, Italy, USA, Mexico, Colombia, Brazil and Argentina, and clients in over 65 countries. EDICOM has built sustained growth in the past years mainly selling EDI/B2B and Compliant Electronic Invoicing solutions. EDICOMNet, the private EDICOM's Value Added Network is one of the most important VAN used in Europe for some of the most relevant companies worldwide in their respective industries. EDICOM is Certification Authority in the EU and Mexico, so they are able to handle, by their own means, projects involving digital signature, different kind of digital certificates and time stamping among other services.	The company operates its data integration services through EDICOM B2B Cloud Platform, a complete ASP – SaaS service available 24x7x365 for data transmission and integration solutions fully adapted to clients necessities across national borders, legislative regimes or technical complexities. Some solutions our clients can manage through EDICOM B2B Cloud Platform : • WEB Edi Solution • INTEGRATED Edi Platform • Integrated CRP - VMI tool • GDSN Data Synchronization Platform • Remote signature Services • Time Stamping Services • Long Term Data Archiving Service.
EDITEL Austria GmbH	www.editel.at	EDITEL is an internationally leading provider of EDI solutions (Electronic Data Interchange) that specializes in the optimization of supply chain processes. The company serves clients in many different business sectors and industries. EDITEL has a presence in myriad countries, which makes the EDI provider the perfect business partner for companies with international business activities.	Via the EDI platform eXite®, EDITEL offers a comprehensive portfolio of services, ranging from EDI Communication and EDI Integration, Web EDI for SMEs, e-Invoice solutions and Digital Archiving to Business Monitoring. Our successful EDI projects are backed by 30 years' experience and in-depth expertise.
ImPuls AG	www.impuls.de	Web-based and EDI-compatible software for management and controlling of various sales areas and concepts in the fashion industry. It offers a set of predefined reportings like short term profit/loss analysis, plan/actual comparison, Top/Flop, size performance, etc. Based on contemporary and EAN-based sales data, a constant replenishment i.e. automatic supply of products can be established. ImPuls fashion XL is an ERP solution and provides with modern internet technology a wide range of economical functions for the fashion and lifestyle industry.	ImPuls retail ImPuls fashion XL

Quick Guide to VMI project

The toolbox consists of:
1. VMI Business Case / Savings Calculator
2. Key Success Factors in VMI implementation
3. Process Steps in VMI project
4. VMI Implementation Guidelines

VMI BUSINESS CASE AND SAVINGS CALCULATOR

Vendor managed inventory VMI is a collaborative replenishment strategy that leads to lower inventories and higher availability in the supply chain. Companies using VMI have achieved:

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

Additional benefits include 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% to 3% of total turnover can be achieved with VMI programme, if applied correctly.**

Use VMI SAVINGS CALCULATOR to estimate the impact on your company at

http://links.telema.com/VMIcalculator

KEY SUCCESS FACTORS IN VMI IMPLEMENTATION

BUSINESS RELATIONSHIP FACTORS	INTERNAL FACTORS	TECHNICAL FACTORS
1. Trust between partners 2. The quality of the business relationship 3. Commitment of partners, management and team members	1. Alignment of processes and user training 2. Qualified and dedicated project manager 3. Support by top management	1. Accuracy of sales and inventory data 2. Suitable IT solution and EDI connection 3. Product master data alignment

VMI SETUP PROJECT STEPS

1. EVALUATE › 2. PLAN › 3. TARGET › 4. AGREE › 5. ALIGN › 6. ROLLOUT

1. 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.

2. Plan time schedule and team

- Compose a comprehensive project plan and prepare a time schedule.
- Appoint a strong project manager and determine project organisation. Make sure project team members have required skills. If not, involve external support.
- Use the RACI chart for defining clearly who, when and what should do.

3. Select target products and categories

- Determine which products are suitable for VMI (depending on shelf life, demand variability, etc.).
- Determine which partners to involve (depending on previous relationship experience, trade volume, origin, etc.).
- Determine Min/Max quantities for each product and delivery units (full pallets/truck loads).
- Update and correct product master data if needed.

4. Agree on goals and KPIs in VMI contract

- Specify common goals and KPIs for the VMI project with your partner—e.g., set a target to increase availability (OSA) by 3%, and decrease inventory levels (DOS) by 20%.
- Sign a VMI contract specifying KPIs, service level, EDI messages, rules and responsibilities.

5. Align IT with business

- Analyse changes in business processes, modify and adjust.
- Map your new process flow, determine EDI messages to be used and channels to be built.
- Select a suitable VMI solution, make sure it satisfies your company's needs.
- Modify your IT system to support the new processes, set up and test the VMI solution.

6. Rollout: pilot and onboard partners

- Communicate the project in both companies: involve key users, train all parties.
- Plan and execute go-live carefully.
- Pilot your VMI program well, make it a success story to "market" VMI internally and externally.
- To get the most out of the VMI project, select and implement additional VMI partnerships.

KPI'S AND PERFORMANCE MONITORING iN VMI

PLANNING

MONITORING

IMPLEMENTING
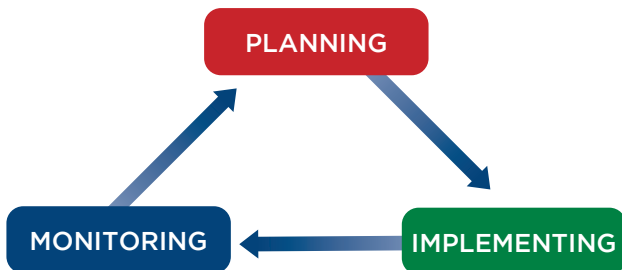
In the planning and negotiation phase, key performance indicators (KPIs) have to be defined together with the VMI partner. Best practice is to have targets for at least one inventory metric (e.g., DOS) and one availability metric (e.g., OOS), and preferably agree those in written form in the formal VMI agreement.

Right from the start of the VMI project, monitoring of the project performance should start. If the agreed targets are not achieved, the reasons should be investigated together.
Use VMI dashboards and alerts of exceptions to be aware of problems and to be able to resolve them quickly. If needed, adjust the goals and targets.

TIPS AND TRICKS FROM VMI USERS

Basics
- Understand VMI – how it works, what are the benefits, which processes it affects and how. Most failures of VMI result from misconception of VMI.
- Focus on consumer – understand that the supply chain earns revenue only when the consumer buys. When the end customer is satisfied, VMI benefits can be realized.
- Communicate and involve all stakeholders in an early stage.
- Regular project status meetings with partners help to ensure the smooth execution of the project.

Benefit from the experience of other VMI users
- Start sharing sales data as soon as possible, even if no replenishment decisions are made based on this data. It will help the whole supply chain to understand the real end-customer demand.
- Keep the minimum and maximum quantities dynamic depending on the sales cycles and seasonality.
- Avoid associating the decision of switching to VMI strategy to other negotiation points, for example prices.
- Strict penalty policies do not solve root causes of problems. Both partners should be willing to devote time to find out root causes of the problems and solve them.

How to get most out of VMI project
- Work carefully on the first pilot and make sure it is a success. Once it is up and running, it will be much easier, faster and less costly to connect additional partners.
- On-board as many partners as possible. The greater the share of VMI based relationships, the greater the value gained.