Reverse Logistics*

How to realise an agile and efficient reverse chain within the Consumer Electronics industry

*connectedthinking
Foreword

Welcome to PricewaterhouseCoopers’ first Reverse Logistics report in the Consumer Electronic industry. This report is designed to help companies in the Consumer Electronics industry to better explore, understand and share the ideas about today’s pressing business and strategic topic: Reverse Logistics.

Our unique combination of a broad, web-based survey sent to supply chain managers and their tax/finance counterparts throughout Europe, one-to-one interviews with subject matter experts and field visits to industry leaders has allowed us to gain insights to current reverse chain strategies, organisations and processes.

In this report, we will focus on examining the value drivers that trigger companies in setting up a reverse chain strategy and also how they embed this strategy into their processes, technology and organisation. A special focus in this survey was on how these drivers relate to a company’s tax policy and processes. Not surprisingly, environmental challenges, customer satisfaction, cost reduction and being compliant to increasing and complex regulations are driving companies to explore Reverse Logistics as one of their strategic challenges and opportunities. Our conclusion is clear: operational as well as tax & financial considerations must form an integral part of the reverse chain strategy to realise a “best practice” reverse chain.

We hope this report provides interesting and useful reading to you and your colleagues and that it evokes discussions within your company about your reverse chain strategy and processes. We welcome your thoughts on the issues and ideas we have addressed herein as well as your ideas for future topics towards Reverse Logistics.

Sincerely,

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PricewaterhouseCoopers         PricewaterhouseCoopers
We captured our key observations on trends & developments and barriers concerning managing the reverse chain in the picture below. They combine our vision on supply chain and tax complexity and show which key success factors are essential in realising an agile and efficient reverse chain.

**Key Observations**

### Key Success Factors
- Top management awareness and support
- Simplified and standardized processes
- Detailed insight in cost and performance
- Cross-functional collaboration
- Strategic collaboration with reverse chain partners
- Aligned policies and processes
- Strategic focus on avoiding returns
- Perceive returns as perishable goods
- Reverse Logistics as part of sustainability program
- Reclaiming value from returns
- Optimal tax structuring
- Full tax compliance and control
- Simplified tax processing
- Tax knowledge & expertise

### Barriers
- Little recognition of Reverse Logistics in creating competitive advantage
- Unquantified Reverse Logistics costs
- Lack of reverse chain collaboration
- Lack of appropriate management systems
- Limited forecasting & planning
- Lack of clear return policies & guidelines
- High rates of non-fault found returns
- Time of claim and credit processing
- Disatisfaction information technology support
- Non-recoverable Value Added Tax payment
- Administrative and financial burden of tax
- Customs formalities
- Permanent establishment issues
- Difficulties in customs tariff application

### Main Trends in the Consumer Electronics Market
- Consumers become more powerful
- Shortening product development cycles
- Supply and demand markets become more global
- More outsourcing and off shoring of production activities

### Main Trends in the Managing Reverse Logistics
- More strategic focus on Reverse Logistics
- Intensifying collaboration between reverse chain partners
- More use of swapping in the repair process
- Increasing impact of Reverse Logistics on corporate image

### Complexity in Managing the Reverse Chain

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Reverse Logistics
In summary of our report, we set out below a list of our recommendations in the area of Reverse Logistics. This should enable your company to have a good starting point in realising an agile and efficient reverse chain that promotes sustainability and profitability.

A. Critical start is to define the current internal situation. Identify the improvement areas in the reverse chain and quantify the financial impact thereof. Top priority is to create awareness at senior management that must perceive a need for change and notice the potential improvement opportunities and financial benefits.
   • Create visibility of financial benefits and need for change

B. Create awareness that a customer-centric approach will add value. By adopting such an approach, companies assure that they have the right focus for their customers. The key is to translate customer requirements into key performance indicators by which managers can effectively steer Reverse Logistics operations.
   • Focus your organisation by doing the right things for your customers

C. Best-in-class companies must optimise their Reverse Logistics operations from an operational and tax perspective. PricewaterhouseCoopers believes that combining both aspects results in maximum financial results.
   • Optimise the reverse chain from both an operational and tax perspective simultaneously

D. Ensure that the entire reverse chain organisation is aligned with customer requirements and act accordingly. Apply a multi-dimensional method considering processes, organisation structure, technology and people simultaneously so ensuring that changes are all-encompassing. Efficiency and agility are key concepts to consider.
   • Choose the right differentiators for your reverse chain and align your entire organisation accordingly

E. Like forward flows, managing Reverse Logistics is not the activity of just one department or group company. Upstream decisions heavily influence downstream operations. In order to optimise the reverse chain, collaboration of all relevant departments (from R&D to finance and tax) as well as reverse chain partners is fundamental in planning and mutual process improvements.
   • Collaborate within the company and also between companies
F. Reverse Logistics has an increasing impact on corporate image. To increase the competitive advantage, managers have to be aware of the financial and corporate risks of voluntary and compulsory take-backs. It is important to maximise stakeholder value from efforts in sustainability initiatives and take-back innovations.

- Maximise stakeholder value, sustainability initiatives and take-back innovations

G. Large volumes of products are returned unnecessarily. Therefore, preventing avoidable returns is a main focus area in managing Reverse Logistics. Clear warranty conditions and harmonised & standardised returns policies are basics. Measuring and rewarding the efficiency of gate keeping increase the predictability and manageability of service demands. A key element is to proactively manage the entry point of the reverse chain.

- Start initiatives to avoid returns and implement efficient gate keeping with unambiguous guidelines

H. Information technology, software and hardware, is essential for end-to-end control and transparency along the reverse chain. This study reveals a clear gap between the importance and satisfaction of IT in Reverse Logistics management. Best-in-class companies are able to align and integrate information systems, although the availability of appropriate software is a challenge. Create visibility concerning performance and automate processes to reduce the chance on errors and tax gaps.

- Apply appropriate information technology to integrate and standardise reverse chain processes

I. Many companies experience difficulties in forecasting & planning the reverse chain due to the degree of diversity of goods and flows. At the same, it is one of the key success factors because it can eliminate uncertainty and reduce tax burdens and mitigate tax exposures. All this will make it easier to manage the reverse chain.

- Use advanced forecasting & planning principles for both operations and tax management.
J. Measuring the true cost and revenues related to Reverse Logistics is very hard. Visibility in clear costs such as costs of rework, downgrading, processing customer complaints, warranty claims, product recalls, is a first step. Extending the Profit and Loss account with hidden cost, e.g. opportunity tied up in returns, cost of tax compliance and control, activities designed to avoid returns advances insight in performance. Indicators presented in this study provide an initial framework to benchmark with non-financial metrics.
• Reveal true costs, revenues and end-to-end performance

K. Proper planning and management of direct and indirect taxes is a vital financial consideration within the reverse chain. Complex (and cross border) flows of goods as well as the diverse bought-in services engrained in the reverse chain create a high degree of tax complexity and lead to unexpected tax exposures and costs.
• Involve tax specialists as early as possible in the decision making process and at all subsequent stages of the reverse chain
PricewaterhouseCoopers believes that, by taking a holistic view on Reverse Logistics, financial and operational improvements can be achieved. Our study highlights the following improvement considerations in respect of your company’s strategy, process, structure, people and technology.

**Key Actions**

**Strategy**
- Managing product returns calls for strategic decision making
- Incorporation of tax in Reverse Logistics in the general tax risk policy
- Put strategic focus on front-end filtering and avoiding returns
- Tax Strategy for Reverse Logistics should be focused on Value Added Tax and customs
- Harmonise and standardise guidelines and policies
- Make Reverse Logistics part of sustainability programme

**Process**
- Use end-to-end process approach in solutions and programs
- Reduce uncertainty on required resources
- Measure and reduce turn around times
- Incorporation of Tax compliance and control framework into process design

**Technology**
- Make strategic use of technology
- Share detailed return data with strategic partners
- Integration between operational and financial systems
- Develop corporate performance management system
- Customised financial systems for accurate Value Added Tax & customs compliance

**Structure**
- Develop front-end quick service capabilities
- Ensure appropriate attention is given to tax structuring
- Consolidate laborious recovery activities
- Actively manage recovery options
- Align your physical reverse chain structure

**People**
- Create approach towards true integration, not just interface
- Use dedicated resources for Reverse Logistics management, including tax and operation collaboration
- Further develop tax and operations know-how of reverse chain managers

**Holistic approach towards Reverse Logistics management**
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1 Reverse Logistics according to PwC
The Consumer Electronics (CE) business environment is rapidly changing. Consumers are more demanding, product life cycles are shortening, globalisation is increasing, and companies are trying to realise revenue growth by industry consolidation and tapping into new sources of revenue. PwC believes that Reverse Logistics is one of the main unexplored areas for potential revenue growth.

Corporate Governance, Corporate Social Responsibility and Environmental Issues have a rising impact on operations. The industry is more competitive than ever and there is an ever-growing pressure for cost reduction.

PwC argues that it is essential to address both operational and tax aspects simultaneously when optimising the cost effectiveness of the supply chain. The business case for that is evident.

The design of a reverse chain strategy is challenging. Embedding that strategy into an organisation, processes and technology is the following hurdle to take. Ensuring integration of that strategy with tax policies and processes is the final challenge. Reaching this stage amounts to an optimised reverse chain with a maximum capacity to release the financial benefits.

1.1 Reverse logistics at a glance

According to the European Working Group on Reverse Logistics (2004)¹, Reverse Logistics is: “The process of planning, implementing, and controlling flows of raw materials, in-process inventory, and finished goods, from a manufacturing, distribution or use point to a point of recovery or point of proper disposal”

Recalls, commercial returns, wrong deliveries, warranties, repairs & refurbishment and end-of-life returns are some of the many examples of Reverse Logistics that companies face. It has historically been an undervalued part of supply chain management, but is currently gaining much more attention due to its direct impact on profit margins, companies’ environmental image and corporate social responsibility. PwC has identified 5 key areas of supply chain improvements², amongst which we perceive Reverse Logistics as prominent.

A typical reverse chain process is shown in exhibit 1.1. But a distinction should be made between different categories of returns:

1. Commercial Returns
   Returns for which there is an immediate demand at another market location or segment. Possible causes: customer dissatisfaction, catalogue sales, overstocks etc. Commercial returns occur in the sales phase or shortly after.

2. Repairable Returns
   Defects and suspect components (modules/parts) from field (exchange) repair activities or products under warranty. Customer is entitled to a replacement product.

3. End-of-use Returns
   Returned products/components which are not of longer use to the original owner, but for which new customers can be found. Reasons: end-of-season, end-of-lease, trade-in, product replacements etc.

4. End-of-life Returns
   Items of no remaining use, which are processed due to contractual or legislative obligations. These returns are often collected and processed according to legislative obligations.

5. Recalls
   Products recalled by the manufacturer due to a condition or defect that could affect its safe operation. Work on a recall is completed at no cost to the product owner. Other types of returns, such as refillable units and reusable carriers, are not included in this study.

¹) http://www.fbk.eur.nl/OZ/REVLOG/
²) PwC identifies five ‘Integrated Supply Chain Solutions’: ¹) Supply Chain Network Redesign, ²) Centralisation of Procurement, ³) Relocation of Operations, ⁴) Commercial Rationalisation, and ⁵) Reverse Logistics
Returned goods often go through the following activities depending on the return type:

1. **Product Acquisition**
   Retrieval of the product back from the market. The timing, quantity, quality and composition of returned product need to be managed in close cooperation with other supply chain parties.

2. **Collection**
   Logistical activities (such as transportation, consolidation, transhipment and storage) to obtain the products back from the market and transport them to facilities involved in the other stages.

3. **Sorting, Testing & Disposition**
   The classification (according to quality and composition) of returns and determination stage of the route the product will take in the reverse chain. Market and strategic conditions are taken into account in the disposition decision.

4. **Recovery**
   The process of recovering value from the returned product by re-use, repair, refurbishment, recycling or other types of recovery.

5. **Redistribution & Sales**
   Basically, no value recovery has materialised until the recovered products, component or materials are brought back into a forward supply chain.

When PwC clients were asked about Reverse Logistics, their responses captured the complexity and immaturity of this subject:

- “Forecasting & planning of returns is very hard or, in fact, impossible so we don’t do it”
- “We are aware of directives like WEEE and RoHS but what does it really mean for our processes and what are
the potential risks?"

- “Reverse Logistics is really perceived as a cost driver but it is strange to observe that we don’t have insight in our Reverse Logistics costs. In general, I have no idea how we perform in comparison with our peers”
- “I do know that Reverse Logistics could be a source of revenues but our systems are not supporting us”
- “Our sales department makes it much too easy for our customers to return products. They have no clue what they are causing”
- “Hopefully we will not be confronted with a re-call because I don’t think we are ready for it”
- “Reverse Logistics an important theme? We outsourced it so no worries”
- “Please give me a good report so I can put this topic on the agenda of the Supply Chain Management board”
- “We never consider tax, especially VAT as an important issue for Reverse Logistics”.

Reverse Logistics is a complex subject with many supply chain actors, internally and externally, with their own (often contradictory) objectives. This complexity is captured in a high-level process model which acted as a starting point for our research.

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As displayed above, the Reverse Logistics strategy is built on the “Voice of the Customer” and “Voice of the Business”. From this strategy, forecasting and planning processes take place, which form guidance for the Reverse Logistics operations and its various flows to operate. Available tools such as install base management, cost & performance management, warranty management, etc., should assist Operations to achieve “Operational excellence”. This flowchart is designed from an OEM perspective.

1.2 Objectives of our Reverse Logistics research

Information is obtained principally from confidential and proprietary sources with the overall objective:

“To perform an academic and multidisciplinary study on Reverse Logistics within the ‘Consumer Electronics’ industry and translate the outcomes into a ‘Reverse Logistics Best Practice Framework’ to aid companies to make the transition towards an agile and efficient reverse chain.”
This research mainly focuses on answering the following questions:

- What are the major trends, developments and challenges that supply chain & tax managers are facing concerning Reverse Logistics?
- What are the major bottlenecks and which value drivers characterise ‘world class’ performers?
- What are the recommendations to improve Reverse Logistics and what is the business case for consumer electronics organisations to do so?
- How could organisations make the transition happen towards an agile & efficient reverse chain but remain in compliance and in control of the relevant international and local regulations?

Improvements in Reverse Logistics can create substantial value for stakeholders. This is also a key objective of our research.

Historically, several Reverse Logistics research projects have been carried out, focussing on one or just a limited number of operational and/or organisational aspects of the reverse chain and primarily initiated from the academic world. As far as we are aware, there has never been carried out a study on the tax consequences of Reverse Logistics – our reasons for including a tax angle on this study are detailed in section ‘Tax in Reverse Logistics’.

This research is focused on providing a comprehensive overview of all management topics within Reverse Logistics, including taxes. It also aims to provide information and guidance on the growing trend of Reverse Logistics evolving into a “profit” centre within a company.

We are keen to raise awareness and attention of companies to the unique position that Reverse Logistics takes, particularly in the CE industry where it has developed explosively in recent years due to the increase in market volume and reduction of product life cycles.

As depicted in exhibit 1.3, Reverse Logistics directly impacts stakeholder value including shareholders, customer, employees, suppliers, reverse chain partners, the government and the (public) environment. Revenue growth, cost reduction, sustainability and change & control drives performance and must be managed closely together to realise the most optimal situation.

Exhibit 1.3: Key drivers Reverse Logistics

1. Revenue Growth
   How does Reverse Logistics contribute to improvement opportunities like increasing revenues and improving customer satisfaction?

2. Cost Reduction
   What does the cost structure concerning Reverse Logistics look like as part of our entire supply chain and how could we achieve operational excellence?

3. Sustainability
   How does the outside world perceive your organisation and what is the role of Reverse Logistics? What is the direct impact on revenues and costs?

4. Change & Control
   Do we comply to global, regional and local legislation, are we able to make the change from a multi-perspective view? Are we in ‘control’?
1.3 Tax in Reverse Logistics

Managing Reverse Logistics from an operational perspective is already quite complicated and rarely of high priority. Incorporating Tax considerations is an exception to the rule. However, tax plays a key role in Reverse Logistics. The administrative burden of tax compliance is felt throughout the reverse chain but potential savings and profit improvement aren’t necessarily enjoyed. The proper management and planning of taxes can lead to substantial improvement of profits and cash flow.

In exhibit 1.2 Tax Compliance and Control is introduced as one of the strategic attributes to achieve excellence in the reverse chain. PwC developed a high level Reverse Logistics Tax Control and Compliance framework. A flowchart of

Exhibit 1.4: Tax compliance and control framework
Value Added Tax (‘VAT’) is a tax that is levied on a transaction basis throughout every stage of a supply chain. Under a VAT system, output tax is collected by businesses from their customers by adding VAT to the amounts charged. However, businesses also pay input tax to their suppliers on purchases that they make. The businesses settle the balance of their output tax and input tax with the tax authorities and thus tax the value that they add in the supply chain. The tax is ultimately borne by the end consumer. VAT rates and treatment vary from country to country for the same transaction on goods and services. Although VAT is in principle meant to be neutral with respect to the number of passages between producer and final distributor, a lack of knowledge and planning in the reverse chain can lead to unnecessary cascading of VAT costs.

The European Union recently confirmed their proposal for major changes to the Place of Supply rules for Value Added Tax in the EU. These changes will primarily impact the taxability of various services within the reverse chain and could have a critical impact on profit margins. It is important to bear these changes in mind even where VAT planning and structuring have already been considered in the modelling of a reverse chain.

Customs is a duty (tax) levied on the import or export of certain goods. Import duties are non-refundable and form a cost to the company. Customs duties are in principle obligatory and payable by businesses to EU tax authorities as goods enter (or re-enter) from outside the EU into the EU. Duties are calculated generally as a percentage of the value of the goods. The applicable duty rate depends on the nature of the goods imported and is pre-defined in the Customs Code, applicable to the whole EU. In the area of Reverse Logistics, goods and spare parts often enter and re-enter the EU after repairing, refurbishing, swapping, etc. In these cases, duties may be payable twice (or more) on the same goods. Although many IT products do attract a zero duty rate, most consumer electronics attract a relatively high duty rate.

Furthermore, the customs legislation includes systems that allow companies to handle their customs procedures in daily routine as a part of business. Therefore companies can handle customs systems without unnecessary delays and interference from the customs authorities, resulting in (major) supply chain advantages. There are a number of duty relief schemes available and in some member states practical arrangements can also be agreed with Customs.

Corporate Income Tax is a tax levied by various jurisdictions on the profits made by companies. The taxable base is generally calculated as the difference between total revenue and deductible expenses. The method of calculating the taxable base varies from country to country, especially with respect to the methods and allowable deduction of expenses. The applicable tax rates also vary considerably from country to country. Governments are using their corporate tax regimes (lowering tax rates and enhancing deductible expenses) to provide tax incentives to attract businesses. Companies are looking for competitive tax jurisdictions to lower their after tax results.

Transfer Pricing refers to the pricing for transactions between entities belonging to the same organization (group entities). For example, goods from the production division may be sold to the marketing division, or goods from a parent company may be sold to a foreign subsidiary. Market prices, i.e. market mechanisms that establish prices for such transactions between third parties, may not be available. The choice of the transfer price will affect the allocation of total profit among the parts of the company. This is a concern for fiscal authorities who worry that multi-national entities may set transfer prices on cross-border transactions.
to reduce their taxable base in their jurisdiction. This has led to the rise of transfer pricing regulations and enforcement, making transfer pricing a major tax compliance issue for multi-national companies.

From a Reverse Logistics perspective, transfer pricing is the allocation of the costs relating to repairing or replacing of defective goods. The cost should be allocated to the entity within the group that eventually bears the risk of repairing/ replacing the goods. These risks generally are with the manufacturer or reseller. However, the actual Reverse Logistics activities are normally performed by other group companies that incur costs in doing so. This means that the party within the group that incurs Reverse Logistics costs should charge these costs on to the entities within the group that bear the risks. Tax authorities in different countries might also argue that the same service provider has presence in each of their countries, which could lead to double taxation. It is therefore advisable to structure the reverse logistics service contracts and working methods in such a way as to minimise these risks.

1.4 The PwC research approach

Our aim is to create a comprehensive overview of the challenges and key success factors of Reverse Logistics. Therefore, we applied three different dimensions during our research:

1. Reverse chain partners:
   We involved the main reverse chain partners in our research including OEM's, logistics service providers, retailers, service & repair companies but also organisations like ICT suppliers, government authorities and the academic world.

2. Multi-disciplinary:
   We have involved all PwC competences in the project (Advisory, Tax and Assurance) as “Operational Excellence” can only be achieved if all aspects affecting the reverse chain have fully been considered.

3. Methodology:
   Our research methodology is structured around the five business dimensions of each company that is: Strategy, Structure, Process, People and Technology.

Exhibit 1.5: The ‘Guide’
Our research approach was divided into three phases taking six months in total:

### Analyse

- Conduct desk research and literature study to define trends & developments, bottlenecks and key success factors
- Execute interviews with industry & subject matter experts from industry and academic world
- Create web-based surveys concerning supply chain and tax
- Approach different supply chain partners and send out web-based surveys (supply chain and tax)

### Validate

- Receive and analyse outcomes from web-based surveys
- Perform site visits to industry leaders to validate and sharpen research findings
- Organise a ‘round-table Session’ to verify intermediate research findings
- Determine design criteria to create a ‘RL Best Practice Framework’

### Design

- Design a process model that covers the entire scope of Reverse Logistics
- Translate the process model into a ‘RL Best Practice Framework’ considering logistics operation as well as tax implications
- Create a quick scan by which companies can assess their current RL operations rapidly
- Develop an improvement methodology that supports companies in enhancing profit margins

Further details on our research methods including details about the survey and interview phase are included in the Appendices.

### 1.5 What follows

The following chapters will dive further into the world of Reverse Logistics in the consumer electronics industry. We are confident that it will provide you with more insight into this challenging subject and the accompanying benefits and that it will support you in putting the area of Reverse Logistics on the corporate agenda.

Chapter 2 includes an explanation of the Consumer Electronics industry. We provide a description of the major trends and developments in the industry and the direct impact they have on the logistics and tax aspects of the reverse chain.

Chapter 3 discusses the findings of our research including the specific challenges faced by the major trends & developments for supply chain and tax managers as well as a discussion on the key success factors. These conclusions are illustrated with graphics based on the results of the web-based surveys.

Chapter 4 will present our recommended improvement methodology for a radical improvement of Reverse Logistics performance as well as a discussion of the direct benefits to be gained.
Consumer Electronics Outlook
Consumer Electronics is a fast-changing industry with a growing demand for electronic & computer devices and gadgets. Developments in technology follow each other so quickly that CE companies struggle to react to all changes appropriately. The world is evolving from analogue to digital (more digital TV sets were sold than analogue models last year). Manufacturers of electronic goods are bypassing the traditional channel structures to get closer to consumers who are in the driving seat. These consumers can easily access information concerning the Consumer Electronics market while on the other hand the manufacturers struggle to sufficiently understand what is really important for their customers. And to make it even more complicated, retailers are introducing their own brands and solutions and enlarging their geographical scope. Bottom-line, these developments lead to a continuous pressure on profit margins due to declining prices.

2.1  The world of consumer electronics

Some 10 years ago, CE manufacturers focussed on designing products that captured their expertise and were self-fulfilling. R&D departments were ‘King’ and products tended to sell themselves (even when consumers did not need them). Profit margins were high and there was no urgent need for cost reductions or actually listening to customers.

Nowadays, CE companies have to balance the concepts of product development, operational excellence and customer intimacy to realise revenue growth through cost reductions.

Agility (the ability to respond to market changes), adaptability (the ability to adjust strategy, products and technologies) and alignment (the ability to align your organisation, processes and systems) are basic requirements and realising these challenging objectives increases value for all stakeholders.

Scope of the Consumer Electronics (CE)

Although electrical and electronic equipment officially includes four categories defined in the European Directive 2002/96/EC (repeated below) this study has primarily focused on categories 3 and 4:

1. Large household appliances (e.g. refrigerators, washing machines, micro waves);
2. Small household appliances (e.g. vacuum cleaners, irons, toasters, fryers);
3. IT and telecommunications equipment (e.g. personal computers, notebooks, copying equipment, telephones, cellular telephones); and
4. Consumer equipment (television sets, digital cameras, MP3 players, gaming consoles, video cameras, etc.).

Market Size

The Consumer Electronics market (category 4) generated total European revenues of € 44.9 billion in 2006 (GfK, Consumer Electronics Market Europe 2006) which represents a compound annual growth rate of 8.43% for the period 2004-2006. Germany (19.6%), United Kingdom (22.4%), France (16.0%) and Italy (11.0%) are the largest European markets with a total market value of 69%. The major product segments are TV Display (52.6% including Plasma, LCD and CRT), Portable Audio (10.1% including MP3 players, radio records and portable radios), DVD Player & Recorder (8.7%), Static Audio (7.8% including audio home systems, loudspeakers and separate systems), and Car Navigation (7.4% including navigation, audio and speakers). Other product groups (e.g. mobile phones, video cameras) show similar growth figures. For example, the outlook on total shipment volume of digital cameras for the years 2009 and 2010 is for continued growth with a gradually declining sales growth rate. Against the backdrop of robust growth momentum in Asia and other regions,
European shipments are forecasted to reach approximately 37.092 million units (a yearly increase of 5.2%) in 2009 and approximately 38.243 million units (a yearly increase of 3.1%) in 2010.

According to Datamonitor (2007, Global Consumer Electronics), the global Consumer Electronics market is forecasted for an increase of 33% since 2006 with a compound annual growth rate of 5.9% in the period 2006-2011.

Besides this considerable increase of units sold, the sales structure has also become increasingly complicated with distribution via indirect and direct sales channels (see exhibit 2.1). While in the past the larger part was sold via (small) specialised retailers and distributors, general and online retailers are becoming more powerful in this market. Furthermore, OEM’s decide to sell their products via their own (online) stores to get closer to customers and save operational costs.

2.2 Trends & developments in the CE market

The importance of focusing on the triad of product development, operational excellence and customer intimacy is clear. CE organisations have historically focused on the first two aspects with little focus on the customer. If businesses really want to make a difference in the 21st century, they must take ‘Customer Centricity’ as the leading principle.

The remainder part of this chapter will present the main trends & developments within each aspect without the aim to be complete. For each trend we touch the impact from supply chain and tax perspective. In the following chapter, we will go more into detail on the impact on Reverse Logistics.

2.2.1 Product Development

Shortened Product Life and Development Cycles
Manufacturers are under tremendous competitive pressure to be first-to-market with unique and differentiated products. However, a successful product in the consumer market quickly attracts copycat products from competition, leading to rapid price erosion. Many CE companies have reduced the life and development
cycles of their products to compete more effectively and to be able to respond to rapidly changing customer demands. They also need to be able to quickly implement new technologies into their products. This trend is reflected by the increase in outsourcing as it helps companies to reduce their time to market.

- Supply chain impact
  For some products, like digital cameras, the commercial product life cycle is shorter than six months before new model introduction. At the same time, there is rapid price devaluation for many consumer electronics products (some depreciate at rates of even 10% per month). The availability of products to the consumer is key in creating sustainable value. Alongside the Sales & Marketing department, Logistics is responsible to get products to and from the market as quickly as possible. With this ability, companies can reduce the effect of price devaluation on their profit margins.

- Tax impact
  Shortened product life cycles increase the number of transactions (flows of goods, invoices, documents, etc). Streamlining and aligning tax & finance processes with operations will enable the company to manage the increased financial/tax burden and risk.

2.2.2 Operational Excellence

Outsourcing of operations
An increasing number of CE producers outsource their Operations functions to Original Equipment Manufacturers (OEM) or Logistics Service Providers (LSP). Outsourcing (parts of) Operations can significantly decrease costs due to economies of scale given that many OEM and LSP companies work for several (competing) companies. Outsourcing also limits financial risks and improves the ability to focus on core competencies. For many CE companies these are research and development (R&D), sales and marketing. Using OEM and LSP vendors also helps shorten product development cycles.

- Supply chain impact
  From a restricted view on logistics, the impact of converging is quite limited. However, additional functionalities within one product make them more error-prone while impact on Reverse Logistics activities (e.g. remanufacturing, refurbishment and recycling) is huge.

- Tax impact
  The main tax implication of an increase in convergence in products is that the Customs Duty liability may alter dramatically. This strengthens the reason to use specialist Customs Duty knowledge on products and spare parts which could significantly decrease the cost burden of Customs Duties.
factors are clear and honest communication, trust and creating a win-win situation.

- **Tax impact**
  Outsourcing your operations does not mean outsourcing your tax liability. To manage your tax liability when outsourcing your operations require a shift in mentality: Controlling your tax processes and collaboration with your outsourced partners are key.

**Shift in production locations**
Tighter profit margins (due primarily to increased competition and price erosion), drive CE vendors to move production locations to countries with lower labour and overhead costs. As a result, Asia Pacific’s share of global electronics production increased from 20% to 40% between 1995 and 2005. In that time, China’s share of global electronics production increased from 3% to 18%. European large household appliance producers, such as Electrolux, have predominantly moved their factories from Western Europe to Eastern Europe. Large household appliances are cumbersome and the benefits of lower labour costs in South East Asia are offset by higher shipping costs.

- **Supply chain impact**
  Moving production to far-away continents directly create uncertainty within the entire supply chain due to increased lead times. Pipeline stock grows and forecasting processes have to consider this uncertainty as well. Consider for example service parts availability. Noticeable is also the impact on intellectual property rights, for which outsourcing leads to a risk for copying technology.

- **Tax impact**
  Corporate tax and import duty should be considered as one of the key financial drivers/indicators in deciding on a shift of location for outsourcing your production.

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### 2.2.3 Customer Intimacy

**Growing importance of Internet**
In the past five years, broadband penetration and Internet usage have risen sharply across Europe. According to PwC’s “Global Entertainment and Media Outlook: 2007-2011”, the Internet broadband penetration in Western Europe increased from 6.2% in 2002 to 49.3% in 2007. This impacts consumer buying patterns: consumers are able to visit multiple Internet websites which provide detailed information, reviews, consumer experiences and price comparisons of CE products and vendors. The selling process and marketing strategies have therefore become substantially more transparent.

Conversely, consumers still want to see and touch the products they buy. For this reason, companies such as Dell (primarily an internet retailer), is also starting to sell its products through brick-and-mortar shops such as Carrefour (a large French retail company).

- **Supply chain impact**
  Although producers are able to get closer to the consumers and improve profit margins, they also have to manage the process of delivering products directly to the consumer. This ultimately leads to more complexity in respect of distribution processes.

- **Tax impact**
  Tax planning could be considered for internet sales. Optimising the tax compliance structure and processes for Internet sales will minimise tax compliance burden.

**Shift in CE distribution channels**
In many European countries there has been a shift in the channels through which consumers buy CE products. Europe shows a trend where non-specialist distribution channels, such as hard discounters (Aldi and Lidl) and supermarkets, have the power to sell CE products in high volumes at relatively low prices.
Alternative channels also include catalogue retailers and Internet shops which are able to offer lower prices than traditional brick and mortar retailers due to lower overhead cost. According to a survey that was carried out in 2007, a massive 80% of European internet users have bought a product or service online (up from 3% since 2006 and doubling the 2004 figure of 40%.

Also contributing to the shift in channels is the success of new retail concepts. Concepts such as MediaMarkt, have become highly successful by offering aggressive promotions on a regular basis and through its large assortment of CE products.

As a result, independent CE shops and small CE retail chains are facing difficulties.

• Supply chain impact
  The shift from many small specialist shops to a relatively limited number of large retailers simplifies the management of product flows for producers. However, this shift also implies that certain retailers become more powerful and require specific logistics requirements.

2.2.4 General trends & developments

Increased competition in the European CE market
The European CE market remains extremely competitive. Take for instance the large household appliance market which grew in Europe with a compound annual growth rate of just 1.6% in the period 2002-2006.

Many new (Asian) players continue to enter the market, existing CE producers are expanding their product portfolio and a number of OEM producers have started to sell CE products under their own brand name (e.g. Asus). Another significant reason is the increased price sensitivity of many consumers, combined with the increased transparency (detailed above) for consumers.

The competition is not only based on technical features of products, but increasingly on the design aesthetics. For many consumers, CE products have become fashion statements.

As many (new) players try to win market share by selling products at low prices, established vendors, such as Philips and Sony, are trying to differentiate themselves from low-cost vendors by focusing on design and usability of their products as well excellent customer support and longer warranties.

• Supply chain impact
  The challenge is the constant focus on minimising costs. While maintaining high customer service levels, top management expects Logistics to contribute to these cost reduction targets.

• Tax impact
  Optimising your tax position increases stakeholder value and potentially will become a key differentiator within the high competitive market.

Increased significance of Corporate Social Responsibility
Environmental awareness is hot with consumers, companies and governments. Consumers are increasingly concerned about the environment and are aware of the need to reduce energy consumption and waste. Furthermore lies their attention on social aspects of operations, including working conditions and community impact.

In response, CE producers are paying significant attention to Green issues especially since both CE products and processes tend to involve hazardous materials, packaging, end-of-life solid waste and high energy consumption.

In February 2008, PwC published the findings of a survey among 148 senior executives in the technology sector about their going green strategies. Among the key findings
of “Going green: Sustainable growth strategies”, with findings that 61% of approached technology executives believe it is very important that their companies reduce their environmental impact and 63% of executives say their teams are committed to environmental stewardship.

Governmental organisations are also imposing measures to force companies to go green by introducing new legislations. The European Union has, for instance, introduced several new directives such as the Restriction of Hazardous Substances (RoHS) Directive which aims to reduce the use of certain chemicals in CE products and forces manufacturers to clearly indicate the energy consumption of the products they sell. Furthermore, an increasing number of European governments have introduced national collection schemes which place the responsibility on producers to recycle or ethically dispose of CE products sold. In March 2007, there were already 260 Producer Responsibility Organisations in place and the number continues to increase.

Supply chain impact
Logistics processes should meet environmental regulations concerning energy consumption, packaging requirements and the WEEE & RoHS Directives.

Tax impact
Governance, Risk and Control are key in relation to managing increasing and complex environmental regulations.

Growth in Consumer Electronic Unit Sales
As stated above, average European consumers own increasing numbers of CE devices. One of the main reasons for this is the increase of consumer spending power due to strong economic growth. This trend was further fuelled by the growing proliferation of wireless technology and strong price erosion in many CE segments. In the Netherlands, for example, the average price of LCD/plasma televisions declined from €2000 in 2004 to €1,190 in 2006. In the same period the unit sales of televisions in the Netherlands increased from 1.3 million to 1.5 million units and in Western Europe, revenue from LCD/plasma TV sales increased from €6.7 billion to €20.3 billion. The price erosion was driven by manufacturers rapidly expanding their production capacity by building next generation production facilities which enabled manufacturers to produce screens at lower costs. Additionally, groups of Asian CE companies (LG and Samsung for example) targeted aggressive expansion of market share in the TV market by selling flat panel televisions for relatively low prices.

CE products have become more affordable for consumers with many consumers replacing their products with new digitally enhanced CE products. A positive side effect for manufacturers is the increased number of sales of related products CE products as well.

Supply chain impact
Grow in units sales with declining prices increases the relative importance of total logistics cost, and therefore the need for improvement initiatives.

Tax impact
The general reduction in unit selling price puts a greater pressure on profit margins but optimizing tax position has the immediate ability to improve tight profit margins.

CE markets have matured
Many market segments of the European CE market have become mature, saturated and commoditised. Given that the market is already saturated, many CE market segments have turned to a replacement market. Consumers mainly buy new products as replacements for dysfunctional units or when they move. For example, the audio home systems market, declined in Western Europe by 22.6% in the period 2004-2006: from €3.1 billion in 2004 to 2.3 billion in 2006. Additionally, technology used in the CE market is mature – new innovation is rapidly imitated and the performance of existing products is already of high quality.
Supply chain impact
This trend increases demand for standardised logistics activities. However, consumers and other companies will continue to return their products in different conditions. Therefore, companies need to be equipped to efficiently manage these flows.
3 Reverse Logistics as a key differentiator
Reverse Logistics is an undervalued part of supply chain management. Market research shows that reasons for this are:

- Perceived small impact on profit margins – minimal interest of top management
- Insufficient time commitment
- Logistics departments view the area of Reverse Logistics as a Sales department priority
- No combined part of the corporate supply chain design targeted to Reverse Logistics; and
- Lack of awareness of the high value potential of integrating operations and tax matters.

Based on findings from our surveys and site visits, PwC identifies a world-class Reverse Logistics operation as a key differentiator, noticeably increasing sales revenues and reducing operational costs. In this section we summarise our findings that substantiate the differentiating role of Reverse Logistics. Main topics are trends and developments (section 3.1), barriers (section 3.2), key success factors (section 3.3) and the current state of Reverse Logistics within Europe (section 3.4), including results on eight key performance indicators.

### 3.1 Major trends & developments

The consumer plays a key role in the CE Industry. Our principal conclusion is that managing the consumer experience is the leading trend.

CE companies prioritise areas such as product quality, on-time delivery, clear product information and attractive marketing & packaging as key aspects of the consumer experience. Managing the customer returns process is essential and Reverse Logistics therefore plays a key role in maintaining and improving customer satisfaction levels. Here, we present a number of major trends in the CE market which producers cite to be most important (exhibit 3.1). Section 2.2 already provided some background on these trends. In this section, we amplify our findings on the key challenges faced by supply chain and tax management when coping with these trends. We aim to show the complexity of the Reverse Logistics landscape.

#### Consumers in the driving seat

Companies are reorganising for a customer centric approach. Consumer experience is the leading motivator in enhancing service levels. New service models, such as swapping and remote servicing, change the key success factors in the front-end of the reverse chain. Considering the expected high service levels, the impact of a poorly managed recall could be dramatic. Difficulty is that these consumer driven processes put finance and tax drivers in the back seat and the focus on consumer delivery reduces priority on accuracy of proper tax and accounting compliance. Also, consumers push organisations for better corporate social responsibility, e.g. proper end-of-life disposal.

#### Shortening product development cycles

Quick introduction of new products increases pressure for lean channels and, therefore, quick recovery cycles. This provides little time for quality checks and increases the risk of quality issues or even a recall. Extensive use of product
information management is necessary for quick feedback, especially with the increasing number of products in warranty. The short cycles also increase the need for proper forecasting & planning of service parts. In the tax perspective, reduces time pressure the ability to manage cash flow and accuracy of tax declarations. And an increased number of transactions lead to increased financial/tax burden and risk and increased effort to optimise cash flow. All these developments result in higher burden for VAT and customs compliance.

Globalisation of Supply & Demand Markets
This trend directly results in higher uncertainty, longer lead times and more third party management. Challenges related to third parties come forward from e.g. outsourced repair activities that cause heavy tax burdens in foreign jurisdictions. Also the supply of shared-services (e.g. call centre, RMA processing) in far away countries complicates exception management.

Furthermore increase global markets tax compliance exposures, trigger hidden tax costs and put pressure on global product and service part stock control.

Growing importance of internet selling
Producers tend to skip retailers and sell directly via their own website. This changes warranty liabilities and service models, and generally show internet sales higher rates of products being returned. These developments put a higher VAT compliance burden and higher opportunity for direct tax planning.

Trends in Reverse Logistics
In addition to developments in the CE market, our study reveals a number of key developments in managing Reverse Logistics. These developments are ranked on importance as indicated in the producer survey (exhibit 3.2). We also set out the corresponding key challenges cited by supply chain and finance/tax managers.

Exhibit 3.2: Importance trends in Reverse Logistics

More strategic focus on Reverse Logistics
Companies in the CE market are increasingly aware of the strategic importance of product returns. Producers of IT & telecommunication equipment show more maturity in this respect than those in the consumer equipment industry.

Various challenges evolve from this development. The most relevant are:

- Senior supply chain and finance managers are aware of the impact and want to actively manage returns, but do not always know how to do this;
- Visibility of end-to-end process performance is held back by channel partners with different strategic focus;
- 50% of companies expect exposures in respect of VAT and Customs Duty of Reverse Logistics (exhibit 3.3);
- First mover advantage has vaporised, forcing leading companies to search for new improvements.

Intensifying collaboration between reverse chain partners
Improvements in managing the reverse chain are achieved by intensified collaboration with service providers and other channel partners, among:

- Difficulty of evaluating parts from after-sales network (including tax compliance) suitable for outsourcing;
- Conflicting strategic and financial interests in the value chain;
Required core competences within the company rely fundamentally on levels and nature of outsourcing;
- Capturing and sharing knowledge from outsourced processes and vendor relationships;
- Burden of administration & documentation of cross-company processes and information exchange on goods. This also has detrimental knock-on effects in creating tax issues and gaps and exposures. See exhibit 3.4.

More use of swapping in the repair process
Low turnaround times are achieved by more use of swapping. Various challenges evolve from this development. The most relevant are:
- Management of cost and swap stock availability throughout the service network;
- Monitoring swap guidelines and swap products;
- Transfer of ownership of swap stock to group companies & third parties and associated financial, tax and transfer pricing consequences;
- Burden of tax and finance administration and documentation (as above).

Increasing impact of Reverse Logistics on corporate image
Recalls, low quality repairs/products or lack of environmental and community awareness have an increasingly detrimental impact on corporate image.

Various challenges evolve from this development, and the most relevant include:
- Detailed documentation and reporting on Reverse Logistics activities necessary to evidence “sustainability”;
- Risk of a recall is always present, but companies are not always ready for it (recovery plans);
- Prevent unauthorised parties to remanufacture or refurbish products (which could harm brand reputation);
- Public attention on Corporate Governance and Compliance with tax
- Control over the whole chain, mitigating risk of social claims.

Generally we see that the landscape of Reverse Logistics is moving and the managerial implications are numerous.

3.2 Barriers
Supply chain and finance/tax managers experience barriers to successful management of Reverse Logistics. We asked them to identify and qualify a number of such (internal and external) barriers. Main barriers are ranked on importance as indicated by the producer survey (exhibit 3.5). We also summarise strategic reasons why we believe it is important to overcome the concerning barrier.
Limited forecasting and planning
The scarcity of accurate return forecasts are a direct barrier for strategic, operational and financial planning. Main reason mentioned is the diversity of returns flows concerning timing, quality, quantity and location.

From a value perspective there are numerous reasons to overcome this barrier, and the most relevant include:
- Utilisation of assets and resources in the reverse chain can be improved when accurate forecasts exist;
- Return forecasts help to determine optimal return policies and gain economies of scale throughout the network;
- Forecasting and planning of returns maximises sales revenue by optimal timing of new product introductions;
- Detailed planning minimises the risk of financial exposures through overpayment of tax, the incurring of irrecoverable VAT and Customs Duties and creating unnecessary administrative burdens;
- Forecasting would also maximise the cash-flow position in respect of tax and Customs Duties (e.g.: in respect of recoverable VAT incurred – by putting appropriate VAT, Transfer Pricing and Customs registrations/agreements in place).

Lack of clear returns policies
Sales departments are often not held responsible for commercial returns. This results in unclear warranty conditions, varying service levels and take-back policies in commercial agreements with channel partners.

From a value perspective there are numerous reasons to overcome this barrier, and the most relevant include:
- With unclear return policies, dealers and channel partners can easily send products back: unclear guidelines result in ‘accepting everything back’;
- Clear communication on policies enhances agility to respond to market changes;
- Limit costs on administrative burden.

Little recognition of Reverse Logistics as a factor in creating competitive advantage
Companies focus on forward flow of goods. Returns are perceived as unimportant and not given the appropriate gravitas.

From a value perspective there are numerous reasons to overcome this barrier, and the most relevant include:
- Customers directly benefit from improved Reverse Logistics;
- Reverse Logistics is a key part of Total Quality Management;
- Maximising value from returns requires collaboration of many departments (i.e. design, manufacturing, logistics, and marketing);
- Enables integrating tax as part of Reverse Logistics solutions.

Lack of appropriate performance management system
Measuring and managing the true performance of Reverse Logistics is very hard. Internal and operational metrics are in place, but metrics for end-to-end process performance are seldom used or available.
From a value perspective there are numerous reasons to overcome this barrier, and the most relevant include:

- Insight of end-to-end process performance is necessary to justify investments, guidelines and policies;
- Only with insight in total Reverse Logistics costs, full control is gained;
- Management systems provide tools for effective decision making;
- Highly facilitates compliance and control on tax;
- Optimal use of tax and cash flow planning.

Non-recoverable VAT payment
VAT charges by suppliers are not recoverable and form unnecessary costs to companies.

From a value perspective there are numerous reasons to overcome this barrier, and the most relevant include:

- Optimal planning and compliance processing to mitigate non recovery of VAT;
- Optimal planning to optimize VAT cash flow position.

Administrative and Financial burden of Tax
Different VAT rules in various jurisdictions trigger large administrative and financial burden.

From a value perspective there are numerous reasons to overcome this barrier, and the most relevant include:

- Optimal planning to minimise administrative and regulatory burden;
- Optimal compliance minimises unnecessary exposures and penalties;
- Being compliant mitigates VAT risks of around 20% of your sales and purchases.

Customs formalities
Formalities and procedures necessary for customs clearance of imported and exported goods.

From a value perspective there are numerous reasons to overcome this barrier, and the most relevant include:

- More seamless processes increase faster turn around times of goods;
- Optimal planning of customs procedures leads to paying less duties;
- Compliance with customs formalities mitigates customs duties risk and cost.

Customs tariff application
With a high number of new CE products, customs authorities tend to allocate new products to a tariff code with a higher duty rate.

From a value perspective there are numerous reasons to overcome this barrier, and the most relevant include:

- Ensuring the application of the proper tariff code avoids overpayment of import duties;
- Obtaining binding tariff information mitigates unplanned costs.

Permanent establishment issue
Tax authorities in the host country tend to levy corporate tax on part of the profits of the foreign company with operations in the host country. This charge to tax arises if the foreign company’s operation in the host country forms a so called “permanent establishment (PE)”.

Exhibit 3.6: Perceived barriers – finance / Tax Survey

Non-recoverable VAT payment
VAT charges by suppliers are not recoverable and form unnecessary costs to companies.
Companies in the CE market experience a unique set of industry success factors that they must achieve to maintain or increase competitive advantage. The supply chain survey reveals different important key success factors in managing Reverse Logistics (exhibit 3.7). For factors with the highest score, we explain our vision on what contribution the concerning key success factor has to competitive advantage.

### 3.3 Success factors

#### Strategic focus on avoiding returns

Top management should drive the initiative and focus on avoiding returns, from channel partners as well as consumers. We believe that avoidance is a critical part of a clear Reverse Logistics strategy.

- **By excelling in this factor, companies increase competitive advantage, and the most relevant include:**
  - Reduces finance and tax compliance cost and burden;
  - Increases cash flow position;
  - Prevents unnecessary shipment and handling of products;
  - Makes the service demand more predictable;
  - Makes it easier to qualify and control channel partners.

#### Detailed insight of cost and performance

Clear insight into overall Reverse Logistics costs and performance enables companies to create focus and initiate improvement projects. Measuring the right indicators and understanding what each indicator implies is crucial.

- **By excelling in this factor, companies increase competitive advantage, and the most relevant include:**
  - Focus on customer needs (doing the right things) prevents over-delivery on customer expectations;
  - Enables sound strategic decision making, based on real cost, revenues and performance;
  - Full transparency at senior management level of financial costs, tax burden and compliance record.

#### Strategic partnerships with reverse chain partners

Companies should aim for intensive collaboration with their suppliers, sales channel partners and third party service providers on strategic level. Together, they are well equipped to realise breakthrough results.

- **By excelling in this factor, companies increase competitive advantage, and the most relevant include:**
  - New knowledge and dedicated resources increase control over reverse chain;
  - Reverse chain alignment towards consumer experience;
  - Opportunities to fully explore recovery options;
  - Outperform on competitive success factors;
  - Optimal tax process and structure.

From a value perspective there are numerous reasons to overcome this barrier, and the most relevant include:

- Optimal planning on avoiding PE's in countries with higher tax rates to avoid overpayment of tax;
- Optimal tax planning to create PE's in countries with lower tax rates to minimize tax payment;
- Obtaining Advance Pricing Agreements (APA) to mitigate unexpected tax burden and risk on profits.

Overall, managers cite several barriers to successfully manage Reverse Logistics. By providing strategic gains, we illustrated the importance of overcoming the concerning barrier.
Awareness and Cross Function Collaboration in Top Management
Senior management must be aware of complexity, risk and impact of commercial, repairable, end-of-use and end-of-life returns on financial performance. Not only external collaboration is key, departments within the company should collaborate and work with the same planning.

By excelling in this factor companies increase competitive advantage, and the most relevant include:
- Enables comprehensive thinking and cross-department process approach;
- Necessary to put Reverse Logistics on the agenda of channel partners;
- Senior finance and tax management take a place in the driving seat alongside supply chain management in designing an agile reverse chain.

Reclaiming value from returned products
Part of the total costs of goods sold is reclaimed by collection of returns and asset recovery from them. Therefore, Reverse Logistics has a direct impact on the profit margins.

By excelling in this factor companies increase competitive advantage, and the most relevant include:
- Increases the profitability of Reverse Logistics programs;
- Advances environmental and community commitment;
- Exploits both technical and economic life cycles of products.

Full compliance and control of Tax
Being compliant and in control of tax positions for Reverse Logistics is mentioned as important by tax managers.

By excelling in this factor companies increase competitive advantage, and the most relevant include:
- Reduces Tax risks;
- Full transparency of process and reporting;
- Directly contributes to shareholder value.

Optimal Tax structuring
Locality of Reverse Logistics activities are determined by optimal Tax location/regime.

By excelling in this factor companies increase competitive advantage, and the most relevant include:
- Minimum Tax payment for activities;
- Increases profit margins;
- Minimum tax compliance burden and costs.

Simplified Tax processing
Tax processes must be designed as lean & mean as possible to reduce the complexity in tax processes.

By excelling in this factor companies increase competitive advantage, and the most relevant include:
- Increases manageability of Tax processes and flexibility in business changes;
- Better manageable Tax risk and compliance;
- Creates transparency in tax processes.

3.4 Current state of Reverse Logistics in Europe
In this section, we further specify empirical results to outline the complexity of Reverse Logistics. We make use of the five dimensions of The Guide to present our findings: (1) Strategy, (2) Process, (3) Structure, (4) People and (5) Technology. To secure a holistic view, we analysed outcomes both from a producer as well as a chain perspective (i.e. retailer, Logistics Service Provider and Service & Repair perspective). We conclude the section with the outcomes concerning eight key performance indicators.

1. Strategy
Every company has a strategy, implicit or explicit, effective or ineffective. They must explore strategy to expand the boundaries of their definitions of business problems so that
they can build value-adding relationships and be proactive in the way they take new ideas to clients.

**Producer perspective**
The corporate strategy of approximately 50% of producers is primarily driven by ‘Innovation’. The other part cite that their strategy is driven by ‘Price’ or ‘Quality’. The greater part of the companies has a hybrid supply chain strategy which means that efficiency and responsiveness are rated as equal important. In most cases, companies want to be responsive to their customers while being efficient at their back office operations. The remaining part creates competitive advantage through a focus on one of both aspects.

Almost half of the producers (45%) have developed a clearly stated Reverse Logistics strategy. The same number of producers notice that their Reverse Logistics operations are driven through efficiency (exhibit 3.8), which sustain the fact that each company perceives Reverse Logistics as a cost centre (100% score).

We question if this view is right. From a value perspective, customer experience and value recovery from returned goods drive revenue growth. By reusing and recycling returned products or package materials, value is recovered and waste costs reduced.

In addition, value increase from a sustainability perspective leads to human, environmental and economical benefits. Proactive recalls and proper disposal avoid potential environmental or human harm, preventing the company from possible legal claims and feed into a positive and transparent corporate image.

Concerning warranty management, customer satisfaction is rated by 55% of the respondents as the leading differentiator behind their strategy. By excelling in warranty management, multiple business benefits can be gained, examples are:

- Improvement of customer satisfaction and loyalty;
- Reducing cost per warranty;
- Avoidance of unnecessary post sale support costs;
- Reduction of the size and cost of recalls;
- Creation of a feedback circle for product improvements by collection and processing of return goods information;
- Creation of innovative service strategies through captured intelligence.

ERP suppliers, like SAP and Oracle, emphasized the immaturity of warranty management systems. Furthermore, they indicated that organisations are not aware of the potential contribution of good warranty management to profit margins. It could provide extensive input to installed base management and insight to what extent warranties are correctly granted.

**Satisfaction Reverse Logistics management**
We asked respondents to rate the importance of Reverse Logistics to the overall performance of the company. Exhibit 3.9 illustrates that almost 60% of the producers consider Reverse Logistics as an important to extremely important aspect of their overall business system. However, only 32% is really satisfied with its Reverse Logistics operations (exhibit 3.10). This illustrates a clear gap between importance and satisfaction.

[Exhibit 3.8: Main differentiator Reverse Supply Chain - Producer]
Reverse Logistics

Chain perspective
Here we summarise major findings for the Strategy dimension of the retailer, LSP and Service & Repair surveys.

20% of the retailer respondents indicated to manage Reverse Logistics as a profit centre (see contrast to Producers perspective, across). In addition, also retailers show a clear gap between importance and satisfaction of Reverse Logistics management: 60% rate the importance as high against 20% rate satisfaction as high.

For LSPs, control and efficiency are the two main leading differentiators for the reverse chain. An unexpected 40% of LSP respondents state that they do not have or are not aware of a specific Reverse Logistics strategy. This is a high rate in respect of the 90% of LSPs that rate the importance of Reverse Logistics to the company as high and treat Reverse Logistics as a profit centre.

For Service & Repair companies, responsiveness and efficiency are the leading differentiators in the reverse chain. We see that they differentiate by customer centricity, focus on the requirements of the customer and react quickly to changes in the environment. The core value proposition, that Reverse Logistics is for them, comes forward from the fact that all rate the importance as high and all cite to have a Reverse Logistics strategy.

Other topics that we categorise in this strategy dimension include product design, sustainability, legislation and tax strategy. For these topics, we combine the results of the different survey groups.

Product design
Producers have started to manage products throughout their entire life cycle. In the last two years half of the producer respondents (50%) have undertaken design changes to enhance Reverse Logistics. Challenge for designers is to integrate profitable end-of-life strategies during early design phase. Improving the performance of Reverse Logistics programs requires considering approaches like Design for Disassembly and Design for Recycling. Such initiatives can reduce costs and environmental & social risks during recovery and/or disposal.

Designers can rethink the overall supply chain through a cradle-to-cradle approach, promoting the view that production techniques should be essentially waste free. Cradle-to-cradle has the ambition of creating an industry that is ‘sustaining’, not only sustainable, by using safe materials, renewable and efficient energy, products & systems designed for value recovery and “across all design principles”.

Sustainability
Sustainability has become of high importance in Reverse Logistics. The importance of Reverse Logistics to the company as high and treat Reverse Logistics as a profit centre.

For Service & Repair companies, responsiveness and efficiency are the leading differentiators in the reverse chain. We see that they differentiate by customer centricity, focus on the requirements of the customer and react quickly to changes in the environment. The core value proposition, that Reverse Logistics is for them, comes forward from the fact that all rate the importance as high and all cite to have a Reverse Logistics strategy.

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Sustainability
Sustainability has become of high importance in Reverse Logistics.
Logistics. A vast majority (82%) of the producer respondents have a specific sustainability program in place. This rate is 92% for Service & Repair respondents and even all (100%) LSP’s have such program in place. As seen in exhibit 3.11, such programs are mainly driven by competitive advantage (41%) and legislation (23%). The environmental and social impact of consumption behaviour receives growing public attention and consumer awareness of recycling is increasing. At the same time more stringent national and European regulation on waste disposal requires an efficient system that enables proper disposal of post-consumer goods, taking into account environmental and human aspects.

Legislation

Extended Producer Responsibility (EPR) is a sustainable principal emerging in Europe which mandates producer take-back and recycling. Its intention is to reduce waste, stimulate recycling and drive sustainable design. We observe that 45% of producers experience the practical burden of EPR compliance as high (exhibit 3.12). For LSP this rate is even 80%. Survey respondents and interviews indicated that the largest difficulty here was the administrative and reporting burden of EPR compliance.

The principle of EPR is captured in European regulations, including the WEEE and RoHS Directives, and increasingly used as a business principle in designing innovative industry initiatives. In the last two years about one-quarter of producers (23%) indicate that they have undertaken initiatives to increase the volume of returns for sustainability purposes. In the Appendix we present risks and solutions of EU legislation on Reverse Logistics.

Sustainability reporting and rating systems (e.g. Global reporting initiative) are important for companies. More than a quarter (27%) rates such scores high. Next, 80% of service & repair respondents indicate that for their customers such rankings are important.

Furthermore, we have been talking to companies that were not scoring too well on the “Greenpeace guide for greener electronics”. These companies were not satisfied with their ranking in case they were part of the red zone. For further discussion on sustainable supply chain initiatives, we refer to the recently published report Connected in the electronics supply chain (2008)*.

*) Research on sustainable supply chain initiatives in the electronics industry (PwC, March 2008)
Tax Strategy
The tax survey indicates an appealing fact that only 50% of the respondents include Reverse Logistics in their tax policy. From the interviews, we understand that even where companies do believe they have a Reverse Logistics tax policy in place, this policy only implies that it covers all activities of the company, including Reverse Logistics.

When asking interviewees about what is actually included in their tax policy, they confirm that it mainly relates to corporate tax structuring and sometimes customs planning.

Tax policies of companies are originally focused on increasing profit after tax and corporate tax and transfer pricing historically form the heart of a company’s tax policy.

Although customs duties have a direct (negative) impact on a company’s profit margin, it is historically being managed by the Logistics department due to its direct link with the goods flows. Due to the lack of knowledge and responsibility for customs matters, tax and finance departments tend not to include customs in their tax strategy.

Historically, VAT is seen as a compliant tax, which in general has no impact on the Profit & Loss of a company. This leads to the conclusion in all our interviews that from a tax policy level, little attention is given to VAT.

The survey and our interviews however reveal that in fact Reverse Logistics is an area where VAT has the highest impact followed by customs and corporate tax (exhibit 3.14). Our study also reveals that the comfort level for VAT is the lowest compared to customs and corporate tax.

Inherent to the VAT system is the fact that when a company does not comply with the VAT rules, it triggers significant Profit&Loss risks. These risk could rise to a maximum of 20% of the purchase and sale value plus penalties.

While companies tend to be more aware of the VAT impact on their operations, companies still struggle with how to design and embed a VAT strategy in their processes and organisations. Reverse Logistics is not an exception to the rule but an area with more operational complexities due to the level of outsourcing and the variety of (cross border) transactions.

PwC therefore believes that VAT is a key area followed by customs for a tax policy focus in respect of Reverse Logistics activities.

Exhibit 3.13: Impact of Taxes in Reverse Logistics on Profit and Loss account
Exhibit 3.14: Importance Tax areas on Reverse Logistics
Actions to consider

I. Managing product returns calls for strategic decision-making
   Successfully managing the reverse chain performance requires precision, commitment and effective communication of management strategies. Essentially, clearly stated reverse chain strategies must be aligned with business strategies and the voice of the customer. To achieve this, close collaboration between tax and operations functions is essential.

II. Incorporation of Tax in Reverse Logistics in the General Tax Risk Policy
   The financial costs of improper tax planning/compliance is significant (i.e. an average maximum tax cost of 20% of the total costs related to Reverse Logistics). However, this is a cost factor which could be easily minimised or negated when a reverse chain is designed and planned with tax at the forefront.

III. Put strategic focus on preventing products being returned
   Understanding the drivers of reverse logistics is a prerequisite for effective avoidance. Essentially, the reward structure should remunerate avoidance and gate keeping efforts, including innovative solutions in front-end filtering and self-servicing.

IV. Tax Strategy for Reverse Logistics should be focused on VAT and Customs
   Impact of non-compliance to VAT and customs has a significantly greater impact than corporate tax, thus tax strategy must preliminary focus on VAT and customs.

V. Harmonise and standardise guidelines and policies
   Companies should have a focus on standardising and harmonising warranty conditions, service levels and take-back policies and guidelines. Next, avoidance and gate keeping guidelines should be aligned with management strategies.

VI. Make Reverse Logistics part of your sustainability programme
   Documentation and reporting on sustainability initiatives to show environmental consciousness is not a differentiator anymore but a hard requirement.
2. Process
Here, we discuss our findings on the Process dimension of Reverse Logistics. A process is a series of activities, each of which requires input and produces outcomes in line with set objectives. Every company carries out a set of processes to support its strategy and business objectives. The most relevant topics include returns reduction, process control, management systems, and tax compliance & control processes.

Reduce returns
A first critical factor in making flows manageable and profitable is efficient gate keeping. Management focus on screening of products at entry point of the reverse pipeline can reduce return rates significantly, increase customer experience and strongly reduce the number of credit notes. Managers cite that an integrated approach to reduce returns also must include effective disposition management.

With disposition we mean the type of product or material recovery for disposal used for a product. We found out that a small majority (54%) of respondents have a decision support system in place to determine the disposition of malfunctioning products. Exhibit 3.15 shows that 45% of respondents make a decision on disposition as early as possible (pre-ponement), preferably at the point of receipt (consumer or retailer).

Process control
From the case studies, we found out that companies increasingly approach Reverse Logistics by taking a process view to the organisation. We argue that developing end-to-end process solutions and programmes is necessary to integrate Reverse Logistics with general business practices. An important consideration in process control is actively predicting quantity and timing of returns. When we asked producers for the importance of forecasting & planning for successful Reverse Logistics management, a small majority (54%) cite to perceive the importance high. For reverse chain partners increases this number: 60% of retailers, 80% of Service & Repair companies and 90% of LSP’s rate the importance high.

Although there is a clear impact of tax on a profitable reverse chain, we found out that tax effectiveness is not part of forecasting and planning. For example, 83% of the respondents do not have customs planning for their Reverse Logistics.

More notable observations considering process control, as reproduced in Exhibit 3.16, include:

- Forecasting and planning of returns is scarcely incorporated into information technology;
- Only 13.6% of producer respondents share forecasting and planning data with supply chain partners;
- Retailer respondents rarely perform forecasting & planning activities;
- Inventory management is most commonly used for process control in respect of product returns.

These outcomes explain why managers perceive the lack of forecasting & planning as an important barrier for successful reverse chain management.

Exhibit 3.15 Locality of disposition decision
Tax compliance and control processes

The level of awareness of tax implications on Reverse Logistics is still very superficial. For example, 75% of the respondents could not quantify their tax costs for Reverse Logistics (or were not aware how to do so). We notice that tax and finance managers struggle with very basic knowledge on tax compliance and control in their own organisation.

For all tax areas, one-quarter of respondents (25%) cited that the desired comfort level of tax for Reverse Logistics is much higher than their current comfort level. More specific to VAT, this number increases to even 43%.

Other relevant figures from the survey reveal the lack of compliance and control processes for Reverse Logistics:

• 64% of respondents incur VAT problems with the main issue being non recoverable VAT followed by VAT
administrative burdens;

- 42% of the respondents could not estimate their VAT recovery %, but 29% of the respondents that could estimate it only recover 55% of their VAT costs;
- 83% have access to information for Reverse Logistics, but 59% do not trust the accuracy and completeness of the info;
- 58% of the respondents have no knowledge about Permanent Establishment issues related to stock piling;
- 33% of the respondents have no updated Transfer Pricing documents/contracts.

These findings reinforce our message that there is a general lack of tax compliance and control in respect of Reverse Logistics.

Process improvements to consider

Producer respondents ranked a number of desired improvement directions for Reverse Logistics management. Distinguishing between internally and externally focused improvements, we present our outcomes in exhibit 3.19 and 3.20.

Notable observations of internally focused improvements from exhibit 3.19 include:

- Track and trace of returned products scores highest. We found out that is also be a key success factor for retailers.
- Managers rate improvements in the financial process as relatively high. Length of time for credit processing and handling reconciliation of charge-backs are two directions for improvement.

Notable observations of externally focused improvements from exhibit 3.20 include:

- Return information management is an important direction. Sharing of detailed data of product returns throughout the supply chain. This corresponds with the low rate...
of producers currently exchanging return information with chain partners (see exhibit 3.16).

- Managers want to get insight to internal and end-to-end process performance. Improvements in performance measurement over the whole supply chain are cited.

In addition, we provide a short list of improvements in process control that we come across on the agenda of several companies:

- Redesign of the logistics network for Reverse Logistics
- Set-up of data-driven decision hierarchy for flow options
- Dynamic disposition rules depending on quality and stage in life cycle of returned product
- Reward structure to increase control over volume of returns

Based on these findings, we provide several actions to consider for the process perspective.

Exhibit 3.20: Improvements within supply chain

**Actions to consider**

I. Use end-to-end process approach and close collaboration in solutions and programs

Reverse Logistics cannot be assessed as a mutually independent activity. It is essential to incorporate all related business and financial connections to Reverse Logistics in order to compare business practices.

II. Reduce uncertainty on required resources

Technology enabled forecasting, advanced supply chain planning and integration with reverse chain partners are initiatives with potential to increase accuracy and quality of data.

III. Measure and reduce turn around times

Companies should take management decisions based on expected value of returns from maximising value recovery. Make use of lean techniques to reduce turn around times.

IV. Incorporation of Tax compliance and control framework into process design

By doing so, tax processes are streamlined and aligned with Reverse Logistics operations.
3. Structure
Companies need to structure their reverse chain with organisational logic and establish the right level of control. Relevant aspects of the Structure dimension of Reverse Logistics include level of control, network design, outsourcing, primary locations of repair functions and tax considerations.

Level of control
At European level, 90.5% of producer respondents have centralised their management for Reverse Logistics activities. For regional and national levels, these rates are 41% and 50% respectively. For LSP respondents 60% have centralised management at European level, and 80% at national level.

In terms of the management of tax on Reverse Logistics, only 17% of respondents have a specialised knowledge & expertise in respect of reverse chain management. This represents a very low level of control of tax in the reverse chain. Generally are centrally operated Reverse Logistics models more complex for managing VAT compliance and control than where models are managed from a de-centralised/country level.

Network design
Frontrunners are proactively and fact-based designing optimal networks for their Reverse Logistics solutions. Appropriate infrastructure and allocation of resources should be chosen for a cost effective and efficient Reverse Logistics network. We believe that differentiating business processes must be embedded in a corresponding network (see Chapter How to realise an agile and efficient reverse chain).

Outsourcing
Outsourcing is a primary feature of the structure of a reverse chain. We observe that the main reasons for outsourcing of Reverse Logistics activities are: focus on core business, relying on technology and specialism of third party, and risk and control along the reverse chain.

Results from our finance survey indicated that on average tens of millions of euros are spent on outsourced functions relating to Reverse Logistics.

We asked producers to indicate which Reverse Logistics activities are outsourced to a third party. Results are presented in exhibit 3.21, and notable observations include:

- Respondents tend to retain activities that relate directly to consumer experience more in-house. For example, call centre and repair;
- Remanufacturing scores lowest overall involvement;
- Activities related to the end-of-life stage score higher rates of outsourcing, for example, recycling and waste management;
- Financial activities (including tax compliance and administration) are hardly outsourced.

Tax complexities increase with high levels of Reverse Logistics outsourcing, especially in respect of VAT and Customs Duties.
Managers deal with a number of key questions in selecting an outsourcing partner. Among the considerations that managers indicated are the philosophy & attitude concerning outsourcing (based on value and not only on costs), to communicate openly costs and performance figures, and the willingness to share rewards and risks. Also the flexibility to deal with uncertainty in required resources, environmental consciousness and the use of multiple vendors to spread risks are cited to be relevant considerations.

For the Reverse Logistics activities we asked where they are performed, either in the originating country, another EU country or outside the EU. Notable observations from the results, reproduced in exhibit 3.22, include:
- Many cross-border flows take place for all activities;
- Small portion of respondents perform activities outside the EU;
- Little part of end-of-life treatment (e.g. recycling) takes place outside the EU.

Service offerings LSP
During several interviews, LSP indicated to start to offer also more laborious activities such as remanufacturing, aiming to provide a full solution for the management of product returns. Other LSP’s position themselves mainly as a 4PL’s, offering purely logistics activities with drop-off solutions for e.g. returns that easily can be shipped via the postal network. Exhibit 3.23 clearly shows the activities currently offered and those planned to be offered in the coming 2 years.

Primary Locations of Repair functions
Results from the finance survey indicated that the main countries where repairs are carried out are:

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<th>Non-EU</th>
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<tr>
<td>Germany</td>
<td>China</td>
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If Reverse Logistics costs are borne by a non EU entity, managing VAT refunds are generally more complex.

Tax Considerations in Structure
The conclusion from the business models we studied is that there is no standard business model for Reverse Logistics operations. Alongside the variety of operational Reverse Logistics models, there is also a variety of tax Reverse Logistics models applied. In addition to considerations presented earlier, we present more relevant topics for tax structuring:
a) 86% of respondents indicated to perform the finance function of Reverse Logistics fully in-house (exhibit 3.21). In general, managers perceive an in-house finance function to result in a better tax compliance and control level.

b) Organising the legal risks and responsibilities of the goods throughout the reverse chain (e.g. returned/refurbished/swap/end of life-goods). Issues can be: which entity has the legal title of the goods and in which stages? Are there consignment stocks at (third party or inter group)? In general, tax complexities increase with higher level of inter-company and cross border transactions/shipments without transferring the legal title.

c) Advanced customs planning and structuring. The burden of duties (and the benefit of minimising it) is relevant as the costs are often passed on in the supply chain either directly or indirectly.

Based on these findings we provide several actions to consider from a structure perspective.

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**Actions to consider**

I. Agile front-end quick service capabilities need to be developed  
   Categorise returns regionally based on required repair activity. Returns flows can be reduced by decentralised categorisation and by performing easy repair activities locally (without unnecessary transportation).

II. Consolidate laborious activities for various types of returns  
   Well-known benefits of centralisation can be gained for the back-end of the reverse chain. Consolidate partners and services for various types of returns and evaluate the potential of shared services.

III. Actively manage recovery options  
   The future demand and yield of asset recovery are volatile. Proactively managing recovery options anticipates on these changes. Next, constantly rethinking locality of recovery activities can lead to substantial cost reductions.

IV. Ensure appropriate attention is given to Tax structuring  
   From the very initial design phase, companies should consider the complexities and impact on Tax management and risk.
4. People
The behaviour and performance of people is influenced by the investments made in them as a workforce, the culture in which they operate, and the company’s ability to change. For the People perspective of Reverse Logistics, relevant topics include workforce, communication, culture, know-how and collaboration.

Workforce
The majority of respondents indicated that a functional unit is in place which is fully dedicated to the management of Reverse Logistics (exhibit 3.24). The number of FTE ranges for producers mainly between 2 and 15, with 9.1% respondents indicating to have between 100 and 200 FTE. The high numbers can be explained by in-house involvement in laborious activities such as stripping and disassembling.

By contrast, only 17% of respondents have tax/finance employees with a specialised knowledge/function in respect of the reverse chain.

During our field studies, industry leaders were challenged to identify the more beneficial regarding:
1. Reverse logistics as part of the general supply chain organisation. Principle benefit is the use of economies of scale in a shared organisation. However it was made clear that forward logistics would always take priority; or
2. Reverse logistics as a separate reverse chain organisation. Ability to build up a separate specialised department focused on the reverse chain and dedicated resources.

There is no general truth and the most optimal situation is different from case to case. The consumer experience must always be the leading principle in organisational design.

Communication
First step in ensuring a holistic approach towards Reverse Logistics is the sharing of information between various departments. We notice that:
- Supply chain managers exchange follow-up data in regular meetings, mainly with the finance (68%), service (64%) and sales (59%) departments;
- Best-in-class companies rethink the effectiveness of the reverse chain and create awareness of tax/financial and operational consequences of upstream decisions on Reverse Logistics.

Collaboration between departments enables easy communication. Our study examined the level of collaboration between the tax and supply chain departments in respect of the reverse chain. About one-third of the supply chain managers (32%) cite the collaboration as high, and tax managers (34%) show a similar score. These are worrying numbers when we consider that communication between supply chain managers and tax departments is crucial to identify all the implications and added costs, which could stem from operational decisions in the reverse chain.
Our study identified this as a regular problem area. 34% of companies rated the involvement of tax in the design of the reverse chain as Low to Extremely Low – reasons cited for lack of communication are:

• differences in focal points and performance indicators;
• differences in “professional language” and paradigm;
• central finance function and management which is physically distant from operations and logistics functions.

Where clear communication lines are maintained, a highly successful and cost effective reverse chain is achieved.

From the chain perspective, 40% of LSP rated the extent of collaboration between tax and supply chain high. This percentage is even 0% for retailers. These results suggest a rather disappointing extent of collaboration. This proves that only frontrunners extensively communicate via cross-functional collaboration.

Culture
Companies intensify collaboration with reverse chain partners to improve bottom-line profits. This brings various challenges from a people perspective while the willingness towards collaboration on Reverse Logistics is not always the case.

Interviewees cite that culture for continuous improvement is favoured in every echelon in the chain. Exhibit 3.25 illustrates that in some parts of the chain such culture is still not supporting improvement. This suggests a need for improvement for the end-to-end approach in terms of a culture which supports the continuous improvement of Reverse Logistics.

Tax know-how and awareness
Our study investigated the current level of tax know-how and awareness in Reverse Logistics. Some indications from the survey are:

• 58.3% of companies are not aware of rules relating to Permanent Establishment for tax and transfer pricing purposes;
• 42% of companies have no knowledge of Customs procedures or planning; and
• Incongruous responses – some 42% of respondents viewed the cash flow impact of VAT in the reverse chain to be low.

Also a majority of interviewed operation managers did not have any idea about how tax and especially not about how VAT could have a decisive impact on the financial results of operations. In general we identify a marked lack of specialist tax knowledge in respect of the reverse chain.

Chain collaboration on Tax
The tax survey also studied the collaboration in Reverse Logistics within the group and outside the group. Results illustrate that:

• 50% rate the importance of collaboration within the group as high;
• 25% rate the importance of collaboration outside the group as high
• But only 25% rates the current level of collaboration (within and outside the group) as high.
We observe a gap between collaboration within and outside the group for tax purposes. PwC believes that increasing the level of collaboration between the supply partners is key to increasing the comfort level of tax and finance managers for Reverse Logistics. Especially given that administration and documentation of the VAT obligations are still major challenges, due to the extent of outsourcing.

Below, we illustrate the awareness level with fragments from interviews with operational managers on tax and Reverse Logistics.

PwC:
“Are you aware that on average 20% of the service fee you pay to your service providers for your Reverse Logistics activities (both inter companies as well as third party) is VAT?”

Manager:
“Yes, I know but I thought 20% VAT is never counted as a cost because VAT is not a cost. We make on average EUR 180 mio of costs a year for Reverse Logistics”

PwC:
“You are right, but if your company makes EUR 180 mio of Reverse Logistics costs per annum, about EUR 36 mio is VAT that you need to pay. Are you sure the 36 mio VAT paid has been recovered somewhere in your organisation and that you have considered the cash flow impact thereof?”

Manager
“Your example is an eye opener for me, I never realised this before”

Based on these findings we provide several actions to consider for the People perspective.

**Actions to consider**

I. **Create an approach towards true integration, not just interfaces**
   The evolution from complete functional independence within each company in the reverse chain to a truly integrated reverse chain is still not the focus point. Integration unlocks full potential of product and process design changes. Collaboration with tax managers put tax as a driver for the design and execution of operations.

II. **Use dedicated resources for Reverse Logistics management**
   Efficient managing in-house and vendor activities asks for dedicated resources. Because forward logistics always get priority over Reverse Logistics, companies should have a dedicated Reverse Logistics entity in place with own resources and the ability to set own priorities within the reverse chain domain. Senior management support and commitment enable cross-functional improvements. To achieve this, a close collaboration between tax/finance and operations functions and with chain partners is essential.

III. **Encourage culture for continuous improvement and train Reverse Logistics employees**
   Increase the knowledge base while providing supply/reverse chain courses to finance & tax managers and vice versa.
5. Technology

Technology is essential for the implementation of efficient business processes and the management of data. Companies heavily rely on their Information Technology (IT) to manage their Reverse Logistics operations. However, for Reverse Logistics management we notice a gap between importance and satisfaction of current Information Technology support. Our findings for the Technology dimension of Reverse Logistics are discussed alongside the following aspects: satisfaction IT support, integration, used technology, installed base management, financial systems and specific Reverse Logistics packages.

Satisfaction current IT support

Information systems are heavily relied on in managing Reverse Logistics throughout the supply chain. Survey results illustrate that:

• 95.5% of producer respondents rate the importance as high;
• Only 36.4% of respondents rate the level of satisfaction as high;
• Similar with retailers: 80% rate the importance as high and only 20% rate satisfaction as high.

We observe clear gaps between importance and current satisfaction level of IT support in managing Reverse Logistics.

Integration

During interviews it came forward that systems are interfaced rather than integrated. Furthermore, producers and service providers make use of their own separate systems. Interviewees indicate that lack of integration cause double data processing, manual transfer and putting pressure on accuracy and quality of data.

PricewaterhouseCoopers believes that interfacing systems create a hurdle for successful Reverse Logistics programs. Interfacing systems
• do not provide full control;
• fuel differences in procedures and processes;
• create additional administrative burden;
• create big gaps in financial and tax reporting; and
• increase cycle times.

Respondents were asked to rate the companies ability to integrate IT systems with supply chain partners. Results show that:

• Only 40% of retailers rate the ability as high;
• 54.5% of producers rate the ability as high;
• These rates increase from 70% for LSP respondents to 100% for the service & repair respondents.

These numbers suggest that system integration mainly for producers and retailers is not yet on par.

In our field studies and interviews we notice that companies show a clear commitment towards cross-functional information sharing, but some are unaware of the essence of analysing return data. A positive signal in this area is that managers cite to increasingly automate warranty claims and processes.

Overall, a first critical step is commitment to technology and necessary resources to enable true integration.

Used technology

In exhibit 3.26 and 3.27 we present survey findings on use of technology in Reverse Logistics. We asked what hardware and software support is available for managing Reverse Logistics. Notable observations from the exhibits include:

• Product embedded information devices such as Radio Frequency Identification are in the infancy stage of use for Reverse Logistics;
• Retailers show lower use of hardware technologies than other respondents;
• High use of serial number identification allows tracking & tracing and logical set-up of customer’s installed base.
In general we observe differences in installed hardware between actors in the chain, which can complicate an end-to-end process approach.

- 68.2% of producers actually do have ERP software in place which covers reverse logistics operations. Generic ERP modules cover the process but the functionality is often spread over many modules or is just insufficient.
- Installation of CRM packages is on the agenda of many companies. Currently only first movers have installed such packages for Reverse Logistics.

Few companies have end-to-end capabilities, from return acquisition until re-distribution. Our belief is that comprehensive systems should recognise the impact of Reverse Logistics.

**Installed base management**

Mainly in the B2B market we encounter strategic use of installed base management for managing returns. For the B2C market are the prospects of identification and monitoring of the entire installed base hardly explored. We believe that value monitoring and prognostic tools on customer’s base have great opportunities to make strategic decisions in Reverse Logistics more fact-based.

**Financial aspects of Information Systems**

For tax managers it is even more essential that systems capture all relevant information. This study however reveals that there are considerable gaps in information systems for financial and tax reporting in respect of the reverse chain.

- Interviewees expressed frustration at the gaps in information systems for financial aspects of the reverse chain (especially in respect of tax declarations);
- Specific finance modules are used to capture transactions but gaps are prevalent.

All of the above give rise to an onerous situation in respect of the accuracy of financial reporting and general tax compliance. In addition, survey results show that:

- Some 42% of respondents do not have sufficient information to calculate the cost of tax in respect of the reverse chain;
- Some 67% of respondents indicated (separately) that information on the VAT cost in the reverse chain was not known.

Our experience shows that a fully integrated ERP system with specific financial and tax codes at transaction level is
key for a world-class reverse chain and has an immediate impact on maximising profit.

The benefits of such systems are achieved by:
- Correct finance and tax codes being used in respect of all transactions in the reverse chain;
- All ancillary tax costs are accurately captured in the information systems and maximum and timely recovery is ensured;
- Administrative burden of tax calculations is mitigated.

### Actions to consider

I. Make strategic use of available technology
   Automating physical, information and financial flows foster a seamless reverse chain. Use of technology streamlines processes and procedures across chain partners. Develop effective IT infrastructure to support Reverse Logistics.

II. Share return data, financial data and performance with reverse chain partners
   Return information management enables identification of the drivers of returns, increases visibility throughout the process, and is a prerequisite for efficient process control. Knowledge on installed base can support fact-based decision making.

III. Interfaces between systems to retrieve required financial information
   Relevant Tax information from operation systems should be available and accurate.

IV. Customised financial systems for VAT and customs compliance and reporting
   Standard ERP modules should be customised in order to automate VAT and customs reporting processes.

V. Develop corporate performance management system
   Almost all companies are struggling what and how to measure performance of Reverse Logistics. Use best practice indicators on internal and external performance for full cost control, including the visualisation of ‘hidden’ cost.

### Specific Reverse Logistics packages

Some companies build their own software due to gaps within their current ERP package or due to a lack of best-of-breed packages, especially within Europe. However, there is a trend of upcoming packages that provide specific functionality for Reverse Logistics. Especially the US is a main supplier of dedicated Reverse Logistics software including gate keeping, returns processing, warranty & claims management and installed base management, amongst others. Furthermore, the main suppliers of ERP software, like SAP and Oracle, are very busy with the integration of Reverse Logistics functionality within their ERP suite. We included an exploratory overview with suppliers of Reverse Logistics software in the Appendix.

Based on these findings we provide several actions to consider for the Technology perspective.

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**Exhibit 3.28: Ability to calculate tax cost on Reverse Logistics**

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<th>Yes</th>
<th>No</th>
<th>Don’t know</th>
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<tr>
<td></td>
<td>25%</td>
<td>42%</td>
<td>33%</td>
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6. Performance Indicators
Here we present notable observations for results of producers on eight high level performance indicators, reproduced in exhibits 3.29 till 3.37. The table under each chart contains outcomes of the retailer, LSP and Service & Repair surveys in which we asked for the perceptions of ‘good’, ‘average’ and ‘worst’ performance of the concerning indicator. These numbers should provide valuable information for strategic planning and to forecast trends in relevant business areas.

We use the four perspectives of the Balanced Scorecard to present our findings, which are:
1. Internal business perspective;
2. Customer perspective;
3. Innovation & learning perspective; and
4. Finance perspective.

I. Internal business perspective
For this perspective we introduce two internal operations indicators in which Reverse Logistics must excel: the non-fault found rate (A) and the return cycle time (B).

A) Non-fault found rate
In practice, some returned products are in fact in working condition when they enter the reverse stream. As indicator we introduce the percentage of returned products that have no cosmetic or functional defect in a period of time, the so-called non-fault found rate. Outcomes of this indicator are reproduced in exhibit 3.29. The avoidable costs borne in respect of these returns include, amongst others, transportation, processing (testing), refurbishing (if necessary) and loss in value due to time delay.

Exhibit 3.29 indicates that about one-third of producers (32%) score higher than a 36% non-fault found rate. This high rate comes close to perceptions of retailers and Service & Repair companies of ‘worst’ performance (22.5% and 45% respectively, table 3.1).

It is critical to obtain the exact data of this metric to know the volume of unnecessary returns. However a worrying 14% of respondents indicate to know this metric exactly.

B) Average return cycle time
A large proportion of product value can erode due to long processing times. As indicator we present the average cycle time that we define as: the time a product is being returned from the customer to the time the product is put back into the market. From exhibit 3.30 we observe that 81% of respondents indicate to have a shorter return cycle time than 15 days. This corresponds with the perception of ‘average’ performance of LSP’s (16.3 days, table 3.2). When we take the
performance perception of retailers, even 86% of producers score better than ‘average’ performance (23 days, table 3.2).

This suggests a rather positive picture of conformity with expectations of retailers and LSP’s. Obviously, a reduction of the cycle time with several days can have major increase in expected market value and customer satisfaction levels.

Companies should gain competitive advantages by actively managing the return cycle time and strive for conformity with customer needs and expected market value.

II. Customer perspective

This perspective consists of two indicators that mainly relate to what the customer expects from the Reverse Logistics operations: the average customer cycle time (C) and average invoicing cycle time (D). As before, we compare the outcome of the indicators with the results of the retailer, LSP and Service & Repair surveys (table 3.3. and 3.4).

C) Customer cycle time

The efficiency of service activities is heavily dependent on Reverse Logistics operations. Companies must focus on achieving a rapid cycle time while minimising total capital and operational costs. We introduce the customer cycle time as the average time from when a customer ships a package until the customer receives the repair, refund or exchange.

Exhibit 3.31 indicates that 54% of producers have an average customer cycle time between 5 and 10 days. From table 3.3, we observe that the lower band of the interval (5 days) comes close to the perception of ‘best’ performance of retailers and LSP’s (6.3 and 4.4 days respectively, table 3.3).
This suggests a rather encouraging picture that majority of producers deliver to the expectations of other reverse chain actors. In the high demanding European market we believe that there is an ongoing pressure to keep customer cycle times as short as possible and that end-consumer requirements should always be leading in managing this metric.

D) Invoicing cycle time
The financial transactions related to Reverse Logistics can be very complex. In the CE industry generates Return Material Authorisation (RMA) several managerial implications and evolving claims and credit processing. In respect of the RMA process we introduce the invoicing cycle time. This metric we define as the average time from when a Return Material Authorisation is given until the payment of all invoices of that authorisation is completed.

Exhibit 3.32 displays the producer results of the invoicing cycle time. It is notable that 42% of producers cite an invoicing cycle time between 26 and 30 days. Comparison with perception of retailers, displayed in table 3.4, illustrates that these cycle times approach their ‘worst’ performance (31.5 days).

For customers it is important to reduce credit processing times. Conversely, companies are aiming for maximisation of their working capital and prompt issuing of credit notes does not support this objective. And exactly this tension is what makes the financial transactions so complex. In general, reducing invoicing cycle times increase cash flow positions of each company.

III. Innovation and learning perspective
The third perspective consists of two measures that relate to the improvement capacity of Reverse Logistics operations, both from a sustainability and total quality perspective: the average recovery rate (E) and the average returns to sales ratio (F). As before, we compare the outcome of the indicators with the results of the retailer and Service & Repair surveys (table 3.5. and 3.6).

E) Recovery rate
Every company that engages in Reverse Logistics needs to add most value with the least use of resources during the recovery process. The use of different type of recovery activities strongly varies. To get a high level insight in asset recovery involvement we asked the recovery rate. This rate we introduce as the number of units scrapped over the total number of products put into the reverse stream in a period.
of time. We perceive a high rate as low involvement in resale, repair and refurbishment of the original product. Exhibit 3.33 displays the producer results of the recovery rate.

From exhibit 3.33 we observe that about one-third (32%) of producers cite to scrap more than 65% of products inducted in the reverse flow. In addition, the perception of ‘average’ performance of Service & Repair companies shows a recovery rate of 21.3% (table 3.5), indicating that in their business involvement in repair and refurbishment is high.

Overall, actively managing recovery options achieves highest stakeholder value, and maximises value from sustainability initiatives and take-back innovations.

F) Returns to Sales ratio
Actors in the CE industry are liable for different warranty periods and conditions. We introduce the ‘returns to sales ratio’ to bring forward the volume of commercial and warranty returns. The ratio implies the total number of product returns within the initial warranty period as percentage of total sales volume. Because we are aware that this percentage can differ strongly per product, do we reproduce average percentages in exhibit 3.34.

Is it notable that more than half of the producers (54%) cite scores lower than a 4% returns to sales ratio, which approaches the perception of retailers of ‘best’ performance (3.5%, table 3.6).

Reverse Logistics has direct and indirect impact on the cost of quality. Measuring the returns to sales ratio can indicate the way improvements in Reverse Logistics lead to reduction in cost of quality.

<table>
<thead>
<tr>
<th>Service &amp; Repair</th>
<th>Best</th>
<th>Average</th>
<th>Worst</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>15.0</td>
<td>21.3</td>
<td>45</td>
</tr>
</tbody>
</table>

Table 3.5: On average perceptions of indicator performance (%)

<table>
<thead>
<tr>
<th>Retailer</th>
<th>Best</th>
<th>Average</th>
<th>Worst</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.5</td>
<td>6.3</td>
<td>23.3</td>
</tr>
</tbody>
</table>

Table 3.6: On average perceptions of indicator performance (%)
For the finance perspective we introduce two measures that mainly indicate how shareholder objectives are addressed by Reverse Logistics operations: Reverse Logistics cost to total sales revenue ratio (G) and percentage of initial value reclaimed by Reverse Logistics (H).

G) Reverse logistics cost to total sales revenue ratio
To illustrate the expenditures on Reverse Logistics we asked producers the Reverse Logistics cost to total sales revenue ratio, which is expressed as a percentage. Table 3.7 contains some examples which we found out to be ‘hidden’ and ‘clear’ costs of Reverse Logistics. Only incorporating all these costs reveals the true expenditures. In our survey we referred for Reverse Logistics cost as the cost occurring prior to delivery to the consumer (e.g. re-boxing, re-testing, down grading) and after delivery to the consumer (e.g. cost of processing customer complaints, warranty claims, product recalls and discarding costs). This description reflects our vision on the wide scope that Reverse Logistics comprises. Results of the ratio are reproduced in exhibit 3.35. For the total sales revenue the most recent fiscal year is taken.

It is notable that only few producers cite an exact percentage (14%) and that 9% is unable to provide any answer. On average the percentage is 4.1% with a standard deviation of 2.5%. The spread in answers comes forward from the 40% of producers that fall out of the 1.6% - 6.6 % interval, which is calculated by summing or deducting the standard deviation to the average percentage.

For multi-billion companies currently ‘revealed’ costs for Reverse Logistics differ in the order of tens of millions of euros. This can be even more when measuring the true cost for Reverse Logistics, for which we give the initial impetus in table 3.7. Performance measurement is therefore a critical first step to reduce the expenditures.
Reverse Logistics as a key differentiator

H) Percentage of original value reclaimed

Companies are able to recover a proportion of original value through their Reverse Logistics operations. For that reason we asked the average percentage of original value reclaimed by Reverse Logistics. We define original value as the costs of goods sold when a product was sold for the first time. We use this value metric to show the potential of value recovery for Reverse Logistics.

Product composition, use pattern and deterioration directly influence applicability of recovery. Hence, to reproduce the results of this metric we make a distinction based on product characteristics. Half of producers (50%) we categorise into “IT & telecommunication equipment” for which exhibit 3.36 reproduces results. The other half (50%) we categorise into “other CE products” for which exhibit 3.37 reproduces results.

In the IT & telecommunication category (exhibit 3.36) we observe that about one-quarter of respondents (27%) cite to reclaim on average more than 70% of original value. Their score comes near to the perception of Service & Repair companies of ‘best’ performance (75%, table 3.37). Conversely, almost half of the producers (45%) in the other category cite a lower ratio than the perception of ‘worst’ performance’ (7.4%, table 3.8).

From these numbers we see that Service & Repair companies believe that producers have opportunities to actually reclaim higher percentages of cost of goods sold. Improved recycling techniques and well established secondary markets are mentioned to contribute to the potential.

During our field studies we noticed that managers find it difficult to provide an answer to this metric due to not taking a value perspective towards product returns. Generally, we believe that returns must be seen as valuable assets. In terms of real shareholder value, management that oversees both the cost and value is better able to fully explore programs and maximise profitability.

Table 3.8: On average perceptions of indicator performance (%)
3.5 Case studies

Lexmark & Schenker
Lexmark International, Inc. is a leading developer, manufacturer and supplier of printing solutions. This includes laser and inkjet printers, multifunction products, associated supplies and services for offices and homes in more than 150 countries. It is recognised worldwide for its customer-driven approach and has a “Customers for Life” principle.

Schenker, part of DB Logistics, the Transportation and Logistics Division of Deutsche Bahn AG, is one of the world’s leading providers of integrated logistics services. They provide support to trade and industry in the global exchange of goods in land operations, worldwide air and ocean freight, and in all the associated logistics services. Schenker is a single source of all these services to its customers.

The joint objective of both Lexmark and Schenker was to shorten the processing time of returned products. In practice, this meant decreasing the elapsed time between pick-up request and crediting/closure of the RMA to be able to issue customer credit within ten days after the RMA request. The philosophy of Lexmark “Customers for Life” puts customer satisfaction as their key business strategy and the Lexmark/Schenker partnership aims to reach this goal together.

The process looks as following:

Over the past few years a strategic shift in perception occurred to turn returns from a cost centre into a profit centre. With mutual improvement initiatives, Lexmark and Schenker were able to accelerate the process of reimbursement which resulted in higher customer satisfaction rates. This initiative formed the foundation for future improvement initiatives requiring closer partnership between both companies. Both parties finally have more insight into the process which makes it easier to manage.

For this operation Key Success Factors include:
• Gate keeping
• Dedicated management for product returns
• Disposition decisions dependent on phase of product life cycle
• Responsiveness in reimbursing RMA
• Flexibility of return handling capacity
• Installed base management
• Cross-department follow-up on returns

IBM and Geodis
IBM did not wait for formal European Union legislation to be put into place to enforce environment awareness and responsibility. Environmental politics has existed within IBM since 1971. Today, IBM commits itself to having a leading position for environment awareness in all its operational activities.

IBM and Geodis have a longstanding partnership. They started to collaborate in the 50’s and one of their contracts, started some years ago, is for the Reverse Logistics of IBM’s ‘end-of-lease’ personal computers.

For this contract, Geodis arranges customer collection of ‘end-of-lease’ personal computers throughout Europe and brings them to an Asset Recovery Center run by Geodis. In this center, Geodis performs the following activities:
• Receipt and identification of computers;
Reverse Logistics as a key differentiator

BHSG & DHL
Willem van Rijn is the only importer for the brands Bosch, Solitaire and Neff in the Netherlands. Up to January this year, they operated as a separate legal entity but has now been incorporated in the Bosch and Siemens Home Appliances Group (BSH Group). The two main product groups for the Dutch consumer market are electrical and kitchen retail products.

Logistics Service Provider
For many years the majority of the supply chain activities were outsourced to DHL (both in respect of the forward as well as reverse flow of goods). DHL operations and management of Willem van Rijn meet on a daily, weekly and monthly basis to discuss topics of importance for the daily operations. Operational DHL personnel have been loyal during the extensive collaboration. Continuous learning with improved collaboration are both important foundations for success.

Returns
A small percentage of total products are actually returned by customers. Packaging damage and product damage are two main reasons for returns. Product returns that only need repackaging are stored by DHL in a separate part of the DHL warehouse and DHL takes care of the repackaging. Product recalls take place very occasionally, when products need to be resent to the factory (abroad) to resolve a technical shortcoming. Products which are returned by the consumer are seldom received by Willem van Rijn. Retailers are taking care of almost all type of consumer returns: damaged products are resold in ‘B-stores’, malfunctioning products are dealt by the service company of BSH Netherlands and unrepairables discarded to the NVMP (Dutch Foundation for the Disposal of Metal and Electrical Products), and end-of-life products are being collected by the retailers and municipalities. Willem van Rijn only takes care of the financial settlement of product returns as well as the payment of ‘verwijderingsbijdrage’ (a Dutch disposals-related tax) to the NVMP (Dutch Foundation for the Disposal of Metal and Electrical Products).

In this process, 85% of the received computers in the center are resold and all the parts utilized for repair come from the dismantling of the machines that cannot be repaired/re-sold. This process strongly favours sustainable development. This year, the millionth machine is going to be processed under this contract.

For this operation Key Success Factors include:
• Responsibility and control over end to end process
• Hybrid strategy: both efficient and responsive
• Quality of rework
• Flexibility in capacity
• Dedicated division for reverse logistics
• Clear disposition trees
• Process visibility
Collaboration with competitor
Driven by cost and Corporate Social Responsibility, a unique collaboration has been set up with Electrolux for milk-run transport. For the supply to customers (mainly retail stores) throughout the Netherlands the same logistics service provider was used and a strategic partnership has been initiated for the delivery of both Electrolux and Willem van Rijn products to common customers. This decision has resulted in economies of scale and less kilometres to be covered in delivery of the same amount of products. Limitations to further synchronisation of the logistics between two parties evolved from different delivery guarantees (Willem van Rijn guarantees a 24 hour delivery; Electrolux guarantees a 36 hour delivery).

Key success factors
• Strategic collaboration with competitor concerning milk-run transport;
• Introduction of new products in assortment at one point in time;
• Re-selling of returned products;
• ‘One number planning’ across the organisation;
• Compliance with Labour regulations for product return handling (Dutch Arbo Law);
• Continuous improvement evolving from partnership with logistics service provider;
• Item level product recognition.
4 How to realise an agile & efficient reverse chain
PricewaterhouseCoopers believes that managing your Reverse Logistics definitely increases your financial performance. Realising revenue growth through focusing on cost reductions only may limit your growth potential. PwC believes that also your profit margin will be increased by exploring potential in the following potential growth areas in the reverse chain: reducing return cycle times, increasing customer satisfaction, increasing recovery rate of returns, branding your corporate image to be green and last but not least, optimising and be in control of your tax position.

Our statement is clear: achieving reverse chain excellence is only possible when both tax and operations are aligned towards the same goal that is to realise a cost efficient but customer agile reverse chain. Managing the reverse chain is a continuous process of balancing between the costs incurred and the level of customer service. PwC believes that aligning the operational as well as the regulatory/tax aspects is crucial to balance the level of customer satisfaction with the need to limit the costs incurred. Key operational aspects are: quality of repairs; quality and timeframe of pick-up of goods; quality of information concerning return progress and warranties, and “green” image of the reverse chain. Regulatory and tax key aspects are: level of compliance with tax and environmental regulations and the quality level of the financial processes.

The current practice is that supply chain managers tend to primarily focus on reducing operational expenses such as costs concerning processing repair and warranty returns. On the other hand, tax and finance managers aim to reduce tax liability, limiting tax exposures and administrative burden. Often costs reduction on an operational level does not necessary lead to costs reduction at a finance/tax level. A reverse chain example: when your company decides to outsource your repair services and gain a cost reduction of for example 5%, it is key to realise that your finance colleague should be confirmed that the proposed outsourcing should not lead to an increase of 20% of VAT charged by your third party service providers, which could not be recovered and secondly that administrative costs must be considered in order to recover those 20% VAT. The challenge is that the profit gained from operational measures should not lead to increase of finance and tax costs and vice versa.

In the following sections, we will further elaborate the roadmap on how to achieve an agile and efficient reverse chain.

4.1 Your roadmap to an agile & efficient reverse chain

Premises to an agile & efficient reverse chain we summarise as follows:
- Take customer behaviour as the main starting point to design or redesign your reverse chain;
- Design a reverse chain that is cost efficient and responsive / effective simultaneously;
- Align your reverse chain organisation and processes with your strategy incorporating finance, tax and regulatory considerations

Revenue growth and cost reduction can be contradicting objectives that have to be managed closely. Again, it is the customer who determines how your company should create sustainable value. Customer behaviour is primarily determined by the leading demand principle: predictable vs. unpredictable demand (see exhibit 4.1). An important requisite is that organisations have to align their business to customer behaviour so that no mismatch exists between customer goals and internal goals. And this is where the challenge starts.

Literature on Reverse Logistics distinguishes two extreme reverse chain types: an efficient/lean supply chain vs. responsive/agile supply chain. Efficient reverse chains are focused on developing a value stream, eliminating waste.
Responsiveness and agility are often interchangeable concepts. Agility enables companies to rapidly respond to short-term changes in demand or supply and handle external interruptions smoothly. Furthermore, adaptability describes to what extent companies are able to adjust their

<table>
<thead>
<tr>
<th>Aspects of Demand</th>
<th>Functional (Predictable Demand)</th>
<th>Innovative (Unpredictable Demand)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product life cycle</td>
<td>more than 2 years</td>
<td>3 months to 1 year</td>
</tr>
<tr>
<td>Contribution margin*</td>
<td>5% to 20%</td>
<td>20% to 60%</td>
</tr>
<tr>
<td>Product variety</td>
<td>low (10 to 20 variants per category)</td>
<td>high (often millions of variants per category)</td>
</tr>
<tr>
<td>Average margin of error in the forecast at the time production is committed</td>
<td>10%</td>
<td>40% to 100%</td>
</tr>
<tr>
<td>Average stockout rate</td>
<td>1% to 2%</td>
<td>10% to 40%</td>
</tr>
<tr>
<td>Average forced end-of-season markdown as percentage of full price</td>
<td>0%</td>
<td>10% to 25%</td>
</tr>
<tr>
<td>Lead time required for made-to-order products</td>
<td>6 months to 1 year</td>
<td>1 day to 2 weeks</td>
</tr>
</tbody>
</table>

Exhibit 4.1: Demand principles (adapted from Harvard Business Review, What is the right Supply Chain for your product, Marshall L. Fisher (1997)

including time aspects, and enabling a level schedule. They work best in high-volume, low variety and predictable environments. Agile reverse chains use market knowledge and a virtual corporation to exploit profitable opportunities in a volatile market. Agility is needed in less predictable environments where demand is volatile and the requirement for flexibility is high.

<table>
<thead>
<tr>
<th>Physically Efficient Versus Market-Responsive Supply Chains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary purpose</td>
</tr>
<tr>
<td>supply predictable demand efficiently at the lowest possible cost</td>
</tr>
<tr>
<td>Manufacturing focus</td>
</tr>
<tr>
<td>Inventory strategy</td>
</tr>
<tr>
<td>Lead-time focus</td>
</tr>
<tr>
<td>Approach to choosing suppliers</td>
</tr>
<tr>
<td>Product-design strategy</td>
</tr>
</tbody>
</table>

Exhibit 4.2: Physically efficient versus market responsive principles (adapted from Harvard Business Review, What is the right Supply Chain for your product, Marshall L. Fisher (1997)
supply chain design to meet structural shifts in markets: modifying the reverse chain structure to strategies, products and technologies. But as you can see, agility and adaptability are both customer-oriented. Exhibit 4.2 describes both types of reverse chains.

The surveys revealed that many companies do not have a specific reverse chain strategy (36%) or indicated that they are not aware of such a strategy (18%). We believe that the reverse chain strategy must be a derivative of customer behaviour and translated into the right reverse chain type to assure alignment between customers and organisation. However, there is often a mismatch because companies are not aware of customer behaviour or choose the wrong reverse chain (see exhibit 4.3).

It is a real exception that companies can or will select one of these extremes. Those companies that started to optimise their reverse chain management with involvement of top management often decided to select a hybrid structure. They want to be agile to their customers by quick pick-up & swap return goods and credit them rapidly. On the other hand, they want to make use of economies of scale by implementing lean concepts after acceptance (decoupling point at receiving). Other companies have two different reverse chains in place, due to a mixed-portfolio of products where some are facing predictable demand and others unpredictable.

After defining customer behaviour, companies have to determine the most appropriate reverse chain (responsive, efficient and/or hybrid) and validate if the chosen strategy matches the corporate strategy, including tax. Next, they
have to realign their organisation to assure a successful embedment including processes, technology, organisation structure and people. Finally, top management should create an environment wherein continuous improvement is part of daily operations.

PricewaterhouseCoopers translated this approach into an improvement methodology by which companies can realise sustainable value within their reverse chain (see exhibit 4.4). It revolves around:
1. Starting with clarity and awareness (section 4.2)
2. Creating focus across the company (section 4.3)
3. Align your entire organisation (section 4.4)
4. And continuously improve (section 4.5)

Exhibit 4.4: Improvement methodology
4.2 Starting with clarity

Our analysis revealed that for many companies Reverse Logistics management is not part of the corporate (supply chain) agenda. Responsible managers mentioned different reasons, but lack of awareness is the central theme. In many cases, the management team has no insight in the related costs while performance indicators for reverse chain management are often missing. Furthermore, specific reverse strategies are not common and tax implications are in almost 100% of the situations not considered. Finally, companies do not know their current bottlenecks and, subsequently, the root causes. As a result of this lack of awareness, organisations do not perceive any need for improvement or change.

Therefore, our improvement methodology always starts with a quick scan which supports companies in determining this need for change. Together with our clients, we assess their reverse chain management by means of digital questionnaires that can be sent out to employees via the internet. Hereby you will also create a solid base within your organisation and assure that you will retrieve a comprehensive description of the current situation. Our assessment will be completed with a limited number of targeted interviews including all business aspects like reverse chain strategy, processes, organisation structure, people and technology. The final deliverable of the assessment is a complete overview with strengths and important bottlenecks.

Next to an operational analysis, a tax assessment is part of our core analysis too. While companies are able to reduce their operational costs by 10 to 15%, reducing the tax exposure could more than double these figures. Therefore, a tax analysis is standard part of our approach in case of cross-border flows considering corporate tax & transfer pricing, VAT and customs.

We will finalise the awareness phase with consolidating our findings and determining the overall performance of your reverse chain operations by means of maturity modelling.

This reverse chain maturity model is based on our extensive knowledge base and is adjusted after every assessment. We reproduce the different levels of maturity in exhibit 4.5 and 4.6. After performing the assessment and maturity modelling, we will perform a high level costs/benefits analysis to determine your company’s improvement potential.
Exhibit 4.6: Stages of reverse chain management model
4.3 Creating focus across the company

Corporate Performance Management (CPM) is the capability of a company to translate its corporate strategy into sustainable performance for a long period. This is not new: many companies are busy with this challenge for years and books and articles have been written on this subject. However, many companies are failing to realise this translation or, at least, do not realise the expected improvement.

Basically, CPM is about two things:
1. Strategy Focus
2. Strategy Alignment

Strategy focus is about knowing and understanding those success factors that determine the extent to which companies are able to realise their objectives. Strategy alignment is about translating this strict focus into your organisation (tax) structure, relevant processes, people and technology. Companies that are able to define such a focus and align their company likewise, are so-called Performance Leaders. These companies gain competitive advantage by their performance management approach because they are able to achieve their objectives quicker and easier. Exhibit 4.7 describes this situation.

Exhibit 4.7: Road to Performance Leadership

- Clueless: high Focus, low Alignment
- Going nowhere: low Focus, high Alignment
- Performance Leadership: high Focus, high Alignment
- Individual: high Focus, low Alignment
The road to Performance Leadership starts with determination of the focus and subsequently translates and embeds this focus within the entire organisation. This will always happen with the corporate strategy as the main foundation. It differs considerably if a company would like to excel as a cost leader or distinguish itself as a provider of quality and customer service. This road to success applied to Reverse Logistics management: does the company want to reduce Reverse Logistics costs (efficiency) or does it want to achieve customer intimacy where service and quality are very important?

The set of key success factors are different for every company. However, companies can standardise the way how these key success factors are determined. According to us, there are two major inputs in determining the key success factors for Reverse Logistics management (see also exhibit 1.2):

1. Voice of the Business which is stated by means of the corporate strategy
2. Voice of the Customer which describes what is important from a customer perspective

By means of one interactive workshop we will translate, together with top management, the corporate strategy into key success factors for the reverse chain. We validate these factors through definition of the ‘Voice of the Customer’ which we will investigate with a web-based tool.

Our research indicated eight generic key success factors that could be applied for almost each reverse chain (exhibit 4.8). If companies match these eight key success factors, they will be able to create sustainable value for their stakeholders. By means of revenue growth, cost reduction and high asset utilisation companies can realise high profit margins after tax and being compliant to environmental and tax legislation.

![Exhibit 4.8: Hierarchical structure of key success factors](image)
After determination of specific key success factors, companies can compose a so-called strategy map. They have to translate their mission, vision & strategy into strategy maps showing what to focus on to manage their reverse chain performance. A strategy map also shows how key success factors are linked to and influence each other. For example, quick processing of repair flows will result into customer satisfaction while efficient gate keeping will reduce the number of returned goods. An unambiguous view of management on this causal relation is of major concern for efficient management meetings and rapid decision-making to steer performance.

The strategy map should be leading for the entire reverse chain management cycle of the company. The key success factors part of the strategy map determines for example:

- Business planning process: how should your company change its planning process to improve its performance?
- Evaluate and reward employees: what does your company want your employees to do, so that your Reverse Logistics management is more successful?
- Assess investment and project proposals: which investments or projects in Reverse Logistics results the highest ROI?
- Assign resources (money and hours): for which activities do you want to develop capabilities resulting in efficiency and effectiveness?

In short, strategy focus means that you really understand your core business and competitive advantage concerning reverse chain management. Above all, it shows what should not be your company’s priorities and prevent doing these things.

Subsequently, the key success factors must be translated into management information. Management teams can adjust their plans by means of reports that show the performance on your key success factors. Key Performance Indicators are the translation of key success factors into information to manage your reverse chain operations. A successful translation of your key success factors provides your organisation with a balanced set of management information:

- Financial and non-financial information;
- External and internal information;
- Input, output and process information.

Often we meet companies with management reports that are either full of output information or data only. This is frequently caused by a direct translation of objectives into information. But how should companies manage their organisation to become the market leader? Of course, market share is important output information but is often not manageable. If a company did not realise its market share objectives, it is already too late for that year. Key success factors that enable companies to realise market leadership, should also be translated into information.

For example, rapid product introduction is one of the key success factors for realising the desired market share. If we translate this key success factor into management information, we have to define a KPI such as ‘time to market’ or ‘availability of new products’. This information has a predicting value for future market share. All KPI’s together form a KPI Dashboard which enables your organisation to manage your reverse chain and a measure to start improvement initiatives in case your company does not meet the targets.

Next, this strategy focus should be translated into all parts of your organisation, embedded in your (operational) business processes and tools, and understood by your employees so that the entire company aims for the same objectives.

Corporate Performance Management is not a tool or system but a way of thinking and working that can only be successful if the entire organisation understands its contribution and everybody acts accordingly.
Performance Leaders have to overcome ‘soft factors’ like culture and behaviour. This must result in the following characteristics in the cultural domain:

1. Corporate culture is actively focused on value creation;
2. All managers show the right example (continuously follow the focus and centralise this principle as the starting point for managing the company);
3. Evaluation and reward processes are directly linked to key success factors;
4. Top management acts as a visible sponsor of the performance management initiative.

Concluding: we can say that CPM has an enormous potential to improve your reverse chain operations. It is all about doing those things you know already in the right way, namely focusing on those things that really help you in realising your objectives and embedding the results into your entire organisation. Often, this potential is not fulfilled because the success rate and overall efficiency rate of performance management is determined by soft factors that are not considered by all those involved.

4.4 Align your entire organisation

Even after selecting the right focus, companies can still be out of control. Persuading the entire organisation of the necessity to re-align your business structure is a challenge. Implementing a reverse chain strategy that is totally in line with your customer requirements is unfeasible for the greater part of the companies. Why is that?

The leading supply chain principle should drive organisational alignment. Proper alignment assures that what you are planning to do (“strategy is about doing the right things”) is actually done in practice. Therefore, organisations have to embed reverse chain strategy into their reverse chain organisation, processes, people and technology. A simple example: If your organisation aims to have a responsive reverse chain in place, it has to assure that the chain is supported by proper technology. In this situation, you need

Exhibit 4.9: Interrelation between focus and alignment
PricewaterhouseCoopers developed a tool that analyses if organisations are aligned with their reverse chain strategies. We define improvement directions and put the requirements into operation by (re)designing reverse chain processes that are supported by a proper reverse chain organisation, technology and capable employees.

The chosen reverse chain type (efficient, agile or hybrid) is the leading principle during this Alignment Diagnostic (dark blue triangle). In combination with an assessment of the current situation, the tool determines the gap the organisation has to close concerning the different dimensions and aspects.

### 4.5 And continuously improve

After full alignment to strategy, your company is ready to start working according to the redesigned processes, structure, people and technology. But organisations often forget that this is just a starting point. Problems and improvement opportunities are still there.

Our continuous improvement methodology is centred on Lean Six Sigma. Lean is a generic process management philosophy with a prime focus of simplification and workers involvement. It is renowned for its focus on reduction of seven wastes in order to improve overall customer value: overproduction, defective parts, excessive inventory, unnecessary motion, over processing, transportation and waiting.

<table>
<thead>
<tr>
<th>Focus</th>
<th>Revenue Chain Type</th>
<th>Efficient</th>
<th></th>
<th>Responsive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategy</td>
<td>Risk management</td>
<td>Risk avoidance</td>
<td>Risk acceptance</td>
<td></td>
</tr>
<tr>
<td>Policies</td>
<td>Restrictive</td>
<td>Liberal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Approach</td>
<td>Reactive</td>
<td>Proactive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Process</td>
<td>Pre-position</td>
<td>Delay</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>Tight</td>
<td>Flexible</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forecasting &amp; Planning</td>
<td>Centralised</td>
<td>Consolidated</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Processing</td>
<td>Batches</td>
<td>Individual</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capacity</td>
<td>Lean</td>
<td>Excessive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structure</td>
<td>Organisation structure</td>
<td>Centralised</td>
<td>Decentralised</td>
<td></td>
</tr>
<tr>
<td>Core business</td>
<td>Outsource</td>
<td>In-house</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network structure</td>
<td>Centralised</td>
<td>Decentralised</td>
<td></td>
<td></td>
</tr>
<tr>
<td>People</td>
<td>Improvement focus</td>
<td>Cash driven</td>
<td>Quality driven</td>
<td></td>
</tr>
<tr>
<td>Leadership</td>
<td>Proactive</td>
<td>Motivating</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>Open</td>
<td>Informal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technology</td>
<td>Functionality</td>
<td>Standard</td>
<td>Advanced</td>
<td></td>
</tr>
<tr>
<td>Data</td>
<td>Balanced</td>
<td>Real-time</td>
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</table>

Exhibit 4.10: Alignment diagnostic
The second approach to Lean is focus on improving the flow or smoothness of work through the system to improve agility and efficiency of the process at the same time. Six Sigma on the other hand is a set of practices to systematically improve processes by eliminating defects. A defect is defined as non-conformity of a product or service to its specifications. Sigma is a Greek letter that represents the statistical measurement of the variability or spread of data. Six Sigma measures how well a process or product meets customer requirements. It is characterized through a focus on customers, the returns process and reducing variation which causes one of the waste types. By reducing the variability in your process, and therefore waste, companies can significantly improve performance.

The combination of Lean and Six Sigma proved to be a very effective and pragmatic means of process improvement focussed on adding value. The goal of Lean Six Sigma is meet customer needs & increase company profits by eliminating business process variability, defects and waste that undermine customer loyalty, organizational efficiency and employee productivity. Lean Six Sigma is a way to do business with the support of a proven methodology, a data driven focus, a best practices toolset and a mechanism to drive continuous improvement. It has four important characteristics:

1. Strategic mindset through managing strategic goals/value (achieving financial performance previously thought impossible)
2. Metrics mindset through performance management (it stretches us into the domain of “What we did not know we don’t know”)
3. Process mindset through reduction of variance in a processes
4. Behavioral mindset through the use of leadership & people development as accelerators of a cultural shift

Successful Lean Six Sigma deployments require customers’ requirements to be leading at all times. Lean Six Sigma argues that activities that don’t add value from a customer’s perspective will not add value to the company that want to sell to or serve the customer. In successful companies, everything that is being conducted is measured as to how it adds value to meeting critical customer requirements (CCR’s). This is being referred to as having the Voice of the Customer through into the company’s operations and processes. Other leading indicators that Lean Six Sigma recognizes are the requirements of regulators, suppliers and the business itself.

Overall
Bottom-line, the KPI dashboard generated through CPM is a good starting point for continuous process improvement. If defined well, it shows where the organisation is underperforming and what the mismatch between required and actual performance is. Furthermore, this is where the DMAIC cycle starts with the following steps:

   • Fully trained team is formed, supported, and committed to work on improvement project.
   • Customers are identified and high impact characteristics (CTQs) defined, team charter is developed, business process is mapped.
   • Project charter with the improvement potential has been written and committed to.
2. Measure performance: determine what to measure, manage measurement, and measurement system analysis.
   • Key measures identified, data collection planned and executed, process variation displayed and communicated, performance baselined, sigma level calculated.
   • Data and process analysis, root cause analysis, quantifying the gap/opportunity.
4. Improve performance: generate improvement ideas, evaluate and select solutions, Present Recommendations, and implement change
• Generate (and test) possible solutions, select the best solutions, design implementation plan.

5. Control performance: plan and implement solution, process integration, and closure and recognition
• Documented and implemented monitoring plan, standardized process, documented procedures, response plan established and deployed, transfer of ownership (project closure).

The ultimate goal of Lean Six Sigma is to meet customer needs & increase company profits by eliminating business process variability, defects and waste that undermine customer loyalty, organisational efficiency and employee productivity. This will result in:
• Improved customer satisfaction and understanding of customer needs
• Services and product reliability improvement
• Key performance metrics management
• Production capacity and productivity increase due to value stream performance improvement
• Business risk exposure reduction
• Minimize Waste, Variation & defects
• Employee involvement & measurable benefits of behavioural change

Three aspects are very important to consider during introduction of Lean Six Sigma that is management involvement, extensive communication across the organisation and clear project structure.

We combined our different tools & methodologies into one framework that enables companies to realise significant improvements in their reverse chain.

Exhibit 4.11: Reverse Logistics Framework for Improvement
4.6 Summary

In chapter 1, we already made the assumption that Reverse Logistics can contribute to creating sustainable value for an organisation’s stakeholders (exhibit 1.3). Now, we are able to conclude that an agile and efficient reverse chain has a direct and considerable impact on an organisation’s profit margins, after tax. Customer satisfaction and lean processes are key value drivers but these objectives must be sustainable for the future. Furthermore, it becomes more and more important that companies must be in control which practically means being compliant to accounting, tax and environmental legislation. But at the end, companies should be able to flexibly adapt their entire organisation to changing market conditions and customer expectations. Our research indicated that translating good ideas into real organisational changes is the most difficult challenge.

We hope that our report provides a framework by which you can further improve and professionalise your reverse chain function. The question is which improvement opportunities are waiting for you. To become successful, keep the following slogan into the back of your mind: ‘Think forward, act in reverse’.

Exhibit 4.12: Benefits of an agile & efficient reverse chain
Acknowledgements
In advance of our study, we approached many companies for participation by means of interviews, site visits and the web-based survey. Many of them responded positively and promised their involvement. PricewaterhouseCoopers would like to thank the following companies for their hospitality to invite us for interviews and/or a site visit: Bosch and Siemens Home appliances Group, CEVA Logistics, Cycleon, DHL, FRS Europe, Geodis, IBM, Jabil, Lexmark, Manhattan Associates, Media Markt, NDL, Nokia, Norbert Dentressangle, Oracle, Philips, SAP, Schenker, Spring Global Mail and Xerox. Without the support of these companies, we would not have been able to validate our conclusions and recommendations.

We owe many thanks to those companies that filled our web-based surveys. Furthermore, we received much support and in-depth knowledge from several academics from the following universities: Erasmus University Rotterdam, University of Technology Eindhoven, University of Technology Delft, University of Twente and the University of Tilburg. At last, the PwC research team is also very grateful for the active support and involvement from all the PwC professionals who took an active role in assisting us with this research and in the analysis of our conclusions.
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C  Methodology  89
D  Consumer Electronics market analysis  92
## EU environmental legislation on Reverse Logistics

<table>
<thead>
<tr>
<th>EU legislation</th>
<th>Key targets timeline</th>
<th>Company risks + company solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Batteries and accumulators directive</td>
<td>2008 Transposition by member states and applicability of substance bans</td>
<td>Company risks</td>
</tr>
<tr>
<td>Prohibition of placing on the market of batteries and accumulators &gt; 0.0005% of mercury &gt; 0.002% of cadmium</td>
<td>2009 Compliant treatment and recycling schemes in operation, marking of battery capacity</td>
<td>• Enforcement resulting in a ban to bring to EU market</td>
</tr>
<tr>
<td></td>
<td>2010 Rules on calculation recycling efficiencies</td>
<td>• Liability at disturbance of continuity of delivery</td>
</tr>
<tr>
<td></td>
<td>2016 Minimum of 45% collection rates</td>
<td>• Repressive action taken in inspections of exports</td>
</tr>
<tr>
<td></td>
<td>2010 Efficiency requirements for recycling</td>
<td>• High costs in registering and reporting</td>
</tr>
<tr>
<td>Waste shipment regulation</td>
<td>2007 Producer records for minimum 3 years on the quantity, nature, origin, treatment, destination, frequency of collection and mode of transport of hazardous waste which is transferred to others</td>
<td>• High costs in take-back of products</td>
</tr>
<tr>
<td>Criteria for the disposal and recovery of shipments of waste</td>
<td>2008 At least 60% by weight of packaging waste to be recovered or incinerated at waste incineration plants with energy recovery; 55 and 80% by weight of packaging waste to be recycled</td>
<td>• High technical costs of substance phase-out</td>
</tr>
<tr>
<td>Packaging and packaging waste</td>
<td>2001 25 - 45% by weight of the totality of packaging materials contained in packaging waste to be recycled</td>
<td>• Export of goods designated as waste (reputation risks)</td>
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<tr>
<td>Introduce systems for the return and/or collection of used packaging</td>
<td>2008 At least 60% by weight of packaging waste to be recovered or incinerated at waste incineration plants with energy recovery; 55 and 80% by weight of packaging waste to be recycled</td>
<td>Company solutions</td>
</tr>
<tr>
<td></td>
<td>2001 25 - 45% by weight of the totality of packaging materials contained in packaging waste to be recycled</td>
<td>• Business impact assessment</td>
</tr>
<tr>
<td></td>
<td>2008 At least 60% by weight of packaging waste to be recovered or incinerated at waste incineration plants with energy recovery; 55 and 80% by weight of packaging waste to be recycled</td>
<td>• Only representative scan</td>
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<tr>
<td></td>
<td>2006 RoHS Directive is enforced</td>
<td>• Awareness seminars</td>
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<td>REACH</td>
<td>2006 Member states to meet recycling targets</td>
<td>• Coaching</td>
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<tr>
<td>Restriction of the Use of Certain Hazardous Substances in EEE</td>
<td>2006 RoHS Directive is enforced</td>
<td>• Implementation management</td>
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<td></td>
<td>2006 Member states to meet recycling targets</td>
<td>Data capture, cost modelling and tracking compliance</td>
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<td>WEEE</td>
<td>2004 WEEE is enforced</td>
<td>• Eco-efficient chain management</td>
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<td>Disposal of e-waste</td>
<td>2005 Producers liable for financing WEEE, processing systems set up</td>
<td>- supply chain (eco-design)</td>
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<td>2006 Member States to meet recovery/recycling targets set in the directive</td>
<td>- goods under guarantee chain</td>
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<td>2008 Establish new targets for recovery/recycling</td>
<td>- waste equipment chain</td>
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<td>• Financial management</td>
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<tr>
<td></td>
<td>2008 Establish new targets for recovery/recycling</td>
<td>• Sustainable reporting</td>
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In the following table a selection of software companies is presented that offer packages for Reverse Logistics. We stress that this list is not exhaustive and is only exploring the software landscape.

<table>
<thead>
<tr>
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<td><a href="http://www.tavant.com">www.tavant.com</a></td>
</tr>
</tbody>
</table>
On the purpose of data collection and verification of results we consulted multiple sources. In this section we highlight our methodological background including:

- Extensive academic and practical publications, books and articles;
- Expert interviews;
- Web-based surveys;
- Field studies;
- Round table session.

**Expert interviews**

Experts within the Reverse Logistics arena were consulted throughout the entire period of study. The expert population chosen was a mixture of academic, industry and consultancy. We interviewed academics at:

- The University of Delft;
- The University of Eindhoven;
- The University of Rotterdam;
- The University of Tilburg;
- The University of Twente.

From industry we visited:

- Producers/OEM’s;
- Retailers;
- Importers;
- Third and fourth party logistics service providers;
- Service & repair companies;
- Technology providers.

PwC consultants provided accumulated knowledge and experience in the area of:

- Corporate performance management;
- Consumer electronics industry;
- Supply chain excellence;
- Lean Six Sigma;
- Sustainability.

Each interview involved detailed discussions about trends and developments, barriers, success factors and industry pressures in the area of Reverse Logistics management.

**Descriptive web-based surveys**

Understanding that each role in the reverse chain has different interests and challenges, we designed separate surveys for:

- Producers/OEM’s;
- Retailers;
- Logistics service providers;
- Service & repair companies.

Given the unique approach to this Reverse Logistics study including both the supply chain and tax perspectives, we translated different surveys for supply chain and tax managers in respondent companies.

The majority of producers, LSP’s and Service & Repair respondents completed the survey from a Pan-European or EMEA perspective (respectively 90.9%, 80% and 80%).

The retailer respondents are in most of the cases organised on a national level (representing Belgium, Germany, Poland, Luxembourg, Spain, Switzerland and The Netherlands). The majority of respondents to the Finance Survey completed the survey from an EMEA perspective.
Sales Volume – Respondents
The annual sales volume in the recent fiscal year of the participating companies ranges from 3.3 million up 50 billion euros. The middle fifty percent have European sales revenues between 10 and 500 million euros in most recent years, indicating that middle to large companies participated.
Field studies
To understand in more detail how companies manage product returns we executed one-day field studies, spread out over the Netherlands, Germany and the UK. A field study is less extensive than a case study, but combines the opportunity to enquire for further details about specific topics and management practices. Such studies are valuable because a certain trend can be studied in its natural setting, with observations of actual practice. During the interviews we held interactive sessions: combined between producers and service providers and in most cases also combined between tax and supply chain managers. For anonymity we have deleted the names of the companies that participated. The companies were all multi-national companies in the European CE market, with each more than 1 billion euros annual turnover.

Round table session
On February 22nd 2008 a round table session was organised with participants from the academic world, from the industry and from PwC. During the session intermediate results from the web-based surveys were discussed, analysed and refined.
We use the ‘Five Forces Analysis’ from Porter to describe the competitive battlefield of Consumer Electronics. The Five Forces model is a strategy tool that is used to make an analysis of the attractiveness of an industry structure. The analysis is made by the identification of five fundamental competitive forces, that is:

1. Entry of competitors: how easy or difficult is it for new entrants to start competing and which barriers do exist?
2. Threat of substitutes: how easy can a product or service be substituted and easily made cheaper?
3. Bargaining power of customers: how strong is the position of buyers and can they work together in ordering large volumes?
4. Bargaining power of suppliers: how strong is the position of sellers and do many potential suppliers exist or just a few?
5. Rivalry of the existing players: does a strong competition exits between the existing players or is one player very dominant in strength and size?

This market analysis is partly based on research performed by Datamonitor (Datamonitor, Global Consumer Electronics: July 2007)

Our analysis is set up from the producer perspective.

1. Entry of competitors
Companies like Philips, Sony and Panasonic have been in the CE market for decades and therefore able to build on their reputation and brand name. They are operating on a global scale and have the financial capacity to develop innovative products continuously. But this does not mean that the market is closed for new entrants. They can reduce the initial investments costs through ‘buying’ technology instead of developing. Another way to reduce initial R&D costs is by forming alliances with other runner-ups. Furthermore, new entrants can avoid competition on brand and reputation because they compete on prices and the use of non-specialist sales channels like supermarkets and hypermarkets like Carrefour. Another trend is convergence whereby functionalities from computers, telecommunications and purely consumer electronics are combined into new configurations. Apple is a good example of this trend with their iPod. In less mature markets, the prospect of rapid growth in revenue may be set against the risks of counterfeiting, and the cost of import tariffs or the need to establish manufacturing bases, in order to assess the likelihood of the incumbents facing new competitors. Overall, the threat of new entrants in the global market is strong.

2. Threat of substitutes
Nowadays, almost every household in Western Europe has basis consumer electronics products like a television, computer, DVD player and several mobile phones. Even though similar content is available through other media, and although these markets are mature there is little sign that people are ceasing to replace or upgrade their consumer electronics. However, as a cause of shorter and shorter product life cycles products are replaced very quickly although the functionality is not really changing. Technological developments happen in quick succession every year and consumers will determine more and more which solutions are successful (pull rather than push) that we rated the threat of substitutes medium.

3. Bargaining power of customers
The presence of large numbers of small customers in this market immediately could imply low buyer power, since the effect of any individual decision to buy or not to buy has negligible impact on revenues for players in this market. Also, as it is most unlikely that potential customers will choose to make their own electronic products means that the threat of backwards integration can be neglected. But the law of averages must be considered as well in this case. The average switching costs are relatively low. Consumers are very price sensitivity, because quality could only be dissatisffer instead of an order winner, and brand loyalty is minimal.
Furthermore, consumers have almost unlimited access to product and market information and which created enormous transparency. Besides consumers, also retailers become more powerful because their concentration and regional/global coverage. Furthermore, retailers are dictating shelf space and, therefore, determines what will actually be sold. Overall, the global market has strong buyer power.

4. Bargaining power of suppliers
Consumer electronics devices are manufactured using both commodity and customized parts. Some large players (e.g., Sony, Philips, Samsung) are already integrated backwards, designing and manufacturing semiconductor chips and LCD screens, while companies specialising in device manufacture are less prone to move forwards into making consumer products in their own right: it would require a radically new set of competencies and major investment in new production facilities. Although there are successful examples like Acer and Asus, PC and mobile phone makers commonly use EMS firms, like Flextronics, but this kind of outsourcing is currently relatively rare for consumer electronics companies, which view manufacturing as a core competency. The strongest card in the hand of any supplier is the need of manufacturers to source low-cost, good quality components, in quantities which reflect fluctuations in consumer demand. Going forward, the increasing levels of digitalization in consumer products may mean greater amounts of power being ceded to chip manufacturers such as Texas Instruments and National. However, at present, supplier power in this market is weak.

5. Rivalry of the existing players
The global market is highly competitive. Although the major players operate in diverse businesses, consumer electronics forms a key segment of their revenues. Product differentiation is challenging. Much of the underlying technology is mature, and innovation is rapidly imitated; at a purely technical level, the performance of existing products is already good. Furthermore, consumers are free to change their brand allegiances at little cost to themselves. In the mature markets, demand creation is vital, through the strengthening of brand identity, and differentiating products in terms of visual design, while price competition can be particularly important in markets where consumers have lower disposable incomes.

Based on the Five Forces Analysis we can conclude that Consumer Electronics is a highly competitive market with relatively low profit margins due to the constant pressure on prices.
Hubert Verweij
Hubert is Senior Advisor at PricewaterhouseCoopers Advisory in the Netherlands. He has specialized expertise in the area of Supply Chain Excellence including forecasting & planning, logistics & outsourcing, sourcing & procurement, tax optimised supply chain management and supply chain strategy. He has been working primarily for clients from the Consumer Electronics, FMCG and Industrial Products industries. Furthermore, he is Certified in Production & Inventory Management (APICS CPIM) and a certified Six Sigma Black Belt consultant.

Nga Dang
Nga Dang is a Senior Manager at PricewaterhouseCoopers Tax Advisers and fully engaged in several major (reverse) supply chain projects in the Technology & Consumer products industries. Nga has many years of experience gained from working within various PWC organisations. Although specialised in Indirect Tax, Nga also has broad expertise of various other international taxes including Employment Tax. Nga has a particular business interest on the CE industry within the dragon economies of the East and mainly China, Korea, Taiwan and Vietnam.

Germaine Bonney
Germaine Bonney is a Manager at PricewaterhouseCoopers Tax Advisers with a specialization in European Indirect Taxes. She has many years of experience gained with PWC UK and (more recently) PWC NL of handling the Indirect Tax issues faced by PWC clients within the CE market and particularly in respect of the cross border movement of goods and services. Germaine is a qualified lawyer (Nottingham University) and Chartered Tax Advisor and a member of the Chartered Institute of Tax, London.

Bastiaan Janse
Bastiaan is analyst at PricewaterhouseCoopers Advisory in the Netherlands. Graduated as an industrial engineer, he has expertise in Operations Research and Supply Chain Excellence. His focus is on tax optimized supply chain management, Reverse Logistics, network planning and forecasting & planning.
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At PricewaterhouseCoopers Nederland, over 4,600 professionals work together covering various disciplines: Assurance, Tax and Human Resource Services, and Advisory. On the basis of our corporate philosophy, Connected Thinking, we provide sector-specific services and seek novel solutions. Not only for large national and international companies, but also for medium-sized and smaller businesses as well as for government entities and non-profit organisations. As an independent part of a worldwide network comprising 146,000 colleagues in 150 countries, we can rely on extensive knowledge and experience which we share with each other, with our clients and with their stakeholders. We seek unexpected angles, make surprising connections, feel involved and work together from our strengths.