Maximising Performance

The Power of Supply Chain Collaboration




Results of the EPCA-Cefic Working Group Sessions

organised and sponsored by EPCA
in cooperation with Cefic

EPCA
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cefic

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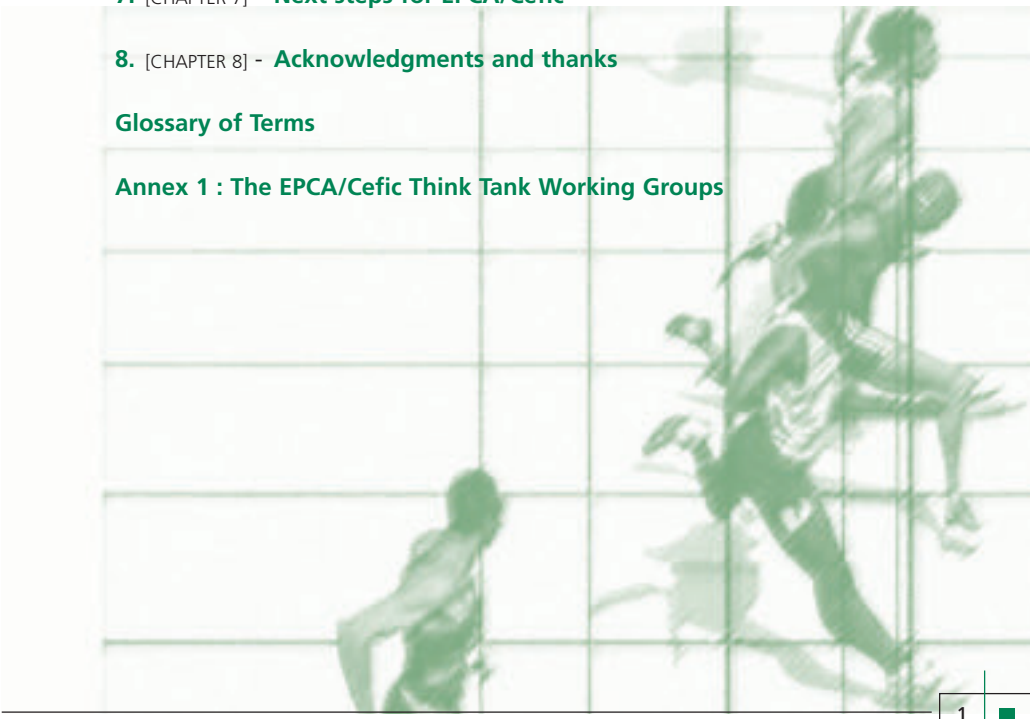




Management Summary

This report commands the attention of business leaders and stakeholders in the European Chemical Industry.

The European Chemical Industry is moving into gradual structural decline which, in the bleakest scenario, could accelerate (see Cefic Report 'Chemical Industry 2015: Roads to the future'). This work describes the conclusions of a large group of experts on the range of supply chain initiatives that their companies and the industry can deploy and that can contribute strategically to its sustainable future.

57 senior people from 38 leading entities have devoted time in working groups to reaching the conclusions of this report. Their aim has been to develop and validate supply chain measures that can maximize the performance and future of the industry; they have reached widespread agreement on the applicability and relevance of supply chain methods in the industry.

It was also clear to our industry specialists that the supply chain 'best practice' that is guiding other industries is much less evident in chemicals, although there are examples of it.

Supply chain excellence brings lower unit costs, higher capital productivity, increased customer retention and better end-to-end value for customers. Applying these concepts in chemicals requires a fresh and radical approach for an industry that has succeeded in the past with an established business model of scale, market pricing, and relatively low customer orientation.

The teams have estimated that the accumulated potential from a range of measures is up to €15 billion, 2% of turnover and €10/tonne. Clearly this average disguises a range.

If that is not strategic potential – then nothing is. We should expect CEOs and CFOs to be highly motivated by this assessment, which is why we believe this report and the work of the groups commands the attention of our business leaders.

The work was organized into four groups, forming a linked programme, integrated by a steering committee. The overarching theme is one of 'collaboration to eliminate waste and create value', under which the conclusions from the working groups are as follows:

I. **The application of collaborative methods and processes across the industry.** There is huge potential from working with customers, suppliers, service providers and, occasionally, competitors to drive out waste and hence cost. Adopting 'lean thinking' to the extended supply chain was confirmed by the group as having the potential to deliver significant benefits. It is from cases evaluated by this group that the overall estimate of benefits has been developed. These are not new ideas; they are supported by researched academic principles, best practice in other sectors and some cases from within the industry.

II. **New capabilities and working methods with Logistics Service Providers (LSPs).** The industry will be totally dependent on its service providers to realise the collaboration measures and eliminate waste in their operations. Shippers are already frustrated by the lack of the services they believe they need. LSP's and shippers should both acquire new skills, establish new business models and adopt a fresh mindset to eliminate the waste that is falling between them.

III. **Skills, Talent & Training in supply chain to an industry framework.** The skills and competences to realise this vision of collaboration are not widely understood or readily available. Therefore focussed education and training is required based on the industry's specific requirements. This working group has prepared a recommended Human Resource development framework in the supply chain for companies involved in the chemical industry and training providers to adopt, adapt, promote and follow.

IV. **Working together to turn compliance in SSE from a 'cost burden' to an economic benefit.** Although standards and compliance have improved considerably over the last 10 years, they are not consistently applied across the whole industry. Obligations and costs around safety, security and the environment are forecast to increase. The industry should face this situation by putting in place a 'stewardship' model covering the complete supply chain. Collaborative and integrated supply chain stewardship will improve SSE standards and at the same time increase efficiencies and lower costs. The alternative is declining standards, more incidents and increased and sometimes inappropriate regulations.

Taken together, these conclusions require a substantially new mindset and approach to some of the ways that the industry has traditionally been operated, serviced and regulated. The working groups are clear that few companies will be able to implement effective change on their own; they will need to draw on new services, work in new ways, deploy new skills, and draw on best practice from each other and other sectors.

The term collaboration can be taken to imply anti-competitive practices. Supply chain best practice places "collaboration to eliminate waste" as one of its principle tenets. While the division of its benefits is a commercial issue for supply chain management, this never extends to price and market fixing. The work of the groups has been governed by a strict code of conduct and compliance has been monitored.

EPCA and Cefic will promote these findings and further investigations and research. We can promote industry forums on specific issues, but are not chartered for any role in implementation.

Producers, service providers, customers and suppliers should take the time to evaluate the conclusions. Regulators should understand the challenges facing the industry and be prepared to support the creation of a virtuous circle in chemicals for the European economy.

The obligation for action is with the operational stakeholders to maximize performance. Promoting, sponsoring and adopting supply chain thinking and practice can deliver your company serious value. Individual companies should act to understand the implications of the findings in their specific circumstances and commit to and launch their own programmes of action.



[CHAPTER 1]

1. Overview

This chapter provides an overview of the report and signposts for the individual chapters. The reader can use this as a guide to their specific areas of interest in the rest of the report.

The European Chemical Industry is a powerful force in the European economy but is moving into gradual structural decline. In the bleakest scenario, this decline could accelerate. *Chapter 2* provides an overview of the situation and outlook.

In other industries, such declines are countered strategically by consolidation, rationalization, off-shoring and disposal to private equity firms. All of these responses are relevant and already evident, but the potential contribution of supply chain excellence is considerable and has been given only limited attention.

The threats of increasing feedstock and fuel costs, environmental and congestion measures in transportation and the relentless shift of manufacturing to the East combine to accentuate the business and supply risk for the sector.

The industry has very high intensity in terms of its generation of transportation and logistics activity. We estimate that its logistics and supply chain activities have a cost of up to € 60 billion. Yet in spite of these huge costs, the industry does not have a track record of applying good practice in supply chain management. This is all the more surprising given the industry's high levels major contribution to the EU economy and its process integration culture in manufacturing.

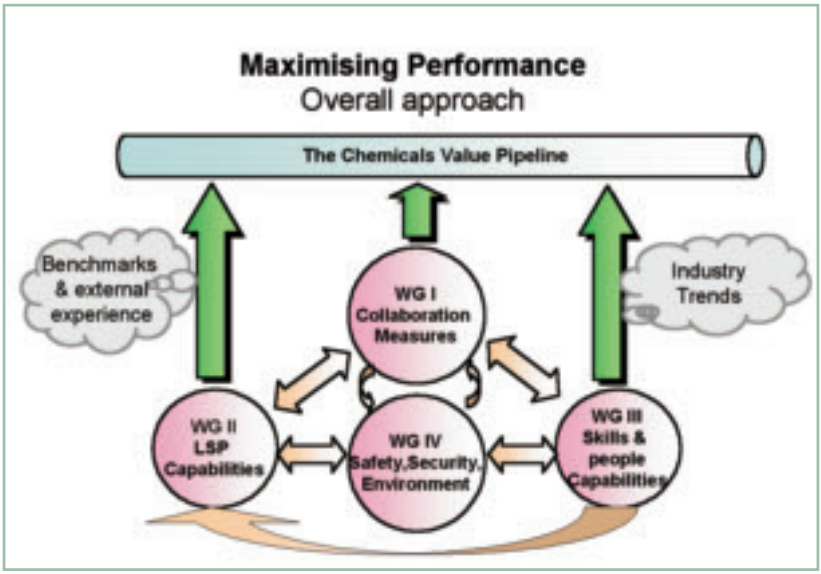
The working hypothesis for this EPCA/Cefic initiative has been that the supply chain can have a highly beneficial impact on the European Chemical Industry and brings the potential to arrest the decline. This is not a claim that supply chain concepts are the sole saviour of the sector; however the work of the expert groups this year has shown that it can contribute substantially.

The origins of the work during this year were founded in a smaller think tank exercise in 2003/4 under the sponsorship of EPCA with Cefic support. A summary of this work is contained in *Chapter 3*. In essence, that group found that there were widespread opportunities to apply supply chain thinking and practice in the industry. It provided a four dimensional framework for improvement: core to the company: vertical – working with suppliers and customers: horizontal – working with other companies in the sector: and working with LSP to improve performance.

The core theme of all these dimensions was increased collaboration. However the work of the original think tank stopped short of validating and valuing the concepts in relation to the industry. The report proposed a next step, drawing on wider involvement from the industry, to validate and quantify the potential from the four dimensions of improvement through investigation and endorsement by practitioners.

The work in 2004/5 was organised into four working groups dealing with Collaboration principles and practices (WG I), LSP Capabilities to support the new processes (WG II), Skills, talent and training to implement supply chain concepts (WG III), and The Impact of Safety Security and the Environment (WG IV).

The diagram following shows the way the work groups were related.



There have been 57 executives from 38 entities participating across these work groups, making this a representative effort that can be given high credibility. *Chapter 8* provides the details of the contributors together with a vote of thanks to them all.

In overview, the working groups all concluded that the potential from effective supply chain management based on benchmarks, cases and examples can be at least €10 per tonne. *Chapter 4* provides an overview of how this is derived.

In summary if this benefit is applied to the industry turnover of € 600 billion and its estimated total tonnage of 1.5 billion, it converts to:

- Around 2% of selling value across the entire chain which benchmarks with experience in other sectors where costs have been reduced by more than that
- … and is equivalent to a cash injection of up to €15 billion into the industry with which to cope with the trading pressures that it is facing

Short summaries of the evidence and thinking of the working groups key conclusions are contained in *Chapter 5*. The headlines can be summarised as follows:

I. The application of collaborative methods and processes across the industry. *Chapter 5.1*

The Working Group's objective was to raise the level of interest in collaboration through demonstrating a compelling value proposition with evidence of achievability. The group believes that the structural, demographic and cost trends described in Chapters 2 and 3 are re-defining the opportunity for and need to collaborate if companies are to raise the performance bar.

Collaboration methods are diverse; the group determined that they can apply to both inter and intra company interfaces, and the management of their relationships. All the buzzword terms of:

- Customer Relationship Management (CRM),
- Supplier Relationship Management (SRM),
- Efficient Consumer Response (ECR),
- Collaborative Planning, Forecasting & Replenishment (CPFR),
- Vendor Managed Inventory (VMI),
- Customer Managed Inventory (CMI),

… and the entire 'Lean' and 'Agile' agendas are grounded in the one big idea of collaboration through synchronisation and integration of the supply chain.

Collaboration is not an especially new concept and capability. It does not necessarily imply partnership at the financial level, but it does imply end-to-end process design and information exchange – enabling organisations to recognise and cut waste in the chain. This is the 'Lean' methodology, and has been a driver of the success of some world beaters such as Dell, Wal*Mart, TESCO, Procter and Gamble, and the auto industry lead by Toyota. The chemical industry has engaged in various forms of collaboration for many years, and is exploring "Lean" principles; however it is not as widespread in the industry as might be expected.

The work group divided into sub-groups to explore the approaches to and applicability of **vertical and horizontal collaboration.**

Ideal supply chains display a high degree of predictability, and low variability. In contrast factors driving demand and supply variability include payment and buying cycles, process industry constraints, and customers anticipating commercial tactics. Vertical collaboration helps to increase the understanding of these dynamics, and manage them out. In addition, vertical collaboration (from raw material supplier, to shipper, LSP, and customer) brings transparency to the chain, and helps to reduce variability. Reduced variability in turn reduces inventory holding and financing costs, premium freight due to emergencies, and administrative rework.

Collaborative methods and techniques that can deliver greater predictability include postponement, e.g. make-to-order (MTO) and finish-to-order (FTO) and the various methods of managing inventory (vendor MI, customer MI, LSP MI). Case studies and the work group's estimates on a segment of the industry showed that the potential from these measures amount to just under € 4 per tonne.

In **horizontal collaboration**, the group focused on product trading on an exchange basis, shutdown phasing, asset pooling and network collaboration. These measures are much more contentious from a competition law point of view, but the group identified several instances where each had been applied to reduce costs.

Specific analysis of the potential to trade product on an exchange basis showed a benefit of as much as € 35 per tonne. Applied to just 15% of the industry this would convert to an average benefit of € 5.25 per tonne.

Shutdown phasing, asset pooling and network optimisation offer the chance to reduce waste and premium logistics costs. The specific actions include collaborative shutdown management, the introduction of chemical industry value parks, container and modal transfer terminals, carrier alliances, and equipment and data standardisation.

The value from these measures was judged to be highly dependent on service providers; that work group has estimated there is a € 10/tonne potential from quite simple measures (at least in concept) like traffic pooling, schedule integration and delay minimisation. Adding an estimated 10% modal transfer, from road to rail contribute around € 1 per tonne across the whole industry.

Overall, the working group used sub sector benchmarking on existing performance in polyolefins by Philip Townsend Associates to validate the accumulated potential. This analysis showed that the difference between 75% performance and the 50% and 25% levels are € 14/tonne and € 31/tonne; as a result upgrading the bottom quartile to average would yield more than the € 10/tonne already identified before innovative measures are taken into account.

In this context the potential for an average € 10/tonne appears conservative and achievable. The question of achievability became a major consideration in the workgroup and the conclusion was that difficulty of attainment would vary by both company and measure.

There are some fundamental barriers to collaboration, which cannot be under-estimated; these include concerns about anti-trust exposure, commercial caution about sacrificing marketing advantage, and the traditional confrontational/adversarial style of purchasing departments in the chemical industry. On the side of the LSP's, the fragmented, protective family-owned nature of the business is not conducive to collaboration; however, there are examples of alliances that do show it is possible.

The group concluded that collaboration was more likely to be successful in conditions where there is:

- a commonality of corporate size (to ensure mutual respect and shared benefits),
- homogeneity of the products to facilitate swapping and standardization,
- a willingness to explore new paradigms,
- an abundance of trust,
- and last but not least, a compelling value proposition (or burning platform).

… in simple terms a mindset shift.

II. New capabilities and working methods with Logistics Service Providers (LSPs). *Chapter 5.2*

The work group's mission was to identify the role and potential for Logistics Service Providers to contribute to the economic future of the industry and their own companies.

The chemical industry is totally dependent on the resources and capabilities of logistics service providers; the industry has outsourced its physical logistics almost universally while retaining most of its supply chain control and design.

There was a strong consensus in the work group from the petrochemical industry side of the need for an enlarged Logistics Services Sector bringing enhanced Capabilities. The shippers clearly recognize the fact that initiatives to maximise performance and arrest the decline are conditional on their operational realisation by service providers.

The capabilities requested are expressed in terms of greater European

coverage, modal shift and flexibility, but even more so in terms of design capabilities, innovation and long term competitiveness.

These expectations are largely viewed as not being fulfilled by LSPs, giving rise to frustration and an approach to outsourcing of logistics services mainly based on a transactional, lane by lane, cost driven exercise.

At the same time the LSP sector is suffering low financial returns and has neither the resources nor confidence to invest in and proactively innovate on services.

The approach to customer satisfaction, innovation and flexibility by LSPs is often limited by the short term pressure on margins and a traditional thinking about the development of an integrated network and solutions that are 'asset based'.

The frustrations and lack of trust between the parties in this situation have been reinforced over the time.

To counter this and help release the value identified in Working Group I, a new way of working is needed within and between shippers and their service providers that can change the outlook for the industry and its providers; this means changes in their focus on capabilities, contracts and operating methods.

The group concluded that LSP's have traditionally invested in extending their networks, services, sector and IT capabilities to propose a more complete offer to their clients and prospects.

It appeared to the group that LSPs need to recognise that they are unlikely to be able to fill all the requirements of shippers on their own. Indeed, research on success in services provision shows that it is driven by much tighter alignment with clients.

LSPs need to upgrade key strategic capabilities in the areas of client relationship management, commercial models and control, joint venturing and partnerships and people skills.

Shippers, the LSP's clients, need to take responsibility for their own upskilling. This is needed in their set-up, relationship and contract management processes; it is about establishing strategic partnerships which are less transactional and more focused on supply chain value.

The vision that this working group shared was of shippers and providers collaborating together to identify, invest in and deliver the value with a fair economic return for the provider – rather than the present power-based and adversarial approach.



A model for this new 'way of working' has been provided in this report and offers a real opportunity to break out from the current downward spiral that providers are experiencing.

The benefits of improved LSP and Shipper integration are largely factored into the findings of WG I. However there is more potential from working this dimension; it can earn LSPs a better return as well as returning savings to shippers.

It is important to note that € 5/tonne is the rough equivalent of 50 kms per day of reduced empty running due to better scheduling plus half an hour of unnecessary waiting at a terminal – not much really.

Finally, failure to follow this course could lead to supply chain disruption and safety breaches.

This work group has developed both long and short term recommendations:

- A cultural & strategic change is required among both shippers and providers to create longer term, mutually beneficial contracts based on increasing trust in the relationship.
- To support that 'Trust' basis, LSPs need to invest in new strategic dimensions of relationship management, joint venturing and alliances, innovative contractual models, and an emphasis on the people skills area (cf. WG III).
- Specifically, LSPs need to consider extending their network and service capabilities through Alliances of specialised LSPs to meet the needs of shippers.
- This collaboration will require: rules and behavioural charters, shared investments and/or pooling of equipment, contracting models and skills, and project management, all based on a team approach.
- Cases studies of success, including innovative projects and relationships are needed to demonstrate the validity of the new approach.
- Organisations in both shippers and providers will need to be energised for this approach and the vision and practice cascaded right through their businesses; shippers will need to change as well.

- Key enablers will be a better understanding of the end to-end-cost of the chain with a shared cost vision and longer term and value based contracts

It is clear that the management of the outsourcing relationship is a strategic competence; both shippers and providers should recognise this and mobilise to address it.

- **… in simple terms a mindset shift.**

III. Skills, Talent & Training in supply chain to an industry framework.

Chapter 5.3

The Supply Chain consists of 3 major elements: People, Business Processes and Infrastructure. The second and third have been the subject of the work by groups I and II. The focus of this working group was how to improve the professionalism of senior people in this field by defining the rights Skills & Competences.

During its development of an approach to skills and talent development, the group made some important observations:

- There is a gap between the focus of universities (theoretical/content related) and real business needs, where practical and pragmatic competences are as important as the theoretical level.
- In many shipper companies the focus on Supply Chain management is still not as active, as it is for Marketing & Sales. This means that career paths are not made in this area and jobs are not career enhancing. This has to change fundamentally in order to attract talented people from inside and outside companies.
- Presently the level of knowledge of, and training in, strategic thinking and design skills of the LSP's is not well developed. This is seen as a key element in improving their collaboration with shippers.

Therefore, there is a real need to have an industry-wide people development framework from which companies can build to resolve these issues.

The group set itself the goal of providing a pilot framework. It is a considerable task as the end-to-end business processes of 'Source – Manufacture – Sell-Deliver' contain many functions that act on the supply chain and influence supply chain management.

The working group reviewed this wide scope and decided to constrain its focus only on the managerial functions/roles in the areas of supply chain planning and "logistics" and not those in Marketing, Sales, Manufacturing, Purchasing etc. This decision was taken for reasons of focus and not because of any lack of their importance – on the contrary leading edge companies have high levels of integration in their skills and competence development. They actively develop in these areas.

Against this decision on scope, the requirement for Skills Talent and Training were reviewed from both the Shippers and LSP perspectives.

From the Shippers side, the areas were:

- Supply Chain Management
- Demand Chain Planning
- Logistics Management
- Supply Chain Engineering

From the LSP side …

- Business Development Management
- Business Information Management
- Operational Management

Development of skills and talent in relation to the supply chain requires both hard skills and softer competences. This is because the supply chain collaborative concept has relationships and working together as a basic principle. It is important to make this distinction between skills and competences. Skills can be learned by education and practice. Learning curves can be very short (basic techniques) or longer when more extensive practice is needed. In contrast, competences are the softer and personal capabilities, visible through behaviours. These are about how a person gets results interacting with their working environment, within the business function or with others in the wider integrated picture.

The Skills and Competences needed for the chemical industry were first assessed in terms of today's needs and then based on how it will during the next 10 years. From this long term view, a prediction was made on the additional Skills & Competences that were forecast be required in 2015.

It was noted that some of the working group member companies actively use skills and competence frameworks in selecting, appointing, assessing and developing people for all their functions; others do not.

Based on this good practice in some of the participants' companies, the skills and competence requirements of the various functions and roles were represented in a matrix and framework form. The goal was to provide these matrices so that they can be used by every company as a pilot framework from which they can build their development of supply chain skills and competences.

It was decided to develop one skill and one competence matrix per function/role as this would provide a combined perspective and support closer provider integration. Example tables are contained in Chapter 5.3.

The members of the working group concluded and strongly recommend that companies should adopt and roll out these or similar skills & competences frameworks. Companies that make this investment will secure the greatest benefits when Supply Chain Management becomes a primary business process. In addition, training that emphasizes corporate and organizational capabilities are more likely to succeed. e.g:

- Managing the global – local balance and organisation.
- Increasing emphasis on market facing behaviour and innovation.

The recommended actions to establish momentum behind the crucial enabler of skills and talent development in the industry are:

1. Long term corporate commitment is required to improve the capabilities of people working in the supply chain by implementing a professional SC education program.
2. The conclusions of this work group should be pro-actively communicated at every opportunity.
3. EPCA, Cefic and companies themselves should initiate discussions on fulfilling the training requirement with leading Academies and Universities. The aim should be to have them include in their curriculum:
   - chemical industry relevant subjects, cases and exercises
   - developments and trends in SCM and their implications for chemicals
   - the requirements for HRM for SCM
   - negotiation and partnering
   - managing multicultural environments.
4. Finally, EPCA and Cefic should set up working group to define a generic (master) education program for supply chain excellence in the chemical industry.

IV. Working together to turn compliance in SSE from a 'cost burden' to a mutual economic benefit.

The chemical industry is one of the most transport intensive in Europe. It is also the custodian of many hazardous materials. The working group confirmed that the scale and hazardous characteristics of chemicals transport, together with the Responsible Care approach of the chemical industry, make safety, security and the environment (SSE) a 'front of mind' question. The working group reviewed the possible impacts of current and future SSE issues on the sustainability of the industry and its potential to maximize performance.

The group was clear that standards and compliance for almost all aspects of SSE in transport have improved a lot over the last 10 years, through the introduction of best practices and assessment schemes such as SQAS and CDI. But it was also clear that standards and compliance are not consistently applied across the whole industry.

Notwithstanding the fact that the share of GHG emissions from chemical transport operations represents less than 1% of total GHG emissions, the industry must expect that it will be the subject of increasingly onerous obligations and restrictions on its logistics activities, resulting from future measures to reduce GHG emissions and congestion. This will come in the form of

increased charges for use of transport infrastructure and other measures to encourage a modal shift from road to other transport modes.

Similarly there will be more and more pressure to reduce vapour emissions from loading, unloading and gas-freeing operations during bulk transports of chemicals.

At the same time there is also an increasing tension between land use priorities and the transport of (dangerous) goods on existing transport infrastructure.

The risk to SSE standards from the declining economic climate in the industry was a major concern for the group. The temptation to cut investment and relax compliance is commonplace in any sector under economic pressure, in the end this acts counter to its interests.

There was a parallel and equally strong concern for the implications, unless mitigated, of increases of SSE charges and controls. The question for the work group was the extent to which the industry can respond positively to this outlook? The group identified a multiplicity of detailed issues many of which cross relate to the findings of the other working groups.

The main conclusions and recommendations on the **Environment** were:

- There is a need to reduce the transport intensity in general and the dependency on road transport in particular, by initiatives such as more product exchanges (see WG I), modal shift and network/route optimisation (see WG II).
- Voluntary industry initiatives should be developed to further reduce operational emissions from bulk loading/unloading and gas-freeing operations.
- The concept of 'logistics stewardship' should be introduced in order to promote 'environmental' governance throughout the complex supply chain.

The main conclusions and recommendations on **Safety and Security** were:

- Risk management of the chemicals supply chain is fragmented and incomplete. There is a need for integrated safety and security management throughout the supplier - producer - LSP - customer chain. This should cover issues such as multimodal transport interfaces, subcontracting and safety standards at customers' sites.
- There is a need to raise the safety and security awareness of commercial and procurement staff.
- There is a need for wider sharing of learning from accidents and incidents across the industry. This should be embedded in company safety cultures.
- Bulk marine transport is open to risk. The root causes of recent explosions need to be analysed and corrective actions put in place.
- There should be more focus on people (training, communication, behaviour and recognition).

Overall, the industry must do more to promote Responsible Care and stewardship along the complete supply chain. In line with the theme of this report there is an opportunity for a much more collaborative and proactive approach. The industry should document and train on best practices (WG III).

The group believes that investing in good SSE standards will pay back quickly because "Good SSE is Good Business". The quality result that it creates over time saves on the cost of incidents, improves operational performance and reduces the cost of inappropriate regulation. The potential for leading companies (producers and LSPs) to co-operate to set and steward standards would provide economies of scale in implementation and management.

Chapter 6 deals specifically with the question of whether some key supply chain measures can or should be construed as anti-competitive. This has been done in the context of collaboration and co-operation as a recurring theme and one of the key principles of supply chain management.

Many world class businesses in automotive, electronics and food retail continuously exchange information on the status in their chains with customers, suppliers and with their service providers. Companies within these industries trade with each other as well as the end customer. We can conclude that supply chain collaboration is not, by definition, a potential breach of competition law.

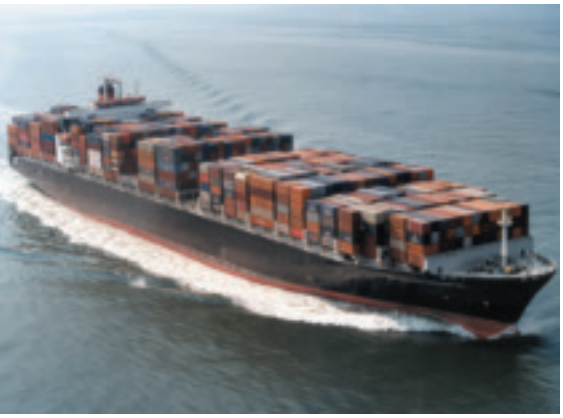
The proposals in this report are always intended to be on a single company, bilateral basis or market service offer that complies with competition law; it should go without saying that any supply chain measures should then be applied with appropriate governance of the commercial arrangements.

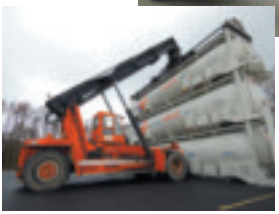
The next steps *(Chapter 7)* for EPCA and Cefic are to:

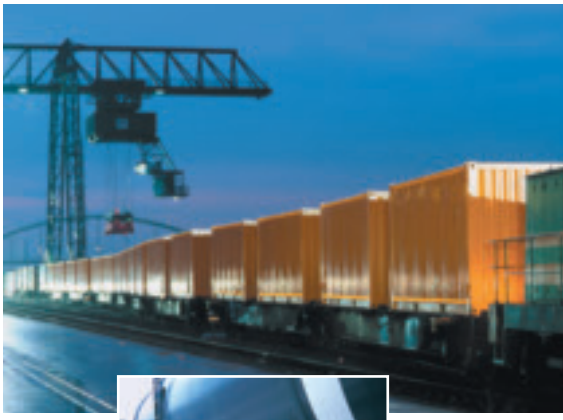
- Promote the conclusions of the work.
- Develop research connections with leading institutions to actively reinforce the findings and direction.
- Continue with some working group activity.

However, the baton is now firmly passed through this report to industry leaders. We hope the work of the experts and their powerful conclusions will lead more boards to engage supply chain best practice on behalf their companies to maximize performance.

The mantra is ***'Collaboration is the new, but proven, way'***. … in simple terms a mindset shift.









[CHAPTER 2]

2. The Chemical Industry in Europe: Structure, Trends and Implications

The chemical industry is facing challenges of unprecedented scale. It was against the background of these challenges that the working groups were chartered to determine the supply chain potential.

- Growth in sales in the industry of 4.5% pa between 1999 and 2004 has been secured by imports and price levels; volume growth in production has been only 0.9% pa.
- Chemical industry production is lagging European industrial growth in general and is below GDP.
- European chemicals has seen its share of global sales decline by 4% in 10 years.
- Capital investment in the industry has declined by 26% since 1998 and R&D has reduced by 24%.

Notwithstanding these depressing statistics, the industry is integral to every sector of the European economy and contributes 12% of manufacturing value add and 2.4% of GDP.

Its capital intensity and high levels of process integration make the financial performance of the industry extremely vulnerable to quite small declines. As a result, the speed of decline could accelerate; any and every action that can help to arrest this situation is therefore strategic for firms. They are also crucial for the European economy.

In March 2004, Cefic published a report titled 'Chemical Industry 2015: Roads to the Future' following two years of research into the chemical industry in Europe.

Its headline conclusion was bleak, foreseeing structural decline:

"… the EU as a major chemical production region is at risk. To secure the industry's long-term competitiveness, decisive action by both industry and authorities is required to steer the critical drivers determining the future of the industry in the right direction over the next ten years".

For those who are already familiar with this conclusion and its implications, we apologise for its repetition in this section. Nevertheless, it is important to restate the key messages as it is easy to lose sight of the big picture. Using a military analogy, it is hard to see the whole battle when pinned down by the immediate hostile fire of daily business life.

The key facts on the industry – together with their implications have been well documented by Cefic and Eurostat. They are as follows. The EU 25 Chemical industry:

- generates revenues of nearly € 600 billion – around 28% of the world total.
- employs nearly 3 million highly productive people who are nearly 9% of the total employed in manufacturing in Europe.
- contributes 12% of total manufacturing value add.
- serves every segment of manufacturing as well as direct consumer products.
- accounts for 45% of the EU's entire manufacturing trade surplus.
- has steadily increased its levels of export to 25% of total output (excluding pharma chemicals).
- has consistently reduced its real prices since 1996 vs. the consumer price index.

By any standards this is a story of success and scale, delivering real economic value. The detailed facts and figures available in reports from Cefic and Eurostat provide a comprehensive viewpoint.

Behind these figures is a trend that is less encouraging:

- "… this position is slowly eroding, the EU's share of global output declining from 32% a decade ago to 28% today".
- The Middle East with its access to feedstock and ambition to add value is increasing share of output.
- "Asia-Pacific, and China in particular, is absorbing an increasing share of global chemicals production.
  - First of all because that region's rate of industrial production growth exceeds much of the rest of the world.
  - Secondly, … its pattern of demand is more chemicals-intensive than developed economies.
  - Thirdly, is the dynamism in the emerging countries of industries … that are very important end-users of chemicals.
- Investment intentions for Europe in some categories such as Ethylene are almost zero.

- The employment of highly skilled graduates in the industry is estimated to be declining by 10% pa from a peak in 1996.
- While labour productivity growth in the 90's has more than offset wage inflation, in the last 4 years this has not be sustained and unit labour costs have risen.

Together the negatives combine to suggest that the decline is underway; in spite of continued revenue growth this is a sector that is losing global share and standing. Cefic's report last year suggested that the high levels of industrial interdependency in chemicals could result in a 'tipping point' where deteriorating economics become difficult to arrest or reverse.

In this context, the scale and significance of supply chain and logistics is remarkably important.

- We estimate that the industry is responsible for 1,500 million tonnes of movement per year.
- This represents 5% of freight tonnes lifted in the EU and around 8% of tonne-kms.
- Consignments of chemicals move 48% further on the road network and 80% further by rail than the EU average for freight.
- The industry spends on average 8 to 10% of its total turnover on supply chain and a significant part of that is on transport costs – a total of € 60 billion pa.

The threats to the sector of increasing energy costs, traffic congestion and associated regulation, emissions controls combined with customer migration to the East make this supply chain intensity a structural risk that must be countered.

And the pressures of the landscape for the industry in social, environmental and political terms are substantial as reflected in the quotes following:

- *Regulation is a key factor generating adverse effects on the competitiveness of the EU chemical industry. In this field Europe continues to tighten its environmental regulations putting domestic producers at a comparative disadvantage. … Moreover, the interpretation and implementation at national level is divergent and not coherent.*
- *Chemicals contribute to and suffer from a current transport infrastructure that is already overloaded with high levels of congestion in important parts of Europe. The situation will become even worse with the estimated 50% increase in freight volumes in the coming 10 years impacting on both service and economics.*

- *Environmental controls on the movement of all types of freight are steadily tightening. Governmental organisations have suggested that current taxes on freight transport, especially by road, would have to rise significantly to fully recover environmental costs. Governments are particularly concerned about the projected growth of CO_2 emissions from the freight transport sector. It is likely, therefore, that taxes on freight movement will rise. The resulting increase in transport costs per tonne-km will impact more heavily on those sectors, such as chemicals, which are relatively transport-intensive and spend an above-average share of sales revenue on transport.*
- *Safety and security are increasing concerns due to the hazardous nature of the product combined with socio-political interruptions (terrorism and strikes). There have been a string or marine explosions and this risk exists on land too.*

Relative to less onerous standards in other regions, Europe must learn to operate more competitively. The industry must help itself or face the most pessimistic scenario of accelerating decline. The situation requires a radical shift, generating tangible value to re-invest in sustainability.

And the public image of the industry is poor. People in the chemical industry are among the highest paid, reflecting its scale and economic success. But, because of the general perception of power and pollution and risk contribution, the sector finds it difficult to get the advocacy that both its industrial contribution needs and its track record deserves. The decline in graduate employment in chemicals is a further factor that is disconnecting new opinion formers from any commitment to the sector.

The working hypothesis for this EPCA/Cefic initiative has been that the supply chain can have a high impact on the European Chemical industry and brings the potential to arrest the decline.



[CHAPTER 3]

3. The Foundation work in 2003/4 for this phase of the Think Tank programme

This report builds on the work of a smaller Think Tank Group in 2003/4 that had three principal goals:

- to examine opportunities for using supply chain management to increase the long-term competitiveness of the European chemical industry.
- to learn lessons from supply chain best practice in other sectors.
- to recommend changes to the design and operation of European chemical supply chains.

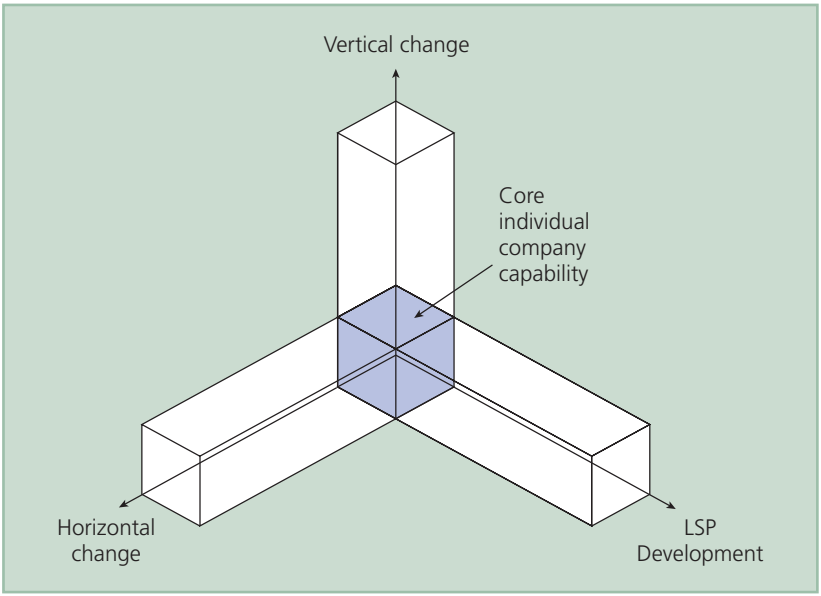
The report from that think tank identified the issues and the dimensions of potential improvement from applying supply chain concepts in Chemicals. It said:

"A series of measures are proposed which collectively could transform European chemical supply chains. They would not only offset the upward cost pressures, but also enable companies to offer a superior distribution service more cost-effectively.

…

In summary, the long list of supply chain improvement measures identified by the think tank group fall under six general headings: collaboration, segmentation, co-ordination, system optimisation, standardisation and liberalisation. Many of the measures are mutually reinforcing and, if implemented as part of a package of supply chain improvements, could yield major economic and environmental benefits. Some will, nevertheless, require fundamental changes in business processes, trading practices and managerial mindsets."

The 2004 report provided the conceptual improvement framework illustrated below:



The guiding thought was that companies could look at their supply chain and logistics in terms of:

- **Core to themselves** – what they can do internally to improve their operations.
- **Vertical change** – what can be done to manage the supply chain better by working with suppliers and customers on programmes such as VMI, CPFR, modal and packaging changes (see glossary for definitions).
- **Horizontal change** – what companies can do by co-operating together to reduce costs, such as adopting shared services, back-loading and pooling, training and development, and applying common standards.
- **LSP development** – enhancing the capabilities that LSPs bring to the industry and how shippers work with them.

The 2004 report concluded that

"Collectively the initiatives represent a substantial pool of potential improvements. The benefit profile will vary from company to company depending on their specific combination of products, markets, sources and capabilities. Partly for this reason, and partly because of time limitations, it has not been possible to model the impact of these measures or estimate the resulting economic and environmental benefits. These benefits are, nevertheless, likely to be large and will but require more collaborative models to be adopted by individual players."

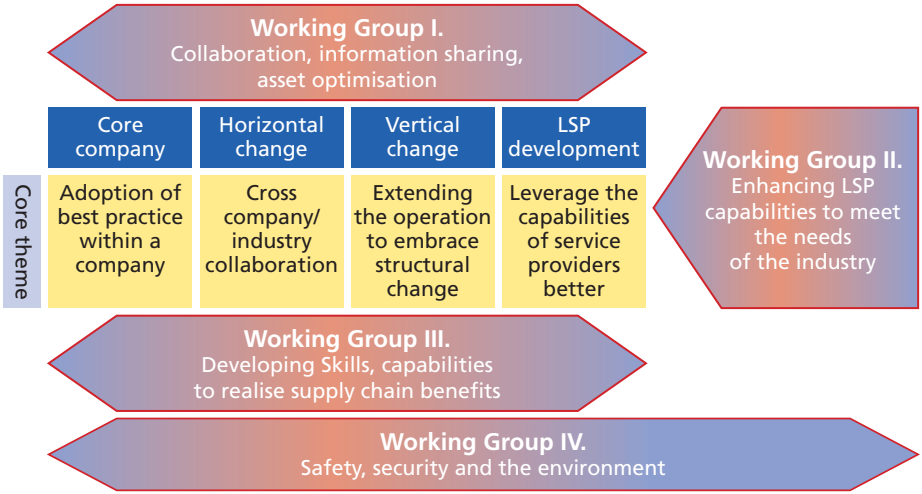
These collaboration models will be essential for several reasons:

1. Investment in shared capacity, of vehicles, terminals and ICT systems, may exceed the financial scope of service providers and individual producers.
2. Industry-wide consultation, and possibly advocacy, will be required to ensure that the regulatory environment is conducive to the safe and efficient operation of chemical supply chains.
3. The nurturing of logistics and supply chain skills in the European chemical sector will benefit from industry-wide rather than company-specific initiatives.
4. The willingness and ability of the logistics service sector to innovate will need to be challenged and developed to meet the chemical industry's strategic imperatives.
5. Cross-sectoral collaboration will be required to achieve higher utilisation of freight terminals and equipment.

The presentation of the 2004 think tank concluded with a general invitation for participation in working groups to unpack, validate and quantify the directions that had been identified; these were to be the first steps of industry collaboration to gain momentum for radical change.

As a result four working groups were established along the supply chain themes using the points above. The formation of the working groups is illustrated in the diagram:

Think Tank 2004
The dimensions of improvement for chemical supply chains and creating 2005 working groups



The working groups have met 5 to 6 times each, depending on the specific group and with membership in total of 57 people from 38 entities. This has proved to be an energetic and active process in which excellent contributions have been made to creating the picture in this report.

Supply chain and logistics is not usually a core function within prevailing organisation structures in the chemical industry; business unit and product market structures are the dominant focus. Unlike other industry sectors, SCM is seldom represented on the Board.

But the expertise and appreciation of the issues and potential exists, as evidenced by the high levels of expertise brought to the working groups by the participants. The clear implication of this experience is the need for a mindset shift in the way supply chain potential is addressed. Where previously, logistics and supply chain functions have been distributed between logistics, production planning, procurement and commercial verticals, in the future organisations will need to find ways to focus on it as an integrated capability that can deliver strategic value.

The findings of the working groups have validated the potential identified in 2004 and shown the strategic importance of supply chain excellence as a way to maximise performance.



[CHAPTER 4]

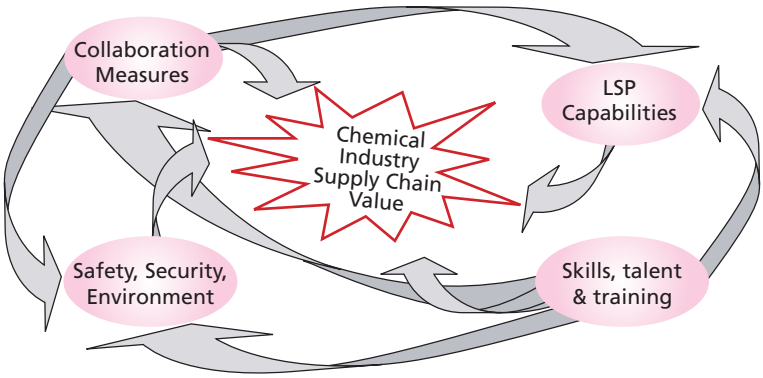
4. The Working Groups Connect to form a model of European Excellence

This report has estimated a potential benefit of € 10 per tonne across the whole industry. This potential can easily be exceeded and for many companies it is much greater. The benefit forecasts between WGs I & II overlap so it is important to summaries the way the groups connect and their benefit areas.

1. Vertical collaboration using techniques for information synchronisation € 4.0/tonne
2. Horizontal collaboration to facilitate exchanges and network optimisation € 5.2/tonne
3. Modal shift € 1.0/tonne
4. LSP performance improvements € 10.0/tonne

The diagram shows how the working groups' conclusions combine to create a virtuous circle:

Creating a virtuous cycle throught the working group conclusions



Collaboration measures are the main entry point for the industry and the sequence of thinking is:

- Collaboration drives value and also change at LSPs
- LSPs drive value for the industry
- Skills and capability development drives value for the industry
- Skills and capability development drives collaboration, LSPs and SSE
- Collaboration drives practices around SSE
- SSE collaboration drives value for the industry.

This is an integrated model for European excellence. The dependencies are clear. Senior teams who are motivated to embrace the ideas in this report will need to mount a programme 'in the round' to leverage the benefits.

They will be well advised to look outside the industry for best practice and not just look at what has been done, but also how it was accomplished.

Our experts brought experiences to the group from other sectors where programmes have been organized to create the right dynamic and a road map followed to achieve step change.



[CHAPTER 5]

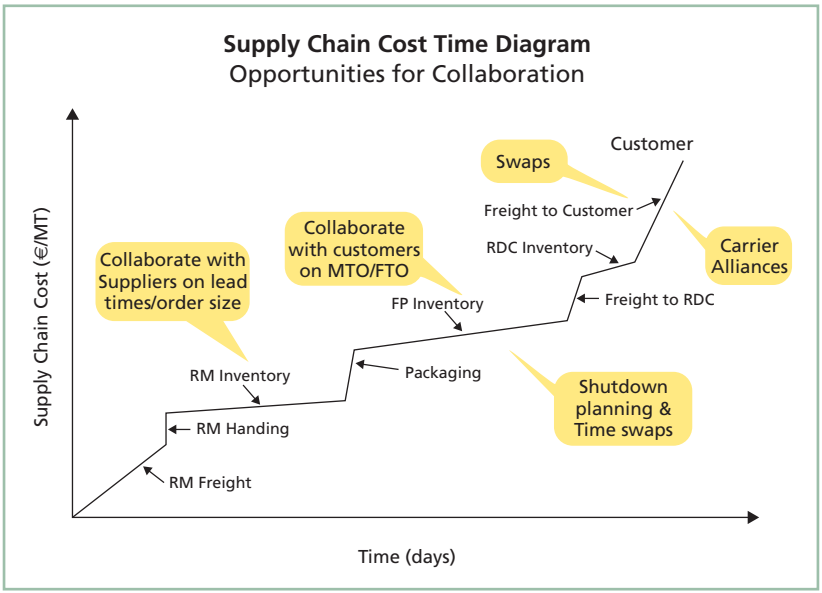
5. Working group Report Details

The findings of the working groups will be the subject of specific reports. The purpose of this section is to provide limited highlights on key facts and outputs from the working groups in the space available and without duplicating the summary in the overview.

5.1 The application of collaborative methods and processes across the industry

The team developed a hypothetical Supply Chain Cost/Time diagram – showing where costs are added either through process steps, or residence time in the chemical supply chain. This can be used as a way to identify and describe the many initiatives along the chain.

Based on this diagram, the objective of Supply Chain management is to drive the cost line "South and West".



Some collaborative opportunities have been placed on the chart to indicate where and how they could influence this process, either through time compression (shorter cycles) or direct impact on the cost components. The team identified that the benefits of a more tightly coupled supply chain could be experienced in some or all of the following:

- Inventory holding and financing costs – achieved through shared forecasting and planning processes with both customers and suppliers leading to different supply chain operating models and service levels.
- Emergency shipments reduction – achieved through better planning and visibility and more reliable schedules.
- Reduced logistics kms – achieved through exchange deals, carrier alliances, value parks.
- Reduced packaging costs and improved bulk transport economics – achieved through modal switching and value parks.
- Improved plant utilisation and reduced shutdown impacts – achieved through a range of collaborative measures.

The points above are a sample of the industry's range of potential measures to improve the supply chain; there are more and they fit together in a range of ways. The conclusion was quickly reached that it is impossible to define a single supply chain strategy for the industry. As a result, the work of the group concentrated on estimating indicative potential on some key measures and also identifying the relative difficulty of achieving the changes.

The group created a high level model of the potential from improved planning in the chemical supply chain by deploying the latest sales and operations planning processes combined with improved customer and supplier collaboration and synchronization. By smoothing the so-called 'bullwhip' effect, inventory can be reduced, capacity more effectively used and unnecessary movements avoided.

The group found that the European industry could conservatively save $70M/yr on inventory holding cost based on 50MTPA sales with an inventory value of €500/mt, assuming a typical inventory profile.

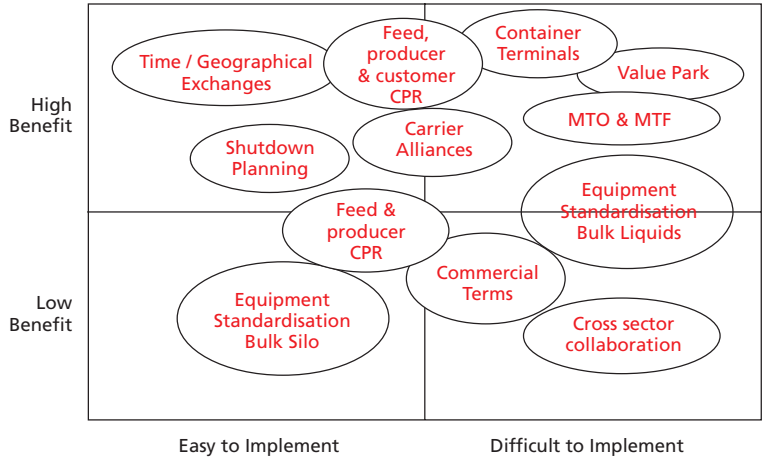
The penalty from poor planning driving the use of premium transportation and additional administration costs was explored. The team estimated that the reduction in premium costs on a business of 30MT shipped by road could easily be €10M or €1 per tonne. Further more administration savings from reduced emergencies across 150 major companies (suppliers, consumers, and LSP's) each employing around 200 people in supply chain roles could easily be €60M.

The team looked at cases of VMI in support of improved planning and inventory deployment. The case investigated concluded that *"This seamless VMI process delivers productivity improvements for the shipper and customers, as well as asset utilization benefits for the carrier. In addition, the smoothed 24/7 operation has also allowed shipper and customers to avoid capital investment in storage tanks".*

The potential for benchmark performance including the adoption of product exchange policies, sometimes called 'Swaps', was examined through both case studies and independent benchmarks from Philip Townsend Associates. Subject to some conditions, PTA estimated that ***"the successful industry model of product exchange widely used for ethylene, propylene and aromatics will be more broadly applied to plastics and derivatives. PTA estimate a fully implemented product exchange model allows 5 to 10% of total shipped tons to be delivered under multiyear or evergreen structural exchange agreements, at a net savings of about € 35/ton".***

"The group felt that the grossed up benefit statement from its research, provided in Chapter 4 is certainly achievable and for many companies can be easily exceeded." Overall, the group identified and classified a range of horizontal and vertical opportunities and placed them on a benefit – difficulty grid. The difficulty to implement ranges from quite straightforward to 'organisationally challenging'. The potential is there; it requires a 'mindset shift'.

Identified Opportunities for Collaboration

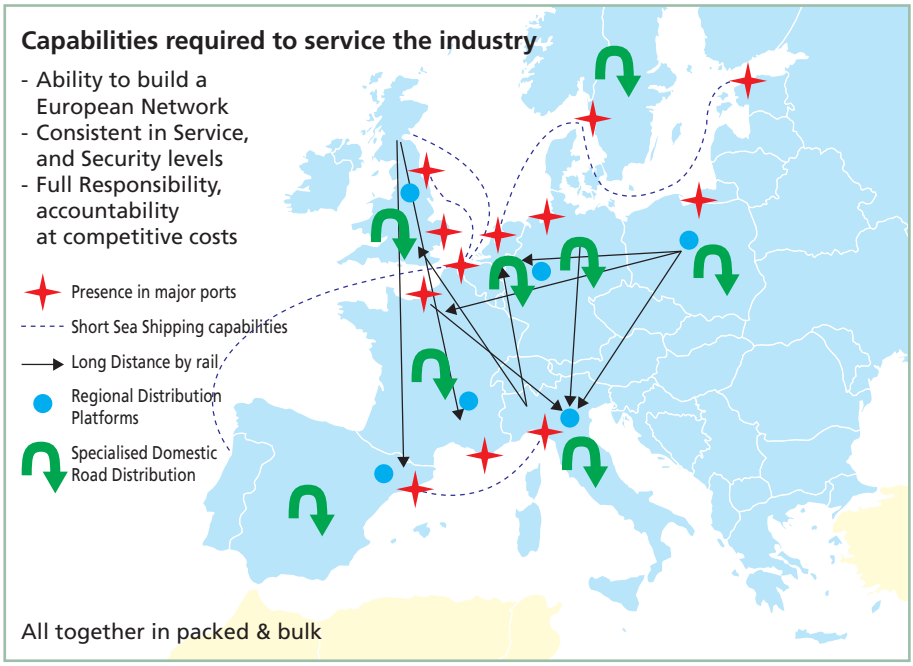


5.2 | New capabilities and working methods with Logistics Service Providers (LSPs)

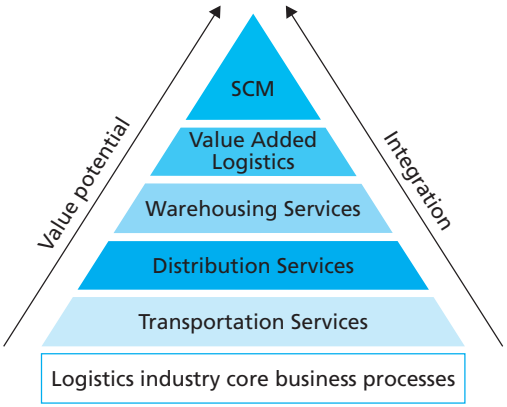
The chemical industry is totally dependent on the resources and capabilities of logistics service providers; the industry has outsourced its logistics almost universally to a range of providers including bulk tanker operators, container lines, terminal operators, packed and bulk trucking companies, warehouse operators, packaging specialists and a range of ICT companies.

None of these companies provides either a full range or integrated service across the modes and geographies. Research identified by the group from Transport Intelligence Ltd showed that even in conventional 3PL services there are no truly pan-European providers. The experts confirmed that the levels observed by TIL are even lower for services for chemicals.

Shippers in the petrochemical industry hold the strong opinion that they need an enhanced and an enlarged Logistics Services Sector and capabilities. The diagram shows the slide that was agreed by the groups as reflecting the requirements of shippers. They are asking for integration and looking for lower total cost. It is this lack of integration and optimization that is leaving waste and cost in its trail.



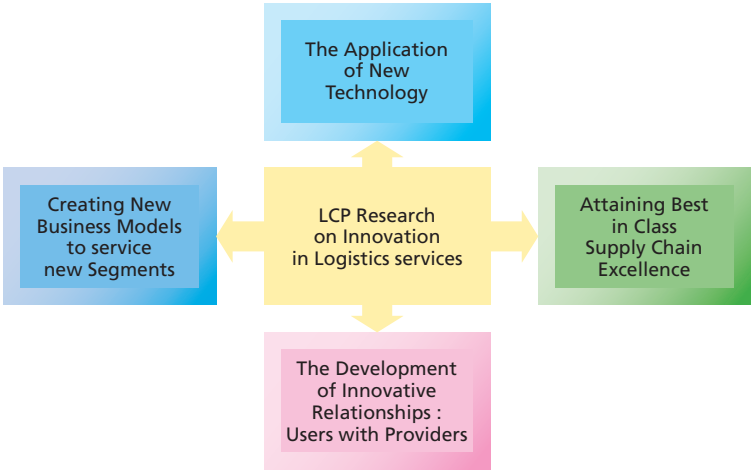
The result of this perceived limitation has been that shippers have attempted to self design and integrate without a full cost and constraints picture. The tender processes have been highly restrictive of creativity and value creation in comparison to other sectors that have been more collaborative and hence successful.



The financial returns in the sector were reviewed, again using data by TIL. Average margins are declining year on year as the sector grows. They are now less than 2.5% and too low for providers to invest in pro-active capabilities or to add services and geographies. The track record of providers in adding services and geographies has been poor. Providers confirmed that they are all aspiring to climb the value pyramid and provide leadership from their specific service perspective as illustrated in the diagram.

The actual experience of attainment is rather unsuccessful. Significant sums and time have been spent on trying to climb this pyramid to secure more value without an adequate understanding that there is value at every level. This was attributed to the mindset of the sector. The quote from Professor Dale Rogers of the University of Reno, Nevada sums up the dilemma. *"Most 3pls have a long history of marketing services to Buyers and … consequently, have an engrained approach of defending costs, not articulating a true Value Statement".*

The LCP / Cranfield research identified 4 areas of innovation …



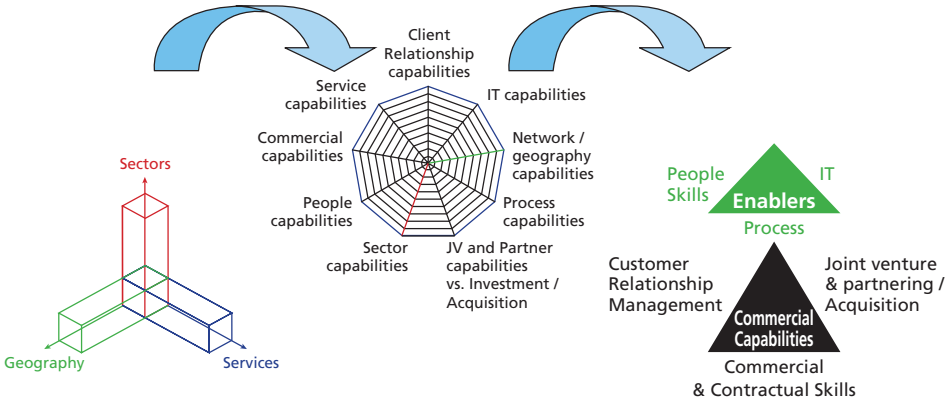
Innovation is a core business concept to create business value. Developing and delivering unique capabilities drives growth and margins and creates customer loyalty. It is the only real source of value in a world in which parameters seem to have solidified over the time. It is the true differentiating factor.

Recent research from LCP Consulting with Cranfield University was introduced that showed that innovation by providers is perceived as poor. The work sought to find examples of innovation and to characterize their nature. Four dimensions of innovation in services were identified as illustrated in the diagram, of which the development of tighter collaborative relationships with their customers was found to be the single most important factor.

Research, also from LCP Consulting, introduced a competence framework for LSPs that goes beyond their normal strategic thinking around geographies, services, sectors and IT. This work concluded that successful providers display strong attributes in the areas of business processes, client relationship management, commercial models and the ability to work in joint ventures and alliances. A strong focus on developing people skills is also a critical success factor and this is consistent with Workgroup III's focus.

Finally in reaching its conclusions, the practicality of partnership type relationships between shippers and providers was considered. A large body of research was identified from the academic community that shows close partnerships are possible and provide value potential. Successful relationships are characterized

Services, sectors and geographies are only the core of 9 strategic differentiators



Core positioning

+ enablers and commercial capabilities




by close alignment of the goals of the parties and much more open governance than is found in purely transactional relationship. Overall this analysis the group took its conclusion that new models exist, are about changes in the way relationships are managed and that bring new skills and orientation to the contracts. This includes new contract models.

Both shippers and providers need to contribute to this change; shippers must understand their core role in this process and cannot just expect providers to take the initiative from their current position.

The detailed recommendation of the workgroup included the following points:

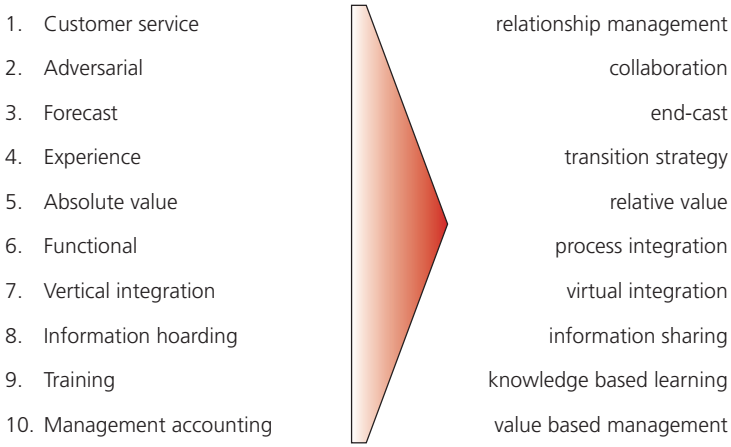
- LSPs should make more intensive use of advisory services to better address customer issues.
- LSPs and shippers should adopt a more positive and active approach to industry-wide IT platforms.
- LSPs should make deeper commitments towards HSS&E standards as a baseline for Trust with Shippers.
- LSPs should develop a better knowledge and recognition of the capacities, capabilities and commercial approach of fellow LSPs, specialised in other core areas than their own …
- … leading to a systematic commercial approach via Alliances of providers (with alliance rules, project coordination, effective pooling of resources,…) – this is likely to be limited in scope in the beginning but can be progressively enlarged.
- LSPs should cascade the approach fully into their organisations using the training models outlined by WG III.
- LSPs and shippers should promote success stories together with customers.
- … and there should be an increasingly strong role for EPCA, ECTA and Cefic in sponsoring SSE initiatives and compliance through industry inspection and certification companies.

5.3 | Skills, Talent & Training in supply chain to an industry framework

The requirement for skills talent and training is increasing and changing. The group assembled evidence in this area from a number of sources.

First, on supply chain change and the vision of the future, a presentation slide (below) headed Megatrends for the Millennium from Professor Don Bowersox was tabled showing the scale supply chain change and the implications for skills.

10 Megatrends for the New Millennium



Don Bowersox

Second, the team from DSM tabled a vision for 2015 of Supply Chain requirements the industry and its training and development implications. It concluded that the Market expectations requirements will increase in relation to:

– Globalisation
– Competition
– Information Technology
– Legal, Political and Environmental developments

… and the following skills & competences will become increasingly important:

– Business intelligence in the Supply Chain field
– Multicultural Diversity
– Change management
– Negotiating and partnering
– Creativity and innovation
– Networking
– Languages

Finally, the group noted that Dean Laura Tyson of the London Business School was on record as saying that institutions are coming under increasing pressure to provide more specific learning and development needs for business. This was consistent with the opinions and experience in the group that chemical industry specific training with a strategic dimension and to a high quality is hard to find from established institutions.

It was on this basis that the group concluded that there is a real need to have an industry wide people development framework from which companies can build to address the emerging requirement and resolve these issues.

The group set itself the goal of providing a pilot framework. The importance in supply chain management of developing both skills and competences was a key principle in this work. The skills are the engine room of the business, providing hard technical capabilities that can be learned by education and practice. Learning curves for skills can be very short (basic techniques) or longer when a more extensive practice is needed.

Competences are softer and are used to 'steer'. They are about the capabilities and behavior skills needed to interact with the work environment and within the business function. The chart shows the competences identified.

The balance between skills and competences is like a bicycle; power to the back wheel and direction from the front; the team found this to be a useful analogy.

15 Competences
• Leadership • Entrepreneurship • Result Orientation • Coaching to Success • Creativity/ Innovation • Customer orientation • Decisiveness • Judgements • Learning ability • Communication (oral, written, presentat.) • Persuasiveness • Planning and Organizing • Sensitivity & personal understanding • Teamwork • Vision

Based on the job roles for shippers and providers described in *Chapter 1*, the team prepared a list of 26 skill areas that would be required. Each area had a defined high medium and low attainment level. The table following illustrates the conclusions in skills reached for shippers roles. A fuller description and the matrix for service providers is available in the detailed work group report.

	Skills/Knowledge	SHIPPERS			
		Demand / Supply Chain (DSC)		Logistics	DSC
		management	planning	management	Engineering
1	Analytical thinking		H		H
2	Conceptual & strategic thinking	H			
3	Project management				M
4	Supply chain engineering & modeling				H
5	Distribution network strategy & design	H		M	
6	Production & distribution logistics operations			H	
7	Processes (supply chain) management	H		M	M
8	Demand forecasting		H		
9	Inventory & supply planning		H		
10	Production scheduling		M		
11	Company business knowledge	H	M	M	M
12	Business finance knowledge & costing	H	M		M
13	Business application (ERP, tools)		M	M	M
14	e-business, e-logistics			M	
15	Warehousing			H	
16	Consulting				M
17	Order to Cash			H	
18	Sales & Operation Planning processes	M	H		M
19	SC performance monitoring & KPIs		H		
20	Quality management & SHE			M	
21	Trade regulation/compliance			L	
22	Language skills (min. 3)		M		
23	Change management	H			
24	Negotiation	M			
25	Risk management	M			
26	Outsourcing/ partnering	H			

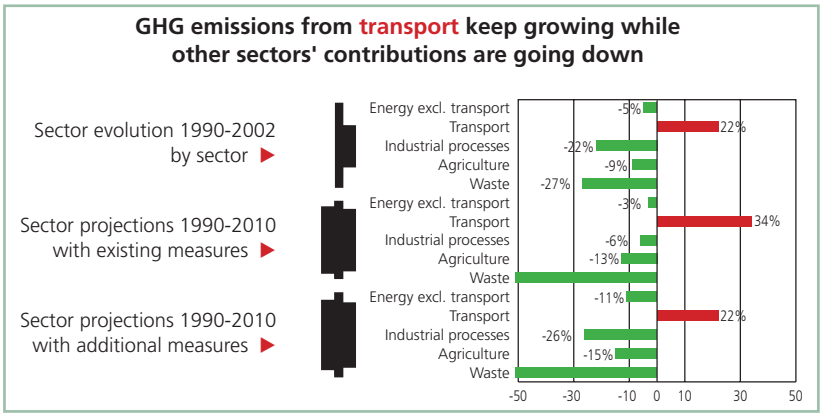
Attainment levels for competences were defined by reference to the terms: Reactive, Procative- and Coaching to describe the attainment of an individual and these are graded 1 to 3 in the table. 10 competences were defined and the table following shows the framework for Service Providers as an example.

Competences		LSPs		
		Business development management	Business Information management	Operational management
1	Leadership	2	1	2
2	Entrepreneurship	2		1
3	Result Orientation	2	1	2
4	Coaching to Success			
5	Creativity/ Innovation	2	2	
6	Customer orientation	3	2	2
7	Decisiveness	2	1	1
8	Judgements		2	1
9	Learning ability		2	
10	Communication (oral, written, presentat.)	2		2
11	Persuasiveness	2		
12	Planning and organizing		2	2
13	Sensitivity & personal understanding	2	1	2
14	Teamwork	3	2	2
15	Vision			

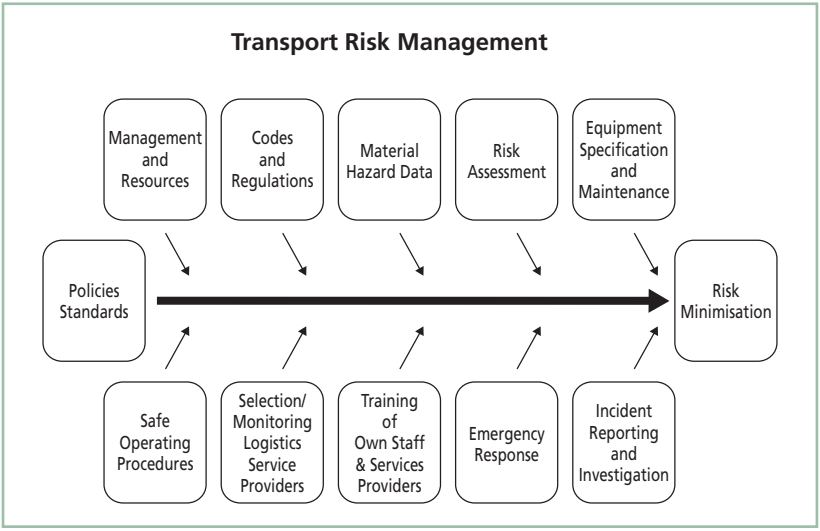
This short summary of the findings of the work group provide an insight into a structured way to think about and implement skills and talent development in the sector. It is a menu for training providers and industry teams to take and build on; given the conclusions of the other work groups the task is urgent.

5.4 | Working together to turn compliance in SSE from a 'cost burden' to a mutual economic benefit.

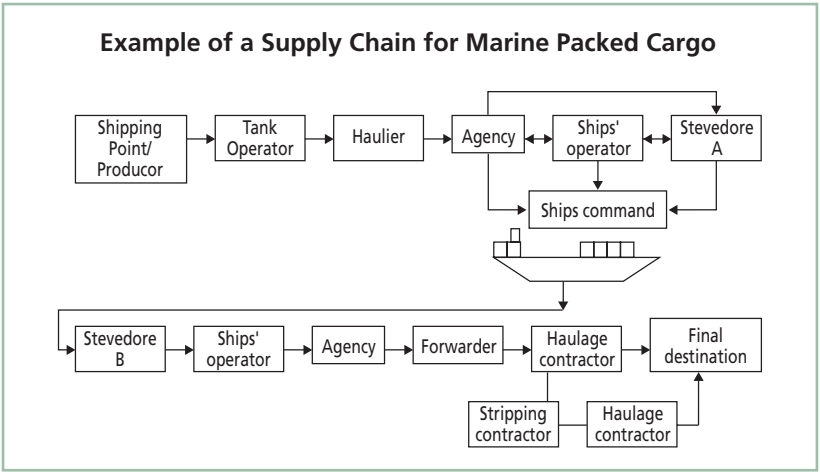
Information from the European Commission is showing that GHG emissions from transport keep growing while other sectors' contributions are going down. Although transport in general is a major contributor to GHG emissions, the share of freight transport is small compared to passenger transport. GHG emissions from chemical transport operations represent less than 1% of total GHG emissions. Nevertheless the industry must expect that it will be the subject of increasingly onerous obligations and restrictions on its logistics activities, resulting from future measures to reduce GHG emissions and congestion.

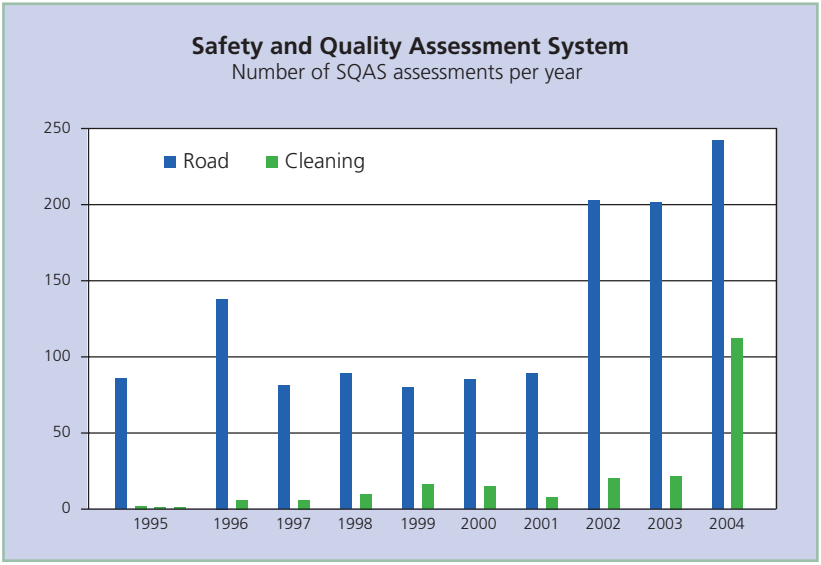


The chemical industry is the custodian of many hazardous materials during transportation. The herringbone diagram of risk management in transport shows the complexity and scope of the management task in SSE.



This complexity is confirmed and underlined by the flow chart on the supply chain for marine packed cargo. The number of handoffs between operators as the product flows along the transport chain is substantial. Their recognition of and compliance with standards and procedures is the foundation of safety and security and the elimination of environmental risk from spillages and emissions.



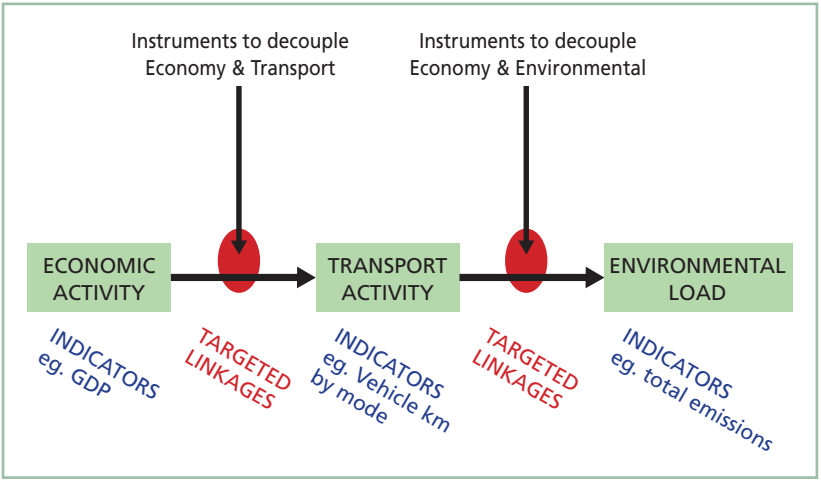


The group was clear that standards and compliance for almost all aspects of SSE in transport have improved a lot over the last 10 years, through the introduction of best practices and assessment schemes such as SQAS and CDI.

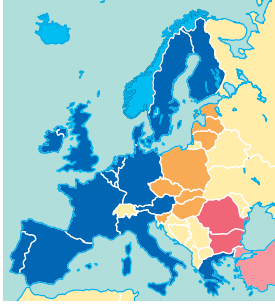
Figures on the number of SQAS assessments confirm that the use of SQAS by the transport industry has increased considerably over the last years. Assessment schemes such as SQAS and CDI now cover all key elements of the chemical supply chain and are widely applied in the transport industry. However more work needs to be done to ensure that these assessment schemes are actively and consistently used by the industry to drive continuous improvement.

Similarly, although much effort has already been invested by the chemical and transport industry in the development of best practices, there is still a lot of work to be done in order to achieve consistent implementation of these best practices across the industry.

Clearly the industry must act more on SSE and control its destiny as far as possible. It is also reasonable to expect that the paradox and conflict between the social and environmental interests and the economic imperatives gets the attention it deserves from the regulators and politicians.







[CHAPTER 6]

6. Competition Law and its implications for this initiative

The essence of EU competition law is to protect consumers by ensuring that they obtain the best price/quality relationship under competitive conditions and that economic players are not engaging in collusive practices that distort the working of a competitive market.

The sector's industrial scale and position in the supply chain invites the spotlight and referral. This is because the relatively narrow market place on some product and service categories can give rise to perceptions of collusive behaviours.

In this context, and at all times, the working groups have been compliant with competition law in the EU. EPCA and Cefic meetings have been conducted under their code of conduct. Chairpersons have reminded the meetings of the legal requirements.

Notwithstanding this declaration of compliance, it is important to understand how supply chain concepts might be perceived as in conflict with EU competition law and to explain why this is not the case, subject of course to individual corporate governance.

In essence supply chain is about collaboration of the parties along the chain in joint ways of working that drive out waste and hence cost. But the word 'collaboration' is often taken as implicit of collusion and 'working with the enemy'. The emotional response to the word is enough to create prejudice among those who do not have an understanding of supply chain principles and practice.

Such responses ignore the reality that chemicals are dependent on all segments of European industry and they on it. Collaboration can also be an expression of mutual dependency and hence co-operation.

Indeed, collaboration and information sharing is an established part of supply chain excellence and is widely adopted through formal programmes such as ECR (Efficient Consumer Response), CPFR (Collaborative Planning Forecasting and Replenishment – see glossary).

Within these programmes are embedded techniques such as VMI (Vendor Managed Inventory), CRP (Continuous Replenishment Programme), Network Optimisation as well as a range of tools from the 'Lean' and 'Agile' movements of supply chain thinking.

The application of these techniques and tools has driven huge benefits for some segments of industry through better service, increased choice, lower costs (and hence prices) and lower investment in stocks. There is a wealth of case material of how companies have transformed their performance and driven growth through such methods. Wal*Mart and Dell are perhaps the ultimate example of supply chain success.

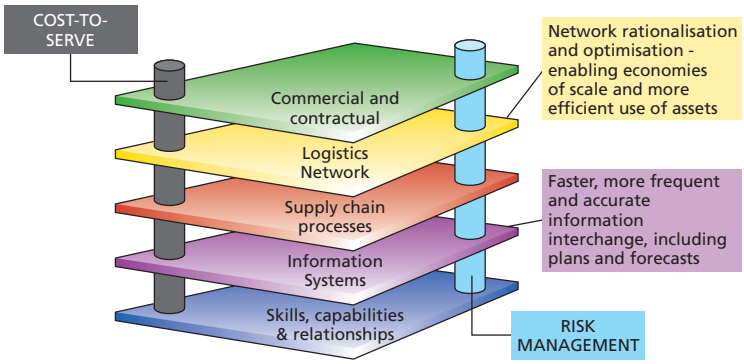
Reducing the tools and techniques to the very essence of what they do, we find that it is about:

- Faster, more frequent and accurate information interchange, including plans, forecasts, orders and inventory status, between the parties in the supply chain – enabling less inventory to be more accurately positioned in the chain to meet real demand.
- Network rationalisation and optimisation – enabling economies of scale and more efficient use of assets.

Hiding behind this simplicity is the biggest challenge of supply chain management; how the costs and benefits are distributed at the interfaces between functions and firms. It is a common mistake to associate commercial models and supply chain techniques as inextricably linked; whereas the reality is that there are many commercial options that can be applied to the different supply chain design techniques.

To help to make this point, the diagram below introduces the idea of supply chain layers and pillars. The layers build up to form a supply chain solution which is topped out by the commercial and contractual layer. The pillars are the supply chain Cost-to-Serve and Risk Management; they support the layers and provide the cost-to-risk balance on which the commercial and contractual model is based.

The players and pillars of supply chain best practice



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So, the headline idea is that the commercial model that dictates funds flow between organisations can be designed to enable supply chain principles without breaching competition law.

There have been some specific sensitivities about the competition policy implications of proposals that have emerged from the original report and the working groups. The table below shows typical concerns compared with the actual intent. It should be immediately apparent that the supply chain intent can avoid the commercial layer.

Supply chain initiative	Competition law concern	Actual Intent
Product range rationalization	Manufacturers allocating product ranges between them	Looking at your own range and the true cost-to-serve and then taking out uneconomic products
Product swaps	Manufacturers swapping products and customers	Working on a balanced bilateral exchange contract to reduce logistics costs to deliver to customers
Vendor managed inventory	Locking in customers by investing in exclusive on-site storage	A process to manage the stock in customers' silos and storage to optimise use of resources
Shared services	Companies pooling their buying power against service providers	Encouraging providers to set up services that are available to several clients to optimise asset use

It is always possible to implement supply chain concepts without breaching competition law. The success of companies in other sectors such as automotive and food retailing are living examples. So, while competitive markets will always provide the potential for unethical behaviour, supply chain best practice should never be associated with anti-competitive practices.

The proposals in this report are always intended to be on a single company, bilateral basis or market service offer that complies with competition law; it should go without saying that any supply chain measures should then be applied with appropriate governance of the commercial layer.


[CHAPTER 7]

7. Next steps for EPCA / Cefic

EPCA and Cefic can promote these findings but have no direct role in implementation.

The next stages for EPCA and Cefic in this initiative will be to:

- Actively promote the conclusions of the working groups as a way to change attitudes and perceptions of the industry and its service providers …
- … and to alert entrepreneurial providers to the business opportunities that the work has highlighted in service provision, skills development and distribution
- Develop research connections with universities and institutions to provide industry specific education, training and best practice models
- Explore and develop the potential for the industry to connect with and benefit from established EU programmes in logistics and supply chain
- Continue with the working group activities where there are areas for further discussion and development.

But the main obligation for action is with the operational stakeholders to maximize performance. Promoting, sponsoring and adopting supply chain thinking and practice can deliver your company serious value. Individual companies must act to understand the implications of the findings for their specific circumstances and commit to and launch their own programmes of action.

Alan Braithwaite (ed.)
LCP Consulting
October 2005




[CHAPTER 8]

8. Acknowledgements and thanks

EPCA hereby warm-heartedly thanks all participants in the working groups for having shared their knowledge, expertise, skills and competences so that we all together could deliver the results that are synthesized in this report. We had many very interesting discussions and have learned a lot from each other. The chairman of each group played an important role in the progress of the work and they showed real leadership in motivating the working group members to give the best of themselves. A feeling of belonging to an attractive industry we are rightly proud of is the result.

EPCA also thanks the EPCA member companies, both producers and service providers, for the support that they have given to the activities of the four working groups. By accepting that valuable contributions were made by their key managers in supply chain, they made the creation of this report happen. Some member companies in addition accepted to participate in the sub sector benchmarking on existing practice in polyolefins conducted by Philip Townsend Associates. Without their and PTA's support we would not have been able to validate the accumulated potential in the industry.

Mark Major (European Commission, DG Energy & Transport) gave us his support and insight. Together we tried to pave the way for contributing to a reduction in traffic congestion by looking for other ways of managing our chemical logistics and supply chain operations, all in line with the objectives of the European Commission's White Paper on Transport Policy.

EPCA furthermore expresses its gratitude to the universities of Antwerp and Tilburg, who have delegated young and talented academics to participate in the working sessions and insure the drafting of working group progress reports. May this cross fertilisation between industry and universities lay the corner stone of a continued co-operation so that mutual understanding of each others' needs serves the building of educational programs that fit the expectancies of the chemical industry.

WG 1 Company collaboration Network design - Information management	WG 2 LSP capabilities	WG 3 Skills, talent & training	WG 4 Safety, security & environment
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John Paul Broeders,	Vopak
Phil Browitt,	Agility
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Paul P. Evertse,	ExxonMobil Petroleum & Chemical
Paul Gooch,	Formerly the Dow Chemical Co., now 'The Logical Group GmbH'
Frank Otten,	DSM
Wout Pronk,	Geest North Sea Line
Denis Tual,	Arkema
Jos Verlinden,	Cefic
Cathy Demeestere	EPCA

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Last but not least our gratitude goes to Alan Braithwaite of LCP consulting, who guided the steering group and working groups 2 and 3 with his wisdom and in-depth knowledge of logistics. He is the editor of this report on basis of all the documentation that has been gathered during the whole year by each working group and of his experience in chemicals' as well as in other sectors' supply chain methods.

May the reader have enjoyed this report as much as we all did putting same together.

It was both a pleasant and enriching experience.

We are fortunate to work for such an innovative and creative industry as the chemical industry is… So let us now all work on shifting our mindset to maximise our company's performance and achieve chemical supply chain excellence!"

Cathy Demeestere
Secretary General EPCA

Glossary of Terms :

This glossary is provided for the benefit of readers who may be unfamiliar with the terms in use in supply chain management. It may be helpful to provide a definition of Supply Chain Management as the starting point for this glossary.

- The goal of supply chain management is "To manage upstream and downstream **relationships** with **suppliers** and **customers** in order to create enhanced value in the final market place at less cost to the supply chain as a whole."
- "Supply chain management… is the integration of key business processes from end user through original suppliers, that provides products, services, and information that add value for customers and other stakeholders."

These definitions are provided by The International Center for Competitive Excellence, 1994 and The Global Supply Chain Forum, 1998 respectively

CRM – Customer Relationship Management is the formalized process of managing the relationship between your company and its customers. It is also frequently represented as KAM, Key Account Management. In essence the CRM process is aimed at getting closer to customers so that the processes and interactions are aligned for maximum satisfaction, retention and profitability. The commercial layer is an important part of this entire process. It is supported by a number of global software solutions

SRM – Supplier Relationship Management is the other side of CRM. Increasingly companies are trying to govern and manage their relationships with suppliers to achieve conformance and compliance and eliminate unnecessary waste in the supply chain.

CPFR – Collaborative Planning Forecasting and Replenishment is the process of developing / sharing sales forecasts and demand plans and co-operating on the frequency, timing and execution of replenishment orders. It is especially appropriate in situations where demand is volatile and/or seasonal, as it allows the buying and selling companies to co-ordinate on the position of inventory in the chain and its subsequent replenishment. CPFR is relatively new and is now being supported by software solutions. However it is primarily a management process.

VMI / CMI – Vendor Managed Inventory is the process by which the supplier takes responsibility for maintain 100% availability at the customer of his product to meet planned demand. This means that the supplier must obtain and maintain stock and movement data at his customer and supply product to meet demand. Conventional purchase orders are not exchanged under VMI; the supplier ships as required to maintain service and maximise his own economics. Occasionally VMI schemes involve transfer of title only when the product is used or sold and / or the provision of storage capacity such as silos by the supplier; neither of these additional arrangements are essential for the basic VMI process.

CMI – Co-Managed Inventory is very similar to VMI except that the process is more consultative with the customer and stock levels, seasonal builds and supply processes are agreed mutually.

ECR – Efficient Consumer Response is an overarching supply chain concept which was launched in 1993 in the food and consumer products industry. The aim is for distributors and suppliers work closely together to bring better value to the consumer. By jointly focusing on the efficiency of the total supply chain, rather than the efficiency of individual components, they are reducing total system costs, inventories and physical assets while improving the consumer's choice of high quality products. The ultimate goal of ECR is a responsive, consumer-driven system in which distributors and suppliers work together as business allies to maximize consumer satisfaction and minimize cost.

ICT – Information and Communications Technology is what many call business systems. ICT is at the core of supply chain management since it allows the creation and transmission of information signals and instructions along the supply chain with the speed and accuracy that is needed to deal with many millions of transactions and movements.

LSP – Logistics Service Providers are the companies that provide physical logistics to the chemical industry either on a spot or contract basis. Their services cover the entire range of transport modes and also storage, packing, international documentation; their services may be integrated within a single company, integrated through alliances of LSPs, or integrated through by the chemical companies themselves.

MTO – Make to Order is when the manufacture of the product is executed by the plant only when the customer has placed his order for the product. Most of the chemical industry operates on a make for stock basis with stocks of finished goods being planned and production scheduled to replenish those stock.

FTO – Finish to Order is when generic stock is converted to the specific needs of the customer when their order is received. Typical examples in chemicals are packaging where there may be many specifications of packaging for the same basic compound. It has the advantage that the inventory is held generically and can direct to where the demand is; this approach is also called postponement.

Shared services – are where a distribution site or logistic operation is operated on behalf of a number of manufacturer. In this way they can save the overheads and capital charges of investing in their own facilities. They may also be able to gain some benefit from economies of scale. Shared services are generally operated by LSPs but may also be provided by a single company across a number of business units or divisions.

Network Optimisation – is the process of supply chain design to optimize the predicted costs of the logistics operation. It involves defining the number and location of sites, the customers they service and the routings and transport operating methods. Network optimisation is generally supported by sophisticated simulation modelling.

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